



DIIS REPORT

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**CONFERENCE ON AN ARCTIC
NUCLEAR-WEAPON-FREE ZONE
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Call for an Arctic Nuclear-Weapon-Free Zone

We the participants in the Conference on an Arctic Nuclear-Weapon-Free Zone, held in Copenhagen 10-11 August 2009:

Recognising that polar ice-cap melting, caused by climate change, increases the potential for greater human and economic activity as well as conflict in the Arctic region, making more urgent the establishment of non-military, cooperative mechanisms for environmental protection, adaptation and security;

Inspired by promising new opportunities and political momentum for the achievement of a nuclear weapon free world;

Believing that Nuclear-Weapon-Free Zones play an important role in building regional security and confidence in order to achieve a nuclear weapon free world;

Recognising the value of international treaties as instruments for building mutually beneficial collaborative arrangements and ensuring verification and compliance;

Welcoming treaties prohibiting nuclear weapons in specific regions, including Antarctica (1959), Outer Space (1967), Latin America and the Caribbean (1968), the South Pacific (1986), South East Asia (1995), Africa (1996) and Central Asia (2006);

Encouraged by the April 2009 resolution adopted by the Inter Parliamentary Union, representing 150 national parliaments, calling for the establishment of additional Nuclear-Weapon-Free Zones;

Welcoming international treaties which take additional steps to completely demilitarise geographic zones, such as the 1959 Antarctic Treaty;

Welcoming especially the 1971 Seabed Treaty which prohibits the placement of nuclear weapons on the ocean floor including in the Arctic region;

Recognising that each region, including the Arctic, has its own unique security environment which requires creative, multifaceted negotiations in order to achieve the establishment of the desired Nuclear-Weapon-Free Zone;

Encouraged by the May 2008 declaration of Illulissat in which the Foreign Ministers of the littoral states of the Arctic region agreed to work together to promote peaceful cooperation in the Arctic region, on the basis of international law, including the 1982 United Nations Convention on the Law of the Sea.

Recommend:

- That governments and relevant sectors of civil society collaborate in developing the modalities for establishing a nuclear weapon free and demilitarised Arctic region;
- That such collaboration should include active participation of, among others, indigenous and northern peoples, inhabitants of the region, parliamentarians, scientists, health professionals and academics;
- That the aim of a nuclear weapon free Arctic should be promoted in relevant environmental and development forums;
- That the aim should also be promoted in relevant national and international political forums including, but not limited to, the United Nations, Arctic Council, Organisation for Security and Cooperation in Europe, Nordic Council, North Atlantic Treaty Organisation, Cooperative Security Treaty Organisation (Tashkent Treaty), Non Proliferation Treaty Review Conferences and the Conference on Disarmament;
- That countries in nuclear alliances be encouraged to reduce the role of nuclear weapons in their security doctrines in order to better facilitate the establishment of Nuclear-Weapon-Free Zones involving these countries, including in the Arctic region;
- That countries in the Arctic region not possessing nuclear weapons (Canada, Denmark, Finland, Iceland, Norway and Sweden) take initial steps towards a Nuclear-Weapon-Free Zone in close cooperation with the United States and the Russian Federation;
- That governments undertake steps to increase transparency and to redress negative impacts on inhabitants and the environment from military activities in the Arctic region including those that have taken place in the past.

Summary

Many different views on making the Arctic a Nuclear-Weapon-Free Zone (NWFZ) were expressed over the two days. However, there was a general consensus concerning the importance of getting the issue onto the international agenda. In considering the rationale for creating an Arctic NWFZ participants came up with several arguments.

From an environmental angle, it was argued that making the Arctic a NWFZ is important as the future climate of the Arctic is closely linked to the future of the global climate. Last year summer ice in the area was 30% less than the year before and scientists still face massive challenges with regard to predicting the future of the Arctic. It seems likely that we will face consequences that, until now, we have not imagined. Moreover, in the context of nuclear weapons, although the risk of a global nuclear war probably is lower today than it was during the Cold War, even a small nuclear war in any area of the world would have massive environmental consequences, especially in the Arctic.

It was equally argued that an Arctic NWFZ is a security issue. In some instances the European rhetoric that there is a need for nuclear weapons to protect the continent is absurd, seeing that there is currently no real threat of a nuclear attack on Europe. Thus it is unlikely that an Arctic NWFZ will make the world any *less* secure for any state. On the contrary; designing an Arctic NWFZ should be considered an important measure to be undertaken for security concerns. It seems that currently countries that have a connection to the North Pole are increasing their military spending and practice in the area. This is mainly due to the unexploited resources. The Arctic Council estimates that the Arctic is considered to hold as much as 25% of the world's undiscovered hydrocarbon potential. Until now there has been no exploitation of these resources but with the thinning of the ice, conditions for exploitation will become easier, putting the Arctic region at risk of becoming a high conflict area. Therefore, it was argued, steps must be taken for preventing tensions from escalating.

In discussing the steps towards making the Arctic a NWFZ many suggestions were made. Virtually all participants stressed the importance of getting the issue onto the public agenda and various propositions were put forward for suitable forums. Of those, the following are noteworthy: the upcoming NPT review in 2010, the Copenhagen

Climate Conference in December 2009 (COP15), NATO's new strategic concept and the Organisation for Security and Cooperation in Europe (OSCE).

Additionally, much of the discussion stressed the need for engaging the indigenous peoples of the North, since allowing local people's voices to be heard has great importance in a regional security perspective. It was pointed out that a focus on how the existing NWFZs were formed could be helpful, and both Antarctica and the South Pacific were mentioned. The case of the South Pacific NWFZ was mentioned several times as an example of a process where awareness and political will were built. The story of the way in which the military forces had moved indigenous people was told with reference to how, when the indigenous people found a common voice (or keep 'started working together'), people started listening to them ... Such stories about experiences could prove helpful in making people conscious of the importance of an Arctic NWFZ. On this note one participant stressed the general importance of sharing information to advance the agenda and it was suggested that resource materials be put together, e.g. from Pugwash, PNND and other relevant stakeholders, in a pool of op-ed articles, background articles and other resources that potentially can help build the case, move consensus forward and educate civil society and the public in general. However it was also widely agreed that the matter of an Arctic NWFZ will throw up new challenges and cannot purely be based on previous experience.

Another discussion with regard to raising the issue was that of creating new kinds of partnerships and alliances, for example creative alliances and progressive parliamentary forces, in relation to forming a legal basis as a framework for future negotiations. In this context it was stressed by several participants that negotiation, transparency, and respect for the environment and the indigenous populations are imperative issues, as is the ability to adapt to change and develop new technology in the area.

PRESENTATIONS

Towards an Arctic Nuclear-Weapon-Free Zone - Towards A Nuclear Weapon Free World

Hon Matt Robson

*New Zealand Minister for Disarmament and Arms Control 1999-2002,
Committee Member of IALANA (NZ), Honorary Member of PNND*

We live in an unbalanced world in terms of what humanity needs and what humanity gets. That means we live in a world of contradictions. Billions of our fellow citizens live without adequate shelter, food or clothing. Over 2.5 billion human beings, 40% of the world's population, have to try and live on less than US\$2 per day. They lack adequate healthcare, if they get it all, and have little quality education. The great majority in this situation live in the so-called developing world. But a sizeable number who go without also live in the richest countries. The world's richest individuals have a combined income greater than that of the poorest 416 million.

Yet those whom Bob Dylan called the 'Masters of War' have determined that rather than meeting these basic needs of humanity, military spending will take priority and that military spending needs, indeed, to increase. The internationally respected Stockholm International Peace Research Institute (SIPRI) reported in June 2008 as follows:

World military spending grew 45 per cent in the past decade with the United States accounting for nearly half of all expenditure. Military spending grew 6 per cent in 2007.

And that growth continues. In 2007 US\$1.338 trillion was spent on arms and other military expenditure, corresponding to 2.5 per cent of global gross domestic product, or GDP – or US\$202 for each of the world's 6.6 billion people.

The United States spends by far the most towards military aims; officially dishing out US\$547 billion last year, or 45 per cent of the global expenditure. Britain, China, France and Japan, the next group of big military spenders, lag far behind at just 4 to 5 per cent of world military costs each. In 2008, eight nuclear weapon states possessed almost 10,200 operational nuclear weapons. Several thousand of these nuclear weapons are kept on high alert. When all nuclear warheads are

counted – operational warheads, spares, those in both active and inactive storage, and intact warheads to be dismantled, the nuclear armed states have 25,000 warheads.

So we know where the weapons of mass destruction that George Bush went looking for in Iraq are located. Those WMDs were right under the noses of George and Tony. They were not with rogue states and terrorist groups but in the military installations of the largest and most powerful states. And a number of them, alarmingly, are stored or deployed in the fragile ecosystem of the Arctic region.

SIPRI concluded that the five nuclear states defined by the NPT in 1968 – China, France, Russia, the U.K. and the U.S.A. – were all in the process of deploying new nuclear weapons or had announced their intention to do so. The de facto nuclear weapon states of Israel, India and Pakistan and, probably, North Korea are proceeding apace to develop missile systems that can deliver nuclear weapons. In the decade to 2008 military spending in Eastern Europe went up 62 per cent; North America 65 per cent, the Middle East by 62 per cent, South Asia by 57 per cent and Africa and East Asia by 51 per cent each.

This escalation has of course been a bonanza for the merchants of death. Sixty-three of the hundred top weapons firms are in the U.S.A. and Western Europe. In 2006 their sales were US\$292.3 billion. In the present economic recession they are not reported to be having any great financial problems.

Joseph Stiglitz and Linda Bilmes in their wonderful research presented in the ‘Three Trillion Dollar War’, published in 2008, estimated that the U.S.A. had spent three trillion dollars on George Bush and Tony Blair’s war against Iraq. They asked how this enormous sum could have been used beneficially in the U.S.A. and the wider world.

In the U.S.A. they state:

A trillion dollars could have built 8 million additional housing units, could have hired some 15 million additional public school teachers for one year; could have paid for 120 million children to attend a year of head start; or insured 530 million children for healthcare for one year; or provided 43 million students with four-year scholarships at public universities. Now multiply those numbers by three.

They then go on to calculate the effect if the money for the war, or even a fraction of it, had been devoted to development goals for the poorest countries:

For sums less than the direct expenditures on the war, we could have fulfilled our commitment to provide 0.7 per cent of our gross domestic product to help developing countries – money that could have made an enormous difference to the well-being of billions today living in poverty – Two trillion dollars would enable us to meet our commitments to the poorest countries for the next third of a century.

How to redress this imbalance of expenditure?

If a referendum were held of the world's peoples on whether military expenditure should be greatly decreased and whether nuclear weapons should be abolished and the funds redirected to the goals set out by Stiglitz and Bilmes, my money would be on the bet that a thumping majority would vote 'yes'.

Our task at this conference is to be part of a movement to mobilise humanity so that that referendum becomes a reality and a movement of solidarity across the globe grows and its voice becomes one that cannot be ignored. Nuclear-Weapon-Free Zones are a vital tool in developing that voice so that that voice becomes a powerful political force. Creating an Arctic Nuclear –Weapon-Free Zone will be an important part of building that political force, will redress the imbalance with the Antarctic and will provide an important impetus to the goal of the total abolition of all nuclear weapons.

The Southern Hemisphere

When all the countries of Africa below the equator are committed to the Treaty of Pelindaba, and that process is almost complete, then every country in the Southern Hemisphere will be free of nuclear weapons. This means the Pacific countries, those in Asia, Latin America and now Africa have committed themselves to rid not only their own territories of nuclear weapons but also to being part of the overwhelming number of countries committed to total abolition. We in New Zealand, at government level and among the people, have long supported the call not just for a Southern Hemisphere Nuclear-Weapon-Free Zone but for one that incorporates adjacent areas as well.

We are well aware that the indigenous peoples of the Pacific, north and south, have led the way in our region to be nuclear free. It took a long time for New Zealand and

other nations to respond to their call to end nuclear testing and storage in the Pacific. For too long we ignored these just demands and sided with the colonial powers who used them and their territories to develop weapons of mass destruction and to despoil the environment. Their territories and waters were the testing ground for the nuclear powers and they suffered terribly and continue to suffer. But in the end their demand to be a NWFZ was victorious and has been emulated elsewhere.

Latin America, central and south, and the Caribbean, is a Nuclear-Weapon-Free Zone. And at the Antarctic, that area so important for the whole planet, a Nuclear-Weapon-Free Zone, a military free zone, has been in place since the Treaty of Antarctica of 1959. It is unimaginable now that humanity would accept nuclear weapons or any military activity in this precious heritage area for the earth.

The Madrid Protocol of 1991 to the Treaty of Antarctica has reinforced the Antarctic's peaceful status by proclaiming that it is a natural reserve and the only activities permitted under international law are those devoted to peaceful purposes, scientific research and protection of the environment. Mining exploration is prohibited.

It is more than time, 50 years on, that Antarctica is balanced by its polar opposite at the Arctic, equally important for the survival of life on this planet. The Arctic must be declared a Nuclear-Weapon-Free Zone for the sake of humanity, for the sake of the world's ecosystem. The wheel does not have to be reinvented. The model to achieve this goal exists in the Treaty of Antarctica and over 50 years of adherence by the whole world to its provisions. And that NWFZ for the Arctic is what this conference will set its sights on.

Checking in all nuclear weapons at the equator

Earlier this year I had an enforced stay in a hotel in Hong Kong. To pass the time I watched a John Wayne special – five westerns. In one of the B-grade (or possibly C-grade) films John Wayne as sheriff and Dean Martin as his deputy battle lawlessness in a frontier town. One of their key law enforcement methods is to ensure that all and sundry at the precincts of the town hand in their guns. They could pick them up on the way out. This reminded me of my suggestion as a minister to the, inaptly named, Conference on Disarmament at Geneva in early 2000.

Remembering the westerns I had seen on so many Saturday afternoons as a child where they practised the John Wayne method, I suggested to the nuclear

powers represented at the conference that it would be a big step forward for disarmament if they committed to checking in their nuclear weapons at the equator before entering the Southern Hemisphere. Exactly how this would work in practice and how the weapons would be stored and safeguarded I had not worked out at that stage. But I am sure that those mere details could have been prescribed.

Needless to say my proposal did not receive a warm welcome from the five declared nuclear powers of the NPT, in particular the United States. One representative accused me of trying to undermine NATO with my proposal. I replied that I hadn't had that intention but now that he mentioned it I thought that was probably a good idea. I can advise, however, that in talks with the representative of China he did state that China would commit to such a policy and that China would respect the NWFZ status of the Southern Hemisphere on land, sea and air if all other countries did.

How do we get to our goal for the Arctic?

First of all we should remember what a step forward it would be to the goal of the NPT of abolishing all nuclear weapons, if the Arctic gained the status of Antarctica. Then we should remember the patient building and mobilising of public opinion that went into creating the NWFZs that now exist, including the most recent one in 2006 in the Central Asian states.

The key to achieving the goal and helping to complete another part of the jigsaw puzzle of a world that is a total NWFZ is to mobilise public opinion by committed parliamentarians, peace groups, environmental groups and mass organisations. Support can then be built nationally, regionally and internationally. Modern technology, as recent events in Iran have demonstrated once again, can give the wings of Mercury to this movement. To say that someone was twittering was once an insult. Now it makes the most powerful politician quake to hear the word.

Enormous support is also building for such zones in Central Europe, East Asia and the Middle East. In regard to the Arctic, the only Arctic states that are not already nuclear weapon free are the United States and Russia. That of course presents a huge obstacle. These two super powers are expanding their military, commercial and exploratory activity as global warming relentlessly frees up large areas that were previously frozen and made access difficult or impossible.

Norway's foreign minister was reported in the Guardian newspaper recently as saying that:

The rise in temperature across the Arctic is twice the world average. Soon there will be no summer ice – that will open up new routes and new strategic issues for the world.

And those strategic issues include the greater military presence in the Arctic, including a nuclear armed presence on submarines, aircraft and bases, as countries position themselves to take advantage of newly accessible mineral resources and a new sea route at the top of the world.

Fortunately we do not have to start from zero to try and make the call of the 2007 Canadian Pugwash group for an Arctic NWFZ a reality. Already a Seabed Treaty forbids the stationing of nuclear weapons on the Arctic Ocean floor. The majority of Arctic states are nuclear weapon free. The majority of states are trying to work cooperatively and have a number of agreements for environmental protection in place. But as international lawyer Donald Rothwell has pointed out:

‘the current Arctic environmental protection regime is based around a collection of customary international law, fragmented multilateral and bilateral legal instruments dealing with some Arctic issues, and global international instruments that have an impact in the Arctic. Currently there is no unifying connector for these various components of international law which have specific and general application in the Arctic. Unlike Antarctica, there is no regional infrastructure based on international law to facilitate or promote cooperation and the development of new international law.’

Our job is to work towards getting that unifying connector and to develop that new international law. We need to work closely with all the ecological activists, as so many of us do, who are highlighting the fragility of the Arctic, the disaster that is global warming and the need to give the Arctic the type of protection that Antarctica already has.

The declaration that comes from this conference needs to be a mobilising document that goes out by every conceivable means so that the twitter becomes a clarion call for action. Our parliaments across the world, our mass organisations, our scientists and youth leaders and the organisations of indigenous people can take up this demand

to add the Arctic, which is the heritage for all humanity and pivotal to the survival of life on the planet, to the existing and growing zones which are free of that blight on humanity and threat to our very survival – nuclear weapons.

Conference on an Arctic Nuclear-Weapon-Free Zone

Erik Gant

Acting Executive Secretary, Arctic Council Indigenous Peoples Secretariat

I was very pleased to be given the opportunity to participate in this event dealing with the Arctic as a Nuclear-Weapon-Free Zone. I did not realise that the organisers of the conference expected me to give a presentation, and I have had very little time to prepare, so what I have come up with is not very original, but rather personal and anecdotal. I could not even think of a title or a headline. What I present here is nothing specialised or disciplined, and it is not traditional knowledge except in the sense that knowledge, I guess, is always a tradition of knowing something about something.

Still, I find it very intriguing to speculate about the Arctic, to relate to the concept and the discourse of the Arctic, to try and comprehend the coldness of a polar region with the coldness of a war, the whiteness of snow with the whiteness of spots on old maps of the world. It is not so long ago that, by way of scientific discovery, the concept of Greenland was determined with some degree of precision. I mean when it was discovered, among other things, that it is an island. It meant that it was this insular entity, naturally separated from other Arctic territories by water and sea-ice, which the kingdom of Denmark claimed as its own.

To other nations the Danish sovereignty over Greenland was by no means given as if by Nature itself. The young country of Norway did not intend to let its centuries-old stake slip out of its hands, nor did the Dominion of Canada find it self-evident that Greenland belonged to Denmark rather than to its own Arctic Archipelago. Most importantly, to the United States, Greenland definitely looked American. That is, it appeared as nothing other than a north-easterly appendix to the continents within the hemisphere of the New World.

So Danish sovereignty, even if formally respected and set down in international treaties, was always of a precarious nature, with Greenland being in some respects clearly a Danish domestic affair, in other respects clearly falling within American foreign policy, as was to become abundantly clear in the post Second World War years. During the war, before the U.S. joined the U.K. against the axis powers, a few German-British outpost engagements actually took place on the east coast of Greenland, violating the American neutrality and the hands-off principle.

This principle originated in the so-called Monroe Doctrine of 1823 that, as far as I am informed, aimed at neutralising all changes of power relations among the European colonial powers insofar as these changes threatened to affect their colonies or former colonies in the New World. Before becoming allied, the American State Department kept a watchful eye on anything that appeared to infringe on the American hemisphere. For example, British assaults on the Danish mercantile fleet were on one occasion termed, by President Roosevelt, '*a bit of low-grade English piracy*' and '*third rate commercial imperialism*'.

According to the American president, the only legitimate interests when it came to Greenland were the American and the Danish, as he explicitly traced the latter a thousand years back to the Norse settlements in Greenland. During the war, with the connections to occupied Denmark effectively severed, Greenlandic affairs were managed in a triangular arrangement consisting of the American Administration, the exiled Danish diplomacy in the U.S., and the Danish colonial officials in Greenland.

This state of affairs, among other things, entailed the signing of a treaty by the U.S. and the Danish diplomat Henrik Kauffmann, to the dismay of the paralysed Danish Government in Copenhagen. Renewals of this treaty continue to form the foundation on which the American military presence in Greenland is based.

So it was with this proviso that, after the war, the Greenlandic card was dealt safely back into the hands of its rightful owners, the descendants of my namesake, the Norse chief Erik. As a young boy I lived among two kinds of building ruins, Norse and Inuit. The former were often barely visible, low structures overgrown with turf. Still, you could sense the ground plans of different kinds of buildings; living quarters, barns, churches, etc.

I sometimes visited and played among the partly excavated remnants of Erik the Red's settlement, Brattalid. In Greenlandic it is called Qassiarsuk, and from this place, just opposite it on the other side of the fjord, you can clearly see another kind of abandoned place, an American air base that, however, was taken over by Danish authorities many years ago and is still functioning as a main gateway that connects South Greenland with the other parts of the country and with the outside world.

The remarkable thing is that, to this day, when you move about in Greenland, and when you enter and leave the country, you effectively use the aerial infrastructure set up by the U.S.A. in the course of its war efforts during the Second World War

and subsequent wars: the Korean War and, indeed, the whole complex of historical sequences and military-industrial, propaganda, and deterrence mechanisms known as the Cold War.

My own family thus moved from the northernmost to the southernmost part of Greenland via present and former American air bases. I lived with my family in a place called Dundas, right next to the Thule Air Base from 1962 to 1966. That is, in between two defining moments in the history of this place. The local population of Inughuit called this place by a very common Greenlandic place name, Uummanaq, meaning 'something shaped like a heart'. In 1953 the Inughuit were relocated from here to a place some 65 miles to the north called Qaanaaq, so as to not get in the way of the military activities on Thule Air Base.

Yet it is a remarkable fact that at about the same time, almost coinciding with their being relocated, the Inughuit – the Arctic highlanders; the proud, resilient descendants of people who had escorted Robert E. Peary to the North Pole, and Knud Rasmussen to northeast Asia – were made Danish citizens, as were the rest of the native Greenlandic population, thanks to a revision of the constitutional law adopted by the Danish Parliament and approved by referendum. In this way, a hundred and some individuals were removed from their village outside of civilised jurisdiction and transplanted into the warmth of national and international law.

This, I surmise, is very paradoxical, as there was nothing lawful about the coercive relocation of this group of people: they did not want to leave, they were not asked, and no one cared about what they wanted or did not want. Yet strangely, at the same time, and as the Danish authorities took great care in explaining to the world, this move by the Danish authorities was aimed directly at delivering this small, overlooked band of people; to bring them in from the cold, a cold connoting not only their backwardness with respect to their Arctic surroundings and stone age-like ways, but referring just as much to the legal no man's land of their status as a colonised people.

In short, when the Inughuit were, in 1953, removed from their homes, it allegedly all happened for their own good, with a constant view to protecting them from evils of all kinds; to bring them out of harm's way and into the warmth of good, civilised, and democratic governance.

Which brings me to the other event, the other defining moment in the history of this place. I am speaking here of the accident that occurred in January 1968 when a B-52

bomber airplane with *some of that stuff on board*, as its load of nuclear weaponry was referred to in confidential reports of the time – when this B-52 fell out of the sky over Thule and down on the ice-covered sea.

It was as if skeletons came rattling out of the national wardrobe closet, and perhaps it is in the nature of this accident that the full extent of its damaging consequences – to people involved in cleaning up the crash site and to the natural environment, to the marine resources harvested by the Inughuit – that these damaging consequences must remain undetermined. It was a disastrous accident that was also a huge scandal surrounded by all sorts of unnameable circumstances, preventing the differently affected military and civilian individuals from ever being fully recognised as victims of the accident.

Thinking back on my southern Greenland boyhood, I do not have any recollection of hearing anything at all about a plane crash in the opposite part of the country that we had left less than two years prior. We, me and my family, had lived in Thule in between what I have here called its two defining moments. I missed both of these moments, not only in the sense of not being present and directly affected by them but, even more importantly, by not knowing anything about and not being aware of them at the time.

My childhood, you could say, was a Nuclear-Weapon-Free Zone in the sense that I did not know that it might be anything but that. Much in the sense, perhaps, that Danish territory was nuclear weapon free territory in accordance with the official Danish policy of not allowing nuclear weapons anywhere within territory under Danish sovereignty. Much in the sense, that is, that nuclear free at the time meant not wanting to know of, not wanting to acknowledge the presence of nuclear weapons.

You often hear it said that knowledge is power. I like to question this by maintaining that not knowing is equally powerful. It might also be pointed out, I think, that sovereign power, the power to decide in accordance with international law and human rights, the determination and efforts to overcome the predicaments of colonialism and imperialism – it might be pointed out that all of this is a question of respect, respect of basic rights of peoples. But it is possibly also a question of realising the extent to which knowing and not knowing are interwoven, as well as realising the importance of the element of time, the time of not knowing and the time when you get to know.

This, I fear, is the closest I will get to anything resembling a conclusion regarding the subject of Nuclear-Weapon-Free Zones. I thank you for your time and your patience.

A Nuclear Weapon Free Arctic: Arms Control ‘On The Rocks’

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The Arctic and the High North has for ages been generally inaccessible for other than a few explorers. Since the 1950s regular airlines have been passing the area above the surface, nuclear powered submarines passing under the ice and a few icebreakers occasionally pass through the ice.

In recent years, however, the average world surface temperature has raised a few degrees centigrade followed by a shrinking of the polar ice. The reason for the global warming is believed to be that it is a result of substantial human burning of coal and oil and a subsequent gross emission of the greenhouse gas, carbon dioxide. The world is alarmed and various restrictive measures are being discussed.

The very complex interplay between human activities and ‘natural variation’ and their relative importance is currently not fully understood. But it is a fact that the polar ice has, for a number of subsequent summers, been melting more than before. According to many experts the northern Polar Sea, presently covered by ice year-round, may as a whole and eventually permanently become open waters in the near future.

Some consider such a possibility a ‘worst case scenario’. Others look forward to what they think is a ‘best case scenario’. Should the Arctic Sea become open year round, substantial new possibilities of great economic value would be available. Shipping between harbours in the Atlantic and the Pacific oceans passing via the North Pole could grow to dimensions comparable to the traffic of today through the Strait of Malacca. Dormant oil and natural gas reserves matching those of the Middle East, now unreachable because of the harsh climate, could be available for exploitation. New areas would be opened up for large scale fishing.

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No one knows, however, if such a scenario will become a reality after 20, 50 or 100 years if at all. But the mere possibility has prompted many countries to prepare themselves for action just in case, in terms of territorial claims, research expeditions, and military presence. The Arctic Sea littoral states, the European Union, NATO and others have declared ambitions and made claims. A race for territory, energy and protein has begun.

A geographical note

Back in the 1920s, the Arctic Sea littoral states claimed territory according to the so called 'sector principle'. They claimed all land territory within sectors based on their coastlines between the outermost limits towards neighbouring states and in straight lines to the top at the North Pole.

But the prospect of a warmer climate and the agreement in 1982 of the United Nations Convention on the Law of the Sea (UNCLOS)² have created a new situation. At a historical meeting in Ilulissate (Jacobshavn) in Greenland on May 27-29, 2008, five littoral states – Canada, Denmark (Greenland), Norway, Russia, and the U.S.A. (Alaska) – agreed on the principles for future cooperation in the Arctic by negotiation, transparency, protection of the environment, and respect for the interests of local communities and indigenous populations. Their basic legal framework for future cooperation, territorial delimitation and resolution of disputes and competing claims would be the UNCLOS. Of the five states, four are party to UNCLOS. Only the U.S.A. is not, but will now proceed to become a party.

The geographical concept of the Arctic could be and has been defined in various ways for various purposes. For the purpose of discussing Arctic arms control – a matter for sovereign states – it seems reasonable to adopt the formula of the Arctic Council; i.e. the core group of states involved would be those having territory north of the polar circle. They are the eight states of Canada, Denmark (Greenland), Finland, Iceland, Norway, Russia, Sweden and the U.S.A. (Alaska). Other states may become parties to Arctic arms control measures as appropriate.³

² *United Nations Convention on the Law of the Sea, UNCLOS* (UN Sales No. E.83.V.5, United Nations *Treaty Series*, vol. 1833, No. 31363), signed on 10 December 1982 and entered into force on 14 November 1994. As of 20 July 2009, 159 states were parties to UNCLOS and an additional 18 had signed. All major maritime states except the U.S.A. are parties.

³ An example in point is the 1920 Treaty on the Spitzbergen Archipelago, today subject to Norwegian sovereignty, also making the area a demilitarised zone, today having some 40 parties.

The political geography of the Arctic is dominated by a large area of high seas and the Exclusive Economic Zones (EEZ) of coastal states. Parts of the periphery of the area are land areas; islands and continental territories of littoral states. An ongoing process is delimiting the sea areas as well as the continental shelves for national jurisdiction in accordance with UNCLOS. When that process is completed sometime in the future, large areas will remain outside national control and subject to UN management. Some boundaries have been agreed in the past, some are disputed, while many remain to be defined. An overview of the complex political geography of the Arctic was published in August 2008.⁴

Of the littoral states, all but Russia are members of NATO. None is a member of the European Union,⁵ and all are participants in the Organisation on Security and Cooperation in Europe (OSCE).

The legal situation

Some international treaties and agreements are relevant for establishing a Nuclear-Weapon-Free Zone in the Arctic. Fundamental is the *Non-Proliferation Treaty* (NPT),⁶ in force since 1970, defining two of the core states, Russia and the U.S.A., as nuclear weapon states, and the six others as non-nuclear weapon states. The latter are prohibited from having their own nuclear weapons or control over such weapons. Also important are the security guarantees provided to NPT parties by the UN Security Council resolution S/RES/984 (1995) as well as the unilateral negative guarantees extended by the five nuclear weapon powers.

The NPT permits stationing and deployment of nuclear weapons controlled by the five nuclear weapon states in the territories of NPT parties and at sea. This permitted massive deployment of nuclear weapons in Europe during the Cold War despite the fact that most European states were parties to the NPT as non-nuclear weapon states.

⁴ *Maritime jurisdiction and boundaries in the Arctic*, International Boundaries Research Unit, Durham University, 15 August 2008. www.durham.ac.uk/resources/ibru/arctic.pdf.

⁵ Since Greenland withdrew from the Danish membership in 1985.

⁶ The Treaty on the Non-Proliferation of Nuclear Weapons (*UN Treaty Series*, Vol. 729, No. 10485) was opened for signatures on 1 July 1968 and entered into force on 5 March 1970. All states of the world but four (DPRK, India, Israel and Pakistan) are currently parties to the NPT. Two more states: the Cook Islands and Niue in the South Pacific, never signed the NPT nor are they members of the United Nations. However, as independent states in free association with New Zealand, they could be considered bound by the adherence to the NPT of New Zealand. As members of the South Pacific Forum, they are ratified parties to the South Pacific Nuclear-Weapon-Free Zone Treaty. DPRK became a party to the NPT in 1985 but withdrew from the treaty on 11 January 2003.

However, it has been internally agreed within the NATO alliance that no nuclear weapons will be stationed in Greenland, Iceland and Norway in ‘peacetime’.

But in large areas of the world, including in Nuclear-Weapon-Free Zones (NWFZ), such stationing and deployment is now prohibited. Following the success of adherence to the NPT, the establishment of more Nuclear-Weapon-Free Zones is now the dominating trend in promoting the non-proliferation regime. The establishment of NWFZs is indeed encouraged by the NPT itself (Article VII), repeated at the Extension and Review Conference of the parties to the NPT in 1995 as a matter of priority⁷ and again at the 2000 review.⁸

All in all, the eight Nuclear-Weapon-Free Zones established so far cover more than half of the world’s landmass (74% of all land except nuclear weapon state territory), including 99% of the Southern Hemisphere land areas, while excluding most sea areas. They encompass 119 states (out of some 195) and 18 other territories. Some 1.9 billion people live in the zones.

The history of establishment of those zones and the relevance of the experience of their implementation for a new zone in the Arctic has been thoroughly covered by professor Hamel-Green in his contribution to this conference.⁹

In addition, two United Nations expert studies could be mentioned that have contributed to establishing the scope and the frame of the NWFZ concept.¹⁰ A thorough discussion within the United Nations Disarmament Commission 1997–1999 resulted in a set of recommendations for zone-making adopted on 30 April 1999 and later that same year unanimously endorsed by the UN General Assembly.¹¹

⁷ Principles and Objectives for Nuclear Non-Proliferation and Disarmament [Document NPT/Conf. Document NPT/CONF. 1995/32 (Part I), 1995/32/DEC. 2.

⁸ Document NPT/CONF. 2000/28 Part I.

⁹ Michael Hamel-Green, Existing regional nuclear weapon free zones: precedents that could inform development of an Arctic Nuclear-Weapon-Free Zone. Paper presented to this conference. 10 August 2009.

¹⁰ *Comprehensive Study on the Question of Nuclear-Weapon-Free Zones in all its Aspects*. United Nations Document A/10027/Add. 1 (UN Sales No. E.76.1.7); and *Study on the Question of Nuclear-Weapon-Free Zones*. The latter report was not entirely finalised but ‘exists’ as an annex to a letter of 9 February 1985 from the Chairman of the expert group, Dr Klaus Törnudd of Finland, to the Secretary General. The formal status of this annex is subject to dispute. It is, however, very informative.

¹¹ Report of the Disarmament Commission’s substantial meeting 12-30 April 1999 (UN Document A/54/42), Annex I: *Establishment of Nuclear-Weapon-Free Zones on the basis of arrangements freely arrived at among the States of the region concerned*. The report was later unanimously endorsed by the UN General Assembly (UN Document A/RES/55/56 A).

Also relevant is the 1963 *Partial Test Ban Treaty* to which all core states are party. Among the nuclear weapon states, China and France are not. More important is the Comprehensive *Test Ban Treaty* (CTBT)¹² prohibiting all nuclear test explosions including all nuclear explosions for peaceful purposes for all time. The process of that treaty's entry into force is currently ongoing. Among the core states, all but Russia and the U.S.A. have become parties. Among the nuclear weapon states, France and the U.K. are parties. China and the U.S.A. are signatories.

Very relevant is the 1971 *Seabed Treaty*¹³ prohibiting emplacement of nuclear weapons on the seabed and the ocean floor from coast to coast regardless of any future delimitation of the Arctic shelves. All core states and all nuclear weapon states but France are parties.

An important convention of possible relevance was opened for signature as recently as September 14, 2005. It is the International Convention for the Suppression of Acts of Nuclear Terrorism.¹⁴ The provisions of the convention cover both nuclear explosive devices and 'dirty bombs'.

NWFZ general objectives and measures

There would be three measures of central importance for the achievement of the objectives of Nuclear-Weapon-Free Zones in the general case. These are:

- *non-possession* of nuclear weapons by zonal states,
- *non-stationing* of nuclear weapons by any state within the geographical area of application of the zone, and
- *non-use or non-threat-of-use* of nuclear weapons throughout the zone or against targets within the zone.

¹² The Comprehensive Nuclear Test Ban Treaty was opened for signature on 24 September 1996 but has not yet entered into force. As of 15 May 2009 it had 148 parties. An additional 33 had signed. For text, see UN Document A/RES/50/245.

¹³ Treaty on the Prohibition on the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil Thereof (The Seabed Treaty; UN Document A/RES/2660 (XXV), Annex) entered into force on 18 May 1972. The treaty had, as of 15 May 2009, 97 parties including all recognised nuclear weapon states but France and an additional 19 signatories.

¹⁴ The text of the Convention is included in UN Document A/RES/59/290. It entered into force on 7 July 2007 the 30th day following the deposit of the 22nd instrument of ratification, acceptance, approval, or accession with the Secretary General of the United Nations. As of 7 August, 2009 the Convention had 54 parties including all core states but Russia.

The meaning of these measures might seem clear enough. However, their legal representation could be complicated as shown, for instance, by the definition of 'nuclear weapon' in the Tlatelolco Treaty (Art. 5).

The non-possession measure would apply to zonal states. Its codification could be much simplified if relying on the concepts of the NPT (Article II). If the zone encompasses only territories of states parties to the NPT, as would be the case in the Arctic case, most of the non-possession requirement would be fulfilled. If the zone is to encompass states which are nuclear weapon states, a special regime must be defined. The same would be true in the special case that only a part of a state will be included in the zone. A process of establishing a NWFZ in the Arctic could very well result in a situation where only part of some of the participating states will be included in the zone.

Sometimes in the past the circumstances were such that only part of a state was considered for inclusion in a zone. Four cases are referred to here:

- One clear category is when a considerable part of a state is denuclearised while other parts are not, an example being the territory of the former German Democratic Republic now nuclear weapon free and part of unified Germany and NATO territory.¹⁵
- Another category refers to dependencies of states being part of a zone while their mainland belongs to other regions. Protocols of the Tlatelolco, Rarotonga, and Pelindaba treaties apply to such cases.
- A third category refers to states belonging to a Nuclear-Weapon-Free Zone but where a far away dependency does not. In the discussions on a Nordic European Nuclear-Weapon-Free Zone, Norway was considered an obvious part of the zone while its dependency in the South Atlantic, Bouvet Island, was not.
- A fourth category refers to the case where a separate part of a country is a denuclearised or a demilitarised entity and the mainland is not. Examples are the demilitarised Spitsbergen and Aaland Island archipelagos; dependencies of Norway and Finland respectively and not parties to a zone.

¹⁵ According to the Treaty on the Final Settlement with Respect to Germany, the so called 4+2 treaty on reunification of Germany signed in Moscow on 12 September 1990 by the Federal Republic of Germany, the German Democratic Republic, France, the U.K., the U.S.A., and the U.S.S.R., the former DDR territory was designated as denuclearised (Article 5:3).

- A combined zonal and non-zonal case is when an extra-zonal state has a military base in a zone, but the host country has no responsibility for the base. An example is the U.S. base of Guantánamo in Cuba.

The non-stationing measure would primarily apply to the territories of zonal states with the exception that zonal states could not, by agreement among themselves, restrict or prohibit innocent passage (or transit passage) by vessels of nuclear weapon states and other extra-zonal states with prohibited weapons on board in their territorial and archipelagic waters.

Non-stationing measures applying to international land and sea areas would require special legal arrangements.

Related to the non-stationing measure is 'transit' of prohibited weapons through zonal territory – an issue primarily related to nuclear weapons. The transit concept would include 'innocent' transit over a limited period of time of otherwise prohibited weapons by an extra-zonal state, on land, by air or in internal waters including calls at ports by ships or landing of aircraft carrying such weapons.

The transit issue was extensively discussed when the Nuclear-Weapon-Free Zone in Latin America was negotiated. The problem was solved by not being solved. Transit was left to the individual zonal states to permit or deny in each case.¹⁶ The other Nuclear-Weapon-Free Zones have similar transit regimes.

A zonal treaty should prescribe whether transit would be generally prohibited or arranged in a way similar to the Tlatelolco formula. Transit through zonal high sea areas or through territories which are dependencies of extra-zonal states could not be permitted without making the zonal regime of such areas an illusion.¹⁷

While 'innocent transit' has been considered tolerable under all zone regimes so far, 'hostile transit' would probably not be accepted, i.e. passage of delivery vehicles with prohibited weapons across zonal territory towards targets beyond the zone. This rule would apply to seaborne and airborne, manned or unmanned vehicles, and to ballistic missiles insofar as they penetrate zonal airspace, while crossing zonal territory

¹⁶ Document COPREDAL/76 p. 8, or UN document A/6663.

¹⁷ The fact that three nuclear weapon powers, France, the U.K. and the U.S.A., are parties to Protocol I of the Latin American zone treaty and to Protocol 1 of the South Pacific zone treaty, and that France is a party to Protocol III of the African zone treaty poses this problem which has not, however, been raised or referred to politically.

overhead in international space could not be prohibited by agreement among the zonal states.¹⁸

The special transit issue of ships and aircraft which may carry nuclear weapons and call at ports or land at airports in zonal states has been particularly sticky because nuclear weapon powers usually ‘neither confirm nor deny the presence or absence of nuclear weapons on board specific ships or aircraft at specific times.’¹⁹ A political problem of considerable dimensions some years ago, the issue of neither confirming nor denying has lost most of its former importance following the withdrawal by nuclear weapon powers of sub-strategic nuclear weapons from naval ships.²⁰

The non-use measure would be a commitment by states controlling nuclear weapons. Legally, this provision has been given the form of a separate protocol to existing zone agreements.

Consideration of the non-use measure should be made against the background of the UN Security Council resolution taking note of both existing negative nuclear assurances and the positive assurances where the five nuclear weapon states undertake to provide ‘*immediate assistance, in accordance with the UN Charter, to any non-nuclear weapon state party to the NPT that is a victim of an act of, or an object of a threat of, aggression in which nuclear weapons are used*’ (Op. 7).²¹

So far, all discussion on nuclear security assurances assumes that the nuclear weapon powers are the five recognised by the NPT (China, France, the Russian Federation, the United Kingdom and the U.S.A.). After the nuclear test explosions of India and Pakistan in May 1998, both states identify themselves as nuclear weapon

¹⁸ The problem of drawing a line between the territorial airspace, subject to national jurisdiction of the underlying state, and the international outer space where the underlying state would have no responsibility, has been on the agenda of the United Nation’s Committee on the Peaceful Uses of Outer Space for very many years. Many difficult issues must be taken into account when defining such a line. Without a final solution, a reasonable assumption would be that the line would be drawn at approximately 100,000 metres above sea level.

¹⁹ For an account of the consequences of these policies, see e.g. J. Prawitz, “The ‘Neither Confirming nor Denying’ Policy at Sea” in J. Goldblat, (Ed.), *Maritime Security: The Building of Confidence*. Document UNIDIR/92/89 (Sales No. G.V.E.92.0.31).

²⁰ Including primarily the Presidential Nuclear Initiative (PNI) simultaneously declared by U.S. and Soviet Presidents George Bush (Sr) and Michael Gorbachev in the Fall of 1991, and confirmed by the Russian President Boris Yeltsin in January 1992. For the text of the Bush, Gorbachev and Yeltsin statements, see e.g. *SIPRI Yearbook 1992*, Oxford University Press, 1992, pp 85–92.

²¹ UN Document S/RES/984 (1995).

states, a status that is not recognised by most other states of the world²². But the issue of including them as guarantor states is raised from time to time.²³ Should they become widely recognised as nuclear weapon states, however, they too would probably be recognised as legitimate guarantor states.

All five nuclear weapon states have made unilateral declarations that they would not attack, or threaten to attack, with nuclear weapons, states that do not possess such weapons themselves or host those of others on their territories. These declarations are not coordinated and include some conditions and reservations linked to the question of whether a state can be a member of a Nuclear-Weapon-Free Zone and be an ally or partner of a nuclear weapon state simultaneously. Theoretically that may be possible provided, however, that the two sets of commitments are not contradictory. Whether that would be politically desirable is another question.

Linked to the non-use measure has been the idea that this measure should be complemented by a 'thinning out' arrangement in areas adjacent to the proposed zone where nuclear weapons are deployed. The 'thinning out' idea implies withdrawal of such weapons that are targeted against the zone or that have short ranges and are deployed very close to the zone, thus making them usable primarily against the zone. If such weapons are not withdrawn, non-use commitments would be less credible.²⁴

Special provisions for sea areas

There is a significant difference between applying arms control in sea areas as compared to land areas because of different legal regimes. Almost all land is subject to

²² India, Israel and Pakistan are usually referred to as states on the 'threshold' of becoming nuclear weapon states. After the nuclear test explosions of India and Pakistan in May 1998, India in particular has tried to be formally recognised as a nuclear weapon state; in vain, however. The 2000 NPT Review Conference of the parties to the NPT stated in its Final Document: "*The Conference deplores the nuclear test explosions carried out by India and then by Pakistan in 1998. The Conference declares that such actions do not in any way confer a nuclear weapon state status or any special status whatsoever.*" (Document NPT/CONF. 2000/28 Part I, chapter on Article I and II and Preambular Paragraphs 1 to 3, para 9). Similar language is expressed in a resolution (New Agenda) adopted by the 55th UN General Assembly (UN Document A/RES/55/33 C, Preambular paragraph 4).

²³ Interestingly, the Tlatelolco Treaty as the only zone treaty includes a provision (Art.29:4) that if a new power possessing nuclear weapons arises after the full entry into force of the treaty, that fact "shall have the effect of suspending the execution" of the treaty for parties which request such suspension and that the treaty shall remain suspended for those parties until the new power adheres to the treaty's guarantee protocol (Additional Protocol II).

²⁴ The 'thinning out' idea was first suggested by A. Thunborg in 1975 in relation to the proposed Nuclear-Weapon-Free Zone in the Nordic area, in "Nuclear Weapons and the Nordic Countries Today – A Swedish Commentary", *A Special Issue of Ulkopoliitikka*, 1975, pp 34–38.

the jurisdiction of one state, a well known exception being Antarctica. As a consequence, adversary military forces on land are geographically separated from each other in peacetime. Naval forces of different states, on the other hand, may mix all over the sea, on the surface, in the water, under the ice, and on the seabed. Indeed, they frequently do so.

The very elaborate and detailed United Nations Convention on the Law of the Sea (UNCLOS) was agreed in 1982 and entered into force in 1994, and functions as the 'constitution' of the sea areas covering more than 70% of the surface of the earth. Many of its sovereignty related provisions are today considered customary law, binding for all states whether parties to the convention or not. UNCLOS entitles all states to utilise the '*freedom of the high seas*', mostly applicable also in the Exclusive Economic Zones, including the freedom of navigation and the freedom of overflight.²⁵ But the convention also prescribes that '*the high seas shall be reserved for peaceful purposes*'²⁶ and that '*states shall refrain from any threat or use of force against the territorial integrity or political independence of any state, or in other manner inconsistent with the principles of international law embodied in the Charter of the United Nations*'²⁷ implying that use of military force at sea must comply with the UN Charter.²⁸

Coastal states have full jurisdiction over their internal waters only. Their jurisdiction also extends to their territorial seas and archipelagic waters; except that any flag state enjoys the right of innocent passage for its ships in such waters (there is a more liberal regime of transit passage through international straits).²⁹ The provisions granting the right of innocent passage to men-of-war make no distinction between ships because of the types of weapon they may carry.

In Exclusive Economic Zones or on the high seas the coastal states have no jurisdiction related to nuclear weapons.

Zonal states would be obliged not to possess, deploy, or otherwise operate nuclear weapons anywhere including at sea, but they would have no right according to international

²⁵ UNCLOS, Art. 87.

²⁶ UNCLOS, Art.88.

²⁷ UNCLOS, Art. 301.

²⁸ In particular, use of military force in compliance with the Charter's Arts. 2:4 and 51 would not be prohibited by UNCLOS.

²⁹ The legal concepts of 'innocent passage' and 'transit passage' are defined in the United Nations Convention of the Law of the Sea (UNCLOS) Articles 17–33, 45, and 52, and Articles 38–44 respectively.

law to limit by agreement among themselves the general right of flag states to navigate ships or fly aircraft in such waters which all states have the right to enter and use. Denuclearisation of a sea area would require agreement in principle among all states of the world or at least among the nuclear weapon states to make the regime effective.

Zonal commitments applying to sea areas should, therefore, preferably be prescribed in a separate legal instrument or protocol linked to the main Nuclear-Weapon-Free Zone Treaty and expressed in terms referring to the general Law of the Sea. The precise objective of such obligations must not necessarily coincide with those of the main zone treaty applying to the land areas of the zone. Maritime zonal commitments could be assumed by the zonal states, as well as by the nuclear weapon states and other extra-zonal states subject to invitation to sign special marine protocols. The restrictions could include all nuclear weapons, or only some, or only nuclear weapons with a regional role. Such restrictions could also include 'thinning out' and confidence building measures. The formula to be chosen would respond to the relative importance in each case of restricting the zonal states, the nuclear weapon states, and other extra-zonal states.

Needless to say, the negotiating and drafting of a maritime additional protocol to a Nuclear-Weapon-Free Zone Treaty would be a delicate matter to undertake. There is no historical precedent so far. In formal principle, it should be done at a special world conference of all states having access to the sea areas concerned. But more practically, it could be done in the same way as guarantee protocols, i.e. by zonal states versus nuclear weapon states negotiations.

Among existing Nuclear-Weapon-Free Zones, the Antarctic Treaty and the Rarotonga Treaty (South Pacific) include specific provisions that treaty obligations will not infringe upon freedoms of the sea within the zone perimeter. The Tlatelolco Treaty (Latin America and the Caribbean) defines the zonal area as including substantial parts of the Atlantic and the Pacific oceans, but nuclear weapon states parties to the guarantee protocol (Protocol II) have made statements of interpretation to the effect that they will not be restricted as regards freedom of the sea in those areas.

Treaty design and negotiation

Establishing a Nuclear-Weapon-Free Zone in the Arctic would most probably require a long and elaborate diplomatic process. The region under discussion is unique and few parallels to other existing Nuclear-Weapon-Free Zones exist. The NWFZ concept

is a very flexible one that, beside general commitments, could also accommodate a number of geographical and political peculiarities in the region at hand. There would thus be a fair number of possible 'solutions' to the problems of designing a NWFZ treaty for the Arctic. What follows below is one possible solution that to this author seems simple geographically and politically, straightforward, to the point, and which accommodates relevant regional facts.

The first issues to be determined to get negotiations started are the geographical scope of the prospective zone, and the states to be invited to participate. One geographical outline of an Arctic zone would be all the area north of the polar circle. That seems simple and relevant but the circle has no distinct political meaning. Therefore, a strict delimitation along the circle would divide all the states with territory north of the circle into two parts: one part north of the circle and within the zone, and another part south of the circle and thus outside the zone. The management of such a zone would be rather complicated. The eight states on the circle will here be called the core states – Canada, Denmark (Greenland), Finland, Iceland, Norway, Russia, Sweden, and the U.S.A. (Alaska), which are also the members of the Arctic Council. Among the core states, two are nuclear weapon states and six are non-nuclear weapon states. Among the latter, four are members of the NATO alliance which has a nuclear weapon role as part of its strategic concept.

The theoretical approach to the zone delimitation could be the polar circle and the original zonal states, accordingly the eight mentioned above. But the six non-nuclear zonal candidates could be invited to offer their whole territories as zonal territory and thereby substantially facilitate the management of the zone. As regards the nuclear weapon states on the circle; their participation in the zone would be politically very desirable, but to include the whole of their territories in the zone would be mostly non-Arctic and beyond reason. And as inclusion of nuclear weapon state territory in a NWFZ would in any case be a delicate matter, the parts of Russia and the U.S. that will be included should preferably be negotiated between them bilaterally.

As regards the obligations of the non-nuclear weapon zonal states, all are parties to the NPT and most of the non-possession commitment will be solved that way. However, the four which are members of the NATO alliance must ensure that their zonal obligations take precedence over their alliance commitments. They must demonstrate that they will not under any circumstances receive control over any nuclear weapons through the alliance and offer sufficient transparency of the alliance's nuclear command structure to make the implementation of that commitment verifiable. The

nuclear-weapon zonal parties are also parties to the NPT and committed not to share any nuclear weapons or control over such weapons with anyone.³⁰

For the non-nuclear weapon parties, the non-stationing obligation would be clear enough. No nuclear weapons would be present within their land territories, territorial waters or their airspace. But a possible rule for transit could be desirable. This measure could easily be verified but must be accommodated by NATO. The non-stationing obligation would be more complicated for the nuclear weapon zonal parties. A possible solution could be that all sub-strategic (tactical) nuclear weapons in Alaska and northern Russia are withdrawn according to the ‘thinning out’ formula after bilateral negotiations, and that the strategic nuclear weapons currently stationed there could remain until a more solid START agreement is concluded.

The no-use and no-threat-of-use obligation would be a commitment primarily for all nuclear weapon powers of the world to adopt and therefore should be addressed in a separate protocol to be signed by them.

An issue different from what has been instituted in other NWFZs in the world, is that of how to handle a nuclear weapon free Arctic Ocean. The prime obligation in the water areas would be a non-presence formula with, eventually, a no exception for transit as, according to UNCLOS, all states of the world have the right to enter and

³⁰ During the NPT ratification process in the U.S.A., Secretary of State Dean Rusk explained to the U.S. Senate that the NPT “*does not deal with arrangements for deployment of nuclear weapons within Allied territory, as these do not involve any transfer of nuclear weapons or control over them unless and until a decision were made to go to war, at which time the treaty would no longer be controlling*” (Documents on Disarmament 1968, p (478) 495). This statement, indicating an interpretation that the NPT would enter out of force in case of war, reflected a previously agreed position within the NATO alliance. However, in 1985 the third Review Conference of the NPT parties unanimously adopted a final declaration stating *inter alia* that “*the Conference agreed that the strict observance of the terms of Articles I and II remains central to achieving the shared objectives of preventing under any circumstances (emphasis added) the further proliferation of nuclear weapons and preserving the Treaty’s vital contribution to peace and security, including the peace and security of non-parties*” (Document NOT/CONF. III/64/I, Annex I), thus stating the opposite interpretation. This interpretation was repeated in the unanimously adopted Final Document of the NPT Review Conference in 2000 (Document NOT/CONF. 2000/28 Part I on Article I and II and Preamble Paragraphs 1 to 3, Para 5).

Obviously Mr Rusk’s statement in 1968 referred to the East–West conflict dominating at the time. But the end of the Cold War and the prospects for local wars in the future now makes the more restrictive 1985 interpretation the only reasonable one. In 1991, the UN Security Council did indeed confirm the 1985 approach in its resolution on Iraq. The opposite interpretation would be beyond reason – that Iraq’s involvement first in a war with Iran and later in the Gulf War would have entitled her to acquire nuclear weapons, or that India and Pakistan could accede to the NPT as non-nuclear weapon states but continue their weapons programmes claiming that there is a war going on in Kashmir.

This issue has been comprehensively discussed by Martin Butcher, Otfried Nassauer, Tanya Padberg, and Dan Plesch in their report *Questions of Command and Control: NATO, Nuclear Sharing and the NPT*. PENN Research Report 2000.1 (ISBN 3-933111-04-08). March 2000.

use those sea areas. Therefore, all states should be invited to adhere to a special Arctic marine protocol committing them to observe a nuclear non-presence obligation. Of course, the signatures of the nuclear weapon states to such a protocol would be the most essential ones to make the northern ocean nuclear weapon free.

In addition to these basic commitments, an Arctic NWFZ treaty could include a number of other related provisions regarding verification, environmental protection, military presence, and a number of measures determined by the Arctic climate. This makes it desirable to coordinate the zone building with other cooperative activities in the Arctic. It seems that an organisational frame for the build-up of a management system for the implementation of the zone should be entrusted to the Organisation on Security and Cooperation in Europe (OSCE). That organisation has 56 participating states, including all the Arctic core states, and would provide the zone project with a much wider but still regional support. But the military mandate of the OSCE covers only conventional military land forces in areas from the Atlantic to the Urals and Central Asia, and almost no sea areas and no independent naval forces and no nuclear weapons. In order to host the Arctic NWFZ, the OSCE must have its mandate widened to cover the whole of the Arctic Basin and both naval and nuclear forces. With its long experience and expertise in handling military transparency, and with its diversified other activities, it should be a good candidate for administering the Arctic NWFZ. The establishment of a formal relation between the OSCE and the Arctic Council would also be desirable as well in order to allow the Arctic indigenous populations to have a say in the implementation of the zone.

An Arctic Nuclear-Weapon-Free Zone: A Norwegian Perspective

Torbjørn Graff Hugo

IPPNW Norway

Dear friends and colleagues,

Before I begin, let me express my gratitude, and that of the Norwegian anti-nuclear weapons organisations, to John Avery and the Danish Pugwash and DIIS for organising this event, and for helping to bring the issue of an Arctic NWFZ further up on the agenda.

For those of us who see NWFZs as important tools for both non-proliferation and disarmament, the prospect of an Arctic zone is an appealing one. It would become another piece in the jigsaw puzzle we are working to construct all over the planet, in order to slowly strangle the rationale for maintaining nuclear weapons. At first glance, therefore, I find the Arctic zone to be an attractive thought. Yet, a closer look quickly reveals that the establishment of such a zone is anything but simple. There are numerous strategic and political obstacles ahead.

While the more complicated aspects of an Arctic zone have been, or will be, touched upon by other more competent speakers, I thought my contribution to the concert could be in the form of some Norwegian reflections and perspectives. And I mean Norwegian mainly because I myself am Norwegian, but hopefully some of it will also reflect the thoughts of the NGO environment in Norway, as well as those of the Norwegian government. In any case, in my attempt to provide such a perspective I thought I would focus my remarks on three main pillars. Firstly, a dive into history and the proposal to establish a Nordic NWFZ; secondly, the Alliance – that is NATO, and thirdly, if time permits, some thoughts on process and timing.

The attempt at a Nordic zone

As most of you would know already, the idea of a Nordic zone dates back quite a few decades. And the first proposal for such a zone was presented to the Nordic heads of government by the then Soviet premier, Nikolai Bulganin, as far back as 1958. The original proposal was for an isolated Nordic zone though, and while President Kek-

konen of Finland supported the idea, his colleagues from the other Nordic countries dismissed it as a threat to the stability and strategic balance between the eastern and western blocs. Kekkonen continued to promote it, but it took more than 20 years before the other Nordic leaders would take up the proposal in a serious manner.

In Norway, the question of a Nordic zone forced itself onto the political agenda in September 1980 when the Norwegian diplomat Jens Evensen suggested that Norway should take the lead in establishing such a zone. The Foreign Minister Knut Frydenlund was, as he writes in his memoirs, taken a bit by surprise – or *taken in bed*, as the saying goes in Norwegian and, literally speaking, that was indeed the case as he happened to be down with the flu the morning the news of this broke. Yet the minister was not, as the media suggested, unfamiliar with the idea of a Nordic NWFZ. On the contrary, on the question of an isolated Nordic zone, he was profoundly opposed to it. Two years earlier, in 1978, he had dismissed the latest proposal by Kekkonen for the establishment of the zone.³¹

But when Evensen pulled the plug on the idea in 1980, it appeared to be a tangible alternative – something the Nordic countries could do by themselves, and it sparked a grand debate among the political parties in Norway, and particularly within the Labour party.

In her contribution to the 1982 book, *Before it's too Late*, Mrs. Gro Harlem Brundtland, having recently stepped down as Prime Minister for the Labour party, presented a list of preconditions for supporting a Nordic zone.³² *First*, maintaining a low level of tension in the Nordic region was imperative. *Second*, it had to be based on mutual commitments and restraints, in a balanced manner. *Third*, the broader disarmament framework, such as the negotiations on the reduction of long range missiles, was to be given priority. The zone had to be seen as a part of the bigger picture. And *fourth*, solutions had to be found that could be accommodated into the NATO cooperation, and that would result in fewer nuclear weapons both in the east and the west.

The amount of work put into exploring the prospect of the zone is actually quite impressive in retrospect. From 1984 to 1985, a bipartisan commission studied the feasibility of the zone and presented its recommendations to parliament. Then

³¹ Frydenlund, K (1982) *Lille Land – hva nå?*, Universitetsforlaget, Oslo.

³² Brundtland, G H (1982) "Nedrustning i Europa: vår utfordring", in *Før det blir for sent, atomkrig eller nedrustning* (Jagland & Berg Johansen, eds.), Tiden forlag, Oslo.

from 1987 to 1991 a Nordic Senior Officials Group also discussed the possibility of the zone.

Though the ‘end of history’ in 1989 seemingly reduced the urgency of the matter, the Nordic Council actually recommended the establishment of the zone as late as in 1993. What happened to that recommendation afterwards, I’m not really sure of. But it shows that the willingness was there, and it also underlines the fact that these issues have been discussed not too far back in time.

Even more recently, in the event of the NATO expansion in 1999, a renewed effort was put into promoting the zone by the NGOs, with the argument that NWFZs could help reduce the tension otherwise created by the expansion. Jan Prawitz’s paper entitled ‘A Nuclear-Weapon-Free Zone from the Black Sea to the Baltic Sea’ was presented to the Foreign Minister, after which we received a rather positive response. It also ended up as a debate in the newspapers.

In Norway most of the political parties also retained the goal of a Nordic zone in their party platforms well into the 1990s. The Labour party didn’t remove it until 2005, when it was replaced with the goal of a zone in the Middle East. And, of course, a zone in the Middle East is important – not to say crucial – for the overall nuclear disarmament, but at the same time this appeared in the eyes of the NGOs in Norway as something of a resignation.

Now, why am I telling you this story of the Nordic NWFZ? Obviously because, from a Norwegian point of view, the challenges and outright obstacles to the establishment of a Nordic zone seem relevant also for the debate on an Arctic zone. And it gives an indication of the political feasibility of it, at least from a Norwegian point of view. And one thing we notice that keeps coming back to haunt us when we discuss the issue of zones is of course, as Brundtland also mentioned in her fourth point, the relationship with NATO. And this brings me to the second issue that I would like to raise with you – or the second pillar, if you will.

NATO and the umbrella problem

Norway does not allow any nuclear weapons on its territory, and this has been a unilaterally enacted policy since the late 1950s, or 1960. The case is similar to that of Denmark, perhaps with the added spice of a shared border with Russia. Alongside Turkey, Norway was the only NATO member to share a direct border with the Soviet

Union, and this prompted a policy of caution and confidence building measures. The self-imposed ban on nuclear weapons was therefore mainly a political tool for maintaining calm relations with the Soviet Union. And it seemed to work quite well. The Soviet Union trusted, at least officially, the Norwegian ban and maintained normal relations with Norway despite our membership of the alliance.

Now, one could argue that the step from a nuclear weapon free Norway to joining a Nuclear-Weapon-Free Zone should be a small one. There are no weapons to remove, so to speak – at least that we know of ... Yet, of course, the picture is, at least from the point of view of our politicians, not that simple. For one, the Norwegian ban on nuclear weapons is, strictly speaking, a peacetime ban. This means that if war breaks out, Norway would form an integrated part of the NATO command structure, and nuclear weapons could be stationed in Norway.

The question, therefore, becomes: how can the participation in a NWFZ be reconciled with membership of an alliance with a nuclear umbrella? And, I could add, does it have to be reconciled?

I believe the answers to this should be looked for both within NATO and outside. As we know, NATO's nuclear umbrella is not the only umbrella in existence, and there are other cases and regions from which inspiration and experience can be drawn. New Zealand could be one example, though Australia might be a better one, with its full membership in both ANZUS and the Rarotonga Treaty. The Semipalatinsk treaty presents a similar dilemma, with the CSTO/Tashkent Treaty joining together Russia and the Central Asian countries in a collective security organisation.

My question is: does this render the Semipalatinsk and the Rarotonga treaties irrelevant? I believe the answer to this is 'no'. They are indeed relevant, but one could argue that it makes them weaker. The lack of guarantees from all the NWS, as is the case for the Central Asian zone, makes it harder to use the zone as a basis to claim negative security assurances, and the impact of the zone on disarmament and non-proliferation is, consequently, reduced.

In this perspective, NWFZs should perhaps be analysed by their *degree* of efficiency, rather than by a dichotomous existence or non-existence. And in such a framework an Arctic zone could possibly serve a purpose, even without withdrawal from NATO's nuclear umbrella by the Nordic states and Canada. You would have a case similar to that of Australia in Rarotonga, and it would most likely strengthen the already

existing unilateral bans. But in my opinion, this scenario would never be more than a second best.

I believe, therefore, that the lion's share of our efforts should be focused on how to answer the first question above; on finding a solution to the umbrella problem: how a country can withdraw from the nuclear posture without withdrawing from the collective defence of the alliance. The first thing that comes to my mind is that this would require a change in NATO's strategic concept, and this brings me to the third pillar.

Process and timing

In 2009 NATO is celebrating – if that is the word to use – its 60th anniversary. In addition it is also the 10th anniversary of the current strategic concept. And with the two coinciding, the SG of the alliance, Mr. Jaap de Hoop-Scheffer, has launched a process of reviewing the strategic concept and, to some extent, the debate surrounding this review has begun. Yet, it is a slow process, and few seem to believe that the work will be finished before the NPT Review Conference in 2010. The last estimates I have seen say the new concept will be ready for NATO's Lisbon summit in 2010 or 2011.

This could be fortunate... in a way, because a positive outcome of the review conference could potentially lay the ground for a bolder change in the nuclear doctrine. Yet there is no guarantee against the opposite happening either. Nevertheless, the process of changing the strategic concept provides an opportunity for discussing how the umbrella problem can be solved and I believe it is an opportunity we should seize.

From the Norwegian government's point of view, NATO has a very high priority when it comes to nuclear disarmament, and Norway is now part of an initiative within the Alliance, a group referred to as NATO 7, whose aim it is to push the disarmament agenda forward within the Alliance. During this year's PrepCom in New York the group presented a joint working paper in which the position on disarmament and non-proliferation stretched well beyond that of the presumed position of the Alliance. It is hard to say what the real position of the Alliance is, since it does not behave as a unitary actor within the NPT. But for this reason as well, the NATO 7 working paper in May was, in my opinion, significant, as it provided a taste of a NATO role in the NPT.

Norway is, of course, not the only country looking at the 2010 RevCon as an important and decisive moment for the NPT. The positive development of the last few months, with the resumed talks between the U.S. and Russia, Obama's pledge to ratify the CTBT, the entry into force of the Semipalatinsk Treaty, the relatively positive outcome of the PrepCom, the breakthrough in the CD in Geneva; all this is of course encouraging, but it has also created high expectations for the 2010 conference. And I believe they should be high. The question is how we can maximise the chances of a positive outcome in which these expectations can be met. And this leads me to the question of timing.

In my opinion – and I'm just throwing this into the ring – the case for an Arctic NWFZ is a card that should be played out *after* the 2010 conference is concluded. For three reasons. First, the agenda up until the RevCon is quite full, and the additional focus on an Arctic zone could, potentially, take attention away from other processes. Governments, unfortunately, only have so much capacity.

Secondly, waiting until after the RevCon provides more options. If 2010 is a success, the Arctic zone could be a follow-up to strengthen the positive trend. And if it turns out to be a failure, countries could argue that *then*, more than ever, new initiatives will be needed, and with a basis in Article VII of the NPT, argue that a NWFZ should be established in the Arctic. Thus, no matter the outcome of the RevCon, it could be smart, the way I see it, to wait until after 2010 before this is actively promoted. The outcome of the conference would simply help define the packaging and presentation of the case.

Thirdly, it provides a time frame and a deadline for figuring out a proper answer to what I believe is the most important question: reconciling the membership of a NWFZ with the membership of a nuclear umbrella. And if a change in the nuclear posture is indeed necessary, then the coming year could be spent on advocating a change in the strategic concept to reduce as much as possible NATO's reliance on nuclear weapons and thereby, hopefully, opening up for the possibility of establishing NWFZs, not just in the Arctic, but also in other parts of NATO – from the Black Sea to the Baltic Sea, to paraphrase one of our colleagues here.

With that, I end my remarks and yield the floor to the next speaker.

Thank you for listening.

Climate Consequences of a Regional Nuclear War

Gunnar Westberg

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Past President, International Physicians for the Prevention of Nuclear War*

New studies on nuclear winter and nuclear darkness

The risk of a global nuclear war, using the main part of the 11,000 nuclear weapons that are deployed today, is probably lower now than it was during the Cold War. However, several of the nuclear power states maintain a large part of their nuclear arsenal at high alert status, ready for launch within minutes. This shows that the military leaders of these countries still fear an all out attack from another nuclear weapon state. It may be impossible to calculate the risk that a global nuclear war is started because of misunderstanding, but many wars have begun because of mistakes. The President of Russia or the President of the U.S.A. has at most ten minutes to decide whether an alarm that a nuclear attack is under way is true or false. Humans make mistakes. Are we to trust that a mistake never will happen with nuclear weapons?

Today the risk of a 'smaller' nuclear war is increasing because of the proliferation of nuclear weapons. The presence of nuclear weapons in the Arctic region would increase the risk of such a limited nuclear conflict.

In my presentation I will show that even such a 'small' nuclear war would produce severe global environmental consequences. As an example of such a limited conflict I will describe the climate effect of a nuclear war between India and Pakistan.

In the 1980s the concept of nuclear winter was brought into our discussions. It was shown that a large nuclear war in which a major part of the nuclear arsenal was used would result in a drop in global temperatures of 7-10 degrees Celsius for several years. Most of those who survived the war, anywhere on the globe, would die from starvation. That means that if a state 'won' the war through a devastating first strike, the population of that state would also succumb. Victory would mean suicide.

In the last 25 years the nuclear arsenals have been much decreased. It has been argued that because of this decreased number of nuclear charges a nuclear winter would no longer be a consequence of a nuclear war. However, recent studies have shown the opposite. Observations after large forest fires show that the nuclear darkness would

last longer than we previously thought. In a large fire a dark cloud of soot rises rapidly up to about 10 km altitude. The news is that it does not stay there. The cloud is heated by the sun and then rises up to the stratosphere. As very little material from the stratosphere rains down, the soot stays there and is distributed around the globe over the course of a year or two. The increased darkness of the stratosphere clouds will remain for many years (Robock et al 2007a; 2007b; 2008).

Extensive calculations using large computers and three-dimensional models of the atmosphere have been used to predict the development. A large nuclear war between Russia and the U.S., where many of the nuclear weapons are brought to explode over population centres, is expected to release 150 Tg of soot (teragrams, one Tg equals one million metric tons). Most of that material will end up in the stratosphere. The result would be a drop in global temperatures of 7-10 degrees Celsius over 5-10 years. A more limited exchange, using mainly the nuclear weapons carried on intercontinental missiles, of which some will not target areas close to large cities, might result in a release of 50 Tg of soot, resulting in a drop in global average temperature of around 4 degrees Celsius (Fig.1).

In both these scenarios we can expect that the global consequences will be devastating. Even in the 'victorious' country most if not all people will succumb to the secondary consequences of the nuclear war – radiation, famine, epidemics, social disintegration and despair.

Global climate consequences of a regional nuclear war

A certain number of small weapons will have much greater consequences, both in the number of people killed from the explosions and in the amount of soot produced, than a smaller number of larger bombs with the same total explosive force (Robock et al 2007a). The new insights into the circulation of the atmosphere have also shown that a limited nuclear war, such as a war between India and Pakistan, where about 100 Hiroshima-size, 15 kt bombs are used, mostly over population centres, would result in the release of about 5 Tg of soot. This soot, mostly from burning cities, would decrease the global temperature by about 1.25 degrees C, over 6-8 years. That is not nuclear winter, but the nuclear darkness will cause a deeper drop in temperature than at any time during the last 1000 years. The temperature over the continents would decrease substantially more than the global average. A decrease in rainfall over the continents would also follow (Figs. 2 & 3).

The growing season would be shortened by 10 to 20 days in many of the most important grain producing areas in the world, which might completely eliminate some

crops that have insufficient time to reach maturity (Fig. 4). An accurate evaluation of the global decrease in food production has yet to be done, but there will be substantial deficits (Helfand 2007). In earlier periods we have seen that a global decrease in grain production of 5% over a couple of years brought about a sharp increase in prices, and that starvation increased in countries that are normally dependent on the import of food. The period of nuclear darkness would cause a much greater decrease in grain production than 5%, and it would continue over many years. The reserves of the most important grains in the world have, in recent years, been corresponding to less than six weeks of consumption (see ref: Wikipedia 2007-2008; World hunger facts 2009).

There are currently more than 800 million people in the world who are chronically malnourished. Several hundred million more live in countries which are dependent on imported grain for their survival. In a situation of severe food shortage globally, can we expect that the wealthy countries will accept tightening their belts to such an extent that the poor and undernourished survive these seven years of famine? If not, hundreds of millions of people in many continents, in particular Africa, will die from hunger (Helfand 2007).

In the war zone of India and Pakistan it can be expected that 20 million people will die from blast and fire, millions more from the radioactive fallout. Many tens of millions will flee the contaminated areas. And many will die from epidemics and hunger, maybe more than from the bombs. But the greater number of fatalities will occur in countries far away, of those who will succumb to starvation because of the global nuclear darkness (Toon et al 2007a, 2007b).

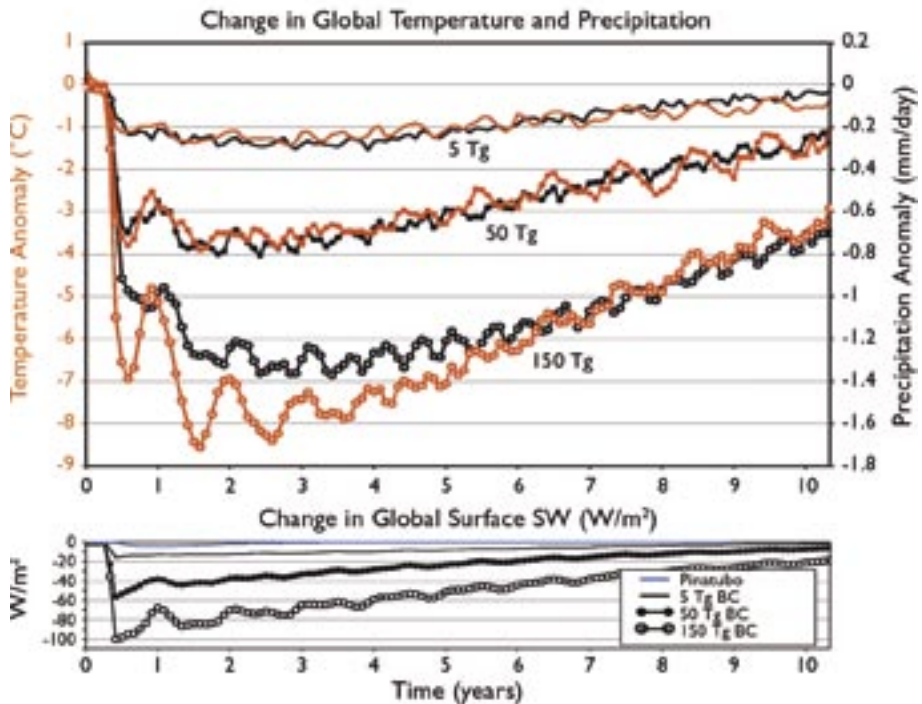
Severe ozone depletion

To make matters even worse, such amounts of smoke injected into the stratosphere would cause a huge reduction in the Earth's protective ozone (Mills et al 2008). A study published two years ago by the National Academy of Sciences, using a similar nuclear war scenario involving 100 Hiroshima-size bombs, shows ozone losses in excess of 20% globally, 25-45% at mid latitudes and 50-70% at northern high latitudes, persisting for five years and with substantial losses continuing for five additional years (Fig. 5). The resulting increases in UV radiation would have serious consequences for human health. Here in Copenhagen we would be advised not to be outdoors for several hours around the middle of the day. The effects on agriculture, on animals, on the economy and on the human population of this unprecedented increase in ultraviolet radiation have not yet been evaluated. The effects would undoubtedly be serious.

A regional nuclear war would result in an unprecedented global catastrophe

I have decided to present this material at this conference because it shows the global consequences of any nuclear war, even a war in which less than one half a per cent of all the nuclear weapons in existence are used. Nuclear proliferation is a threat to all of us. Nuclear weapons in the Arctic zone would increase the danger of a nuclear confrontation. And, most importantly, it is not sufficient to decrease the number of nuclear weapons to a few hundred. They must be abolished.

Figure 1. Change of global average surface air temperature, precipitation, and downward shortwave radiation reaching the surface of the Earth for the 5 Tg (Robock et al 2006), 50 Tg and 150 Tg cases.



Also shown for comparison, in the lower panel, is the global average change in downward shortwave radiation for the 1991 Mt. Pinatubo volcanic eruption, the largest volcanic eruption of the 20th century, as compared to the nuclear war scenarios.

Figure 2. The decrease in average global temperature after a regional nuclear war with 100 Hiroshima-sized nuclear weapons, compared to the development of the temperature over the recent century. The decrease in temperature will be much more pronounced (Robock et al 2007b).

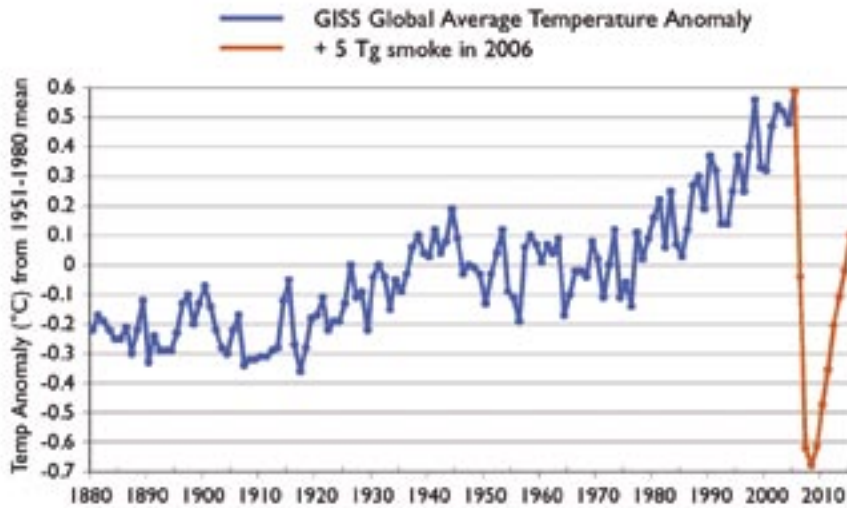


Figure 3. Changes in global temperature and precipitation after a regional nuclear war using 100 Hiroshima-size nuclear weapons, producing 5 million tons of soot (Robock et al 2007b).

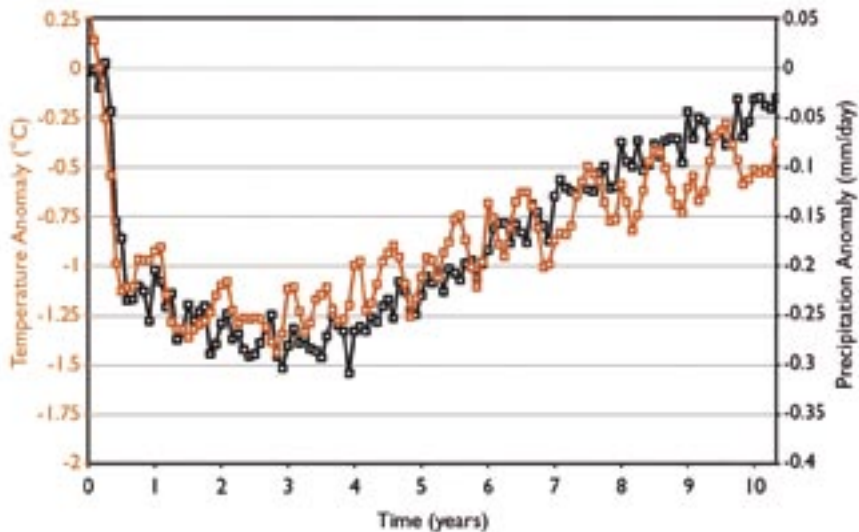


Figure 4. Changes in the growing season – frost free days – in the northern and southern hemispheres in the first year after a regional nuclear war using 100 Hiroshima-size nuclear weapons (after Robock et al 2007a).

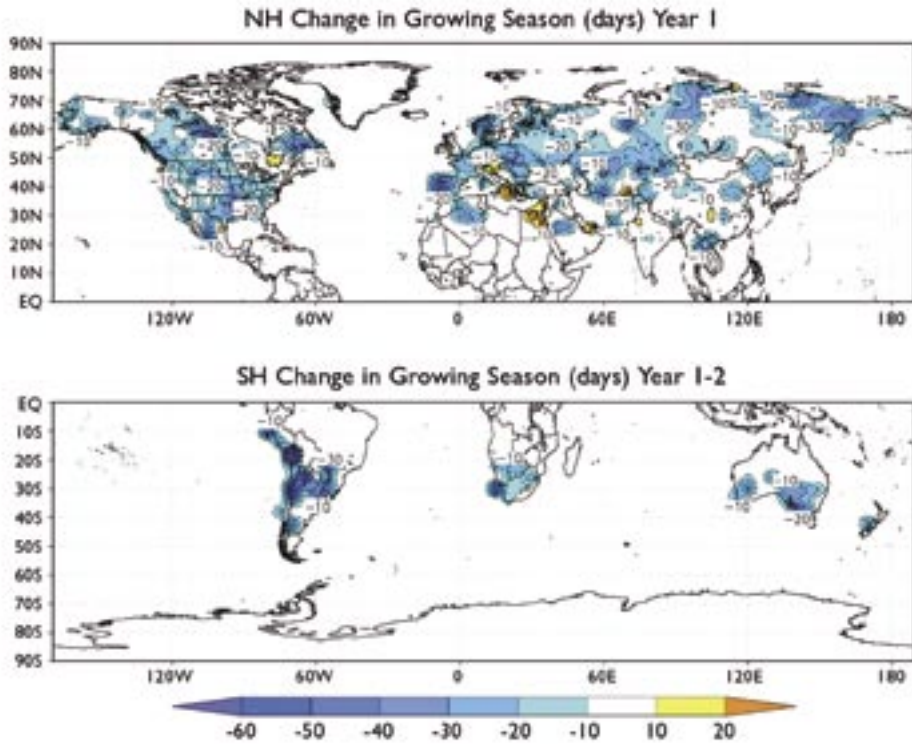
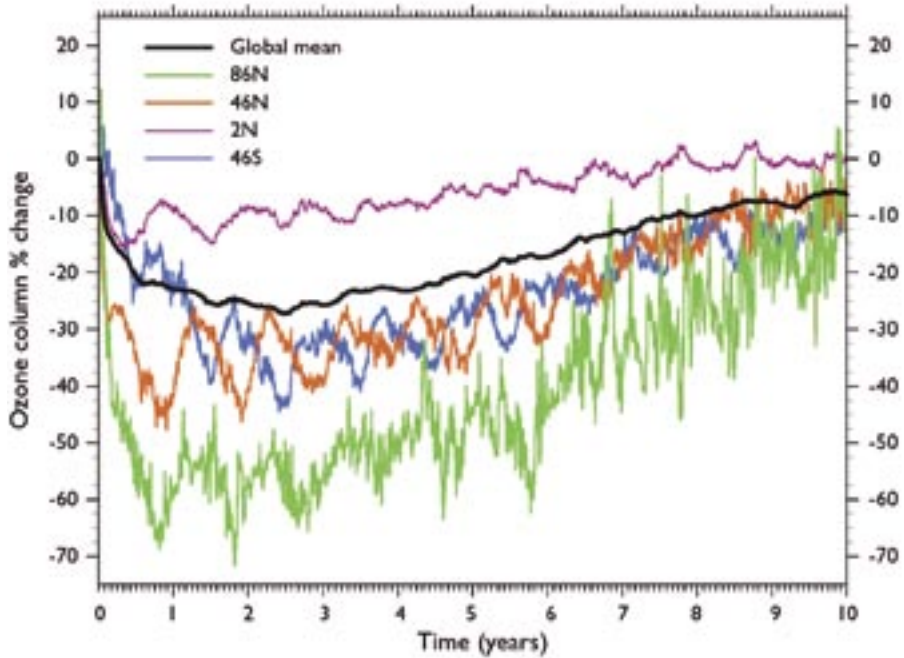


Figure 5. Time evolution of the total ozone column after a 5 Tg soot injection into the upper troposphere at 30°N latitude. Changes in ozone are given as a per cent deviation of the integrated column from the control run, or baseline value, as a function of time since soot injection. The global mean total ozone variation is shown along with zonal average changes at four specific latitudes (as labelled) (Mills et al 2008).



Acknowledgement: PowerPoint graphs made available by Dr Alan Robock at <http://climate.envsci.rutgers.edu/nuclear>

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Existing Regional Nuclear-Weapon-Free Zones: Precedents that could inform the Development of an Arctic Nuclear-Weapon-Free Zone

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At the end of the Cold War in 1989, there were unprecedented possibilities for major breakthroughs in arms control and disarmament. These opportunities were largely lost through a lack of political will on the part of the world leaders at the time, and the trenchant opposition to multilateralism on the part of a Republican controlled Congress under Clinton and a Republican Administration under George W. Bush. We are now at another turning point in history when the leadership in countries all over the world is beginning to appreciate better the need for global cooperation and multilateral action on a number of fronts, not least climate change and nuclear threats. We are also at a point where the accession of the Obama Administration in Washington, and the advent of a Democrat controlled Congress more open to multilateral initiatives, opens a new window of opportunity for arms control.

The urgency of action on arms control and disarmament has been underlined over the past decade by the 1998 Indian and Pakistani nuclear tests, the 2006 North Korean nuclear test, the Iranian moves to acquire nuclear weapons capability through uranium enrichment programs, the expanding reach of missile defence systems serving to provoke escalating nuclear countermeasures, and nuclear modernisation programs across all the nuclear powers. Like Nature, military power abhors a vacuum and tends to spread to any region, however remote, where there is no treaty or other binding legal regime to constrain it. The Antarctic is free of nuclear weapons and military activities precisely because five decades ago the leaders of the major powers and the Southern Ocean regional states had the vision and political will to enter into a binding treaty that ensured 'the use of Antarctica for peaceful purposes only', and established the world's first effective Nuclear-Weapon-Free Zone (NWFZ). The Arctic region has long been the arena and a casualty of great power transit and deployment of strategic nuclear weapons above and below the ice, nuclear weapon accidents, atmospheric and underground nuclear testing and radioactive waste and fallout contamination (and their associated health impacts for indigenous peoples), as well as displacement of indigenous peoples as a result of military bases and infrastructure. If a comparable nuclear free zone treaty had been established as in the Antarctic, it is reasonable to

assume that the Arctic might have been spared these deadly and unwanted nuclear attentions.

The Nuclear-Weapon-Free Zone concept was first pioneered in 1956-57 by the Polish diplomat, Adam Rapacki, in the early phase of the Cold War as a way of defusing nuclear confrontation in Central Europe.³³ The basic idea was that the Central European states would establish a treaty that would ensure the total absence of nuclear weapons in the region, whether in the form of nuclear weapon stationing by a nuclear weapon state, or acquisition of such weapons by zone states; and that the zone would be given binding guarantees from the nuclear weapon states not to use nuclear weapons against the zone countries. The concept foundered at the time as a result of the NATO logic that the alliance needed forward deployment of nuclear weapons to counter numerically superior Warsaw Pact conventional forces.

The idea, however, found partial embodiment two years later, in 1959, with the multi-lateral negotiation of the Antarctic Treaty, which not only established the Antarctic as a zone 'to be used exclusively for peaceful purposes' but also, in Article V, prohibited any nuclear explosions or disposal of radioactive waste material.³⁴ Coupled with its Article 1 prohibitions on 'any measures of a military nature' (including military bases, manoeuvres and weapons testing), and intrusive inspection provisions, the Treaty effectively established the world's first Nuclear-Weapon-Free Zone.

Eight years later, in 1967, this was followed by the creation of the first fully-fledged Nuclear-Weapon-Free Zone in a highly populated region, Latin America. This was the Tlatelolco Treaty, which now has achieved almost universal adherence from Latin American states, and has secured nuclear non-use or threat-of-use guarantees from all five of the UN Security Council nuclear weapon states (P5 – China, France, Russia, U.K. and the US).³⁵ The zone was negotiated in response to concern over how close the region came to being engulfed in a nuclear holocaust at the time of the 1962 Cuban Missile Crisis. The Nobel Prize winning architect of the zone, the Mexican diplomat Alfonso Garcia Robles, argued that such zones would not only contribute to preventing horizontal proliferation among the countries of a given region, but

³³ Hinterhoff, E., 1959, *Disengagement*, Stevens & Sons, pp.423-9; Saeter, M., 1983, 'Nuclear Disengagement Efforts 1955-80' in Lodgaard, S. & Thee M., *Nuclear Disengagement in Europe*, SIPRI/Pugwash/Taylor & Francis, p.59.

³⁴ UN Department of Political Affairs, 1993, *Status of Multilateral Arms Regulation and Disarmament Agreements*, Fourth Edition, v.1, UN, New York, pp.22-32.

³⁵ Ibid. pp.72-109.

also contribute to wider global security by gradually expanding the areas of the world “from which nuclear weapons are prohibited to a point where the territories of the powers which possess these terrible weapons of mass destruction will be something like contaminated islets subject to quarantine.”³⁶

This, indeed, is what has been gradually happening in the subsequent decades, no doubt to the dismay of many nuclear weapon advocates and apparatchiks in the militaries of the nuclear weapon states. In 1985, the South Pacific states established the Rarotonga Treaty, a nuclear free-zone banning all stationing and testing of nuclear weapons in a broad ocean region that linked up with the boundaries of the Antarctic Treaty and the Tlatelolco Treaty. The zone is now recognised and guaranteed by all the P5 nuclear weapon states, although the U.S. has so far only signed but not yet ratified the treaty. In 1995, the Southeast Asian (Bangkok) Treaty was established by ASEAN and, in 1996, the whole of the African continent (Pelindaba Treaty) followed suit. Ten years later, the first zone wholly in the Northern Hemisphere, the 2006 Central Asia Nuclear-Weapon-Free Zone (Semipalatinsk Treaty) was established. There are now Nuclear-Weapon-Free Zones preventing acquisition, testing, stationing and development of nuclear weapons (but not yet transit) in over 100 countries across the world, including the whole of the Southern Hemisphere. Not all have secured the required non-use or threat-of-use of nuclear weapons by external nuclear weapon states, but several are well on the way to doing so, assisted by international pressure in such forums as the UN General Assembly.

New zones have been proposed for such regions as Central Europe, Northern Europe, the Middle East, South Asia and Northeast Asia and the Korean Peninsula, and last but certainly not least, the Arctic region.³⁷ In the case of the Arctic, the first NWFZ proposal was advanced in 1964 by the ‘two Alexanders’, one Russian and one American: both scientists writing in the *Bulletin of the Atomic Scientists*. The Arctic NWFZ proposal was taken up in various forms by the Inuit people’s organisations and councils, including the Inuit Circumpolar Conference (from 1974), regional and international peace organisations, academic peace researchers, and Arctic Region area specialists: Arctic NWFZ proponents include Hanna Newcombe (1981),

³⁶ Alfonso Garcia Robles, speech to the United Nations, UN A/C.1/PEV2018, November 13, 1974, 32, cited in Alfonso Garcia Robles, Occasional Paper 19, *The Latin American Nuclear-Weapon-Free Zone* (Muscatine: The Stanley Foundation, p. 197

³⁷ For an analytical overview of both existing and proposed denuclearised zones, see Goldblat, Jozef, 2002, *Arms Control: the New Guide to Negotiations and Agreements*, PRIO/SIPRI/SAGE, London, Chapter 13: ‘Denuclearised Zones’, pp.196–219.

Owen Wilkes (1984), Oran Young and Gail Osherenko (1989), Ronald Purver (1989) and, more recently, the Canadian Pugwash Group (2007), Ramesh Thakur (2007), Mike Wallace (2008), Jozef Goldblat (2008), Jayantha Dhanapala (2008), and PPND Canada (2007-9).³⁸

The existing NWFZs are extraordinary testimony to the power of regional groupings of states to exert their control and influence over a policy and security sphere that has long been dominated by the nuclear weapon states (NWS). The NWS became accustomed during the Cold War – and to a large degree since – to put their own narrow military and strategic interests ahead of the need for a cooperative security approach to reducing and eliminating the threat of a nuclear holocaust (which could well rearrange our climate far more abruptly than and just as disastrously as global warming).

In the case of all the successfully established zones, there were critics and pessimists who suggested that such zones would never be agreed or, if agreed, never recognised by the nuclear weapon states. Certainly, to have whole regions agree on such measures is a formidable challenge, especially when the nuclear weapon states themselves seek to apply pressure on alliance partners. However, in all the existing zones a number of factors, including skilful diplomats and visionary leaders and, in some instances, vigorous grassroots campaigns from non-government academics, peace movements and indigenous communities, have successfully won out against traditional arms race advocates of nuclear-based deterrence and ‘security’.

The question could be raised as to whether the more than 100 countries who have opted to become members of Nuclear-Weapon-Free Zones are less or more safe or secure than those who have opted for nuclearisation. Is Israel, for example, more secure as a result of its 1967 decision to acquire nuclear weapons, thereby triggering a nuclear arms race with regional adversaries and the current denouement of potential Iranian acquisition of nuclear weapons, than if it had agreed to an internationally verified and guaranteed Middle East Nuclear-Weapon-Free or Weapon-of-Mass-Destruction Free Zone as advocated by Egypt, Iran and the UN General Assembly from 1974 onwards? Is India now more secure as a result of its 1974 acquisition of nuclear weapons as a deterrent to China, and thereby triggering a nuclear arms race with Pakistan, than if it had negotiated an internationally verified and guaranteed South Asian Nuclear-

³⁸ For an overview of Arctic denuclearisation proposals up to 1988, see Purver, Ronald, 1988, ‘Arms Control Proposals for the Arctic: a Survey and Critique’ in Mottola, Kari (ed.), *The Arctic Challenge*, Westview, Boulder, pp.183–219.

Weapon-Free Zone arrangement, as proposed by the UN General Assembly during 1974-77 and the 2000 NPT Review Conference?

More broadly still, is the world a safer place as a result of the addiction of a relatively few nation-states to nuclear weapons as an allegedly necessary part of their security arrangements? Even a relatively limited nuclear war in the regions concerned would be devastating in terms of loss of life and economic impacts, while simultaneously having catastrophic global economic, climate and refugee movement consequences.

So what may be learned from the existing precedents in establishing Nuclear-Weapon-Free Zones in the context of renewed initiatives to establish an Arctic NWFZ?

The Antarctic Treaty is probably the most important precedent. This is not only because it relates to a polar region but also because it brings together a core group of geographically proximate and closely interested states including the U.S. and Russia – which has parallels with the eight Arctic Council states of Canada, Denmark, Finland, Greenland, Norway, Sweden, Russia and the US. It is also a valuable precedent because it embodies in the treaty itself, and in the wider Antarctic Treaty System (ATS) branching from the trunk of the main treaty, a very successful legally binding regime that regulates almost all nuclear, military, environmental, scientific and economic activities in the region in a mutually agreed and cooperative way.³⁹ All of these activities have their counterpart in the Arctic region, yet have only been regulated in a relatively *ad hoc* and non-binding way. The only Arctic nuclear and military activities to have been regulated are in the specific domains and activities covered by the Partial Test Ban Treaty of 1963 and the Seabed Treaty of 1971, and the limited 1920 demilitarisation agreement relating to Norway's Svalbard Archipelago in the Greenland Sea.

The Antarctic Treaty negotiations were motivated by concern over potential territorial disputes between the various territorial claimants, a spirit of scientific cooperation fostered by the International Geophysical Cooperation Year of 1957-58 amongst the treaty countries, and concerns of the then Cold War adversaries, the U.S. and

³⁹ For detailed studies of the Antarctic Treaty System see: Beck, Peter, 1986, *The International Politics of Antarctica*, Croom Helm, Beckenham, (especially chapter 4: 'A Continent for Peace'); Francioni, Francesco and Scovazzi, Tullio, 1996, *International Law for Antarctica*, Kluwer Law International, The Hague; Jorgensen-Dahl, Arnfinn and Ostreng, Willy (eds.), 1991, *The Antarctic Treaty System in World Politics*, Macmillan/Frijtof Nansen Institute, London; Rothwell, Donald, 1996, *The Polar Regions and the Development of International Law*, Cambridge University Press, Cambridge; and Stokke, Olav Schram and Vidas, Davor (eds.), 1996, *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty System*, Cambridge University Press, Cambridge.

U.S.S.R., to deny each other military hegemony over Antarctica. In the present context of the Arctic, with the prospect of summer melting of the Arctic ice-cap and increased access to mineral and other resources, together with disputes over national jurisdictions over the 200 mile Exclusive Economic Zones, and continued tension between NATO states and Russia over deployment of missile defence systems and radars on Russian borders, some of the same elements that prompted the Antarctic Treaty are very relevant for the Arctic. While the strategic nuclear submarine deployments of Russia and the U.S. in the Arctic Ocean might seem an insuperable obstacle to establishing an Arctic NWFZ, in practice it might be in both states' interests to have a demilitarised buffer zone in the region. The prospective summer melting of the Arctic ice-cap may lessen the invisibility benefits of nuclear-powered ballistic missile strategic submarine deployment in the Arctic Ocean; and the strategic benefits of such deployment were probably overestimated even under present conditions, owing to the risks of under-ice collisions and the comparative safety from ASW monitoring in Russia's closer-to-home havens for submarine patrols.

The actual provisions of the Antarctic Treaty and its ancillary agreements hold many valuable precedents for a similar treaty in the Arctic.

The treaty, with its boundary set at 60 degrees north, includes both land and sea territory. This would also be the case for an Arctic region zone (since the territorial and EEZ claims of Arctic coastal states would reach to the very centre of the Arctic Ocean, as Russia's 2008 planting of the Russian flag on the seabed of the North Pole itself dramatically illustrated). The Antarctic Treaty's inclusion of what might be considered EEZs (under the frozen territorial claims of proximate treaty states) and high seas does pose questions of consistency with the subsequent 1982 Law of the Sea Treaty, which allows for nuclear weapon and military transit, but so far the Antarctic Treaty's non-nuclear provisions have been observed within the treaty boundaries. This issue would be more contentious in the Arctic Region where underwater deployment of nuclear armed attack and ballistic missile submarines has been an ongoing practice of both Russia and the US. However, it is feasible under protocols to a proposed Arctic NWFZ for Russia and the U.S. to waive their UNCLOS rights of passage within the zone in the interest of establishing a stabilising buffer zone between themselves, particularly in a context where both states have recently signalled their intention to substantially reduce their deployed nuclear warheads.

The Antarctic Treaty has very clear arms control prohibitions under Article 1 prohibiting military bases, manoeuvres, and weapons testing, and under Article 4 prohibiting

nuclear explosions and radioactive waste dumping; all of which would be highly relevant for a similar zone in the Arctic, and currently apply to not only the land areas of Antarctica but also the ocean areas south of the 60 degrees south parallel.

It also has very effective verification machinery in the form of Article 7 which states the right of Parties to designate observers to carry out inspections with complete freedom of access in 'any or all areas of Antarctica.' Some 32 inspections had been carried out by 1995, including by teams from the U.S., Russia, Australia, Norway, Sweden, China, Brazil, Chile, Argentina, New Zealand and the U.K.; with the U.S. carrying out approximately one third of all inspections (Giuliani 1996). Undoubtedly, the inspection provisions of the treaty have provided confidence and trust that all parties are fully complying with the treaty, and certainly warrants consideration in any comparable treaty in the Arctic.

The Antarctic Treaty has also served as an outstanding successful framework agreement for promoting further binding cooperative agreements on scientific research, environmental protection, and resource management. The Madrid Protocol of 1991 was particularly important in committing Antarctic Treaty members to comprehensive protection of the Antarctic environment, declaring Antarctica to be a 'natural reserve, devoted to peace and science', and prohibiting 'any activity relating to mineral resources, other than scientific research.'

Arctic environmental specialists and legal experts, such as Pharand (1992), Koivurova (2008) and Rothwell (1996)⁴⁰ have welcomed the formation of the Arctic Council to foster cooperation in the region in environmental and sustainable development (but specifically excluding military security) and the establishment of working groups in such areas as: flora and fauna, protection of the marine environment, emergency prevention and response, and Arctic monitoring and assessment. However, in the context of the flurry to open up the region to mineral exploitation and development, Arctic environmental experts are also drawing attention to the fact that current Arctic arrangements have no teeth, and that what is needed is a comparable treaty to that in the Antarctic. Pharand (1992) proposed a treaty very similar in spirit to the Antarctic Treaty, focussing on environment protection and regional cooperation to develop the Arctic 'for peaceful purposes in the interest of all humanity'. More recently, Sands (2003)

⁴⁰ Koivurova, Timo, 1992, 'Alternatives for an Arctic Treaty – Evaluation and a New Proposal', RECEIL 17, 1, 2008; Pharand, Donat, 'The Case for an Arctic Region Council and a Treaty Proposal', *Revue Generale de Droit*, 23, pp.163–195; Rothwell, Donald, 1996, *The Polar Regions and the Development of International Law*, Cambridge University Press, Cambridge.

has noted that while the present 'soft law' approach in the Arctic has been a good first step, 'ultimately it will be necessary to establish appropriate institutional arrangements and substantive rules, perhaps similar to those applied in the Antarctic, to ensure that agreed obligations are respected and enforced.'⁴¹ More recently still, Rothwell (2008) has argued that the principles that should be taken from the Antarctic Treaty include 'a sovereignty neutral regime, the guarantee of freedom of scientific research, a demilitarised/denuclearised region, flexibility to develop additional instruments, and a quasi international management which retains a role for key states.'⁴²

Looking back, the architects of the Antarctic Treaty, led by the U.S. diplomat Paul Daniels, might be pardoned for feeling highly satisfied with their 19 months of negotiations between June 1958 and December 1959 when the Treaty was signed, particularly when this is compared with what has already happened in the Arctic. They have preserved a whole continent from a range of environmental, military and nuclear threats for some fifty years; and facilitated the kind of scientific cooperation that has already produced important outcomes and benefits for the whole planet, not least in the fields of climate and atmospheric research, such as the 1985 Antarctic scientists' discovery of the hole in the ozone layer, in turn leading to the 1987 Montreal Convention to control substances that deplete the ozone layer. It is not only the emperor penguins of the Antarctic who might flap their approval for those who had the vision, skill and will to negotiate the Antarctic Treaty, but people all over the world whose health and food supplies would be threatened if the ozone layer were to be permanently destroyed. A similar zone for the Arctic, if the Arctic littoral states can summon the courage, foresight and political will to bring it about, would no doubt earn the appreciation of the Inuit peoples and other Arctic dwellers for generations to come (not to mention appreciative snorts from humpback whales and paw salutes from polar bears).

The previous U.S. George W. Bush Administration was evidently worried about environmentalist and disarmament groups' advocacy of the need for an Arctic Treaty similar to that of Antarctica. Having for many years refused to ratify the 1982 Law of the Sea Treaty (after very successfully seeking throughout its lengthy negotiations to weaken its provisions), and having, during the Bush Administration, tended to disparage and even tear up existing multilateral agreements (such as the ABM Treaty),

⁴¹ Sands, Philippe, 2003, *Principles of International Environmental Law*, 2nd Edn., Cambridge University Press, Cambridge, p.731, cited in Koivurova, op.cit.

⁴² Rothwell, Donald R., 2008, *A New Legal Regime for the Arctic?* Presentation, accessed at www.arcticnet.ulaval.ca/pdf/talks2008/rothwellDon.pdf on 28/7/09.

the Administration apparently rediscovered the value of the Law of the Sea Treaty as the lesser of two evils, and announced its intentions to belatedly seek congressional ratification of the Law of the Sea. John Bellinger, legal advisor to the then U.S. Secretary of State Condoleezza Rice, wrote:

Some nongovernmental organizations and academics say that we need an ‘Arctic treaty’ along the lines of the treaty system that governs Antarctica. Though it sounds nice, such a treaty would be unnecessary and inappropriate ...So what should the United States do about the Arctic? For starters, it should do nothing to advance a new comprehensive treaty for the region. Instead, it should take full advantage of the existing rules by joining the Law of the Sea Convention. The convention, now before the Senate, would codify and maximize international recognition of United States rights to one of the largest and most resource-rich continental shelves in the world – extending at least 600 miles off Alaska.⁴³

At one minute to midnight (or should it be sunrise?) on January 9th 2009, just before the inauguration of the Obama Administration, President George W. Bush issued a National Security Presidential Directive (NSPD 66) specifically on U.S. Arctic Region Policy.⁴⁴ The policy affirmed longstanding U.S. policy about preserving U.S. military vessel and aircraft mobility and transit throughout the Arctic region, including the Northwest Passage, and foreshadowed the U.S. developing ‘greater capabilities and capacity’ in the Arctic Region to protect U.S. borders. It calls upon the U.S. Senate to accede to the Law of the Sea Convention ‘promptly, to protect and advance U.S. interests, including with respect to the Arctic ...joining [the Law of the Sea] will serve the national security interests of the United States, including the maritime mobility of our Armed Forces worldwide. It will secure U.S. sovereign rights over extensive marine areas, including the valuable natural resources they contain.’ While rejecting the idea of a comprehensive treaty, the Directive did, however, envisage consideration of ‘new or enhanced international arrangements for the Arctic to address issues likely to arise from expected increases in human activity in the region’, giving as examples, shipping, resource exploitation, energy development, and tourism. There seems, at present, no sign that the new Obama Administration is varying this policy. In April 2009 U.S. Secretary of State Hilary Clinton said the Obama Administration is ‘com-

⁴³ Bellinger, John B., *Treaty on Ice*, 23 June 2008, accessed on U.S. State Department website 28/7/09.

⁴⁴ The White House, President George W. Bush, *National Security Presidential Directive and Homeland Security Presidential Directive*, NSPD-66/HSPD-25, January 9, 2009, accessed on U.S. State Department website on 28/7/09.

mitted' to ratifying the Law of the Sea as the best way for Arctic powers to resolve competing territorial claims over the Far North's resource-rich seabed.⁴⁵

If we turn from what the Antarctic Treaty can offer as a precedent to some of the other existing Nuclear Free Zone treaties, we might look briefly at each of the treaties in turn, beginning with the first fully-fledged zone to be negotiated in a heavily populated region, the 1967 Tlatelolco Treaty in South America.

The Latin American NWFZ Treaty, like other NWFZ treaties in populated regions, does not seek to achieve comprehensive demilitarisation as required by the Antarctic Treaty but rather denuclearisation in the form of bans on regional states acquiring, manufacturing or testing nuclear weapons, bans on external nuclear weapon states stationing nuclear weapons in the region (as happened in the lead-up to the Cuban Missile Crisis), and guarantees from the nuclear weapon states not to use or threaten to use nuclear weapons against the zone.⁴⁶ It does not, however, prevent nuclear weapons transit in EEZs and on the high seas within the zone. The zone has been valuable, in conjunction with the NPT and bilateral mechanisms, in helping prevent nuclear rivalries within the region (as in the past between Argentina and Brazil). It now has almost universal acceptance within the region, and has achieved negative security guarantees from all of the P5 nuclear weapon states.

One of the major contributions of the Tlatelolco Treaty was to demonstrate the viability and international credibility of a regional NWFZ established through the exercise of regional states' own sovereignty. Initially proposed by five Latin American states, Brazil, Mexico, Chile, Ecuador and Bolivia, in the wake of the 1962 Cuban Missile Crisis, it was negotiated over four years from 1964-7 with Mexico taking the lead in coordinating the negotiations. The U.S. did not initially ratify the security guarantees but finally ratified the treaty's Protocol 2 in 1971; the first time that the U.S. had entered into a legally binding agreement to restrict its use of nuclear weapons, an important breakthrough that paved the way for other nuclear powers to make similarly binding commitments.

The Treaty's basic denuclearisation provisions and protocol mechanisms for locking nuclear weapon states into non-use guarantees became an inspiration and a starting

⁴⁵ Alberts, Sheldon, 'US supports Arctic treaty in turf battle over oil riches', Canwest News Service, Edmonton Journal, 7/4/09

⁴⁶ Goldblat, *op.cit.* pp.198-202.

point for the drafting of all of the other established NWFZs. These include its Article 1 prohibitions on the 'testing, use, manufacture, production or acquisition by any means whatsoever of any nuclear weapons' and the 'receipt, storage, installation, deployment and any form of possession of nuclear weapons, directly or indirectly, by the Parties themselves, by anyone on their behalf or in any other way', and on the Parties 'engaging in, encouraging or authorising, directly or indirectly, or in any way participating in the testing, use, manufacture, production, possession or control of any nuclear weapon'. It has been argued that an Arctic NWFZ is not necessary since the non-nuclear Arctic littoral states are already members of the NPT and bound not to acquire nuclear weapons. However, one of the key elements of the Tlatelolco and other NWFZ treaties is that not only do they prevent the parties themselves from acquiring nuclear weapons but they also prevent nuclear weapon states from stationing and permanently deploying nuclear weapons in the zone. This is very relevant to the Arctic where some nuclear weapon states already have military bases within the Arctic Circle, and where further military bases are planned. The Tlatelolco Treaty clearly underlines the role of such zones in constraining horizontal nuclear proliferation within the region, and vertical proliferation by nuclear weapon powers seeking to forward base nuclear weapon systems beyond their own territory (as occurred in the case of Soviet nuclear weapons deployed in Cuba, and U.S. nuclear weapons deployed in Turkey and Germany).

Beside the quite rigorous denuclearisation provisions of Article 1, all of which would also make sense in the Arctic context, the two Protocols of the Treaty have also become models for similar protocols in other NWFZ treaties. Protocol 1 requires external states with territories in the zone to apply the same Article 1 denuclearisation provisions to these territories. Protocol 2 requires external nuclear weapon states to similarly respect Article 1, not to contribute to any violations of that article and, most importantly, 'not to use or threaten to use nuclear weapons against the Contracting Parties'. In the case of an Arctic NWFZ, an equivalent to Protocol 2 would require nuclear weapon states to provide non-use or threat-of-use guarantees to the non-nuclear Arctic region states. An equivalent to Protocol 1 would require denuclearisation in the Arctic territories controlled by Russia and the United States – a relatively bigger ask for Russia in view of its major Arctic submarine and military bases. This would probably only prove feasible in the context of bilateral arms control agreements forming part of the following START 2 agreement, although at the time of Mikhael Gorbachev's 1987 Murmansk initiative, proposing a 'zone of peace in the Arctic', Russia seemed prepared to entertain negotiations on partial demilitarisation of the Polar Basin, including air and naval military restrictions in

the North, Norwegian and Greenland seas (e.g. submarine and air stand-off zones, and ASW-free zones).⁴⁷

A particularly strong feature of the Tlatelolco Treaty was its creation of a very effective implementation and compliance multilateral agency in the form of OPANAL – the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean. OPANAL was set up under Article 7 to ensure compliance with the treaty and to hold periodic consultations on treaty implementation. As one analyst has noted, OPANAL not only played a crucial role in gaining almost universal regional adherence to the zone, but also ‘proved particularly useful in dealing with the potential nuclear rivalry between Argentina and Brazil’.⁴⁸ It has since gone on to organise major international conferences of countries that belong to Nuclear-Weapon-Free Zones, such as the 2005 Tlatelolco Conference, thereby contributing to wider disarmament strategies and the promotion of new NWFZs. While other NWFZs have preferred periodic consultations, the advantage of the OPANAL model is that there is an ongoing organisation to coordinate and implement the treaty, to monitor compliance, to retain commitment to the zone amongst the political leaderships of regional and nuclear weapon states and to promote cooperation with other zones in working to expand zones and move towards global elimination of nuclear weapons. The creation of a similar agency for an Arctic zone would be particularly important in view of the need to promote and secure enduring regional and international commitment to simultaneous efforts to address nuclear, environmental, resource and indigenous issues.

The 1985 Rarotonga Treaty establishing a nuclear free zone in the South Pacific also offers some valuable precedents for an Arctic zone.⁴⁹ The initial impetus for the zone came from indigenous peoples and regional non-government organisations concerned about the impact of French, British and U.S. atmospheric nuclear testing in the Pacific, including French testing at Moruroa and Fangataufa in French Polynesia, British testing at Maralinga in Australia and Christmas Island in Kiribati, and American testing at Bikini and Eniwetok Atolls in the Marshall Islands. The cumulative fallout from

⁴⁷ For a recent study of the Murmansk initiative, see Atland, Kristian, 2008, ‘Mikhael Gorbachev, the Murmansk Initiative, and the Desecuritization of Interstate Relations in the Arctic’, *Cooperation and Conflict*, 43, 289, 2008.

⁴⁸ Serrano, Monica, 1998, ‘Latin America – The Treaty of Tlatelolco’ in Thakur, Ramesh (ed.), *Nuclear Weapons-Free Zones*, Macmillan/St Martin’s Press, London, p. 46.

⁴⁹ Goldblat, *op.cit.* pp.202-205. For a detailed study, including the historical and political aspects of the treaty, see Hamel-Green, Michael, 1990, *The South Pacific Nuclear Free Zone Treaty: A Critical Assessment*, Peace Research Centre, Research School of Pacific Studies, Australian National University; and a further study of its implementation in Thakur, *op.cit.*, ‘The South Pacific – The Treaty of Rarotonga’, pp.59–80.

these tests raised regional alarm about long term health effects – not only for islanders and other indigenous people in close proximity to the test sites but for people all over the region as fallout began to be detected in food sources.

A 1975 Fiji Nuclear Free and Independent Pacific Conference launched and began promoting a Charter for a Nuclear Free Pacific, including a specific proposal for a Pacific Nuclear Free Zone. The idea was taken up by peace movements and Labour parties in both New Zealand and Australia, and by the South Pacific Forum: the main regional organisation of independent South Pacific states. In 1983 the incoming Australian Labour Party Hawke Government led negotiations under the auspices of the South Pacific Forum to establish the zone. The final treaty, signed in 1985, embodies most of the key provisions of the Tlatelolco Treaty, including bans on development, acquisition and stationing of nuclear weapons. It has tighter provisions in the sense of banning 'peaceful' nuclear explosions (a weak point in the Tlatelolco Treaty), but weaker provisions in other areas (such as the failure to establish an implementation and compliance organisation like OPANAL).

There are several important precedents established by the Rarotonga Treaty. It was the first Nuclear-Weapon-Free Zone to be established as a result of grassroots campaigns, especially through the indigenous Pacific Islander network, the Nuclear Free and Independent Pacific. While the final treaty was not as comprehensive as Pacific Islanders and peace groups wanted (for example, continuing to permit nuclear weapons transit and nuclear weapon related communications bases), it did serve to interlock with the preceding Antarctic and Tlatelolco treaties in creating a zone throughout much of the Southern Hemisphere that prohibited any land-based stationing of nuclear weapons by external nuclear powers. It also contained an extra protocol for signature by nuclear powers that prohibited any testing of nuclear weapons in both land and ocean areas within the 'picture frame' boundaries of the zone, encompassing all the South Pacific Islands, Australia, New Zealand, and ocean areas up to the boundaries of the Antarctic Treaty, the Tlatelolco Treaty, and the equator (with some minor inclusions north of the equator). The treaty is now signed and ratified by all the states in the region and by all the P5 nuclear weapon states, except for the U.S. which has signed but not yet ratified the treaty. The treaty certainly serves to prevent any resumption of testing anywhere in the zone. A further innovation was to include a ban on radioactive waste dumping at sea anywhere in the same zone.

The way in which the zone was established – through the pressures on regional governments and regional bodies (like the South Pacific Forum) through grassroots coalitions

of indigenous people's organisations, peace groups and environmental NGOs (such as Greenpeace) – has particular resonance with the Arctic where there is a similar focus on regional denuclearisation possibilities on the part of Inuit organisations and Councils, and the peace and environmental movements in many of the littoral states, particularly Canada and the Nordic states. This provides a comparable mobilising basis to that which proved relatively successful in the South Pacific region in a far more constrained Cold War era.

The inclusion of the high seas and EEZs in anti-testing and anti-waste dumping control regimes is also a valuable precedent. Similar provisions would add value to an Arctic Nuclear-Weapon-Free Zone Treaty and reinforce the need for such a treaty compared to reliance solely on the Law of the Sea, which has no such provisions.

The South Pacific NWFZ is also of relevance because it includes one country, Australia, which is a close friend and military alliance partner of a nuclear weapon state, the United States. Australia's ANZUS alliance with the U.S. has some parallels with some of the Arctic littoral states, such as Canada, Norway and Denmark, which are similarly allied with the U.S. through NATO. The South Pacific experience serves to indicate that such alliances do not pose an insuperable obstacle to regional Nuclear-Weapon-Free Zone establishment, although the provisions of such zones may reflect some aspects designed to accommodate pre-existing military alliances. The Rarotonga Treaty, for example, does not prohibit nuclear weapon transit, or U.S. communication bases in Australia, or the right of nuclear powers to fire nuclear weapons from the zone as distinct from firing at the zone.

The 1995 Southeast Asian Bangkok Treaty, negotiated through ASEAN, and relatively unconstrained by the need to accommodate alliance relationships with external nuclear powers, also contains useful precedents for an Arctic zone.⁵⁰ It has defined the zone to include the straits and Exclusive Economic Zones (EEZs) of the states belonging to the zone. The treaty locks the zonal states into the same prohibitions on development, acquisition, testing and stationing of nuclear weapons as the preceding Tlatelolco and Rarotonga Treaties (a vital non-proliferation measure as some regional states contemplate developing a nuclear power industry, and Burma seems to be developing nuclear linkages with North Korea). At the same time it puts pressure on the external nuclear weapon states to respect the nuclear

⁵⁰ Goldblat, *op.cit.* pp.206–208.

free status of the region, including the EEZs and straits, by guaranteeing not to use nuclear weapons against the zone, or indeed, from the zone. The U.S. has refused to sign the required security guarantees against using nuclear weapons against or in the zone on the grounds that it conflicts with its rights of passage under the 1982 Law of the Sea (even though it has so far itself refused to ratify the LOS; a characteristic example of 'eating your treaty cake and having it too' on the part of the world's exceptionalist superpower).

There are some obvious parallels between the Southeast Asian straits and EEZs, and the numerous passages and extensive EEZs in the Arctic region. Southeast Asian attempts to protect their straits and EEZs from becoming embroiled in nuclear conflicts not of their own making have a counterpart in proposals to denuclearise Canada's Northwest Passage as a potential first step to wider denuclearisation of the Arctic region. While nuclear weapon states may seek to insist on their full rights under the LOS, there is nothing to prevent their agreeing, through binding protocols, to respect specific maritime zones as denuclearised areas and waive their normal rights under the LOS. The nuclear weapon states frequently unilaterally declare 'exclusion zones' in open waters for the purpose of missile testing, and continue to observe the ban on nuclear weapons in the open waters of the Antarctic Treaty zone. The possibility of denuclearisation is enhanced by the reciprocal undertakings of the U.S. and Russia not to deploy tactical nuclear weapons on ships and planes, and the proposed START 2 bilateral talks offer further possibilities for agreeing bilaterally on zones where nuclear weapons will not be deployed or transited, including Southeast Asia and the Arctic. Even for the nuclear weapon states, the benefits of supporting regional groups in arrangements that will prevent proliferation may well be greater than clinging to Cold War habits of clutching at every inch of maritime or land territory where nuclear weapons may be transited or deployed. Is it really in U.S. interests for it to refuse support for an ASEAN NWFZ that prevents Burma from becoming a nuclear weapon equipped ally of North Korea on the basis that it needs to send nuclear-armed vessels through ASEAN waters at a time when it no longer deploys tactical nuclear weapons on such vessels, and when it is sharply reducing its strategic weapons in tandem with Russia?

The 1996 Pelindaba African NWFZ offers further precedents in that it was established on a continent where nuclear weapon testing had already occurred in the early 1960s when France carried out nuclear tests in the Sahara desert, and where one regional state, South Africa, during the Apartheid era instituted a nuclear weapons program and produced a small number of nuclear weapons. The Treaty, now only one ratifica-

tion away from coming into force, has special provisions for the dismantlement of existing nuclear weapon facilities under IAEA supervision, the dumping of nuclear waste anywhere in the zone, and armed attacks on nuclear power reactors. If Arctic territories of Russia and the U.S. are included in an Arctic NWFZ then similar provisions would be required; and even for the non-nuclear-weapon Arctic littoral states, provisions against attacks on civilian nuclear power plants and waste dumping would be important.⁵¹

The most recent zone is the 2006 Semipalatinsk Central Asia NWFZ established by the five Central Asia states of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.⁵² The treaty contains core provisions against nuclear weapon acquisition, development, testing and stationing that are similar to those of the other treaties. Its significance has been explained well by Jayantha Dhanapala, the former UN Undersecretary General for Disarmament. 'This region once reportedly hosted 700 tactical nuclear weapons – not to mention the over 1,400 former Soviet strategic nuclear weapons that Kazakhstan returned to Russia before joining the NPT in 1995'.⁵³ With abundant supplies of uranium, stockpiles of at least three metric tons of plutonium at a shut down reactor in Kazakhstan, and considerable nuclear expertise within the region, it would seem particularly urgent to put in place binding denuclearisation arrangements. In the context of the region's strategic location, currently hosting both Russian and U.S. air bases, it would also seem urgent to prevent nuclear weapon stationing and rivalry by external nuclear states.

The zone is entirely land-based, so might be considered to have less in common with the Arctic region. However, like the South Pacific NWFZ, it involves some states that are in military alliance with a nuclear weapon state. In this case the 1992 Tashkent Treaty between Russia and four of the zonal states: Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan. Unfortunately, this has resulted in the inclusion of the Article 12 provision that states: 'This Treaty does not affect the rights and obligations of the Parties under other international treaties which they may have concluded prior to the date of the entry into force of this treaty. The parties shall take all necessary measures for effective implementation of the

⁵¹ Goldblat, *op.cit.* pp.208–212.

⁵² Goldblat, *op.cit.* pp.212–214.

⁵³ Jayantha Dhanapala, former UN Undersecretary General for Disarmament Affairs, September 30, 2006, cited in Parish and Potter, 'Central Asian States Establish Nuclear-Weapon-Free Zone Despite U.S. Opposition'.

purposes and objectives of this Treaty in accordance with the main principles contained therein.’ According to Roscini’s recent detailed international legal analysis of the treaty:

The combined effect of the two paragraphs of Article 12 is that only those provisions of previous treaties that do not prejudice the effective implementation...of the Treaty are preserved...therefore, the Central Asian denuclearised States parties to the Tashkent Treaty still have an obligation to provide military assistance to the other parties (including Russia) in case of aggression, but this assistance cannot include the acceptance of nuclear explosive devices on their territory.⁵⁴

Despite this legal effect of the current wording, the Western nuclear states have chosen to refuse recognition to the zone on the grounds that the first paragraph of Article 12 may be interpreted as giving precedence to the Tashkent Treaty and thereby lead to an undermining of the zone if Russia were to deploy nuclear weapons in defence of any Central Asian state. This is despite the fact that the same Western powers have endorsed the South Pacific NWFZ in which Australia could presumably draw upon U.S. nuclear weapons use as part of the ANZUS military alliance; and despite the fact that there are relatively simple legal solutions to this problem including, as Goldbat suggests, agreeing on the application of Article 30 of the 1969 Vienna Convention on the Law of Treaties, or possibly as a last legal resort, attaching appropriate reservations to ratifications of the non-use or threat-of-use protocol to the treaty.

Innovative features of the Semipalatinsk Treaty that are also worthy of consideration in designing an Arctic NWFZ include: its prohibition on the ‘conduct of research’ on nuclear weapons, something on which most of the other treaties (with the exception of the Pelindaba Treaty) have been weak or silent; and its incorporation of the more rigorous and intrusive IAEA Additional Protocol verification safeguards.⁵⁵

In conclusion, there are important precedents that will be valuable in Arctic NWFZ discussions and negotiations from all the existing treaties, most particularly from

⁵⁴ Marco Roscini, ‘Something Old, Something New: The 2006 Semipalatinsk Treaty on a Nuclear Weapon-Free Zone in Central Asia’, *Chinese Journal of International Law* 7, no.3 (2008), 593–624

⁵⁵ Roscini, *ibid.*

the Antarctic Treaty but also from each of the other treaties. The Antarctic Treaty relates to a region with no permanent human population. The other treaties all relate to populated regions. The Arctic region has a mix of both aspects, with its central Arctic Ocean basin and populated areas north of the Arctic Circle in the littoral states. It is therefore appropriate that any Arctic NWFZ treaty should take account of the experience and provisions of both the Antarctic Treaty and treaties for populated regions.

Aside from the specific precedents and processes that might be drawn from existing NWFZs, there is another more general political aspect of previous zone establishment that should be kept in mind. Debate and negotiations on NWFZs are sometimes closed off by simplistic assessments suggesting that if the major nuclear weapon states, particularly the U.S. and Russia, are not in agreement with the zone, then NWFZ arrangements are doomed, or do not warrant efforts towards bringing them into being. If this assessment or advice had been followed, then none of the existing NWFZs in populated regions would have been established. They represent the determination of regional groupings of states (and sometimes single states like Mongolia) to exercise their sovereign right to denuclearise their region even when the nuclear weapon states have been reluctant or unwilling to give their immediate support. Even in the case of the Tlatelolco Treaty, which greatly benefited the United States in establishing a Latin American denuclearised zone that would prevent nuclear weapons being deployed in America's 'backyard' (as happened in Cuba in 1962), the U.S. did not ratify the zone until four years after it was signed.

The 1968 Non Proliferation Treaty's Article VII, binding on all the P5 nuclear powers, clearly states the right of regional groupings to establish NWFZs. 'Nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories.'⁵⁶ In the case of the Arctic, it is feasible, if the two Arctic nuclear weapon states of Russia and the U.S. were initially reluctant to have their Arctic territories included, for the remaining non-nuclear Arctic region states to establish a NWFZ in their regions, and to exert continued diplomatic pressure for the remaining Arctic territories to be denuclearised under a separate protocol relating to Russian and U.S. Arctic territory. This would be analogous to Protocol 1 in the Tlatelolco Treaty and Protocol 1 in the Rarotonga Treaty.

⁵⁶ UN Department of Political Affairs, 1993, *Status of Multilateral Arms Regulation and Disarmament Agreements*, Fourth Edition, v.1, UN, New York, p.114.

As the foremost international authority on NWFZs, Dr Jozef Goldblat, has noted:

In much of the discussion of Arctic issues, some say attention should focus only on the US and Russia. Yet if a group of countries decided to create such a zone, fine, the nuclear powers are not necessary – countries do have the right to agree not to allow nuclear weapons on their territories. There is, of course, a need to consult nuclear-weapon powers: this happened in Central Asia, but the regional states have no obligation to follow diktats of the great powers. The Central Asian treaty is valid even if nuclear-weapon-states do not ratify its protocol...Other advantages of a NWFZ exist: they create a different type of relations among countries of the region; they offer common forums and institutions; parties can discuss other matters including conventional disarmament; and they can advance their common environmental security interests.⁵⁷

We are at a new moment in arms control and disarmament with the advent of the Obama Administration in Washington, a Democrat-majority Congress, new bilateral talks between the U.S. and Russia on strategic arms reductions, and the forthcoming 2010 NPT Review Conference at which many of the non-nuclear states are wanting to see substantive rather than token implementation of Article VI's requirement for 'effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament'.⁵⁸ We are also at a crucial watershed for the future of the Arctic region: whether it becomes a locus for deadly nuclear weapon system rivalries, conflicts over EEZs and resource extraction, and consequent environmental damage; or whether it becomes a crucial denuclearised buffer zone between the two major nuclear powers – the kind of zone of peace and international scientific cooperation that the Antarctic Treaty so successfully created.

This moment has to be seized, both by the non-nuclear Arctic regional governments of Denmark, Greenland, Norway, Finland, Sweden, Iceland and Canada, and by Russia and the US. The same vision and determination that was in evidence at the time of the 1957-58 Antarctic Treaty negotiations (with several of the same players) needs to be revived and demonstrated again, both to avoid catastrophic

⁵⁷ Goldblat, Jozef, cited in *Arctic Security in the 21st Century Conference Report*, The Simons Foundation and the School of International Studies, Simon Fraser University, Vancouver BC, April 11–12, 2008, Session II Military Security in the Arctic, pp. I-vii – I-viii.

⁵⁸ UN Department of Political Affairs, 1993, *Status of Multilateral Arms Regulation and Disarmament Agreements*, Fourth Edition, v.1, UN, New York, p.114.

threats to Arctic peoples and their environment, and to take another step forward in rolling back region by region the scope for the use and deployment of nuclear weapons.

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Future Climate of the Arctic

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Introduction

As the Arctic regions of the world enter into a period of unprecedented change, it would be well to plan now for policy and practice that will ensure and enhance the security of peoples, lands and oceans of the Arctic. The future is as near as tomorrow, next year, or decades from now, and to the end of this century and beyond.

Climate change in the Arctic has been surprising the experts who participated in the work of the IPCC⁵⁹ (Intergovernmental Panel on Climate Change) because the rate of change of average temperature is exceeding predictions. The paper draws on current publications and websites, scientific research papers and breaking news about the future climate of the Arctic. The year 2050 is the target year by which massive interventions are to be accomplished; the means of international cooperation to achieve this is to be discussed at the December 2009 Conference in Copenhagen, Denmark. The successor agreement that will commence when the Kyoto Protocol ends in 2012 will be drawn within the UN Framework Convention on Climate Change (UNFCCC).

The information in this paper has been acquired from many credible sources, but relies somewhat disproportionately on climate change effects noted and projected in the Canadian Arctic. Nevertheless, climate change is global so observations about changes in land, sea and ice will be applicable throughout the Arctic, perhaps with minor alterations to fit regional conditions.

The future climate of the Arctic is examined here by looking at the projected condition of the polar ice-cap, and the climate changes associated with it. Then a survey of the consequences of the Arctic climate change gives a sense of the vast extent and effect of the new conditions in the Arctic. The inescapable conclusion is that significant international attention is required to bring governance and an orderly adaptation regime to the Arctic, now a new frontier for the planet. A sense of urgency is vital.

⁵⁹ United Nations Intergovernmental Panel on Climate Change (IPCC), The Fourth Assessment Report (AR4) 2007.

Figure 1⁶⁰. Annual mean temperature change by 2050; model shown for the northern latitudes

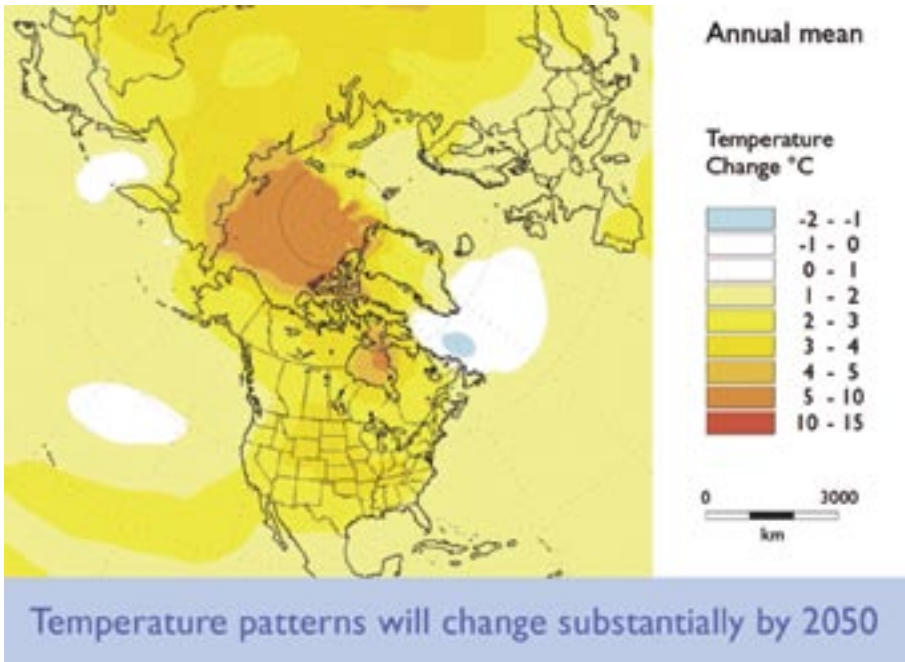


Figure 1 is a prediction of the change of annual mean temperatures, centred on the Arctic, presented with colour coding. From this model we note that most of the earth experiences an increase of 2°C to 4°C, but that the polar region has a startling increase.

This temperature rise everywhere on earth is not just a benign change that makes daily life and climate go on as before, with a little added warmth. In fact, this change indicates a massive disruption to the present climate systems of the earth, particularly in the Polar Regions. Climate change models are used to calculate a range of scenarios, from 'best case' to 'worst case'; we may be advancing to the realm of 'worst case'.

Melting of polar ice in the Arctic

The observations about polar ice cover lead to the prediction that the Arctic Ocean in summer will be mainly ice-free before mid-century; forecasts and modelling peg this

⁶⁰ NCAR (National Center for Atmospheric Research [US]).

period anywhere from 2015 to 2040. Although the IPCC report of 2007 anticipated an eventual ice-free Arctic, the process is much more rapid than expected. The entire globe depends on the Arctic ice for moderating the climate, since it reflects heat, whereas the open sea absorbs sunlight, thus accelerating the warming.

Figure 2 shows the global polar region of the north, highlighting the annual ice cover as observed over the years 1979-2007. The light blue shows the extent of ice, on average, as measured in the 21 years up to 2000. By 2005, much shrinkage has

Figure 2⁶¹. Average polar ice 1979-2007



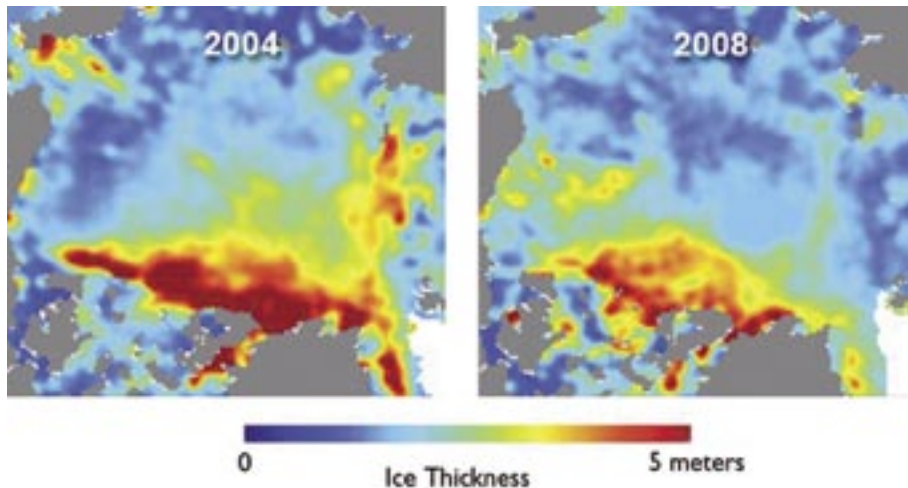
⁶¹ <http://eos-webster.sr.unh.edu>

occurred; and by 2007, an even greater diminishment of ice cover is evident. Data on the *annual ice cover* shows little change between 2007 and 2008. However, satellite data on ‘cover’ does not take into account the changes in the nature of the ice, and interpretation and integration of data from other sources such as aircraft and in situ measurement is also important. There has been an even more notable decrease in the summers of the past decades. In the summer of 2008, Arctic sea ice shrank to more than 30 per cent below the summer average. A greater proportion of the ice is now first-year ice, subject to melting in the summer season. Measured depth of ice has decreased, as has the extent of multi-year ice.

Dramatic Arctic sea ice thinning

Arctic researcher Ola Johannessen, Nansen Environmental and Remote Sensing Center, Bergen, Norway has studied sea ice for decades⁶². Many factors interact in climate change, and the integrated result is seen in sea ice changes. Sea ice measure-

Figure 3. ICESat measurements of the distribution of winter sea ice thickness over the Arctic Ocean in 2004 and 2008 along with the corresponding trends in overall, multi-year and first-year winter ice thickness. Credit: Ron Kwok, NASA/JPL



⁶² O. M. Johannessen; Arctic Climate, Present and Future Perspectives; Problems of Arctic Security in the 21st Century, Vancouver BC Canada, April 2008, Conference Report (abbreviated [ArcSec 21Vanc 08]).

ment over a period of years is possibly the best scientific method of tracking the magnitude of the change in the Arctic. Johannessen reports that overall ice cover is decreasing at a rate of 3-5% per decade while the thicker multi-year ice is decreasing at a rate of 7-10% per decade.

By means of in situ observations, aircraft, remote sensing technology and satellites, Arctic Ocean data has been collected over the whole of the twentieth century. Microwave derived sea ice time series are now among the longest continuous satellite derived geophysical records, extending over thirty years. The coupled ice-ocean-atmosphere regime has been analysed for trends in salinity, seasonal variation, and the relative ice-cap content of multi-year ice (MYI) and first year ice (FYI). Open water has different radiative properties than ice, and also radiative absorption differs between MYI and FYI. The negative trend in MYI is much greater than that in FYI, indicating an ice cover in transition. These are major factors in accelerated global warming. The ice cover is also in transition due to natural variability, such as the North Atlantic Oscillation (NOA) and its coupling to regional sea ice fluctuations. Johannessen's statistical analysis has shown that 90% of the decreasing ice extent can be explained by increasing CO₂ in the atmosphere.

The years of accumulated data have made it possible for models to make revealing projections. The coupled global atmosphere-ice-ocean simulations using the ECHAM4 model from the Max Planck Institute for Meteorology, as well as a dataset from the Arctic and Antarctic Research Institute in Russia, have enabled examination of warming cycles early in the 20th century as well as those late in the century. The late century global warming anomaly can only be simulated by including observed anthropogenic forcing. Current models ECHAM-4 and HadCM3 have made projections to 2100. In these models both spatial and seasonal variability is projected. The ice extent is reduced even faster than the predictions from the IPCC Special Report on Emissions Scenarios, as modelled to 2050. The spatial variability due to ocean water exchanges and currents, and atmospheric movements (winds, for example) mean that ice cover will not be uniform and the modelling reveals that the Nordic Seas will be ice-free in the summers of the late century. The last remaining ice in the 2081-2090 period will be in the Canadian Arctic archipelago and seas north of Greenland.

Consequences of sea ice changes are that open water allows for much more heat absorption, but at the same time it could become an important sink of atmospheric CO₂. The rapid changes in the Greenland ice sheet will impact both northern (and global) sea level rise, and the thermohaline circulation (the Gulf Stream). Great altera-

tions in the climate of the Arctic and the adjacent regions in Europe are anticipated. The observation-prediction system needs to continue in support of the planning of the entire spectrum of societal and natural changes in the Arctic.

Ocean dynamics and sea level rise

A completely absent polar ice-cap in the summer season, plus expansion of the ocean water due to increase of the average temperature of the oceans means that coastal regions will be endangered by sea level rise. Coastal regions in the western Arctic are particularly vulnerable. With global warming, the air-water-land interface is massively changed so that more violent storms have already been experienced. Violent storms in coastal areas are anticipated to continue and could be increased in ferocity. Thus coastal flooding will make some presently inhabited areas temporarily or permanently uninhabitable.

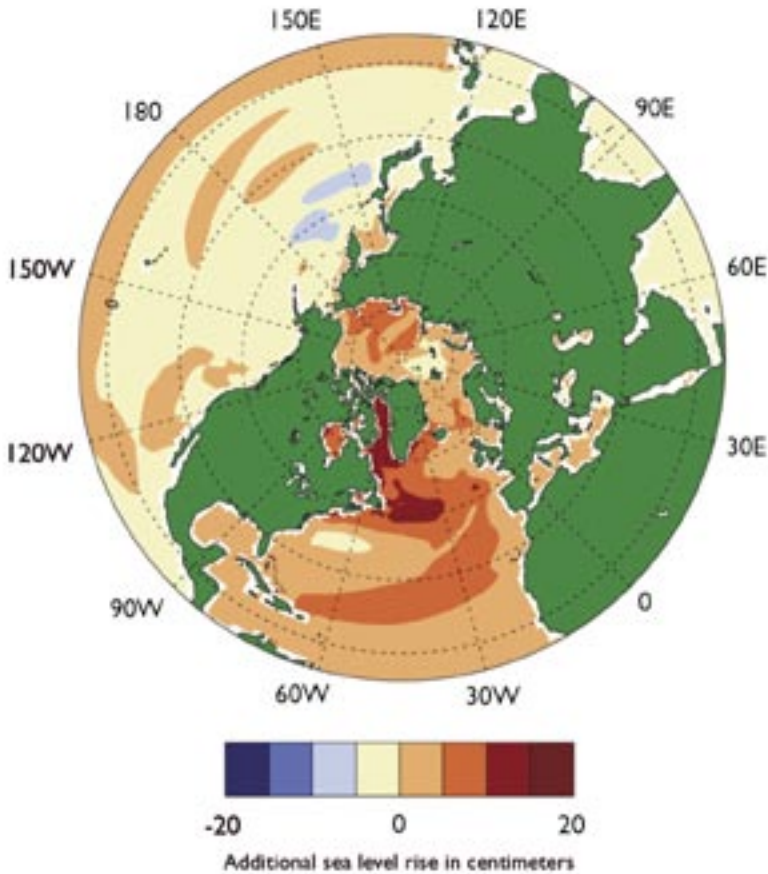
With the Arctic melt, we have an additional ocean surface that is capable of being a sink for CO₂, which will be an (as yet unassessed) countervailing influence. While this seems, at first glance, to be positive, it introduces a major threat. CO₂ in seawater becomes carbonic acid. Marine life⁶³ is very sensitive to pH changes – calcium carbonate in shells begins to dissolve; coral is further endangered; the whole food chain is interrupted. Nutrients of the ocean, which feed creatures as large as the whale, flourish in a very limited range of pH. Acidification of the ocean is measured to be proceeding much faster than anticipated. The oceans will not rise uniformly as the world warms, because of temperature and density differences. Ocean currents will change; at present the flow is from west to east. Differences in ocean dynamics are already being observed.

Until recently, the melting of the Greenland ice-cap had not been modelled. The IPCC Report of 2007 anticipates that the Greenland ice-cap will not cause serious sea level rise until after 2100, but present observations suggest that it will happen sooner than the turn of the century. Newly published NCAR (National Center for Atmospheric Research, U.S.A.) modelling results show that some locations will experience sea level rise that is greater than the global average⁶⁴. Figure 4 illustrates the *additional ocean level rise* that would be experienced by coastal areas.

⁶³ Nancy Macdonald; An Ocean of Poison, Maclean's, August 3, 2009, p. 36

⁶⁴ A computer simulation by the National Center for Atmospheric Research in Boulder, Colo., looked at what would happen by the end of the century if greenhouse gas levels were cut by 70%. The result: The world would still be a warmer world but by about 2 degrees instead of 4 degrees. Arctic sea ice would shrink but not disappear, and sea level would rise less.

Figure 4. Additional ocean rise upon melting of the Greenland ice sheet



Melting of the Greenland ice sheet would cause 10-30 cm of additional water rise in cities bordering the northeast Atlantic Ocean, placing a huge stress on already threatened cities such as New York, Boston and Halifax. The same effect is forecast for the far eastern section of the Russian Arctic coast. Over much of the Canadian Atlantic ocean coast, the sea rise is exceptional, compared to the rest of the world. In the Arctic Ocean, the areas that must anticipate additional sea rise are between Baffin Island and Greenland and in Hudson's Bay. The study noted that the sea level in the Northeast Atlantic is 71 cm lower than the North Pacific because the warm Atlantic water cools in the north and creates a (lower volume) dense layer of cold water. With the addition of fresh water from the Greenland melt, the net effect would be that the deep water would become warmer and less dense, thus elevating the surface of the ocean.

Even if the effect is more moderate and the Greenland ice sheet only shows increased melting of 3 per cent yearly, it will change the present rate of addition of fresh water to the northward conveyor belt, which will weaken the oceanic circulation that pumps warm water to the North Atlantic. Many of the Arctic nations are included in the affected region.

Early in the 20th century, Nansen, a scientist-explorer, anticipated that conditions of the polar basin had much influence on the climate. His expedition explored the properties of the Trans-Polar Drift⁶⁵, an oceanographic condition that caused ice to circulate around the North Pole. With the change in polar ice, atmospheric conditions change and it is likely that further changes in climate conditions worldwide will eventually be caused by changes in Arctic Ocean circulation.

Consequences of Arctic climate change

The impacts of climate change beyond the (average) 2°C threshold are projected to be extremely serious, possibly catastrophic, according to the 2007 Intergovernmental Panel on Climate Change report. ‘Even if the global community achieves the limit-to-average-temperature-change of 2°C which will be the best possible outcome, the Arctic will, nevertheless, experience a dramatic rise in temperature, requiring a huge adaptation to the changed environment. Climate change and the loss of the polar ice-cap are massive in their consequences. It is apparent that, in this situation, there is (a) reason for optimism regarding new opportunities and (b) concern regarding adaptation.

Navigation routes and ice cover changes

For the summer season, two major navigation routes (see Figure 2) will be available within the next few decades

- the Northwest Passage, passing through international, Canadian, U.S. and Russian sovereign waters and
- the Northern Sea Route, passing through international, Russian, and Norwegian sovereign waters

⁶⁵ Clements Markham, 1921, *The Lands of Silence. A History of Arctic and Antarctic Exploration*, Cambridge University Press. Also see <http://npweb.npolar.no/english/articles/tara>

The economic and environmental benefit of saving 5000-7000 nautical miles in transport is compelling. At the same time infrastructure for the voyage is either absent or insufficient. The violent seas of the Arctic Ocean, combined with remnant ice will make this a hazardous trip, requiring ports to service the traffic, navigation charts, coastal pilots, shipping controls and regulations, and the support of emergency services such as search and rescue. Deep water ports are needed in the Arctic; such infrastructure is vital to shipping. The potential shipping route through the Arctic is going to be significantly more dangerous than traditional routes. An oil spill accident would be disastrous to the fragile Arctic ecosystem. Ice-capable ships, crews with Arctic expertise and surveillance of shipping conditions such as small icebergs will be vital.

A major challenge will be to maintain these transits as environmentally benign and to keep the Arctic Ocean and shores pristine. Massive new infrastructure projects will be necessary. There may or may not be a net benefit to northerners through increased shipping in northern waters. Hazards will be present due to inexperience with northern conditions for offshore oil production and industrial transport, whether by land or sea.

National sovereignty and international law

One consequence of climate change for the Arctic can be summed up as a geo-economic shift to the North.⁶⁶ Its magnitude could be compared to the geo-political shift after the end of the Cold War, but this change has an economic motivation. Natural resources are the draw, not only for the five Arctic coastal states, but for other countries. All see the potential in participating for gain, even though is a great technical and human ingenuity challenge. Use and occupancy of Arctic lands, sea and ice by Arctic aboriginal people goes back thousands of years⁶⁷ and must be included in any review of sovereignty claims and resource allocations.

The issues of sovereignty for the Arctic Ocean offshore areas and beyond are not susceptible to solution by any individual sovereign state. To address the challenges, consider what international instruments are already agreed, and available to apply.⁶⁸ The United Nations Charter, Article 52 specifically recognises the legitimacy of regional arrangements for international peace and security issues.

⁶⁶ T. Vaahtoranta, Territorial Claims as an Example of the Geo-economic Shift to the North, ArcSec 21Vanc 08

⁶⁷ T. Pennikett, Political Climate Change in the Canadian Arctic, ArcSec 21Vanc 08

⁶⁸ Sergio Duarte, Keynote Address, ArcSec 21Vanc 08

The Seabed Treaty establishes a Nuclear-Weapon-Free Zone on the seabed and its subsoil.

For jurisdiction over the seas, the applicable legal regime is the United Nations Convention on the Law of the Sea (UNCLOS) which was signed in 1982⁶⁹ and has been ratified by 154 states. The sovereign territory to be considered is shown in Figure 4. All countries that border the Arctic Basin have ratified it, except the United States (the matter is before the U.S. Congress, and is thought likely to pass). The extent of the continental shelf of each sovereign nation, as shown by existing, ongoing and future collections of scientific data, national and international, is the key source of information for decisions by the UN body on territorial claims.

Coastal effects

Sea level rise along with lack of ice cover will put several northern communities at risk of coastal erosion, especially in the western Arctic of Canada. For example, the Canadian town of Tuktoyaktuk is at the northern end of a treeless tundra in the Mackenzie Delta. A relatively small rock breakwater has been installed to alleviate flooding that is caused by severe seasonal storms. However, in recent years the barrier has proven insufficient and many residents have had to leave their homes for extended periods. This situation will get worse with climate change, and some communities will have to be abandoned, and the residents relocated. The chief cause of this new class of environmental refugee is not the rising sea level, although it is a contributing factor, but the more severe storms that are the result of changes in the air-land-ocean interface.

Environmental refugees

Many of the Arctic peoples have communities on the coast in all the Arctic countries. Some coastal communities will have to be evacuated. It is highly preferable to relocate small native communities coastally, since the food gathering methodology and the entire culture is centred around the water, the ice and the marine life there. Elders of traditional Inuit communities in Canada's north have spoken of their long history of adaptation and feel that they need not be overly concerned, and will move when the

⁶⁹ H.J. Rajan, An International Legal Regime for the Arctic, ArcSec 21Vanc 08.

"Sovereignty under the Convention: Under the 1982 United Nations Convention on the Law of the Sea, coastal states are entitled to territorial sea, contiguous zone, exclusive economic zone, and continental shelf over which they have specific rights and jurisdiction. These zones have to be drawn from certain baselines, which is the low water line along the coast (normal baselines) or straight or archipelagic baselines defined by reference to lists of geographical coordinates of points. Waters on the landward side of the baseline are internal waters of the state or, in the case of archipelagic baselines, archipelagic waters".

Figure 5. Map of the Arctic



necessity arises. However, it cannot be denied that moving from a culture of the sea to a culture of the land, rivers and lakes will be a major upheaval for environmental refugees who must endure this type of change.

Arctic peoples

To minimise suffering and maximise opportunity for adaptation, northerners must be fully engaged, and integrated into planning and scientific work. In summary, the consequences of warming in the Arctic require extensive northern planning and this needs to intensify immediately. Issues to be considered are wide ranging⁷⁰ and include:

- Rivers, lakes and coastlines are undergoing very rapid change
- Accumulation of Persistent Organic Pollutants (POP's) is a health issue. Mercury, a neurotoxin, from existing and new coal-fired electricity plants elsewhere in the world, will increase
- The European Environment Agency⁷¹ has expressed concerns about the variety and complexity of environmental issues that are affecting the Arctic, and is calling for policy development and an action plan
- Models are Arctic-wide and are not usually applicable for revealing regional trends. Scientific data over time does not exist and is not being collected
- Native northerners are accustomed to making their living from the ocean, and land. Traditional foods are fundamental to northern culture. As well as adaptation assistance, policies and strategies of adaptation need to be jointly developed, with more resources applied, between northerners and southerners
- Traditional knowledge of native peoples, embedded within their methodology of storytelling, has accumulated 1000 years of data on snow melt and water nutrients, caribou herd size and migration, to give just a few examples from the Inuit Canadian culture. This is an important area of exchange of information with southerners, to supplement scientific data, and to add new data
- Youth are not being prepared for the nature of the new Arctic; learning models and their education must fit the needs of the north. Many of the new employment opportunities will require highly skilled personnel; but training of native peoples for this work is insufficient or absent in the north⁷²

⁷⁰ R. W. Macdonald , Consequences of Warming in the Arctic with Reference to Arctic Security, ArcSec 21Vanc 08

⁷¹ Arctic Environment: European Perspectives – Why should Europe care? European Environment Agency, 2004.

⁷² A.M. Paperny, The search for a vision to match Arctic vastness, The Globe and Mail, August 1, 2009.

The climate change solution is extra-Arctic, but commencement of the Arctic adaptation work is urgent

Permafrost

Permafrost is the salient and normal condition of the northern landscape, be it in Siberia, northern Scandinavia, Alaska or Canada; but that too is rapidly changing. Permafrost thaw is a huge problem for pipelines and infrastructure (e.g. sewage, roads, and buildings). In the natural world, forest sections are devastated, huge landslides occur on mountains and hillsides. On the coastlines, the warming Arctic continues to warm the permafrost and large sections of land are lost to the ocean.

The melting of permafrost greatly accelerates the production of greenhouse gases, and thus becomes one of the major feedbacks into the climate system. Stored carbon is released as carbon dioxide, but even more onerous is the release of stored methane, long trapped in the permafrost, and over twenty times as potent a greenhouse gas as carbon dioxide. The enormous burden of release of the northern hemisphere's trapped carbon as a climate modifier is threatening to life and earth ecosystems as we know them. In the Mackenzie delta of Canada's western Arctic there are several lakes and ponds seeping methane⁷³ at such a rate that three of the largest seeps are said to be sufficient to fuel 9000 automobiles.

In the oceans, there is another version of permafrost; namely the very large deposits of solidified methane on the ocean floor in the form of methyl hydrate. Much of this is in the Arctic Ocean. Scientists and engineers are presently exploring methods of using these deposits as energy sources. However, the opposite side of this same story is that the methyl hydrates might, in warming oceans, turn from solids into gases, and release huge amounts of methane into the atmosphere, already stressed with an overload of greenhouse gases.

The exact nature and quantity of release from the permafrost *has not yet been modelled*. Nevertheless, it is sufficiently alarming that there has been widespread acceptance by governments (who will enter into negotiations in Copenhagen in December 2009) that the temperature rise from greenhouse gases/climate change must be limited to 2°C. However these same negotiators are expected to have serious difficulty agreeing on the severity of the required change to prevent warming that will release all permafrost.

⁷³ Ed Strusik, 2009, *The Big Thaw – Travels in the Melting North*, John Wiley & Sons Canada, Chapter 6.

Lakes, rivers and the ocean

Many northern communities, in Canada, are connected in winter by ice roads that cross the many lakes, streams and tundra that would be very difficult to connect by normal highways. Major delivery of supplies for construction for remote mining, for example, is provided through the ice road system. The season for the ice roads is becoming shorter, with subsequent economic consequences.

Rivers flowing north empty into the Arctic Ocean and have river delta and lake systems that are essential sources of livelihood to northern peoples, as well as to northern wildlife. Here too, unprecedented changes make familiar landscapes become unfamiliar, and the rate of change has probably been underestimated.

In many regions of the Arctic, many small shallow lakes or ponds are usual parts of the landscape. The ponds of the high Arctic at Cape Herschel on Ellesmere Island

Figure 6⁷⁵ – Example of desiccation of one Arctic pond between 1979 and 2006



⁷⁴ John P. Smol and Marianne S. V. Douglas; PNAS, July 24, 2007, o. 30 p. 12395.

have been the subject of many years of observation by Professor John Smol⁷⁴ and his research group. Paleolimnological data indicate that these have been permanent water bodies for millennia. Now the relative balance of evaporation and precipitation has been greatly altered and the result is the near disappearance of many of these ponds, to the detriment of the wildlife that depends on them. One example is shown in Figure 6. Smol points out that these desiccated ponds are ‘canaries in the coal mine’ for the Arctic; changes in permanent water bodies throughout the Arctic indicate major ramifications for ecosystems.

Habitat changes, wildlife and food supply

Complex food webs will alter, in terms of availability of food and access to food. This applies to the marine, animal and human populations. There will be invasive species and diseases, so that populations will be displaced or absorbed. The extent of changes in organic systems due to exposure to contaminants such as POPs (persistent organic pollutants) and mercury is unpredictable, but certainly unfavourable. Food and water security are threatened by thawing of permafrost.

Another source of vulnerability is pH change in lakes and oceans (not just the Arctic). There is potential for ecosystem collapse; at the same time there is potential for new commercial harvesting of Arctic resources. Accurate assessment of these situations is vital.

Tree line

It is widely assumed that, with warming weather, forests will automatically advance northward. Forestation will be slow⁷⁶, over centuries or more, rather than decades, as the soils do not exist. Nevertheless there will be pockets of forestation where soils permit. Thus, this alleviates a concern that major alterations and disappearance of tundra and wetlands would devastate breeding grounds for wildfowl, caribou and other species. Note the present tree line as shown in Figure 5.

⁷⁵ John P. Smol, Professor, Canada Research Chair in Environmental Change, Queen’s University, Canada, “*Water and Ecological Governance: Catastrophic Effects of Climatic Warming in the Arctic*”; at Roundtable on Freshwater – Emerging Threats and Urgent Priorities; Continuing program of the Global Issues Project of Science for Peace and Canadian Pugwash; Trinity College, University of Toronto, Toronto, Ontario, Canada; 7–9 November 2008 www.pugwashgroup.ca

⁷⁶ Martin Hubbes, Professor (Emeritus), Department of Forestry, University of Toronto, Canada, personal communication.

Diseases, species adaptation and foreign species

The climate-changed Arctic flora and fauna of the future will have adapted to the diseases that had formerly been unknown in the north. Where foreign species enter, for example in the ocean, it is possible that existing marine species would be overcome, or would interbreed. Some land-based parts of the chain of life in the ice fields of the Yukon in the western Arctic have been noted to change over the current periods of observation. The tiny mouse-like collared pika⁷⁷ live in a hostile environment that is snow-free for only six weeks of the year. However, populations have been known to collapse in the face of atypical warmer weather, such as very wet snow or rain, which destroys their normal habitat and food sources. There are alarming decreases in the number of caribou in the Canadian north. The reasons are not fully understood but would include disruption of calving grounds and other habitat by nature and by human operations such as mining. The well-known habitat problems of the polar bears may cause them to become land-oriented since the ice will be inaccessible because it will be far out to sea. Many polar bears have already been observed in unexpected locations.

Fisheries, commercial fishing and ocean currents

Commercial fishing in the Arctic Ocean will be common as soon as ice conditions permit. The Arctic fishery overall is thought to have abundant stocks of fish, but is unassessed region by region. Nevertheless, the open Arctic will be accessed by all nations that operate fishing vessels. The Arctic is geographically very large and, after all sovereignty claims are settled, there will be international waters accessible for fishing. What is unknown is how ocean currents will change in the ice-free Arctic. Presently there is an extremely nutrient-rich west to east flow of Pacific water into the Bering and Chukchi seas. Canada and the United States are disputing sovereignty over a part of the Beaufort Sea.⁷⁸ Both nations are prudent in recognising that fishery conservation is a goal, but are handling the issue with different policies. Climate change will impact the very important fisheries in the Nordic and Barents seas.

The air and ocean currents of the Arctic affect global weather. A pattern of atmospheric circulation known as the Arctic Oscillation is included as a counter clockwise pattern in most models. Like the better known El Nino, worldwide effects of new Arctic atmosphere and ocean circulation are to be expected, in ways that might intensify droughts and hurricanes. If the Arctic warms, it is certain that the rest of the world

⁷⁷ Ed Strusik, 2009, *The Big Thaw – Travels in the Melting North*, John Wiley & Sons Canada, Chapters 3 and 4.

⁷⁸ Anna Mehler Paperny, Fisheries Conservation Stirs up the Waters, *Globe & Mail*, July 29, 2009.

is warming too. NOAA has reported that in June 2009, the world's ocean surface was the warmest since 1880.

ACTION

Scientific work and technology development

Each of the eight Arctic states has some measure of scientific research ongoing in their territories north of the Arctic Circle. In fact, scientific observations and data collection have been key sources of information that have led to present recognition that the Arctic ice will diminish and eventually disappear, at least in the summer months. When the ice climate is altered, there arises the possibility of abrupt change due to 'surprise' feedbacks.⁷⁹ The vast Arctic is still largely unknown, and much scientific work is still required. For example, the time series data that would show consequential trends for biological and geochemical systems, and thermohaline circulation are urgently required, but do not exist.

While satellite and aircraft research is still vital, many Arctic researchers are required for work on the land and sea. Researching effects on animal population is essential. For example Figure 7(a), regarding studies of reindeer husbandry, can provide policy makers with the capability of making decisions about oil and gas or timber resource exploitation in those same regions. Figure 7(b) illustrates the necessity of ongoing in situ studies of Arctic sea ice.

Figure 7(a) – Inger Marie Gaup Eira prepares for fieldwork on EALAT, the Reindeer Herders Vulnerability Network Study, examining reindeer pastoralism in view of climate change. February, 2009 (from Environmental News Service Feb 25, 2009).



⁷⁹ R.W. Macdonald, Consequences of Warming in the Arctic with Reference to Northern Security, ArcSec 21Vanc 08

Figure 7(b) NPI (Norwegian Polar Institute) scientists participate in the scientific program on sea ice research.⁸⁰



Decision making based on data

The necessity of information for decision making cannot be overemphasised. Yet in all the Arctic countries, it is a continuing theme that scientists are limited in their ability to formulate research plans and carry them out due to lack of funds. Circumpolar cooperation could relieve some of this shortfall. To maximise the use of data on the Arctic, and for accurate transmission of information, policy makers, the media and scientists need better communication. There could be a Scientific Committee on Arctic Research, just as there is in the Antarctic. In addition, cooperative environmental protection is essential in the Arctic.

New technology

Scientific and technological innovation will provide solutions to seemingly intractable problems *and* open new opportunities. To accommodate the harsh environment many existing technologies will require major adaptation. Both situations will generate new technological advances. A few examples of developments, some underway and some not yet conceived, are:

- A new generation of icebreakers
- A new generation of oil and gas drilling platforms
- Ice management at ports, for longest possible season of operation
- Buildings and roadways that withstand melting permafrost

⁸⁰ <http://npweb.npolar.no/english/articles/tara>

- Local grids, renewable energy and infrastructure for rapidly growing communities
- Reliable supplies of clean water, and waste water treatment and disposal
- Capture of methane as an energy source from melting permafrost
- Capture of methane from seabed methyl hydrates

Resources for economic development

As the Arctic opens to new economic activity, natural resources are the draw, not only for the five Arctic coastal states, but for other countries. Exploration on the land will be governed by the sovereign nations; whereas exploration and exploitation of the seabed will require the conclusion of UNCLOS allocations of undersea territory.

To handle the ramifications of climate change the Arctic nations will need access to large funds for a variety of reasons. Financial benefits to multinational corporations and the world economy from exploitation of valuable Arctic resources must be tapped for building up the Arctic and for the many adaptations that are essential.

International cooperation

An early choice must be made whether to militarise the Arctic or to cooperate. That will set the stage for the future of the Arctic.

Now is the time for cooperation and a prime example is commercial shipping. Before it commences, major agreements need to be concluded on shipping, pollution, search and rescue, criminal activity, and international security. Cooperative solutions are needed for the many problems that arise in connection with about to be opened Arctic frontier.

Arctic Council

The mandate and origin of the Arctic Council is described on its website⁸¹ as follows:

The Ottawa Declaration of 1996 formally established the Arctic Council as a high level intergovernmental forum to provide a means for promoting cooperation, coordination and interaction among the Arctic States, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic.

⁸¹ <http://arctic-council.org/article/about>

Member States of the Arctic Council are Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, Russian Federation, Sweden, and the United States of America.

In addition to the Member States, the Arctic Council has the category of Permanent Participants. This category is open equally to Arctic organisations of Indigenous peoples with a majority of Arctic Indigenous constituency representing:

- a single Indigenous people resident in more than one Arctic State; or
- more than one Arctic Indigenous people resident in a single Arctic State.

The category of Permanent Participation is created to provide for active participation of, and full consultation with, the Arctic Indigenous representatives within the Arctic Council.

The Arctic Council is an active, running entity with a permanent secretariat and a rotating chair (Denmark holds the chairmanship for 2009-2011). A number of working groups have been established. Arctic-specific problems are discussed, and regular ministerial meetings are held. The Arctic Council must be empowered to expand its work, and to be an active player in the establishment of the new, climate-changed north. Cooperative responses to the broad spectrum of climate change ramifications are necessary.

The Arctic Council has accommodated more non-Arctic observers of late, some of whom are state representatives. These include China, the United Kingdom, France, the Netherlands, Italy, and Spain. In addition NGOs such as the World Wildlife Fund have been present, and the oil and gas industry is seeking a relationship. This could facilitate communication and add resources to the Council; however there is concern is that this may interfere with accomplishing urgent work of the Council.

Militarisation, arms control and disarmament policies for the north

Franklyn Griffiths points out that the costs and risks of strategic rivalry work against collaboration, and cooperation could be permanently foregone. To the extent that increased military presence on sovereign territory aids in the opening of the new Arctic, it should be welcomed. Naval ports are likely to be shared by both military and civilian commercial operations. Search and rescue would be an important function for military and civilian cooperation. Nuclear weapons in the region present a

multifaceted danger to the Arctic lands, seas and peoples, and preventive measures must be taken before it is too late. Land, sea, or undersea (see Figure 9) stationing of nuclear weapons is wrong. The creation of legal structures and procedures are already part of international discussions. It is important that nuclear weapons issues are put on that agenda, otherwise the status quo will become ingrained.

Figure 9 – Usual military activity in the Arctic



(a) Three polar bears approach a U.S. nuclear submarine, surfaced near the North Pole.⁸²



(b) Russia's navy has 12 nuclear-powered ballistic missile submarines

⁸² U.S. Navy photo by Chief Yeoman Alphonso Braggs.

Cooperative security solutions will be needed. Although there is indication already that conflicts will arise over the continental shelf delineations, military confrontation is unlikely, but not impossible. It is to be hoped that parties realise that cooperation is the only way to keep the nations safe.

Means of governance and the need for an Arctic treaty

The challenges of opening the Arctic are unprecedented. Successful management of the changes brought about by climate change is a goal that would be furthered by negotiation of an Arctic Treaty. Providing an equitable governance regime calls for a high degree of international cooperation and a resolution of rivalries. There is much that needs setting of priorities, followed by immediate work. The governance regimes that enter into this work would be regional, national, pan-Arctic and international. Since the achievement of a ratified international treaty is usually a work of decades rather than years, our governments need to provide an additional framework. Franklyn Griffiths⁸³ has suggested that there could be agreements under the umbrella title of *Agreement on Basic Principles of Arctic International Relations*. First steps might be bilateral, later multilateral.

An Arctic Treaty, and other international agreements, would provide an opportunity to embed the expectation of a NWFZ. Though there are many urgent priorities related to climate change, one of them must be the creation of an Arctic NWFZ. It should be introduced conceptually in the near future, at all levels, so it could gradually gain support, and be taken as a given condition of the future of the Arctic. It would be a significant step toward disarmament, and would build confidence toward a nuclear weapon free world.

Conclusion

Adaptation to climate change in the Arctic is a huge challenge with many facets. There is no place for conflict of a military nature. This paper has given only a partial indication of actions that are essential for governance and adaptation in the Arctic. Huge international resources must be brought forward to bring about a successful opening of the Arctic. Humanity does not possess the monetary nor human resources to apply to both militarisation and development of the Arctic. We must choose development and collaboration.

⁸³ Griffiths, Franklyn "Towards a Canadian Arctic Strategy" Canadian International Council, May 2009, www.canadianinternationalcouncil.org

Presentation Notes

Steps toward an Arctic Nuclear-Weapon-Free Zone

Steven Staples

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Let me thank John Avery and the Danish National Pugwash Group for inviting me here today. Also I want to thank Michael and Adele for their excellent presentations and also Michael Wallace, who could not join us here today, for his input on these remarks.

Well, I don't know what more I can add to such thorough discussions – maybe a story, some dreary numbers and a few good ideas (mostly belonging to other people).

First the story

On February 18th of this year, two Russian long-range strategic bombers, Tupelov 95Ms also known as Bears, took off from Engels Air Force Base in Saratov Region, in the Russian Federation. The base is in the southwest of the country, and these long-range planes are intended to carry nuclear bombs and air-launched nuclear-tipped cruise missiles.

The training flight, most likely unarmed, flew over the Arctic to the Beaufort Sea where, according to an official of the Russian Federation Embassy in Ottawa, the planes came to within 200 kilometres of the Alaska/Yukon border – the Yukon being a Canadian Territory. Then they turned back home homewards.

Nine days later Canada's Defence Minister, Peter MacKay, held a press conference with the Chief of Defence Staff and the U.S. head of NORAD, to announce that the flight had occurred and a Canadian CF-18 Hornet had been scrambled to meet the Russian aircraft and force them to turn back. He strongly reprimanded the Russians for the flight. He pointed out that the incident occurred a day before U.S. President Barack Obama was to visit Ottawa.

The Prime Minister went further. Stephen Harper said, "I have expressed at various times the deep concern our government has with increasingly aggressive Russian actions around the globe and Russian intrusions into our airspace." (cbc.ca, February 27, 2009)

The tough talk from the Canadian government conjured up the Cold War. But the sabre rattling became somewhat embarrassing when it became clear that the Russian aircraft did not enter Canadian airspace at all.

Canadian military officials downplayed the incident, declaring it routine. Russia launched its own counterspin, declared the Canadian protests 'a farce', and dispatched officials to explain that there was no violation of Canadian sovereignty since the flight occurred in international airspace, and that NATO forces regularly make these kinds of flights toward Russian territory.

Even the U.S. commander of NORAD, General Gene Renuart, was unmoved by the purported Russian threat, saying: "The Russians have conducted themselves professionally; they have maintained compliance with the international rules of airspace sovereignty and have not entered the internal airspace of either of the countries".

But the incendiary talk illustrates what some have called Bear-baiting and Rus-sophobia. Canada's former ambassador to Russia and former UN ambassador for disarmament Chris Westdahl said Canada "should stop picking fights where none need be, with Russia".

But Bear-baiting is good politics in Canada these days, as the government asserts Canadian sovereignty in the Arctic, and tries to defend its claim that the Canadian Arctic is not an archipelago of islands, and therefore the Northwest Passage is an internal waterway, not an international one.

Canada is becoming more aggressive, trying to brand itself as an Arctic Power. In fact, reporters have noticed increased use of the phrase 'Arctic Power' in government communications. Canada's Foreign Affairs Minister has said that 'Canada will not be bullied', and met with Russia's Foreign Minister to request that Canada receive advance notice of future training missions.

The issue of advance notice of flights was raised in Parliament, as MPs questioned a Russian embassy official on the process. Canadian government officials claimed they had no advance notice, but the Russian official said that notice was given to the United States under the terms of the 1991 START agreement. START I expires on December 5 of this year. Why Canadians did not know, given that we are partners in NORAD with the U.S., raises as many questions about information sharing with the Americans as with the Russians, in my view.

Testifying before the U.S. House Armed Services Committee, the Commander of U.S. Northern Command and NORAD said that in 2008, pairs of Russian TU-95 Bear-H aircraft flew into NORAD's Air Defense Identification Zone on seven separate occasions. All but one of these flights were unannounced, and foreign planes never violated North American airspace. On another occasion, General Renuart told a Canadian audience that "from the end of the Cold War to 2006, there were 10 or 11 or 12 Russian patrols up in the Arctic region. Since 2007, there have been a total of 30".

The February aircraft incident, which evoked such a strong reaction from the Canadian government, stands in stark contrast to another incident involving nuclear forces and Canadian sovereignty. Last August, a year ago, the Canadian Forces quietly scrambled to investigate a report of a foreign submarine sighting near the eastern entrance of the Northwest Passage. The sub sighting – what the military described as a reliable report from hunters – occurred near the northern end of Baffin Island on August 9, 2008. The sighting was linked to a report a few days earlier of a mysterious explosion in the area, widely reported in the media. Another group of hunters heard the explosion, which was so large it shook their cabin. They emerged and saw a plume of black smoke some distance away. But in the case of the explosion and sub sighting, the military commented only on the explosion, and rewrote planned responses to journalists, removing any reference to the submarine.

The difference in reactions: on the one hand bellicose pronouncements regarding a Russian training flight, on the other attempts to hide from the media the fact that a sub was sighted near the entrance of the Northwest Passage, is remarkable. It is possibly due to the fact that bomber flights are clearly visible using radar and Canada has the ability to scramble fighters and meet the Russian aircraft. But we have no way of identifying or monitoring submarines, nor can we intercept them. In fact, the sub could have belonged to one of our allies.

The government also wanted to avoid a repeat of the awkward visit of a U.S. nuclear attack submarine to the Arctic at around the time of the Canadian federal election in 2005. The then Liberal government was embarrassed when it was revealed that the *USS Charlotte* had spent two weeks under the Arctic ice pack, surfaced at the North Pole, and possibly crossed into Canadian territorial waters.

When contacted at the time, a U.S. embassy spokesperson simply said the submarine did not need Canada's permission to travel through international waterways. The problem

is that the U.S. does not recognise Canadian sovereignty claims beyond 12 nautical miles from the coast, and considers the Northwest Passage international waters.

In order to monitor traffic, the Canadian government has tried to build an underwater network of listening devices to track submarines along the eastern part of the Northwest Passage. An attempt in the 1990s fell apart because of a hundred million dollar price tag. A second attempt, launched in 2007 by the current government to fulfil an election promise emanating from the *USS Charlotte* incident, has also been delayed. Listening devices and land-based sensors on Devon Island were installed in 2008 as part of the Northern Watch program. But reports published last month say that the program is in hiatus as scientists review the data collected.

Now come the dreary numbers

During the Cold War, Russian and United States nuclear submarines played cat and mouse games in the Arctic waters, under the ice. The airspace above the Arctic was the transit route for the nuclear-armed bombers. While NORAD has taken the Russian Arctic flights in its stride, and the Canadian government has used them for political hyperbole, we shouldn't kid ourselves about what these pilots are actually training to do – that is, to launch a nuclear attack.

Russia maintains a fleet of 77 strategic bombers, including 14 TU-160 Blackjacks, supersonic bombers first deployed in 1987 and similar in design to the U.S. B-1 bomber. The remainder of the fleet consists of 63 propeller powered Tu-95 Bears, introduced in 1984.

According to Robert Norris and Hans Kristensen, writing in the *Bulletin of the Atomic Scientists*, Russia deploys 856 nuclear weapons on these aircraft in the form of air-dropped bombs and cruise missiles, representing about a third of Russia's strategic offensive forces. The aircraft have stepped up operations outside and inside Russian airspace during the past year, and have held long-range exercises in the North Atlantic and North Pacific.

Just like aircraft, where you have fighter planes and bombers, there are likewise attack submarines and large-missile submarines. In the Arctic only nuclear-powered submarines can stay submerged long enough to operate. The United States, Russia, Britain and France have nuclear-powered attack and missile submarines that can patrol in the Arctic.

According to Norris and Kristensen Russia maintains a fleet of ten missile submarines, six Delta IVs and four Delta IIIs, which are equipped with 160 submarine launched ballistic missiles, carrying 576 nuclear warheads. The Russian navy is modernising the Delta IVs to carry a new missile, and has a new class of missile submarine, the Borey class, in development. Although delayed, when completed the submarines will carry the new Bulova nuclear-armed submarine-launched ballistic missile.

Today, Russian submarines carry only 20 per cent of the country's nearly 2,800 strategic warheads (nearly half the total number of warheads are on land-based intercontinental ballistic missiles and the rest are on the bombers). But Norris and Kristensen predict that by 2020, even though the total number of warheads will drop to 1,954, the percentage deployed on missile submarines will more than double, to 45 per cent.

Submarine patrols have increased in recent years. Russian ballistic missile submarine patrols have increased from three in 2007 to ten in 2008, though this is far less than the dozens of patrols conducted in the 1980s.

Unlike the Russians' focus on land-based nuclear weapons, the United States has taken submarines as the platform of choice. The U.S. operates a fleet of 14 Ohio-class Trident missile submarines that carry an estimated 1,152 warheads, or 43 per cent of the operational U.S. arsenal, according to Norris and Kristensen.

Using documents obtained through the Access to Information Act, Kristensen found that the U.S. continues to operate its nuclear-armed submarines at rates similar to Cold War levels, and conducts more submarine patrol missions than the rest of the world combined. In 2008, Ohio class subs conducted 31 patrols, most of them from the west coast base at Bangor, Washington. The average patrol lasts 72 days submerged, and some missions have exceeded 100 days.

As for the British and French, they too have come to rely on the submarine fleets to deploy their respective nuclear arsenals. Britain withdrew its last air-dropped nuclear bomb in 1998, and since then has a fleet of four Trident nuclear missile submarines, with one on patrol at all times. The fleet is closely integrated with the U.S. fleet, combining its D-5 nuclear missiles and approximately 200 warheads with the U.S. stockpile. The French fleet of three nuclear missile submarines, and a fourth nearly completed, carries 240 of the country's 300 nuclear warheads.

All four of these countries can operate missile submarines in the Arctic. Although patrol routes are the most closely held secrets of the nuclear submarine powers, it's certain that the American and Russian nuclear-armed submarines are patrolling in the Arctic.

The fact is the Arctic is becoming a zone of increased military competition. Russian President Medvedev has announced the creation of a special military force to defend Arctic claims. Russian General Vladimir Shamanov declared that Russian troops would step up training for Arctic combat, and that Russia's submarine fleet would increase its 'operational radius'. This week, two Russian attack submarines were spotted off the U.S. east coast for the first time in 15 years.

In January, on the eve of Obama's inauguration, President Bush issued a National Security Presidential Directive on Arctic Regional Policy. As Michael Hamel-Greene has pointed out, it affirmed as a priority to preserve U.S. military vessel and aircraft mobility and transit throughout the Arctic, including the Northwest Passage, and foresaw greater capabilities to protect U.S. borders in the Arctic.

The Bush Administration's disastrous eight years in office, particularly its decision to withdraw from the ABM treaty and deploy missile defence interceptors and radar in Eastern Europe, has greatly contributed to the instability we are seeing today. The Arctic has figured in this renewed interest in Cold War weapons systems, particularly the upgrading of the Thule Ballistic Missile Early Warning System radar for ballistic missile defence.

The Canadian Government, as well, has put forward new military capabilities to protect Canadian sovereignty claims in the Arctic, including proposed ice-capable ships, a northern military training base and a deep water port.

Denmark last week released an all-party defence position paper that suggests the country should create a dedicated Arctic military contingent that draws on army, navy and air force assets with ship-based helicopters able to drop troops anywhere. Danish fighter planes could soon be patrolling Greenlandic airspace.

Last year, Norway chose to buy 48 Lockheed F-35 fighter jets, partly because of their suitability for Arctic patrols. In March, that country held a major Arctic military practice involving 7,000 soldiers from 13 countries in which a fictional country called Northland seized offshore oil rigs.

The manoeuvres prompted a protest from Russia – which objected again in June after Sweden held its largest northern military exercise since the end of the Second World War. About 12,000 troops, 50 aircraft and several warships were involved.

Jayantha Dhanapala, President of Pugwash and former UN Under-Secretary for Disarmament Affairs, summarises the situation bluntly. He warns us that: “from those in the international peace and security sector, deep concerns are being expressed over the fact that two nuclear weapon states – the United States and the Russian Federation, which together own 95 per cent of the nuclear weapons in the world – converge on the Arctic and have competing claims. These claims, together with those of other allied NATO countries – Canada, Denmark, Iceland, and Norway – could, if unresolved, lead to conflict escalating into the threat or use of nuclear weapons.”

OK. Now come some good ideas

The Canadian Pugwash Group issued a call in 2007 for an Arctic Nuclear-Weapon-Free Zone, which has been distributed and commented upon widely. While nuclear weapons are not the only threat to peace in the region, they are the most potent.

The proposal has served to spark the imagination of many people concerned about the militarisation, or re-militarisation, of the Arctic, and increased U.S.-Russian tensions. But it is also not without critics, as any serious proposal will be. The discussion it has provoked is welcome.

As my fellow Canadian Pugwash Executive member Michael Wallace has acknowledged, there are two main facts on the ground that make an Arctic Nuclear-Weapon-Free Zone impossible without additional, complementary disarmament measures. The first is that the two largest nuclear powers regularly deploy nuclear-capable submarines in the Arctic waters, and the second is that the largest and most important naval base for Russian ballistic missile submarines, Zapadnaya Litsa, is located on the Kola Peninsula north of the Arctic Circle.

As others have pointed out, all of the world’s regional zones have prevented the acquisition of nuclear weapons by non nuclear weapons states and the deployment of other states’ nuclear weapons on their territory (the latter is permitted under the NPT, so long as the weapons are under the control of a nuclear weapons state). Also, the transit of nuclear weapons, such as aboard submarines, is generally permitted in agreements. Nuclear weapons states that have signed the agreement’s pledge not to

use or threaten to use nuclear weapons against countries in their respective zones. These are called negative security assurances.

So, as we can see, an Arctic Nuclear-Weapon-Free Zone would be unique. It would be the first agreement to encompass the territory of nuclear weapons states, namely Russia and the U.S.A. It would potentially require the de-nuclearisation of the zone, rather than just preventing future actions. The zone would not cover entire states, but only regions of states. And, the negative security assurances required of the two nuclear weapons states would be especially problematic.

Nevertheless, as Michael Hamel-Greene reminds us, we should not quit before we even start. "In the case of all of the successfully established zones, there were critics and pessimists who suggested such zones would never be agreed on", he writes.

Many people have suggested some small steps that could be pursued as we move toward the larger goal. Michael Wallace suggests Canada could consider declaring the Northwest Passage a Nuclear-Weapon-Free Zone. Since surface military ships and attack submarines of both the Russian and the American navies most certainly no longer carry nuclear weapons, and the shoals of the passage make it hazardous for submarine navigation, such a declaration would be a powerful, symbolic statement. In order to acknowledge Russian concerns over such a zone's biased impact, a comprehensive set of nuclear disarmament measures could be put in place to 'balance' the Russian strategic disadvantage. For instance, a follow-on treaty reducing weapons to 500 for each side could allow Russia to rely on land-based missiles, rather than submarine-based ones.

Adele Buckley, also a Canadian Pugwash Executive member, has suggested that all Arctic states presently non-nuclear agree to work together on a regional treaty, as allowed for in the Nuclear Non-Proliferation Treaty, to 'assure the total absence of nuclear weapons from their respective territories.' This would include Canada, Denmark, Norway, Sweden and Finland.

The Parliamentary Network for Nuclear Disarmament agrees, and suggests adding a protocol whereby nuclear weapons states would agree not to deploy, threaten or use nuclear weapons in the entire Arctic zone.

Jozef Goldblat suggests that the difficult circumstances of the region, given the proximity of two nuclear powers, could build on the experience of other Nuclear-Weapon-

Free Zones. “However, certain new approaches would be needed to deal with the existing situation”. He suggests that “one could start by formally declaring the entire Arctic area a common legacy of mankind... The interest in creating a new regime in the Arctic would increase, if the denuclearisation efforts were made in parallel, as well as in conjunction, with the scientific investigations related to climate change”.

We also cannot overlook the existing bodies and treaties that could be used to promote security and co-operation. Christopher Westdal recently asked why we are not making the most of the NATO-Russia Council. For instance, “why aren’t we promoting joint Arctic security patrols flying wing to wing with those ancient Russian Tupelovs to prove the security of the northern Polar airspace, say, or rehearsing coordinated responses to potential aircraft hijackings in the North, practicing joint search and rescue drills?”

The UN High Representative for Disarmament Affairs, Sergio de Queiroz Duarte, reminds us that “the Seabed Treaty of 1971 requires states parties, including all eight states in the Arctic region, not to place on the seabed and the ocean floor and in the subsoil thereof, nuclear weapons or any other types of weapons of mass destruction, as well as structures, launching installations or any other facilities designed for storing, testing or using such weapons”. Extending the treaty to include a prohibition on the stationing of nuclear weapons anywhere else in the region would seem logical.

Rather than a single treaty, Duarte says he sees the gradual emergence of an eclectic Arctic security regime, consisting of various elements derived or adapted from other multilateral arrangements, and applied to the specific conditions of the Arctic region.

In conclusion, let me take a quote from a surprising source, Royal Dutch Shell (surprising because I have been boycotting Shell since the days of apartheid...).

Shell has produced what they call ‘Energy scenarios to 2050’. They were developed to help think about the future of energy, and the result is two scenarios that describe alternative ways it may develop: ‘Scramble’ and ‘Blueprints’.

In the Scramble scenario events outpace actions and policy makers pay little attention to more efficient energy use until supplies are tight. Likewise, greenhouse gas emissions are not seriously addressed until there are major climate shocks. Will national governments simply scramble to secure their own energy supplies?

In the Blueprints scenario actions outpace events. Growing local actions begin to address the challenges of economic development, energy security and environmental pollution. Blueprints emerge from coalitions between various levels of societies and government, ranging from the local to the international, that begin to add up to a new energy framework.

As climate change continues and energy demand rises, nations are looking to the Arctic as their next source of energy supply. In a nuclear armed Scramble the risk of confrontation is too dangerous to tolerate.

Our task here is to see into the future, and act now. Blueprints can emerge from coalitions between various levels of societies and government, ranging from the local to the international, that begin to add up to a new energy, environmental and security framework.

That is everyone's challenge.

Thank you.

Pugwash Conference on a Nuclear-Weapon-Free Zone in the Arctic

Speech by Holger K. Nielsen

Member of the Danish Parliament

I am very grateful to have been invited to give a statement at this conference, one that seems to be extremely important and interesting. Because of the funeral of a good friend and colleague, the first vice-speaker in the Danish Parliament, I was not able to attend the conference yesterday. But I have read the papers, and it strikes me that they are brilliant, competent and relevant. They give a comprehensive and realistic picture of the problems that confront us.

For Arctic policy – in particular Arctic security policy – should have political top priority. Climate change gives new challenges – and problems. We will see an increase in shipping traffic and tourism, more fish resources, new opportunities for exploiting underground resources etc. All this is well described in the papers of the conference and I agree totally in the analysis of these papers.

It is well known that lack of natural resources, already today, is a main reason for conflicts and wars. It is impossible to comprehend the war in Iraq and the patterns of conflict in the Middle East and the Caucasus region without including the oil aspect. The same is the case in Africa. This aspect will be stronger in the future. We know there is a limited lifetime of natural resources. We know that global consumption of natural resources is increasing dramatically – even despite a financial crisis – and that it is a question of time, before they are extinguished. This will – of course – create conflicts and perhaps wars.

The Arctic is interesting in the sense that there has, until now, not been a high exploitation of natural resources in the region. The climate has been too tough, the conditions too difficult and the prices have been too low to make exploitation profitable. This will change dramatically. The climate will get milder. The conditions for exploitation will get easier. The prices of natural resources will increase. The Arctic has all the obvious conditions for becoming a high tension area. And a dangerous one with the involvement of both the U.S. and Russia – and deployment of nuclear weapons of the two countries. Therefore we must – already now – make efforts to prevent tensions from escalating to real conflicts, and conflicts with military involvement.

The Arctic dimension plays a great role in Danish security and defence policy. Greenland is still a part of the Danish Kingdom although it has obtained a high degree of self-governance. No doubt Greenland at some time will obtain full independence – it is up to the people of Greenland to decide when. But in the meantime Denmark has the obligation of securing and – if necessary – defending the territory of Greenland.

I was a member of the commission which, five months ago, submitted a report about the future Danish defence policy. How to deal with the future challenges in the Arctic played quite an important role in the discussions of the commission. The same is the case in the report submitted to the Nordic foreign ministers by Thorvald Stoltenberg on February 9 about ‘Nordic cooperation on Foreign – and Security Policy’. There are only a few sharp conclusions in these reports. It is too early for that and therefore there is still space for a debate – not the least with the Greenlandic authorities and the people of Greenland.

Denmark now has the chair of the Arctic Council and the Danish government was quite active in the decision about the Ilulissat Declaration of May 2008 – adopted by the U.S., Russia, Canada, Norway and Denmark together with Greenland. This declaration is quite important and expresses positive steps in the direction of peaceful cooperation in the Arctic area. The cornerstone of the declaration is its acceptance by all partners of international law, i.e. the Law of the Sea Convention in the case of territorial conflicts. In other words: there is an obligation to negotiate in accordance with international law. So far, so good.

From a Danish perspective, however, it is a problem that the Danish government wants to stop here. All problems are said to be solved and there is no need for further initiatives. As the Danish foreign minister Per Stig Møller wrote in the daily paper *Jyllands Posten* one month ago, “the race for the North Pole is cancelled”. He sees no need for any Arctic treaty and rejects any comparison with the Antarctic Treaty. As he writes: “Antarctica has always been unsettled – here reigns the Emperor’s Penguin. The Arctic has always been settled by human beings. And we don’t need any new legal tool or new organisation”.

It is obviously an odd argument that there should be no need for a treaty in a region because it is settled. You should say the opposite: because of the fact that the region is settled by human beings, there is a real need for political and legal regulation. It is true that it is very difficult, but this can never be an argument for no political initiative. The whole purpose of politics is to overcome problems.

It is a fundamental challenge to prevent further militarisation in the Arctic. I am not a supporter of Russian foreign politics – in particular the Russian attitude and politics towards the former Soviet republics. But it is fundamental to stress that there is no Russian military threat to Europe and America. This was also an assumption in the report from the Danish defence commission. It is immensely important that we do not build up military capacities in the Arctic which create an answer of further Russian militarisation. We must instead make efforts to demilitarise the region.

The concept of a Nuclear-Weapon-Free Zone could become an important instrument in these efforts. I shall not repeat the historical experiences of nuclear free zones in other parts of the world which other speakers have mentioned. But in spite of different problems the consequences of the efforts are positive. It will be a huge task to realise the goal of a Nuclear-Weapon-Free Zone in the Arctic – with tremendous difficulties. On the other hand, time might be working for this idea.

There is a serious obstacle in the form of the military interests of the U.S. and Russia. Therefore the debate on a Nuclear-Weapon-Free Zone in the Arctic must be inter-related to the broader discussion on nuclear disarmament.

Barack Obama has put the vision of a nuclear free world on his agenda. The agreement with Russia one month ago on strategic weapons could be a start – although not a breakthrough – in a new disarmament process. Still there is no solution on the Russian opposition to the missile defence. The missile defence should be cancelled: it is expensive, it has no value and creates negative reactions from Russia. The result was modest, but yet a start. After the frozen period of the Bush era it is progress. But it is absolutely crucial that a pressure for nuclear disarmament from European countries is developed. Two issues shall here be mentioned: the revision of the NPT treaty next year and the discussion of a new strategic concept in NATO.

With the possible achievement of nuclear weapons by failed states and among terrorist groups the non-proliferation regime is becoming more important but also more difficult to control. It is often forgotten among governments that the NPT treaty shall not only prevent the uprising of new nuclear states – is also demands nuclear disarmament among the existing nuclear states. This has not been achieved. But a successful revision of the NPT treaty should be at the top of the agenda of the European countries.

Within NATO the new Secretary General has stressed the importance of a new strategic concept. The Cold War is history and NATO has gone global. Nonetheless NATO maintains its nuclear weapon doctrine. This doctrine, however, is a child of the Cold War. We were many who opposed it during this period, but one could argue that during the Cold War the doctrine at least had a military logic. But the doctrine makes no military sense in a future with peacekeeping missions, counter-insurgency and asymmetric warfare. If the NATO countries are serious about changing the concept and strategy of the Alliance it must have implications also for the nuclear weapons policy.

I know that the disarmament issue is in some way on the agenda within NATO – here Norway plays a remarkably progressive role. I think, however, that most NATO countries should go into this discussion, and that parliamentarians from the different NATO countries should become active in this process. It is very important that we have broad political debate on the strategic concept and it is important that the whole question of the NPT revision becomes an issue in our parliaments.

It has been mentioned that the issue of an Arctic Nuclear-Weapon-Free Zone should await the NPT revision and that after the results of this it could go in as a follow-up to the NPT revision. It might be true and, to be realistic it is not likely, that the Nuclear-Weapon-Free Zone will become a serious point of the agenda until then. Yet we should make an effort to put it on the agenda already now. The natural place for this here will be the Arctic Council, where it should be connected to the proposal for an Arctic Treaty.

The Law of the Sea Convention does not cover all aspects of problems to be solved in the Arctic. There is a need for a legal instrument to regulate all aspects related to environment, traffic, science, exploitation of natural resources, economic conditions and, not least, the life of indigenous people. It is very important that this process takes place in cooperation with the people living there. There are several dark points in Danish relations to Greenland – some of them are to be discussed later on today. Such mistakes must not be repeated.

Thank you for your attention.

Indigenous Sovereignty and Nuclear Forces: Prospects for a Nuclear Free Arctic

Alyn Ware*

Impact of the nuclear arms race on indigenous peoples

Indigenous peoples around the world have had their sovereignty infringed, their territories destroyed and their health impacted by the nuclear arms race.

Uranium mining, nuclear weapons testing, missile testing and nuclear waste dumping have all been done on indigenous territories including the Shoshone lands in the United States, the Maohi islands in French occupied Polynesia, Uighur lands in Lop Nor (China), Pitjantjatjara lands in Maralinga (Australia), the Marshall Islands in the Pacific, and the Arctic territories of the Kazakhs, Sami, Vepsians, Karelians, Aluet, Nentses and Komi (See Indigenous Peoples and the Nuclear Age at www.reachingcriticalwill.org).

As such, the *Indigenous World Uranium Summit* hosted by the Navajo Nation in 2006 called for an end to nuclear testing, waste dumping and the deployment of nuclear weapons. The 2008 *Nibutani Declaration of the Indigenous Peoples Summit* in Ainu Mosir (Japan) echoed these calls and encourages the 2010 Indigenous Peoples Summit in Canada to take further action.

The testing of nuclear weapons on indigenous territory has mostly stopped, but has left a legacy of environmental contamination and trans-generational health effects from the radiation released by the nuclear activities. Meanwhile, the deployment of nuclear weapons on submarines, and the testing of nuclear weapons-carrying missiles, continues.

The Arctic – a changing environment

In the Arctic, conflict and confrontation between the nuclear-armed states is increasing – partly as a result of the receding ice-cap resulting in new resource and territorial claims. In this new area of tension, indigenous sovereignty could suffer further.

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In October 2007 the National Snow and Ice Data Center reported that Arctic sea ice has plummeted to the lowest levels since satellite measurements began in 1979. This could soon allow commercial ship navigation through Arctic waters, and much easier access to seabed resources.

This is leading to a flurry of legal claims and counterclaims regarding transit rights and ownership of valuable seabed resources. There is a growing possibility of serious disputes over these, leading to increased militarisation and possibly even triggering armed conflict.

On 2 August last year a Russian submarine planted their national flag on the seabed under the North Pole claiming it as part of the north Russian continental shelf. This provoked a stern rebuke from Canadian defence minister, Peter MacKay: “This isn’t the 15th century. You can’t go around the world and just plant flags and say: ‘we’re claiming this territory.’” Canadian Prime Minister Harper followed a few days later by announcing plans to construct two new military facilities in the High Arctic region adjacent to the Northwest Passage sea route.

There are also a range of environmental issues that could create tensions and conflict in the region. These include the threat of environmental contamination from decommissioned Russian nuclear submarines scuttled in the area (with their nuclear reactors on board), threats to the homes and hunting grounds of indigenous Arctic peoples from climate change, and the possibility of oil slicks from shipping accidents if the Northwest Passage opens up.

Nuclear tensions and deployments

The U.S. and Russia currently deploy nuclear weapons on strategic submarines that transit the Arctic waters. In addition, Russia maintains strategic naval bases in the region. These create some tension between these two nuclear powers. Since the end of the Cold War such tensions have waned, especially with the removal of tactical nuclear weapons by both powers from surface ships and attack submarines. However, tensions could increase again if ice-cap depletion leads to increased submarine deployment, or if the U.S. proceeds with the development of ballistic missile defences including the possible deployment of missiles or support facilities in the territories of Arctic allies such as Canada or Denmark.

Nuclear-Weapon-Free-Zones: a growing trend

The Antarctic (South Pole) was made a Nuclear-Weapon-Free Zone (NWFZ) in 1959 as part of the Antarctic Treaty. Since then NWFZs have spread to encompass most of the Southern Hemisphere. The trend is also picking up in the Northern Hemisphere with NWFZs established in Central Asia and Mongolia, and other ones proposed for North East Asia, Central Europe, and the Middle East.

With climate change opening up the Arctic region – bringing with it the possibility of increased resource competition, territorial disputes and militarisation – perhaps now is the time to establish an Arctic NWFZ similar to the one covering Antarctica, thus freeing both the North and South Poles from nuclear weapons and helping to build a more cooperative security environment in the north.

Arctic NWFZ: building cooperative security

Some of the emerging Arctic conflicts could be dealt with in existing forums such as the Law of the Sea Tribunal, the International Court of Justice and the Arctic Forum. However, none of these are designed to address security issues in a cooperative manner. The LOS Tribunal and the ICJ are forums for determining legal rights, not for negotiations, while the Arctic Forum deals primarily with environmental and habitat issues. As happened with the Antarctic Treaty, the commencement of negotiations for an Arctic Nuclear-Weapon-Free Zone (NWFZ) could create a forum where wider security issues could also be addressed. At the very least, the establishment of an Arctic NWFZ would be a confidence building measure that could assist in the promotion of peace and security in the region.

Indigenous involvement

Indigenous peoples have campaigned for the establishment of NWFZs and have benefited from them. However, to date, indigenous peoples have not been included in the negotiations on NWFZs, which have been conducted primarily by governments with the help of UN agencies. In the Arctic it would be appropriate to include indigenous peoples in the NWFZ treaty negotiations.

Towards a nuclear weapon free world

In 2005 Mexico hosted the inaugural Conference of States Parties to NWFZs – then numbering 108 countries. Civil society and indigenous peoples were invited to hold a

parallel forum, the final declaration of which was included with an inter-governmental declaration which was submitted to the States Parties to the Non-Proliferation Treaty in order to encourage them to support the establishment of new NWFZs and to implement their obligation to achieve a nuclear weapon free world. In 2010 a second Conference of States Parties to NWFZs and a parallel Civil Society Forum will be held to further these aims.

For further information see:

- The Arctic and Its Future, Soka Gakkai International Quarterly Magazine, www.sgiquarterly.org
- PNND Notes, www.pnnd.org

Nuclear-Weapon-Free Zone in the Arctic

Jens Zinglarsen

The Association of Radiated Thule Workers

First of all, I want to thank the arrangers of this conference for inviting me to speak here today. Secondly I would like to emphasise that I, in the following, will mention the U.S.A. and U.S.A.F. many times. This has nothing to do with any feelings against U.S.A. or the Americans – on the contrary – but it is because we have received very much assistance from the U.S.A., and the American authorities have shown great openness towards us. All information that we in the past many years have obtained comes from the United States of America.

I represent the association of radiation afflicted Thule workers whose members, in 1968, assisted the U.S.A.F. in a huge clean-up operation after an accident involving a B-52 bomber carrying four nuclear bombs of the MK28 thermonuclear type. In 1968 as many as 1,100-1,200 civilian Danish workers worked at Thule Air Base as skilled and unskilled labourers, thereby relieving American soldiers for other tasks. In those days there was a certain need for them in the Far East.

I myself have worked and lived in Greenland for 20 years, of which I lived and worked at Thule Air Base for 10 years

Our association had – when we were biggest – 600 members; now we are 195 left. Our association was created in 1988 due to the fact that a number of the former Thule workers experienced very rare skin diseases and many cancer incidents.

But let us turn our minds back to the sixties. In those days the Cold War was on and the U.S. was at war in Vietnam. Since the late forties the U.S.S.R. and the U.S.A. had been building up very powerful nuclear strike forces. In the U.S.S.R. mainly based on long range intercontinental ballistic missiles and in the U.S.A. mainly based on a long range bomber airplane, namely the B-52.

The whole idea of having this tremendous nuclear strike force was to show the opponent – the enemy – so much military muscle, that he would *not* dare to attack you.

One must say that it worked – the Cold War never turned hot.

The American strategy was to establish Operation Chrome Dome. Operation Chrome Dome was an airborne alert mission consisting of up to twelve B-52s constantly flying 24 hours around the clock in the Arctic area and over the sea of the North Pole – all of them combat ready. The same number of B-52s was flying over the Mediterranean area. Each airplane carried internally four nuclear hydrogen bombs of the type MK28, each with a yield of 1.5 megatons. A B-52 could also at the same time carry two Hound Dog Missiles, one under each wing and with a yield of four megatons each.

So if the Cold War had shown tendencies to grow warm, the airborne alert mission could be of up to twelve B-52s, each armed with nuclear weapons with a yield of 14 megatons per aircraft. And as there were twelve, the total yield of airborne nuclear weapons in the Arctic zone would be 168 megatons. The same amount of nuclear yield would be airborne in the Mediterranean area. So, Ladies and Gentlemen, 168 megatons is the same as 168,000,000 tons of ordinary explosives like TNT or dynamite. As you can see we are, on the American side, talking of 336 megatons of airborne nuclear weapons. Of course we must take into consideration that the U.S.S.R. nuclear strike forces had at least the same. So I will here declare that around 700 megatons of nuclear yield would have been released immediately in a nuclear battle – if the Cold War had turned hot back in those days.

All of us here and there then – were very very lucky that the Cold War *never* turned hot. If it had done so, we today would have no worries about CO₂ and climate changes – it would have already been taken care of.

With such a massive airborne alert mission, there will be many chances for mishaps, incidents and accidents. One such took place on the 21st of January 1968. One B-52 aircraft of the airborne alert mission Chrome Dome had a special mission as a Thule Monitor. The Thule monitor had to fly in a butter-knife figure over Thule Air Base in order to control by radio communication and by visual observations that Thule Air Base was operational and undamaged because the Master Radar Station in the Ballistic Missile Early Warning System was placed at Thule Air Base. This system would give the U.S.A. a 20 minute warning of a ballistic missile attack. Time enough for the fleet of airborne, combat-ready B-52s to go to pre-designated targets in U.S.S.R. and drop their bombs.

On the day of 21st of January 1968 the Thule monitor caught fire down in the navigator's compartment. A lot of smoke developed – the crew failed to put out the fire – and the aircraft suddenly lost all electric power. It was near Thule Air Base and the

crew could see the lights from the base, it was a cold clear Sunday afternoon of minus 38 degrees Celsius and Arctic darkness.

The crew bailed out and the aircraft crashed after it had made a 180 degree left turn passing over the base. It crashed on the sea ice some eleven kilometres due west of the base. Of the seven crew members six were rescued and one was killed. The bombs, at least three of them, exploded in the impact together with the airplane. This explosion was due to the fact that, each bomb has quite a heavy load of ordinary chemical high explosives, which are the 'match' to ignite the nuclear process and the nuclear detonation. As the four weapons on board the aircraft were in an unarmed state – it was *not* a nuclear detonation. But the explosion of the chemical high explosives, together with the explosion of the aircraft itself and all its fuel, widely spread all the radioactive components of the bombs over the crash site and the nearby islands and land.

The bombs contained Plutonium 238, 239, 240, Americium 241 plus a lot of Uranium 235 and some Tritium. We do not know how many kilos of each kind – it is still a secret now – nearly 42 years after the accident. The MK28 bomb entered the U.S. nuclear stockpile in 1958 and was finally withdrawn in 1993. A total number of 4,500 were produced.

I would here like to draw your attention to Plutonium 238. Here in Denmark many people believe that plutonium is of only one kind. That is not correct; there are several isotopes of plutonium. Plutonium 239 is the isotope that we call weapon plutonium. It is rather stable and has a half life of 24,000 years. Plutonium 238 is rather unstable and has a half life of 87 to 88 years and is between two and three hundred times as radioactive as Plutonium 239. The MK28 is the 'mother' of all hydrogen bombs, but is also an early first generation of the hydrogen bombs and a so-called 'dirty one'. I can here put forward a report from Mats Eriksson and others as documentation.

Many Thule workers were involved the huge clean-up operation, which took place in the weeks and months after the crash. All contaminated debris from the aircraft was collected and transported by surface back to the base for storage and later shipment to the U.S.A. in the summer, when the port of Thule Air Base is free of ice. Many cubic metres of contaminated snow and ice were scraped together, loaded into containers and transported back to the base – also for later shipment to the U.S.A.

All this contaminated debris, snow and ice (that later melted into contaminated water), was stored on a so-called 'Tank Farm'. Here it was loaded and reloaded several times

to prepare it for shipment by sea back to the U.S.A. (The Savannah River Plant). It was during this handling of the contaminated snow, ice and debris that the Thule workers were exposed to radiation.

I can here put before you an annotation from The Danish Institute for Radiation Protection. This paper describes and quotes a control list from the control post of the aforementioned 'Tank Farm'; a control list that covers passage of in and outgoing traffic at the 'Tank Farm' of Danish personnel. The control post was manned by military personal, Air Police. Outgoing personnel were always measured for radioactivity. The U.S. military lower limit was 450 counts per minute. That control list shows that a great number of Danish Thule workers received rather massive doses of radiation; in one case as much as up to 140,000 counts per minute. The first part of the paper – the part describing the leader of the Royal Greenland Trade Department and his Eskimo rescue team is a direct lie! I am the mentioned leader of the Royal Greenland Trade Department. The truth is that all of us in the team were stripped naked to the skin and had to go through showers, because we were heavily contaminated on our outer clothing. So heavily contaminated that all our Arctic fur gear was confiscated and sent for cleaning to the U.S.A. It could not be cleaned and it never came back! The U.S.A.F. had to pay for a number of polar bear skins to be flown in from Copenhagen so my Eskimo team could have new polar bear pants made. Without that type of equipment they cannot manage their hunting and living in this far north area.

The Danish Institute for Radiation Protection denies us, the association, and the public, of the names of those workers who figure on this list. The Danish Health System denies to supervise the health of the Thule workers even though The Danish Institute of Radiation Protection has registered that a great number of the Thule workers received massive doses of radiation.

I often wonder who the Danish Institute of Radiation Protection, *protects!* It is definitely **not** the *citizen!*

The fact is, as my association has experienced over the last 20 years, that this case is so *infected* in Denmark – politically as well in the permanent administration system – that it is impossible to get justice here, in this our own country.

Therefore we have turned to The European Union for assistance. First we went to the Petition Committee of the European Parliament and presented our case there. They treated our case very positively in the form of a report, which was set out on

the 10th of May 2007 in the European Parliament. The European Parliament voted with a massive majority in our favour. This political movement against the State of Denmark created absolutely *no* reaction here in Denmark.

Right now we are preparing a case, which we are taking to the EU High Court of Justice in Luxembourg. As of right now our case is in progress there and we are waiting for which result we will eventually obtain. This whole long and difficult fight has solely been financed by the members of our association. *No* public money is involved.

So you can understand that I am very proud of being president and spokesman for such a group of determined men! *They will never give up!*

And, lastly, thank you all very much for your patience and your ears, and let me finish this contribution with the hope that its content shows the danger of nuclear weapons for the whole of mankind – even in relatively peaceful times. And that this contribution will help convince all that it is important to make the Arctic a Nuclear-Weapon-Free Zone.

Jens Zinglersen
Aulum, Jutland, Denmark, July 2009.

Presentation in Copenhagen

Hugo Elmer

The Association of Radiated Thule Workers

Dear guests and conference delegates,

I wish to make use of this opportunity to thank the conference organisers for making it possible for me to stand here today, proving you with an overview about the Thule case.

As the Vice President of the Thule Association for radiation affected Thule workers, I believe that it is important, indeed essential, that all information and facts relating to the disaster are provided and made official to the widest extent possible. We believe quite strongly that in the interests of everybody this is very important.

However, I would like to point out that, as will be clear to all of you in this room today; it will not be possible for me to cover aspects of the case in this presentation. Additionally, it will not be possible for me to go into great detail about all that has transpired. If I were to do that it would probably require several days of presentation and debate.

In view of this, I will restrict myself to presenting factual information about the accident and its consequences, including providing examples of how slow and uncooperative the Danish authorities have been with regard to answering questions and providing information that our association, our members and even members of the Danish Parliament have been asking and requested of the responsible Danish authorities including members of the Danish government.

Our President, Jens Zinglensen, having just provided an overview of the Thule Association Case, you already know what we are working on and what our objectives are. Jens has also provided an overview of the historical background to Thule Air Base's operation and the political situation at the time of the crash, including the constant presence of B-52 Bombers circling over the base carrying nuclear weapons.

The crash at Thule Air Base on January 21st 1968 resulted in a number of long range changes, both in the operation of the base itself and for the many human beings who

were working on the base. 'Not the least because so many individuals were actively involved in the search for the crew members of the aircraft after it had crashed and also, to a great degree, because so many persons were also involved, subsequent to the search, in the very significant and dangerous clean-up operation.

Allow me to now cover the various stages of what happened after the B-52 Strategic Bomber had crashed, using specific headings.

The rescue operation

The crew members of the B-52 left the aircraft by parachute over or in the vicinity of the base. As nobody knew exactly where they had landed a major search operation was put into operation.

Each crew member was eventually found alive with the exception of one who died while leaving the aircraft.

It is important to note that the search mission took place all over the base area as well as the nearby mountain ranges and valleys and even on the ocean ice – and that this rescue operation took place in the dark Arctic night and at minus 40 degrees Celsius.

The consequences

One of the consequences of the crash was that shortly afterwards the constant over-flight missions were stopped. At the beginning the flying was moved westwards, away from Greenland, but shortly after that the flying was stopped! There were no more flights after that.

This also means that the last remaining nuclear weapons were removed from Thule Air Base. Not only the nuclear weapons that had been stored at the base but also the nuclear weapons carried on board the B-52 Strategic Bombers that occasionally landed on the Base. In 1968 there were still a number of activities on the base that were top secret. The same applies to areas which were restricted and treated as top secret, which Danish workers were not able to enter.

Politically, the Danish government had for many years before this told the world that they had adopted the stance and attitude that no nuclear weapons were allowed

on Greenland or on Danish soil, including stating that no aircraft carrying nuclear weapons were allowed over Danish and Greenlandic territory.

At the time the crash happened it can be stated today that a major and significant step was taken against nuclear weapons on Greenland.

This step was the resolution made by the American military authorities as a consequence of the significant publicity that resulted from the crash, neither because of the local Greenland Authorities nor the Danish Government. *In a roundabout way it can be said that as a consequence of the crash this was one positive aspect.* However, this definitely does not apply to the way the workers who were there in January 1968 were treated subsequent to the crash.

In the following time some reports from Danish scientists were worked out in which the radiation level was always estimated to be very low. Please notice the fact that no Danish report mentions anything about the huge amounts of the highly radioactive URAN 235!

The clean-up operation

As an introduction to this section, let me explain that the Danish personnel were asked to assist with the operation and without any hesitation agreed to do this. This has to be understood in the context that they were not asked individually but were simply allocated their tasks the same way as any other tasks they were given on a daily basis.

At no stage were they advised that any of the work they were requested to become involved with could be dangerous, and that they could be exposed to radiation. As a result, none of the participating Danish workers or Greenlanders who helped had any knowledge of the real radiation risks, as we know them today.

Similarly, at no stage were steps taken to provide protective clothing to any of the employees required to work out on the ocean ice at the actual crash site, some *eleven kilometres* from the base itself. This means that the Danish workers and the Greenlanders were wearing their usual, normal clothing.

The representatives of the Danish Authorities (RISOE), who arrived at the base four days after the crash, did not advise of any radiation risks or any other risks caused by the constant exposure to radiation as a result of the crash. *And that is very strange. The*

fact is that 2,000,000 CPM was measured at the crash site. On this basis the clean-up operation started with all Danish workers and Greenlanders ignorant of the risks and dangers they were being exposed to.

Later, a control point was established for persons moving out onto the crash site on the ocean site. However that was some time after the crash, and not from day one. At this control point most of the persons who had been working at the crash site were checked with Geiger counters. Everybody who had high levels of radiation had all their clothing confiscated and they were required to take showers before being issued with fresh clothing.

But notice – even though at the earlier stages many persons were tested, had showers and were issued with fresh clothing, the trucks and other vehicles were not cleaned after returning to the base area. The Americans kept a list of all the tests that were conducted. This includes measurements of radiation, the urine samples collected and the nasal swabs. These lists have never been made available to us.

Fact 1:

Even though Danish nationals were tested, to date we have not been able to obtain copies of the lists prepared by the U.S.A.F. at the control points. Of course, the lists should show the level of radiation individuals had been exposed to on their return to the base after being at the crash site. It should be noted that smaller items with particularly high levels of radiation were immediately flown back to the States.

They should also show how many received excess levels of exposure after being at the crash site; higher – maybe even considerably higher – than what by the American military would be considered to be the maximum level acceptable.

Fact 2:

The other list prepared at the so called Tank Farm available to the Danish Authorities has not been made available to us. Information contained in these lists has not been made available to the persons concerned and whose names appear on the lists either. They still remain in the secret files.

Fact 3:

The processes already outlined involved contamination at the crash site primarily related to persons and vehicles, but also secondarily by distribution by wind, ventilation and drainage systems associated with washing of vehicles at the base's motor

pool – in effect the whole base area was exposed to contamination by people and vehicles moving around after returning from the crash site.

This means that even persons who had not been to the actual crash site were also exposed to radiation risks. In short, there were no systems in place that would provide effective protection for anybody on the base.

Fact 4:

The Danish authorities' representatives on the base failed to plan or introduce ongoing or continuous examination or testing for radiation exposure of all workers who had been directly involved, or for that matter been exposed indirectly.

More Consequences

As outlined, all the work involved took place without the workers participating having any knowledge of the risks of exposure to radiation or the consequences of high levels of radiation and its later impacts on health.

The fact that there *were* risks was established later, with many of the Thule workers and Greenlanders suffering a range of significant health problems. For a long time the Danish authorities did not acknowledge any understanding of the reason for so many reporting health problems and the reasons for them, such as that they must have been related to their involvement in the clean-up operation at Thule Air Base following the crash of the B-52. This extended to a lack of understanding of the sort of treatment that should be provided. Similarly, no information about treatment was provided by the Danish authorities.

Attention should be paid to: Dr. Hugh Zachariae's report of 1990 entitled 'Plutonium – Induced Mycosis Fungoides and Parapsoriasis en plaques – A new Entity?' Published in 'Current Problems in Dermatology', vol. 19, pages 81 to 89.

This was one of the reasons the Thule Association was established.

Since then it has been a long fight with regard to trying to find information about the crash as well as the results of the exposure to radiation that so many of the persons affected are convinced they were exposed to. Over many years, the Danish authorities have refused to release information they have about the crash and its consequences on the health of the persons involved.

One cannot help but wonder how the authorities would react if a similar accident had happened in a location in Denmark!

As the association has managed to find information this has, on occasions, resulted in a certain level of interest from the news media and even from some members of the Danish Parliament. However, the news media failed to follow up on the information and to seek clarification of the many unanswered questions. This has been the situation for many years.

The interest shown by some Members of Parliament has resulted in several questions being asked of various Ministers of the Crown, including the Prime Minister. However, in spite of answers being provided within the legally required time, the answers have not always contained the specific information requested!

In spite of the association having been in contact with several Members of Parliament in an attempt to develop a higher level of interest about our case, no major progress has been made. The members usually restrict themselves to asking questions in Parliament and one could be excused for believing that their only reason for doing this is to improve their public image. Not to help the victims of the crash.

In fairness, it should be mentioned that several of the younger Members of Parliament were not even born when the crash happened. As a result they have no knowledge of the crash from reading the news reports and find it harder to understand what this is all about and what actually happened on January 21st – some 40 years ago.

But that cannot be said about the public servants working in the various government departments. They have access to all the relevant documents and it is their responsibility to provide advice to the Ministers and Members of Parliament about what happened, what the consequences are, etc. In spite of these people being responsible for developing replies for the use of the politicians, unfortunately this does not always happen, as is evident from the answers provided by the Ministers to the various Members of Parliament.

We maintain that many of the answers provided are blatantly wrong – and maybe deliberately so. Because of this we at the association decided to change our strategy. This means that we contacted various Parliamentary Committees directly.

The first was the Parliament's Health Committee. In preparation for the first meeting we sent detailed documents prepared by us and we were then granted an appearance

in which we had fifteen minutes to explain our case. They listened to us but, in effect, that was the end of it. Nothing more has happened.

It is our observation and opinion that the Members of the Committee behaved in a highly arrogant manner and that they believed that what we presented was not important nor of interest. As you can imagine, we found this amazing. It is our impression that the Members of Parliament attending the meeting had not even bothered to read the documents we had provided.

We make these observations to highlight and make you aware of the very considerable difficulties we have been experiencing for years in getting through to the Health Authorities. In fact, we have not been successful in getting through to them and believe their actions are politically motivated, not the least as changing governments have not seen a change in the way our case has been managed.

In 2008 the BBC prepared a TV program about the missing Bomb at *Thule!*

Based on American documents now released, it is now clear that not all four of the Hydrogen bombs carried on the B-52 that crashed have been found. A few years earlier the association had been provided with access to 348 documents that had been released, also identifying this important fact. Unfortunately, however, we were not successful in making the news media and the politicians show any interest in this important fact.

However, in 2008 the case was raised in a committee dealing with issues relating to Greenland. (The Committee for Greenland Affairs) On the basis of the BBC documentary several questions were asked of the Danish Minister for Internal Affairs as well as the Minister for Health and the Minister for Environment! The reason for this was that the committee believed that the information that had come to light was very serious and could have a significant impact on areas in the northern part of Greenland. This meant that the ministers now had direct contact with the committee regarding this case.

In relation to this the Minister for Foreign Affairs has promised that he will ask his department to initiate an investigation into what new information the released documents contain. He seems to believe that the new information, when combined with a previously released report relating to 'Denmark during the Cold War', may assist. It is important to emphasise the following about that report:

- The section dealing with the Thule accident only refers to the fact that there had been a crash and how the Danish Government had been advised of this;
- The report contains no information about the crash;
- The report does not say anything about the very high levels of radiation following the crash and the consequences to the workers affected, nor the environment in the Thule area and in the north-western part of Greenland;

The Committee has adopted an approach of going into the case much deeper than has been the case in the past. They have asked us many questions relating to the crash and the various issues surrounding the accident, the clean-up operation and the treatment of persons who in various ways participated in the clean-up.

As already mentioned, the Committee has also been in direct discussions with the Minister for Foreign Affairs, the Minister for Health and Prevention and the Minister for the Environment!

In total the Committee has asked 32 questions of the various Ministers, critically important questions covering many aspects of this case. In the papers you already have you can see an analytic result of those 32 questions.

The Committee work has resulted in the fact that all the released documents have been given over to DIIS (Danish Institute for International Studies) for closer analysis. DIIS has, some eight days ago, finished a report about this. It will be too much to come closer to the results of that report today. That we will have to do on another occasion!

But even though the Committee and its many initiatives have done a lot to obtain information about the missing bomb and about the case in general, we must note that the replies received today have been vague.

That is, if we receive a reply at all. It is a fact that 78% of replies received are vague, poor or deficient. It is a fact that in 18-34% of replies received, no replies to the questions raised have been provided at all. We believe that this demonstrates a clear lack of understanding of the case.

We also believe that the way questions are treated is in direct conflict with the Government's requirement to provide information to Parliament, and also in conflict with the Government's own promise that all information they have will be provided. Based on the difficulty related to the replies provided by the ministers, we have devel-

oped a report to be presented to the Committee with comments on each individual question. See shortly details in enclosure 1 / extension 1 (Bilag 1)!

I am not proposing to make any further comments on the specific details of the Thule case.

I have mentioned the treatment of the questions as they relate to the Committee; how hard it is to get answers about the case, even though the Government pretends otherwise. The Danish Government has a lot to live up to in terms of achieving its stated objective – that all information available will be made available.

Only time will tell if this will ever happen.

Finally I thank you for your attention and for allowing me to make this important presentation about a real case – or – story from the Arctic area. If your intention with this conference had been undertaken many years ago, a story which we wish had never happened and which never would have happened!

Thank you.

For further information see:

- The many questions about the Thule case can be read in full text on the Danish Parliament homepage under: www.ft.dk – under: dokumenter / Udvalgsdokumenter/ Udvalget for Grønlandske forhold.
- At the same address – as BILAG we draw your attention to the following documents and reports about this case – which are:
 - a) Bilag 69 Rapport fra Grønlands Naturinstitut om deforme moskusokseklove i Nordøstgrønland.
 - b) Bilag 116 Rapport fra FAST med kommentarer og bemærkninger til de af UGF stillede spørgsmål til ministrene om *Thulesagen*.
 - c) Bilag 115 Rapport om Arctic Pollution – AMAP rapport.
 - d) Bilag 114 Rapport / Orientering om henvendelser til Selvstyret i Grønland.

- e) Bilag 100 Rapport fra 'Mats Eriksson' om indhold af radioaktive stoffer i bomberne ved flystyrtet ved Thule i 1968.
 - f) Bilag 79 Rapporter fra Arctic Conference 31 March 2009. Presentation of Arctic areas – / Greenland
 - g) Bilag 73 Rapport fra 'Foreningen B-52' (Thule-Kanak-Grønland) vedrørende materiale fra mødet med udvalget d. 24.02-2009.
 - h) Bilag 64 Rapport fra 'Foreningen af Strålingsramte Thulearbejdere' fra mødet med 'Udvalget UGF' d. 24.02-2009. Emne: konklusioner om bomberne og radioaktivt stråling fra B-52-ulykken i jan. 1968.
 - i) Bilag 61 Rapport fra 'Foreningen af Strålingsramte Thulearbejdere' til 'Udvalget – UGF' om indholdet i de frigivne 348 dokumenter (ca. 2000 sider) vedrørende amerikanernes eftersøgning af bl.a. bombedele fra B-52-ulykken i jan. 1968.
4. Finally we inform you about a book written by the Danish journalist Poul Brink in which he has tried to go through the Thule case systematically. All the research in the book is from 1997. The book has the title: *The Thule Case – Universal Falsehood* No one has since then tried to continue his work and find answers – and there are still open questions!

The Association of Radiated Thule Workers

President:

Mr. Jens Zinglersen

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Vice president:

Mr. Hugo Elmer

Mail: helmer@gvdnet.dk

The name of the association in Danish

'Foreningen af Strålingsramte Thulearbejdere'

APPENDICES

Appendix I – Program

August 10, Danish Institute for International Studies Strandgade 71, 1401 Copenhagen K

12.00-12.30: Lunch:

Closed Round Table Discussions (12.30-15.00)

Chair: Alexa McDonough

- 12.30-12.40: Introductions
- 12.40-13.10: Hon Matt Robson, Former New Zealand Disarmament Minister
- 13.10-13.30: Erik Gant, Acting Executive Secretary, Arctic Council
Indigenous Peoples Secretariat
- 13.30-13.50: Dr. Jan Prawitz, Swedish National Group, Pugwash Conferences
on Science and World Affairs
- 13.50-14.00: Discussion
- 14.00-14.15: Break
- 14.15-14.35: Torbjorn Graff Hugo, Norske Leger Mot Atomvaben and
Middle Powers Initiative
- 14.35-14.50: Prof. Gunnar Westberg, Director at Large, International
Physicians for the Prevention of Nuclear War
- 14.50-15.00: Discussion

Public Meeting (15.30-17.30)

Chair: Cindy Vestergaard

- 15.30-15.40: Cindy Vestergaard, Danish Institute for International Studies.
Introduction of the speakers and organisations
- 15.40-16.00: Prof. Michael Hamel-Green, Executive Dean, Victoria
University, Australia
- 16.00-16.20: Dr. Adele Buckley, Canadian National Group, Pugwash
Conferences on Science and World Affairs
- 16.20-16.35: Break
- 16.35-16.55: Steven Staples, President, The Rideau Institute on International
Affairs, Canada
- 16.55-17.30: Discussion from the floor

**August 11, H.C. Ørsted Institute University of Copenhagen
Universitetsparken 5, 2100 Copenhagen Ø, Aud. C303**

Chair: Hon Matt Robson

- 10.00-10.20: MP Holger K. Nielsen, Danish Parliament
- 10.20-10.40: Alexa McDonough, Co-President, Parliamentarians for Nuclear
Nonproliferation and Disarmament
- 10.40-11.00: Alyn Ware, Global Coordinator, Parliamentarians for Nuclear
Non-proliferation and Disarmament
- 11.00-11.30: Discussion
- 11.30-13.30: Lunch and informal discussion, Chair: Alyn Ware
- 13.30-13.50: Jean-Marie Collin, PNND Staff Member, France
- 13.50-14.10: Jens Zinglersen, President Foreningen af Stralingsramte
Thulearbejdere
- 14.10-14.30: Hugo Elmer, Vice President Foreningen af Stralingsramte
Thulearbejdere
- 14.30-14.50: Discussion
- 14.50-15.00: Break
- 15.00-17.00: Drafting of recommendations to be sent to governments in the
Arctic region

Appendix 2 – List Of Participants

- Hon Matt Robson, Former New Zealand Disarmament Minister
- MP Holger K. Nielsen, Danish Parliament
- Dr. Jan Prawitz, Swedish National Group, Pugwash Conferences on Science and World Affairs
- Prof. Gunnar Westberg, Director at Large, International Physicians for the Prevention of Nuclear War
- Ms. Cindy Vestergaard, Danish Institute for International Studies
- Prof. Michael Hamel-Green, Executive Dean, Victoria University, Australia
- Dr. Adele Buckley, Canadian National Group, Pugwash Conferences on Science and World Affairs
- Mr. Steven Staples, President, The Rideau Institute on International Affairs, Canada
- Ms. Alexa McDonough, Co-President, Parliamentarians for Nuclear Non-proliferation and Disarmament
- Mr. Alyn Ware, Global Coordinator, Parliamentarians for Nuclear Non-proliferation and Disarmament
- Mr. Erik Gant, Acting Executive Secretary, Arctic Council Indigenous Peoples Secretariat
- Mr. Torbjorn Graff Hugo, Norske Leger Mot Atomvaben and Middle Powers Initiative
- Mr. Jens Zinglensen, President, Foreningen af Stralingsramte Thulearbejdere
- Mr. Hugo Elmer, Vice President, Foreningen af Stralingsramte Thulearbejdere
- Mr. Jean-Marie Collin, PNND Staff Member, France
- Ms. Sine Tarby, DIIS Defence and Security Section
- Mr. Mikkel Stein Knudsen, DIIS Foreign Policy Unit
- Dr. John Scales Avery, Chairman, Danish National Group, Pugwash Conferences on Science and World Affairs

Defence and Security Studies at DIIS

The Defence and Security Studies of the Danish Institute for International Studies (DIIS), which is funded by the Danish Ministry of Defence, began in 2000 and runs through 2009.

The Defence and Security Studies focuses on six areas: Global security and the UN, the transatlantic relationship and NATO, European security and the EU, Danish defence and security policy, Crisis management and the use of force and New threats, terrorism and the spread of weapons of mass destruction.

Research subjects are formulated in consultation with the Danish Ministry of Defence. The design and the conclusions of the research are entirely independent, and do in no way automatically reflect the views of the ministries involved or any other government agency, nor do they constitute any official DIIS position.

The output of the Defence and Security Studies takes many forms – from research briefs to articles in international journals – in order to live up to our mutually constitutive aims of conducting high quality research and communicating its findings to the Danish public.

The main publications of the Defence and Security Studies published by DIIS are subject to peer review by one or more members of the review panel. Studies published elsewhere are reviewed according to the rules of the journal or publishing house in question.

Review Panel

Ian Anthony, Senior Fellow and Programme Leader, SIPRI Arms Control and Non-Proliferation Programme

Christopher Coker, Professor of International Relations, London School of Economics and Political Science

Heather Grabbe, Advisor to the EU Commissioner for Enlargement

Lene Hansen, Associate Professor, University of Copenhagen

Peter Viggo Jakobsen, Associate Professor, University of Copenhagen

Dietrich Jung, Professor Modern Middle East Studies, University of Southern Denmark

Knud Erik Jørgensen, Jean Monnet Professor, University of Aarhus
Ole Kværnø, Professor, Head of the Institute for Strategy and Political Science,
The Royal Danish Defence College
Theo Farrell, Reader in War in the Modern World, Department of War Studies
at King's College London
Daryl Howlet, Senior Lecturer in International Relations, Southampton University
Iver Neumann, Research Professor at NUPI
Norrie MacQueen, Head of Department of Politics, University of Dundee
Mehdi Mozaffari, Professor, University of Aarhus
Robert C. Nurick, Director, Carnegie Endowment for International Peace,
Moscow
Mikkel Vedby Rasmussen, Director, Danish Institute for Military Studies
Sten Rynning, Professor, University of Southern Denmark
Terry Terriff, Senior Lecturer and Director of the Graduate School of Political
Science and International Studies, University of Birmingham
Ståle Ulriksen, Deputy Director and Head of the UN Programme, NUPI
Michael C. Williams, Professor, University of Wales at Aberystwyth
Clemens Stubbe Østergaard, Lecturer, University of Aarhus