

INTERNATIONAL LEGAL IMPLICATIONS OF CLIMATE CHANGE FOR THE POLAR REGIONS: TOO MUCH, TOO LITTLE, TOO LATE?

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Climate change is by definition both a global and a regional issue. Perhaps this paradox is most evident in the polar regions where regional change and global impact coexist. This commentary does not deny the importance of the global regime, but opts instead to consider the role of those institutions which can most affect the particularities of the polar context, namely the Arctic Council and the Antarctic Treaty Consultative Meetings. So far, discussion within these institutions has focused on the science of climate change, and it is certainly the case that research done within both regions has made important contributions to regional and global knowledge. The development of regional policy and regulatory responses to climate change has, however, been fairly minimal to date. Nevertheless, the original perception that climate change is not an issue which can be addressed regionally is slowly beginning to change. There are (at least) three areas where action can and should be undertaken by polar states: mitigating and minimising local greenhouse gas emissions; developing appropriate regional adaptation strategies; and representing the interests of these regions within appropriate international fora. We argue that regional regimes cannot abrogate complete responsibility when it comes to climate change. Despite recent scientific and policy initiatives, climate change is under-regulated in the polar regions. Thus, there is too much rhetoric and too little regulation. Unfortunately, before we get a chance to resolve this conundrum, the global reality may overtake the normative endeavour; in other words, it may also be too late.

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I INTRODUCTION

Climate change arguably represents the greatest threat to the environmental, political and legal stability of the polar regions. Long-regarded as a repository of valuable scientific information on climates past,¹ both the Arctic and the Antarctic now represent a barometer for future global climate change. The polar regions are warming more rapidly than the global average and the impact of

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¹ Fabio Florindo and Martin Siebert, 'Antarctic Climate Evolution' in Fabio Florindo and Martin Sietgert (eds), *Antarctic Climate Evolution* (2009) 1; O G Sorokhtin, G V Chilingar and Leonid F Khilyuk, *Global Warming and Global Cooling: Evolution of Climate on Earth* (2007) vol 5.

increasing temperatures on sea ice, glaciers and polar wildlife is already significant. Moreover, it is within the context of the polar regions that the effects of climate change on territorial, resource and institutional security have, so far, been most notable.² Predicted reductions in, or even ultimate absence of, Arctic sea ice raises the prospect of year-round commercial shipping through the North-West Passage and the Northern Sea Route, which may lead to an increase in the already considerable tension between coastal states — Canada and Russia — and third states, such as the United States, over the status of these waters. Anticipating the possibility (but by no means inevitability) of a more benign polar climate, the attention of politicians and commentators has, in recent years, turned to the (largely mineral) resources located within both the Arctic and the Antarctic.³ A plethora of recent controversial submissions to the Continental Shelf Commission ('CSC')⁴ related to both the Arctic⁵ and the Antarctic,⁶

² The relationship between climate change and security more generally has been explored at length: see Jon Barnett, 'Security and Climate Change' (Tyndall Centre for Climate Change Research Working Paper No 7, 2001).

³ For a recent discussion of these issues in the Arctic, see Diethard Mager, 'Climate Change, Conflicts and Cooperation in the Arctic: Easier Access to Hydrocarbons and Mineral Resources?' (2009) 24 *International Journal of Marine and Coastal Law* 347.

⁴ Summaries of state submissions to the CSC and CSC recommendations can be found online at UN Division for Ocean Affairs and the Law of the Sea, *Commission on the Limits of the Continental Shelf (CLCS)* (2009), available from <http://www.un.org/Depts/los/clcs_new/clcs_home.htm>.

⁵ Russia's expansive submission to the CSC in 2001 was based on a controversial interpretation of data relating to the Lomonsov Ridge. Its submission was not accepted by the CSC and the data relied on by Russia has been challenged by Canada, Denmark, Japan, Norway and the US. Russia is currently undertaking further research in preparation for a revised submission to the CSC. See Ron Macnab and Lindsay Parson, 'Continental Shelf Submissions: The Record to Date' (2006) 21 *International Journal of Marine and Coastal Law* 309, 310–13. Norway's 2006 submission to the CSC proved rather less controversial but nevertheless raised questions over the relationship between the status of the continental shelf surrounding the Svalbard Archipelago and the terms of the *Treaty concerning the Archipelago of Spitsbergen*, signed 9 February 1920, 2 LNTS 7 (entered into force 14 August 1925) ('*Svalbard Treaty*'). See generally Torbjørn Pedersen and Tore Henriksen, 'Svalbard's Maritime Zones: The End of Legal Uncertainty?' (2009) 24 *International Journal of Marine and Coastal Law* 141; Torbjørn Pedersen, 'The Svalbard Continental Shelf Controversy: Legal Disputes and Political Rivalries' (2006) 37 *Ocean Development and International Law* 339; Vladimir Golitsyn, 'Continental Shelf Claims in the Arctic Ocean: A Commentary' (2009) 24 *International Journal of Marine and Coastal Law* 401.

⁶ Of the seven states maintaining historical claims to the continent of Antarctica, France, New Zealand and the UK have made partial submissions to the CSC and have expressly reserved a right to make further submissions in connection with the continental shelf extending from Antarctica. Australia and Norway have included information on the Antarctic portions of their continental shelf submissions but have requested that the CSC refrain from considering that part of their claim. Controversially, Argentina's CSC 2009 submission appears to include part of the Antarctic continental shelf associated with Argentina's disputed claim but does not expressly request that the Commission refrain from considering that portion of its claim: Argentine Republic, *Outer Limit of the Continental Shelf: Argentine Submission* (Submission to the CSC, 21 April 2009). See also Argentina's note to the UN Secretary-General accompanying its submission: Note from Jorge Argüello, Ambassador, Permanent Representative of the Argentine Republic, Permanent Mission of the Argentine Republic to the United Nations, to UN Secretary-General, 21 April 2009. The extent to

combined with increasingly confrontational political rhetoric, particularly between Arctic states,⁷ has led some commentators to suggest that the opportunities and challenges resulting from climate change will lead to conflict within the polar regions.⁸ However, despite the likely significant environmental impacts of climate change, and the potential indirect consequences on political stability within the polar regions, the legal and policy responses of the relevant regional institutions to climate change have been limited to date.

The purpose of this commentary — recognising the continued uncertainty surrounding both the speed of climate change and its global (and, in particular, its polar) impact — is to focus on the *legal* implications of what is a multi-layered and interdisciplinary discourse on climate change within the polar regions. This commentary will argue that — notwithstanding the continued significance of climate change-related scientific research taking place within both the Arctic and the Antarctic — relevant regional institutions are currently focusing on science at the expense of developing a targeted normative and institutional response to climate change. In other words, whilst recognising the importance of establishing sound scientific baselines relating to climate change, there is *too much* emphasis on science and *too little* attention paid to legal and policy initiatives. This commentary will seek to identify a range of broad normative responses to remedy this imbalance. Moreover, this commentary also recognises the urgency in developing and adopting regional responses within the Arctic and the Antarctic. As will be discussed below, climate change is *already* having an impact on the polar regions and these impacts (such as the melting of sea ice and glaciers) are also likely to have global implications.⁹ Normative

which any of the seven claimant states are able to substantiate continental shelf claims, and the compatibility of those claims with art IV of *The Antarctic Treaty* (opened for signature 1 December 1959, 402 UNTS 71 (entered into force 23 June 1961)) has yet to be resolved and has generated considerable academic debate. See Stuart Kaye and Donald Rothwell, 'Southern Ocean Boundaries and Maritime Claims: Another Antarctic Challenge for the Law of the Sea' (2002) 33 *Ocean Development and International Law* 359; Patrizia Vigni, 'Antarctic Maritime Claims: "Frozen Sovereignty" and the Law of the Sea' in Alex Oude Elferink and Donald Rothwell (eds), *The Law of the Sea and Polar Maritime Delimitation and Jurisdiction* (2001) 85.

⁷ Tensions increased in the Arctic in 2007 when Russia provocatively planted a titanium flag on the Arctic seabed and Canada announced its intentions to build a new fleet of naval vessels to patrol the North-West Passage and to open a new Arctic deep water port. See Parker Clote, 'Implications of Global Warming on State Sovereignty and Arctic Resources under the United Nations Convention on the Law of the Sea: How the Arctic Is No Longer *Communis Omnium Naturali Jure*' (2008) 8 *Richmond Journal of Global Law and Business* 195, 223–6. Although not strictly related to climate change, relations between Australia and Japan have become increasingly confrontational over the last two years in connection with Japanese whaling activities in the area Australia regards as the Australian Antarctic territory. See also 'Special Issue: Japanese Whaling in Antarctica' (2008) 11(3&4) *Asia Pacific Journal of Environmental Law*.

⁸ See especially Clote, above n 7; Scott Borgerson, 'Arctic Meltdown: The Economic and Security Implications of Global Warming' (2008) 87(2) *Foreign Affairs* 63. *Contra* Julia Jabour and Melissa Weber, 'Is It Time to Cut the Gordian Knot of Polar Sovereignty?' (2008) 17 *Review of European Community and International Environmental Law* 27; Oran Young, 'Whither the Arctic? Conflict or Cooperation in the Circumpolar North' (2009) 45 *Polar Record* 73.

⁹ Ban Ki-moon, UN Secretary-General, 'Speech to the World Climate Conference-3' (Speech delivered at the World Climate Conference-3, Geneva, 3 September 2009) <<http://www.un.org/apps/sg/sgstats.asp?nid=4046>>.

action measures must be taken *now* lest it become *too late* to protect these vulnerable regions.

II CLIMATE CHANGE AND THE POLAR REGIONS¹⁰

The most visible consequence of climate change in the polar regions to date is the retreat of sea ice, glaciers, snow and the collapse of iceshelves. In the Arctic, ice extent has retreated at all times of the year since 1979,¹¹ and 2007 marked the warmest year on record,¹² leading to a record-breaking melt of ice from the Greenland Ice Sheet.¹³ In 2007, ice covered only 4.3 million square kilometres of the Arctic, which is 39 per cent lower than the 1979–2000 average.¹⁴ The North-West Passage and the Northern Sea Route were both ice-free for the first time during the 2008 summer.¹⁵ In the Antarctic, ‘strong and significant’ warming is occurring in the peninsula region,¹⁶ and recent research suggests that the continent as a whole is increasing in temperature.¹⁷ In March 2008, the Wilkins Ice Shelf began to calve and lost more than 400 square kilometres of ice, culminating in April 2009 in the collapse of an ice-bridge linking the shelf to the

¹⁰ In addition to the references cited in this Part, see generally Oleg Anisimov et al, ‘2007: Polar Regions (Arctic and Antarctic)’ in Working Group II, Intergovernmental Panel on Climate Change (‘IPCC’), *Climate Change 2007: Impacts, Adaptation and Vulnerability* (IPCC Fourth Assessment Report, 2007) 653; Arctic Council and the International Arctic Science Committee (‘IASC’), *Arctic Climate Impact Assessment 2005* (Report, 2005); Scientific Committee on Antarctic Research (‘SCAR’), *SCAR’s Antarctic Climate Change and the Environment (ACCE) Review Report* (Report presented at the XXXII Antarctic Treaty Consultative Meeting (‘ATCM’), Baltimore, 6–17 April 2009) (‘ACCE Review Report’); SCAR, ‘State of the Antarctic and Southern Ocean Climate System (SASOCS)’ (Information Paper No 5 presented at the XXX ATCM, New Delhi, 30 April – 11 May 2007) (‘SASOCS’); United Nations Environmental Programme (‘UNEP’), *Global Outlook for Ice and Snow* (UNEP Report, 4 June 2007); Larry Hinzman et al, ‘Evidence and Implications of Recent Climate Change in Northern Alaska and Other Arctic Regions’ (2005) 72 *Climatic Change* 259; John Walsh, ‘Review: A Comparison of Arctic and Antarctic Climate Change, Present and Future’ (2009) *Antarctic Science* 1.

¹¹ Clara Deser and Haiyan Teng, ‘Recent Trends in Arctic Sea Ice and the Evolving Role of Atmospheric Circulation Forcing, 1979–2007’ in Eric DeWeaver, Cecilia Bitz and L Bruno Tremblay, *Arctic Sea Ice Decline: Observations, Projections, Mechanisms, and Implications* (2008) 7.

¹² Arctic Monitoring and Assessment Programme (‘AMAP’), *Update on Selected Climate Issues of Concern — Observations, Short-Lived Climate Forcers, Arctic Carbon Cycle, and Predictive Capability* (AMAP Report, April 2009).

¹³ Arctic Council Project, ‘SWIPA: Snow, Water, Ice and Permafrost in the Arctic: Module 2 — The Greenland Ice Sheet in a Changing Climate (Executive Summary)’ (Paper presented at the Melting Ice Conference, Tromsø, 28 April 2009) <http://arctic-council.org/filearchive/Extended_summary.pdf>. This study estimates that annual mass loss of the Greenland icesheet through ice discharge has increased by 30 per cent over the last 10 years: at 3.

¹⁴ AMAP, *Update on Selected Climate Issues of Concern*, above n 12, 2.

¹⁵ *Ibid* v.

¹⁶ John Turner et al, ‘Antarctic Climate Change during the Last 50 Years’ (2005) 25 *International Journal of Climatology* 279, 291.

¹⁷ Eric Steig et al, ‘Warming of the Antarctic Ice-Sheet Surface since the 1957 International Geophysical Year’ (2009) 457 *Nature* 459. These findings contradict earlier research that suggested that Eastern Antarctica was in fact cooling: see Walsh, above n 10, 186.

peninsula.¹⁸ Climate models project an increase in temperature in the Arctic of between 2°C and 9°C by the year 2100,¹⁹ and although predictions for the Antarctic are less certain, models suggest a warming of between 0.14°C and 0.5°C per decade between the present time and 2100.²⁰ Such temperatures may eventually lead to summers without sea ice in the Arctic Ocean,²¹ melt water from glaciers and the Greenland icesheet, may lead to an alteration in the freshwater budget of the Arctic Ocean and ultimately influence ocean circulation. This could have global impacts.²² Should temperatures increase to such an extent that the Greenland icesheet collapses, it is estimated that global sea levels would rise by approximately seven metres.²³ Predictive models for the Antarctic estimate that sea ice in the region will decrease by 33 per cent over the next century and, should the West Antarctic Icesheet collapse, a further 1.5 metres would be added to global sea levels.²⁴

Melting ice and snow, as well as other ecological changes resulting from warmer polar temperatures, are already impacting upon wildlife located within both regions. Climate change and, in particular, the decline in Arctic sea ice has recently been recognised by the parties to the *Agreement on the Conservation of Polar Bears*²⁵ as the greatest long-term threat to the survival of polar bears as a species.²⁶ The average weight of female polar bears in Hudson Bay, Canada, has declined from 650 pounds in 1980 to 507 pounds in 2004,²⁷ and research indicates that polar bears could be one of the first known species to become extinct as a direct result of climate change by the end of this century.²⁸ At the 2009 Meeting of the Parties to the *Polar Bears Agreement*, states agreed that

¹⁸ National Snow and Ice Data Center, 'Antarctic Ice Shelf Disintegration Underscores a Warming World' (Press Release, 25 March 2008) <http://nsidc.org/news/press/20080325_Wilkins.html>; National Snow and Ice Data Center, 'Ice Bridge Supporting Wilkins Ice Shelf Collapses' (Press Release, 8 April 2009) <http://nsidc.org/news/press/20090408_Wilkins.html>.

¹⁹ Anisimov et al, above n 10, 662 [15.3.2].

²⁰ SCAR, *ACCE Review Report*, above n 10, [47].

²¹ H Stern and R Lindsay, 'What is the Trajectory of Arctic Sea Ice?' in Eric DeWeaver, Cecilia Bitz and L Bruno Tremblay (eds), *Arctic Sea Ice Decline: Observations, Projections, Mechanisms, and Implications* (2008) 184.

²² Anisimov et al, above n 10, 661 [15.3.1].

²³ Arctic Council Project, above n 10, 2.

²⁴ SCAR, *ACCE Review Report*, above n 10, [58], [64].

²⁵ Signed 15 November 1973, 13 ILM 13 (entered into force 26 May 1976) ('*Polar Bears Agreement*').

²⁶ In March 2009, Norway hosted the first Meeting of the Parties to the *Polar Bears Agreement* since 1981 in Tromsø. See the *Meeting of the Parties to the 1973 Agreement on the Conservation of Polar Bears: Outcome of Meeting* (Meeting Report, 17–19 March 2009) ('*Outcome of 2009 Meeting Report*').

²⁷ Ahmed Djoghlaif, 'Climate Change and Biodiversity in Polar Regions' (2008) 8(3) *Sustainable Development Law and Policy* 14, 14.

²⁸ This was noted in the Meeting of the Parties to the *Polar Bears Agreement* at the 2009 meeting. See the *Outcome of 2009 Meeting*, above n 26. See generally Steven C Amstrup, Bruce G Marcot and David C Douglas, 'A Bayesian Network Modeling Approach to Forecasting the 21st Century Worldwide Status of Polar Bears' in Eric DeWeaver, Cecilia Bitz and L Bruno Tremblay (eds), *Arctic Sea Ice Decline: Observations, Projections, Mechanisms, and Implications* (2008) 213; Douglas Clark et al, 'Polar Bear Conservation in Canada: Defining the Policy Problems' (2008) 61 *Arctic* 347.

long-term conservation of polar bears depended upon successful mitigation of climate change.²⁹

The negative impacts of climate change are not confined to this iconic species. Declines in the numbers of voles, lemmings, Arctic foxes and lesser white-fronted geese have been detected,³⁰ and pelagic marine species are moving north within the Arctic region.³¹ In particular, bottom-feeding birds and marine mammals are being replaced by pelagic fish in the Arctic.³² In Antarctica, increases in temperature have already been linked to decreases in the population sizes of Adélie and emperor penguins and Weddell seals.³³ Krill have also declined³⁴ and its abundance has decreased by over 50 per cent in the Scotia Sea region of Antarctica.³⁵ Other species such as shallow water sponges,³⁶ and some native flowering plants (such as *Deschampsia antarctica* and *Colobanthus quietensis*) have increased in abundance,³⁷ and an escalating number of non-native species have been found in the sub-Antarctic.³⁸ The introduction of non-native species to the Antarctic linked to a warming climate is regarded as one of the most significant short- to medium-term consequences of climate change for Antarctic wildlife.³⁹ In the longer term, acidification of the Southern Ocean may impact negatively on the survival of pteropods (marine pelagic molluscs) and cold water corals.⁴⁰ Moreover, many benthic Antarctic marine species are stenothermal,⁴¹ and would be unlikely to survive water temperature increases of more than 5°C.⁴² Thus, the impact of climate change upon polar ecosystems — though its precise effect is presently unknown — is sufficiently determinable to be of significant cause for concern.

Although there are significant parallels between the impacts of climate change within the Arctic and the Antarctic, the presence of four million inhabitants within the Arctic adds a very human dimension to this issue. For example, it is increasingly recognised that indigenous knowledge relating to snow, ice and other environmental factors in the Arctic has the potential to make a significant

²⁹ *Outcome of 2009 Meeting*, above n 26. The parties to the Agreement also decided that meetings should in future be held on a biannual basis.

³⁰ Anisimov et al, above n 10, 666 [15.4.2.1].

³¹ *Ibid* 658 [15.2.2.1].

³² *Ibid*, which expressed concern that changes in the distribution of fish stocks may lead to a decline in some species that are not able to compete with new arrivals and to conflict over commercial stocks: at 665 [15.4.1.3], 669 [15.4.3.3]. See also Allison Perry et al, 'Climate Change and Distribution Shifts in Marine Fishes' (2005) 308 *Science* 1912.

³³ Anisimov et al, above n 10, 658 [15.2.2.1]. See also Meredith Hooper, *The Ferocious Summer: Palmer's Penguins and the Warming of Antarctica* (2007).

³⁴ Anisimov et al, above n 10, 658 [15.2.2.1].

³⁵ *Ibid* 669 [15.4.4].

³⁶ *Ibid* 658 [15.2.2.1].

³⁷ SCAR, *ACCE Review Report*, above n 10, [28].

³⁸ Anisimov et al, above n 10, 658 [15.2.2.1].

³⁹ SCAR, *ACCE Review Report*, above n 10, [72].

⁴⁰ Anisimov et al, above n 10, 656 [15.2.1].

⁴¹ Stenothermal species are only able to survive within a limited temperature range.

⁴² SCAR, *ACCE Review Report*, above n 10, [66], noting that it is very unlikely that such a rise in temperature of the Southern Ocean will occur before 2100.

contribution to climate change research.⁴³ Less positively, thawing permafrost and declines in ice and snow have implications for village infrastructure, transportation, the availability of traditional subsistence food sources and health.⁴⁴ Moreover, the majority of indigenous peoples in the Arctic live in low-lying areas and are consequently vulnerable to even small sea level rises.⁴⁵ To the extent that climate change negatively affects the traditional way of life of Arctic indigenous peoples, this will also impact upon their ability to maintain their cultural identity.⁴⁶ It is therefore unsurprising that, in the Arctic, climate change is as much a human rights issue as it is an environmental issue. In 2005, Sheila Watt-Cloutier (Chair of the Inuit Circumpolar Conference ('ICC')) and other individuals, lodged a petition with the Inter-American Commission on Human Rights ('IACHR') on behalf of the ICC, alleging that US failure to reduce greenhouse gas emissions had resulted in the violation of Inuit human rights relating to culture, to the enjoyment of traditional lands and personal property and to health.⁴⁷ Although this petition was almost immediately dismissed in 2006, the IACHR held a hearing on the issue of climate change and the Arctic in 2007.⁴⁸

Of course, not all impacts will necessarily be negative; climate change may have some discrete benefits to the Arctic in particular, such as a reduction in the costs of heating,⁴⁹ an increase in Arctic biodiversity as the tree line moves north⁵⁰ and commercial opportunities arising from the opening up of the North-West Passage to cargo vessels and cruise ships. With these opportunities, however, come very clear associated risks such as the greater likelihood of a maritime accident or the introduction of invasive species through ballast water

⁴³ See Gita Laidler, 'Inuit and Scientific Perspectives on the Relationship between Sea Ice and Climate Change: The Ideal Complement?' (2006) 78 *Climate Change* 407; Erika Zimmerman, 'Valuing Traditional Ecological Knowledge: Incorporating the Experiences of Indigenous Peoples into Global Climate Change Policies' (2005) 13 *New York University Environmental Law Journal* 803.

⁴⁴ Anisimov et al, above n 10, 675 [15.7.1]. It has been estimated that the cost of moving the village of Kivalina, Alaska, to a nearby site would amount to more than US\$54 million.

⁴⁵ Anisimov et al, above n 10, 661 [15.2.2.4]. See also UNEP, *Vital Arctic Graphics: People and Global Heritage on Our Last Wild Shores* (UNEP Report, 2005).

⁴⁶ Anecdotally, there is some concern that the effects of climate change upon traditional livelihoods is exacerbating an above average suicide rate amongst indigenous peoples, including (if not especially) younger members of the community. See Deborah Zabarenko, 'Arctic Leaders Blame Warming for Wolves, Suicide', *Reuters Newsfeed*, 3 May 2007 <<http://www.reuters.com/article/environmentNews/idUSN0322016720070503>>.

⁴⁷ Sheila Watt-Cloutier, Inuit Circumpolar Conference, *Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations resulting from Global Warming Caused by Acts and Omissions of the United States* (7 December 2005). See generally James Ford, 'Supporting Adaptation: A Priority for Action on Climate Change for Canadian Inuit' (2008) 8(3) *Sustainable Development Law and Policy* 25; Jessie Hohmann, 'Igloo as Icon: A Human Rights Approach to Climate Change for the Inuit?' (2009) 18 *Transnational Law and Contemporary Problems* 295; Timo Koivurova, 'International Legal Avenues to Address the Plight of Victims of Climate Change: Problems and Prospects' (2007) 22 *Journal of Environmental Law and Litigation* 267, 285-95; Marguerite Middaugh, 'Linking Global Warming to Inuit Human Rights' (2006) 8 *San Diego International Law Journal* 179.

⁴⁸ 'Human Rights Body Reconsiders Inuit Climate Change Petition', *CBC News (Canada)* 6 February 2007 <<http://www.cbc.ca/canada/north/story/2007/02/06/climate-hearing.html>>.

⁴⁹ Anisimov et al, above n 10, 671 [15.4.5.1].

⁵⁰ *Ibid* 666 [15.4.2.1]. Along the sub-Arctic boundary, the tree line has already moved 10 km northwards.

discharges and hull fouling. Moreover, whilst greenhouse gas contributions from both the Arctic and the Antarctic are negligible to date, they are likely to increase in future. Emissions resulting from polar tourism (from vessels or aircraft) are likely to increase as the industry expands to accommodate a seemingly inexorable rise in the number of tourists keen to see both regions before (ironically) glaciers and sea ice are lost to climate change.⁵¹ In the Arctic, methane released from Siberian lakes makes a minor contribution to global greenhouse gas emissions⁵² as does black carbon that results from local diesel emissions and flaring activities associated with the oil and gas industry.⁵³ More significantly, the thawing of permafrost in the Arctic, which currently holds more than one-third of the world's terrestrial carbon, represents a potentially serious source of future greenhouse gas emissions.⁵⁴

III INTERNATIONAL CLIMATE CHANGE LAW AND POLITICS

The history of, divisions within and current negotiations concerning global climate change policy are well-known and do not need to be reiterated here. Though progress has undoubtedly been achieved since 1992 in establishing a global climate change system, that progress has neither come easily nor without significant disagreement. The continued absence of the US — despite a change in political administration — from the *Kyoto Protocol to the United Nations Framework Convention on Climate Change*⁵⁵ remains a sizeable stumbling block to global consensus. In fact, 2009 could prove to be a pivotal year for the regime as a whole. The Copenhagen meeting in December 2009, formally designated the 15th session of the Conference of the Parties ('COP') to the *United Nations Framework Convention on Climate Change*⁵⁶ and the fifth session of the Meeting of the Parties to the *Kyoto Protocol* ('MOP'), will be truly significant, one way or the other, for the direction of the international community on this issue. It remains to be seen whether the US will finally endorse a *proactive* multilateral approach to the issue. Legally binding commitments under the *Kyoto Protocol* expire in 2012 and replacements must realistically be agreed to by the end of this year if they are to be operational in time. Failure to agree to new obligations, which may for the first time include some form of commitments from the most economically advanced developing countries (that is, India and China) will have a disastrous effect both on long-term climate policy and, much more significantly, the international community's ability to counter the effects of climate change, both in terms of mitigation and adaptation. As the slogan goes, 'the time for action is now'.

⁵¹ Mary Edes, 'Ecotourism in the Arctic Circle: Regional Regulation Is Necessary to Prevent Concerned Environmentalists from Further Contributing to Climate Change' (2008) 21 *Pacific McGeorge Global Business and Development Law Journal* 251, 253.

⁵² Katey Walter et al, 'Methane Bubbling from Siberian Thaw Lakes as a Positive Feedback to Climate Warming' (2006) 443 *Nature* 71, 73–4.

⁵³ AMAP, *Update on Selected Climate Issues of Concern*, above n 12, 7–8.

⁵⁴ *Ibid* 9.

⁵⁵ Opened for signature 16 March 1998, 2303 UNTS 148 (entered into force 16 February 2005) ('*Kyoto Protocol*').

⁵⁶ Opened for signature 4 June 1992, 1771 UNTS 107 (entered into force 21 March 1994) ('*UNFCCC*').

But stepping back from the political and emotive rhetoric, the climate change regime has achieved a great deal on a range of fronts, including methodological issues, compliance and, dare we say it, emissions trading. Perhaps what has been less well-documented is the relationship between global climate change policy and the polar regions. Though the spectre of the impact of climate change on the polar regions has played an important scientific⁵⁷ and rhetorical⁵⁸ function in the global debates, political and normative discussion on the effect of climate change in the polar regions at the global level has generally been notable by its absence. As far as we can tell, though the polar regions have provided an important impetus to the work of the global regime — the crashing of iceshelves into the oceans proving a highly symbolic counter to those who still discount the reality of climate change — outcomes at the *global* level, with especial reference to inclusion of polar regions in COP decisions, are yet to occur. Undoubtedly, this has much to do with perceived clashes of competence, and deference to more specific zones of jurisdiction, certainly in relation to the Antarctic Treaty System. Nevertheless, it is unclear whether regional regimes have, in fact, accepted this responsibility. Moreover, as a first-order issue, it is equally unclear whether this is a responsibility that a regional system can in any event, effectively respond to.

IV THE POLAR REGIONS: RESPONDING TO CLIMATE CHANGE

Although the issue of climate change and its impact has highlighted significant similarities and synergies between the polar regions, and indeed provided the basis for much discussion at the first ever joint meeting of the Arctic Council and the ATCM held in Washington in April 2009,⁵⁹ their respective regional legal and institutional regimes bear little in common.⁶⁰

The *Antarctic Treaty* area — defined as south of 60° South latitude⁶¹ — is subject to a comprehensive, legally-binding regime commonly referred to as the Antarctic Treaty System. The *Antarctic Treaty* constitutes the lynchpin of this system and preserves Antarctica for peaceful purposes and scientific endeavour. By means of an innovative device located in art IV of the *Antarctic Treaty*, sovereignty disputes over the continent⁶² have been set to one side. Through the adoption of subsequent instruments, the now-47 parties to the *Antarctic Treaty* have expanded the regulatory mandate of the regime to include the management

⁵⁷ In this regard, see the work of the IPCC on the role of polar regions on the global climate and the effect of climate change on the polar regions, as referenced variously above.

⁵⁸ During the 11th session of the COP in Montreal in 2006, an ‘Arctic Day’ was organised.

⁵⁹ See Hillary Rodham Clinton (Remarks at the Joint Session of the ATCM and the Arctic Council, 50th Anniversary of the Antarctic Treaty, Washington DC, 6 April 2009) <<http://www.state.gov/secretary/rm/2009a/04/121314.htm>>.

⁶⁰ For two excellent comparative treatments of both polar regions, see Sanjay Chaturvedi, *The Polar Regions: A Political Geography* (1996) and Donald Rothwell, *The Polar Regions and the Development of International Law* (1996).

⁶¹ *Antarctic Treaty*, above n 6, art VI.

⁶² Seven states maintain historical claims to the continent (Argentina, Australia, Chile, France, New Zealand, Norway and the UK). Three of those claims (Argentina, Chile and the UK) overlap. One sector is unclaimed. The US and Russia maintain a right to make a claim to the continent. These claims are not generally recognised by any other states.

of the fishery,⁶³ seal resources,⁶⁴ mining,⁶⁵ and more generally, the protection of the vulnerable Antarctic environment.⁶⁶ Although the Antarctic Treaty System⁶⁷ is a relatively self-contained regime, it does not operate in isolation from international law more generally, and states carrying out activities within the region must comply with other applicable instruments such as the *United Nations Convention on the Law of the Sea*,⁶⁸ the *Convention on Biological Diversity*⁶⁹ and, of course, the *UNFCCC*.

By contrast, the Arctic region⁷⁰ is governed by ‘a mosaic of issue-specific arrangements rather than a single comprehensive and integrated regime’.⁷¹ Whilst many of these instruments are informal and non-binding, it is possible to identify a sufficient level of formal cooperation and institutional infrastructure, which supports, at the very least, an emerging Arctic legal regime.⁷² The focal point of the Arctic regime is the Arctic Council, which was established in 1996⁷³ but, in fact, built upon political and environmental cooperation within the region

⁶³ *Convention for the Conservation of Antarctic Marine Living Resources*, opened for signature 20 May 1980, 1329 UNTS 47 (entered into force 7 April 1982) (‘*CCAMLR*’).

⁶⁴ *Convention for the Conservation of Antarctic Seals*, opened for signature 1 June 1972, 1080 UNTS 175 (entered into force 11 March 1978) (‘*CCAS*’).

⁶⁵ *Convention for the Regulation of Antarctic Mineral Resources*, opened for signature 25 November 1988, 27 ILM 868 (not yet in force); *Protocol on Environmental Protection to the Antarctic Treaty*, opened for signature 4 October 1991, 30 ILM 1455 (entered into force 14 January 1998) (‘*Environmental Protocol*’). Article 7 of the *Environmental Protocol* establishes a moratorium on any activity relating to mineral resources other than scientific research.

⁶⁶ *Environmental Protocol*, above n 65. The *Environmental Protocol* is supplemented by six annexes: Annex I (*Environmental Impact Assessment*); Annex II (*Conservation of Antarctic Flora and Fauna*); Annex III (*Waste Disposal and Waste Management*); Annex IV (*Prevention of Marine Pollution*); Annex V (*Area Protection and Management*) (entered into force 24 May 2000); Annex VI (*Liability Arising from Environmental Emergencies*) (adopted 17 June 2005, not yet in force). Annex II was recently revised by Measure 16 (2009), although this is not yet in force: XXXII ATCM – Committee for Environmental Protection (‘CEP’) XII, *Amendment of Annex II to the Environment Protocol* (ATCM Measure 16, 6–17 April 2009).

⁶⁷ For a comprehensive introduction to this complex and innovative regional regime, see generally Sir Arthur Watts, *International Law and the Antarctic Treaty System* (1992). For a recent account of many current challenges to the Antarctic and its legal regime, see Gillian Triggs and Anna Riddell (eds), *Antarctica: Legal and Environmental Challenges for the Future* (2007).

⁶⁸ Opened for signature 10 December 1982, 1833 UNTS 396 (entered into force 16 November 1994) (‘*UNCLOS*’).

⁶⁹ Opened for signature 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993).

⁷⁰ In contrast to the Antarctic, there is no definitive definition of what constitutes the Arctic region and its political, geographical, cultural and legal boundaries vary according to context. See Carina Keskitalo, ‘International Regime-Building: Development of the Arctic as an International Region’ (2007) 42 *Cooperation and Conflict* 187.

⁷¹ Oran Young, ‘Governing the Arctic: From Cold War Theatre to Mosaic of Cooperation’ (2005) 11 *Global Governance* 9, 10.

⁷² Donald Rothwell, above n 60, 155. See also David Caron, ‘Toward an Arctic Environmental Regime’ (1993) 24 *Ocean Development and International Law* 377; David L VanderZwaag, ‘International Law and Arctic Marine Conservation and Protection: A Slushy, Shifting Seascape’ (1997) 9 *Georgetown International Environmental Law Review* 303.

⁷³ *Declaration on the Establishment of the Arctic Council*, 35 ILM 1382 (signed and entered into force 19 September 1996).

that had been developing from the early 1990s onwards.⁷⁴ The work of the Arctic Council is supported by six environmentally-focused working groups.⁷⁵ The Chair of the Council rotates every two years, which has resulted in regular shifts in its strategic direction.⁷⁶ One of its most important and innovative features is the provision for the full, permanent and active participation of six indigenous peoples' representatives within the Council. Although this flexible structure undoubtedly has strengths, the work of the Council has been criticised as being 'fragmented and hampered by the lack of funding, of a firm legal structure and of a permanent secretariat'.⁷⁷ The Arctic Council relies on existing global, regional and bilateral instruments of direct or indirect application to the Arctic or to activities which impact upon the Arctic.⁷⁸ One significant limitation of this approach is that not all Arctic states have ratified the relevant instruments. For example, Russia has not ratified the *Convention for the Protection of the Marine Environment of the North East Atlantic*⁷⁹ and the US has failed to ratify both the *Kyoto Protocol* and the *Convention on Biological Diversity*. Moreover, as Rosemary Rayfuse has noted:

The decentralized and sectoral nature of the legal framework gives rise to a range of inconsistent or insufficient mandates in existing agreements and institutions and there is an overall lack of coordination and cooperation both within and across the various sectors.⁸⁰

Furthermore, most of these instruments neither solely focus on the Arctic environment nor specifically address climate change at a regional level. The one exception to this is the *Polar Bears Agreement*; the parties to which, as noted above, met for the first time in 28 years in March 2009. At this meeting the parties confirmed that their obligations to protect the habitat of polar bears under the *Polar Bears Agreement* can only be met if temperatures do not rise to the extent that ice disappears in the Arctic. In addition to developing adaptive management strategies in order to respond to other threats to polar bears in light of climate change, the parties emphasised the need to cooperate within appropriate fora, and agreed to highlight internationally the plight of the polar bear.⁸¹ This extremely positive development is somewhat undermined by the

⁷⁴ The first quasi-formal document to be adopted in the region was the Arctic Environmental Protection Strategy ('AEPS') in 1991: see AEPS, *Declaration on the Protection of Arctic Environment* (14 June 1991) <http://arctic-council.org/filearchive/artic_environment.pdf>.

⁷⁵ The working groups include the Arctic Contaminants Action Programme; AMAP; Conservation of Arctic Flora and Fauna; Emergency Prevention, Preparedness and Response; Protection of the Arctic Marine Environment Working Group ('PAME'); and Sustainable Development Working Group.

⁷⁶ Timo Koivurova and David L VanderZwaag, 'The Arctic Council and 10 Years: Retrospect and Prospects' (2007) 40 *University of British Columbia Law Review* 121, 160.

⁷⁷ Louise Angélique de La Fayette, 'Oceans Governance in the Arctic' (2008) 23 *International Journal of Marine and Coastal Law* 531, 561. For a comprehensive assessment of the Arctic Council, see *ibid*.

⁷⁸ See, eg, Rothwell, above n 60, 204.

⁷⁹ Opened for signature 22 September 1992, 32 ILM 1072 (entered into force 25 March 1998) ('OSPAR'). It should be noted that OSPAR is, in any case, of application to only part of the Arctic: art 1(a)(i).

⁸⁰ Rosemary Rayfuse, 'Protecting Marine Biodiversity in Polar Areas beyond National Jurisdiction' (2008) 17 *Review of European Community and International Environmental Law* 3, 7.

⁸¹ See the *Outcome of 2009 Meeting*, above n 26.

clear statement made in the outcome document that neither it nor the obligations contained therein are legally binding.⁸²

A Responding to Climate Change: The Arctic Council

The Arctic Council has responded to the threat of climate change to the region by directing and facilitating comprehensive and globally significant research into the impacts of global warming in the Arctic.⁸³ Although climate change was not initially identified as a priority area within the AEPS,⁸⁴ in 2000 the Arctic Council established the Arctic Climate Impact Assessment ('ACIA') in order to 'evaluate and synthesize knowledge on climate variability and change and increased ultraviolet radiation [in the Arctic], and support policy-making processes and the work of the Intergovernmental Panel on Climate Change'.⁸⁵ In particular, the Council requested that the assessment address environmental, human health, social, cultural and economic impacts and consequences of climate change and develop appropriate policy recommendations.⁸⁶ No new initiatives were developed at the third meeting of the Arctic Council, although the *Inari Declaration*⁸⁷ noted the special features of the Arctic environment as an indicator of climate change, and supported the inclusion of Arctic climate change concerns in the *Plan of Implementation* adopted by the World Summit on Sustainable Development.⁸⁸

The ACIA reported its findings to the fourth meeting of the Arctic Council in Reykjavik in 2004 and identified a wide range of impacts of climate change on Arctic ecosystems, species and inhabitants; many of which have global implications.⁸⁹ The assessment constitutes the most comprehensive regional study on the impacts of climate change to date and its findings were reported to

⁸² Ibid 7.

⁸³ A discussion of all the instruments of application to the Arctic and their role in responding to climate change is beyond the scope of this commentary. The following discussion will thus be largely restricted to the response of the Arctic Council to climate change. See generally Timo Koivurova, E Carina H Keskitalo and Nigel Bankes (eds), *Climate Governance in the Arctic* (2009).

⁸⁴ See AEPS, above n 74. Furthermore, climate change was also not included within the terms of reference establishing a sustainable development program for the Arctic in 1998, see Arctic Council, *Terms of Reference for a Sustainable Development Program* (5 February 1998), available from <<http://arctic-council.org>>. The topic of climate change also did not feature prominently in the 2000 *Framework Document (Chapeau) for Sustainable Development Programme* (13 October 2000), available from <<http://arctic-council.org>>.

⁸⁵ *Barrow Declaration on the Occasion of the Second Ministerial Meeting of the Arctic Council* (Arctic Council Declaration, 13 October 2000) 2, available from <<http://arctic-council.org/section/documentation>>. Work on the impacts of climate change had in fact been initiated in 1998 by the Working Group on the Conservation of Arctic Flora and Fauna and had been strongly endorsed by the first meeting of the Arctic Council. See *Iqaluit Declaration* (First Ministerial Meeting of the Arctic Council, 17–18 September 1998), available from <<http://arctic-council.org/section/documentation>>.

⁸⁶ *Barrow Declaration*, above n 85.

⁸⁷ *Inari Declaration on the Occasion of the Third Ministerial Meeting of the Arctic Council* (Arctic Council Declaration, 2002), available from <<http://arctic-council.org/section/documentation>>.

⁸⁸ World Summit on Sustainable Development, *Plan of Implementation of the World Summit on Sustainable Development*, UN Doc A/Conf.199/20 (26 August – 4 September 2002) [38(i)].

⁸⁹ Arctic Council and IASC, above n 10. These findings provide the basis for much of the discussion in Part II.

the 2005 meeting of the COP *UNFCCC* in Montreal.⁹⁰ In addition to the detailed scientific findings contained in the ACIA, the report also developed a number of broad key policy recommendations relating to mitigation, adaptation, research, monitoring and outreach. These recommendations were adopted by the Arctic Council and the *Reykjavik Declaration* acknowledged the importance of considering the findings of ACIA when implementing commitments under the *UNFCCC* and developing global climate change policy.⁹¹ Moreover, the Arctic Council recognised the importance of organising future work on the basis of the findings of ACIA and, inter alia, directed Senior Arctic Officials to nominate a focal point and to report as appropriate, any Arctic Council follow-up actions to the COP. These commitments (with particular emphasis on adaptation) were reiterated at the fifth meeting of the Arctic Council in 2006.⁹²

An updated report on selected climate change issues of concern was completed and submitted to the sixth meeting of the Arctic Council held in Tromsø in April 2009.⁹³ The *Tromsø Declaration* emphasised, in the strongest possible terms, that human-induced climate change is one of the greatest challenges facing the Arctic and that preserving the Arctic environment depends mainly on substantially reducing global emissions of carbon dioxide.⁹⁴ It also emphasised (as have previous declarations) the importance of adaptation and working with indigenous peoples within the Arctic.⁹⁵ Recognising the importance of short-lived climate forcers (such as black carbon, methane and tropospheric ozone precursors) within the Arctic, the Council decided to establish a task force on short-lived forcers in order to identify existing and new measures to reduce emissions of these forcers.⁹⁶ Finally, the Council decided to report the findings of the SWIPA Study on the ‘Greenland Ice Sheet in a Changing Climate’⁹⁷ to the 15th session of the COP in Copenhagen and confirmed the commitment of all Arctic states to actively contribute to reaching an adequate agreed outcome at the same meeting.⁹⁸

The value of establishing baseline data relating to the impacts of climate change and facilitating the accurate prediction of future changes in the Arctic

⁹⁰ See Arctic Council, *Statement on Climate Change in the Arctic Region* (Statement delivered at the UNFCCC Meeting, Montreal, 9 December 2005), available from <<http://arctic-council.org/section/statements>>.

⁹¹ See *Reykjavik Declaration on the Occasion of the Fourth Ministerial Meeting of the Arctic Council* (Arctic Council Declaration, 24 November 2004), available from <<http://arctic-council.org/section/documentation>>.

⁹² See *Salekhard Declaration on the Occasion of the Fifth Ministerial Meeting of the Arctic Council* (Arctic Council Declaration, 26 October 2006), available from <<http://arctic-council.org/section/documentation>>.

⁹³ AMAP, *Update on Selected Climate Issues of Concern*, above n 12.

⁹⁴ See *Tromsø Declaration on the Occasion of the Sixth Ministerial Meeting of the Arctic Council* (Arctic Council Declaration, 29 April 2009) <<http://arctic-council.org/section/documentation>>.

⁹⁵ *Ibid.*

⁹⁶ *Ibid.* See further Quinn et al, *The Impact of Short-Lived Pollutants on Arctic Climate* (AMAP Technical Report No 1, 2008); Joel Bluestein, Jessica Rackley and Ellen Baum, *Sources and Mitigation Opportunities to Reduce Emissions of Short-Term Arctic Climate Forcers* (AMAP Technical Report No 2, 2008).

⁹⁷ Arctic Council Project, above n 13.

⁹⁸ *Tromsø Declaration*, above n 94.

(and indeed global) environment is of great importance. Yet, beyond the science, the Arctic Council has developed minimal policy initiatives and its recommendations are merely hortatory. It is clear that the Arctic states have different views as to the level of action which can be adopted regionally⁹⁹ and vary as to the urgency and strength of their responses to the recommendations of the Arctic Council.¹⁰⁰ The obvious obstacle to developing a more targeted normative response in the region is the absence of an overarching regime and binding obligations focused specifically on the Arctic. Although the Arctic Council purports to rely on an apparent plethora of relevant regional and global legal obligations of application to the Arctic, no instrument — including the *UNFCCC* and the *Kyoto Protocol* — currently adequately addresses the range of issues linked to climate change in the Arctic. The question of whether the Arctic should develop a regional binding regime along the lines of the Antarctic Treaty System,¹⁰¹ a framework treaty¹⁰² or, a more limited regional seas convention,¹⁰³ has unsurprisingly generated considerable and, to an extent, polemical debate. At least two authors have suggested that climate change may serve as ‘a tipping point’ that could result in the adoption of a legally binding regime for the Arctic.¹⁰⁴ We would agree; the increasing inter-linkages between Arctic issues — already well known before the current concern over climate change — are even more apparent now. And whether the preference would be for a comprehensive regional regime or a regional regime limited to responding to climate change, a legal instrument of some sort would appear to be timely. But

⁹⁹ Koivurova and VanderZwaag, above n 76. Note that the US in particular views adaptation to climate change as a matter for the Arctic Council but mitigation as an issue for the *UNFCCC*: at 175.

¹⁰⁰ *Ibid.*

¹⁰¹ See generally Douglas Johnston, ‘The Future of the Arctic Ocean: Competing Domains of International Public Policy’ (2003) 17 *Ocean Yearbook* 596, 621–4; Linda Nowlan, ‘Arctic Legal Regime for Environmental Protection’ (International Council of Environmental Law, World Conservation Union, Policy and Law Paper No 44, 2001) <<http://data.iucn.org/dbtw-wpd/edocs/EPLP-044.pdf>>. Erika Lennon appears to be favourably disposed towards the adoption of a binding Arctic regime modelled on the Antarctic Treaty System; yet most commentators have rejected this suggestion: Erika Lennon, ‘A Tale of Two Poles: A Comparative Look at the Legal Regimes in the Arctic and the Antarctic’ (2008) 8(3) *Sustainable Development Law and Policy* 32. See also Hans Corell, ‘Reflections on the Possibilities and Limitations of a Binding Legal Regime’ (2007) 37 *Environmental Policy and Law* 321, 321–2; Jabour and Weber, above n 8, 40; Timo Koivurova, ‘Environmental Protection in the Arctic and Antarctic: Can the Polar Regimes Learn from Each Other?’ (2005) 33 *International Journal of Legal Information* 204, 218; de La Fayette, above n 77, 553; Young, above n 8, 75.

¹⁰² Timo Koivurova, ‘Alternatives for an Arctic Treaty — Evaluation and a New Proposal’ (2008) 17 *Review of European Community and International Environmental Law* 15. See also Oran Young, ‘The Arctic in Play: Governance in a Time of Rapid Change’ (2009) 24 *International Journal of Marine and Coastal Law* 423.

¹⁰³ de La Fayette, above n 77, 554; VanderZwaag, above n 72, 342; Rosemary Rayfuse advocates the adoption of a more limited regional regime — of application to areas beyond national jurisdiction only — and Oran Young suggests the development of a regime restricted to issues related to shipping and marine environmental protection: see Rosemary Rayfuse, ‘Melting Moments: The Future of Polar Oceans Governance in a Warming World’ (2007) 16 *Review of European Community and International Environmental Law* 196, 215; Rayfuse, ‘Protecting Marine Biodiversity’, above n 80, 11; Young, above n 8, 79. See also Alf Haken Hoel, ‘Do We Need a New Legal Regime for the Arctic Ocean?’ (2009) 24 *International Journal of Marine and Coastal Law* 443.

¹⁰⁴ Koivurova and VanderZwaag, above n 76, 180.

unfortunately the issues that make such a treaty necessary will also hamper its negotiation, especially if one includes — as one inevitably should within a comprehensive negotiating mandate — the consequences of increased oil and gas exploitation in the Arctic.

B *Responding to Climate Change: The Antarctic Treaty*

As noted above, in contrast to the Arctic, a comprehensive and binding treaty regime governs most activities taking place south of 60° South latitude,¹⁰⁵ and the environmental impacts of those activities are subject to regulation under the *Environmental Protocol*.¹⁰⁶ Parties to the *Environmental Protocol* have committed themselves to the ‘comprehensive protection of the Antarctic environment and dependent and associated ecosystems’ and have designated ‘Antarctica as a natural reserve, devoted to peace and science’.¹⁰⁷ Article 3 of the *Environmental Protocol* sets out a number of guiding principles designed to minimise the negative impact of activities on the vulnerable Antarctic environment. In particular, parties must plan and conduct activities so as to avoid ‘adverse effects on climate and weather patterns’.¹⁰⁸ To suggest that this obligation requires states to undertake climate change mitigation measures outside of the *Antarctic Treaty* area (such as reducing domestic emissions) is arguably too far-reaching. However, a reasonable and natural interpretation of art 3(2)(b)(i) would suggest that parties must consider the contribution to global emissions and climate change resulting from activities taking place *within* the *Antarctic Treaty* area. Although greenhouse gas emissions from scientific and tourist-related bases, camps, vessels and aircraft undoubtedly make only a negligible contribution to climate change, mitigating measures should nevertheless be adopted in order to demonstrate leadership within a region that is especially vulnerable to climate change.

All proposed Antarctic activities are subject to at least some level of environmental impact assessment under art 8 and Annex I of the *Environmental Protocol*. In light of the obligation under art 3(2)(b)(i) to avoid adverse effects on climate and weather patterns, environmental impact assessments must include an evaluation of the climate change implications of the activity in question. Activities likely to have more than a minor or transitory impact on the environment are required to undergo a Comprehensive Environmental

¹⁰⁵ Whilst we confine our discussion to the response of the parties to the *Antarctic Treaty* to climate change, we would nonetheless like to note that climate change was discussed by the Scientific Committee and the Commission to the *CCAMLR* in 2008. The Commission endorsed three areas of work proposed by the Scientific Committee in relation to management responses from climate change: see Commission for the Conservation of Antarctic Marine Living Resources, *Report of the Twenty-Seventh Meeting of the Commission* (Report, 27 October – 7 November 2008) [7.10]–[7.16]. In particular, the Commission agreed that: the robustness of the Scientific Committee’s advice in connection with population levels would have to be considered in light of climate change; that there is a need to improve current monitoring programs of harvested and dependent and associated species so as to provide robust and timely indicators of climate change impacts; and that there is a need to consider whether the Commission’s management objectives and performance indicators require modification in order to remain appropriate in the face of climate change uncertainty: at [4.61]–[4.63].

¹⁰⁶ *Environmental Protocol*, above n 65.

¹⁰⁷ *Ibid* art 2.

¹⁰⁸ *Ibid* art 3(2)(b)(i).

Evaluation ('CEE')¹⁰⁹ and Annex I of the *Environmental Protocol* expressly requires parties to consider possible alternatives to the activity, including the alternative of not proceeding.¹¹⁰ Currently, fossil-based hydrocarbons provide the dominant source of energy for activities taking place in Antarctica.¹¹¹ However, as part of the environmental evaluation process, states should consider the extent to which alternative energy sources can be utilised.¹¹² Recent CEE submissions indicate that at least some states are exploring renewable options for the supply of energy to new bases. For example, it is envisaged that wind turbines will provide most of the energy to the new Belgian research station currently being built in Dronning Maud Land,¹¹³ and will supplement diesel supplies at the new Neumayer III station under construction by Germany on the Ekström iceshelf.¹¹⁴ Meridian Energy, a New Zealand-based company, is constructing a wind farm on Crater Hill, Ross Island, in conjunction with Antarctica New Zealand and the support of the US Antarctic Science Program. The wind farm will supply energy to both Scott Base and McMurdo Station.¹¹⁵ China has indicated that the proposed Dome A Station, to be built on the plateau in the Antarctic hinterland, will be largely dependent upon solar power to meet its energy needs.¹¹⁶ It should, however, be noted that China intends to eventually operate the Dome A station as a year-round facility and that solar power is clearly not a viable source of energy during the dark Antarctic winter. Regrettably, whilst other recent CEE submissions relating to the construction of new bases acknowledge the importance of exploring renewable energy sources, it is apparent that these facilities will be largely dependent upon non-renewable

¹⁰⁹ Ibid annex I art 3.

¹¹⁰ Ibid annex I art 3(2)(a).

¹¹¹ Council of Managers of National Antarctic Programs ('COMNAP'), 'Best Practice for Energy Practice — Guidance and Recommendations' (Working Paper No 35 presented at the XXX ATCM, 2007) 2.

¹¹² The *Guidelines for Environmental Impact Assessment in Antarctica* require parties to give consideration to alternative technologies designed to reduce outputs. See CEP, *Report of the Committee for Environmental Protection (CEP VIII)* (Report, Stockholm, 6–10 June 2005) annex 7 (*Guidelines for Environmental Impact Assessment in Antarctica*) [3.1.2].

¹¹³ See Belgium Science Policy and International Polar Foundation, *Construction and Operation of the New Belgium Research Station, Dronning Maud Land, Antarctica* (CEE Final Report, March 2007) 46–9.

¹¹⁴ See Alfred Wegener, Institute for Polar and Marine Research, *Final Comprehensive Environmental Evaluation of the Proposed Activities: 'Construction of Neumayer III Station', 'Operation of the Neumayer III Station' and 'Dismantling of the Existing Neumayer II Station and Removal of Materials from Antarctica'* (CEE Final Report, August 2005) 34.

¹¹⁵ See Meridian Energy, New Zealand, *The Ross Island Wind Energy — Stage 1 Project*, available from <<http://www.meridianenergy.co.nz/OurProjects>>.

¹¹⁶ See Chinese Arctic and Antarctic Administration, *Proposed Construction and Operation of the New Chinese Dome A Station, Dome A, Antarctica: Draft Comprehensive Environmental Evaluation* (January 2008) 9–10 <http://www.chinare.cn/en/Download/Draft_CEE.pdf>.

fossil fuel-based energy sources.¹¹⁷ There is currently no explicit obligation in the *Environmental Protocol* to report predicted atmospheric emissions from Antarctic activities, although the UK has recently proposed that parties develop a standard approach to calculating emissions relating to fossil fuel combustion and identify a list of emissions which should be reported in all CEEs.¹¹⁸ Moreover, the *Environmental Protocol* does not set out principles or obligations relating to the minimisation or mitigation of greenhouse gas emissions. Nevertheless, the COMNAP has produced recommendatory guidelines for national operators¹¹⁹ and these were endorsed and adopted by the *Environmental Protocol*'s CEP¹²⁰ in 2007,¹²¹ but do not apply — even in a recommendatory form — to other operators, such as tourist operators. Without resorting to amending the *Environmental Protocol* per se, it would seem to us that the ATCM should take — and be seen to be taking — a much more proactive stance on this matter. Such action would be most usefully contained within a legally-binding Measure, requiring as far as possible the minimisation of greenhouse gas emissions and/or the reliance on renewable sources of energy. As noted above, the effect of such changes in global terms would be negligible but the symbolism alone would be a reason for action.

Two further annexes to the *Environmental Protocol* are of potential or indirect relevance to a regional response to climate change within the Antarctic. Annex IV establishes principles and standards relating to pollution of the marine environment and has potential application to greenhouse gas emissions associated with vessels. Although Annex IV principally implements much of the *International Convention for the Prevention of Marine Pollution from Ships*

¹¹⁷ For example, although the UK has indicated that the new Halley VI station being constructed on the Brunt Ice Shelf will use AVTUR fuel (which, despite being less efficient, is a cleaner fuel), it has only made a relatively weak commitment to exploring the extent to which solar energy can be used to reduce fuel consumption during the summer. See British Antarctic Survey, *Final Comprehensive Environmental Evaluation on the Proposed Construction and Operation of Halley VI Research Station, and Demolition and Removal of Halley V Research Station, Brunt Ice Shelf, Antarctica* (CEE Final Report, March 2007) 50, available from <<http://www.antarctica.ac.uk>>. India's new base to be constructed in the Larsemann hills will undoubtedly be reliant on traditional energy sources and India has merely committed to make 'attempts' to supplement these sources with wind and solar energy. See National Centre for Antarctic and Ocean Research, *Draft Comprehensive Environmental Evaluation of the New Indian Research Base at Larsemann Hills, Antarctica* (CEE Draft Report, December 2006) 19, available from <<http://www.ncaor.nic.in/Draftcee/index.htm>>.

¹¹⁸ 'Quantifying Atmospheric Emissions in Antarctic Comprehensive Environmental Evaluations' (Working Paper No 60 submitted by the UK to the XXXI ATCM, Ukraine, 2008).

¹¹⁹ COMNAP, above n 111. Recommendations include designing facilities to enhance insulation and eliminate heat loss, introducing low-energy heating and lighting systems, installing generators that match site demand and have heat recovery systems, providing for renewable energy systems and bases and field camps and operating ships and aircraft so as to minimise fuel use.

¹²⁰ The CEP was established under the *Environmental Protocol*, above n 65, art 11.

¹²¹ CEP, *Report of the Committee for Environmental Protection (CEP X)* (Report, New Delhi, 30 April – 4 May 2007) [341]–[342].

1973 as Modified by the Protocol of 1978 relating thereto¹²² on a regional basis, it makes no reference to Annex VI of *MARPOL 73/78* on air-polluting emissions from vessels.¹²³ Given that Annex VI of *MARPOL 73/78* has only been ratified by 55 states thus far, there would clearly be benefit in updating Annex IV of the *Environmental Protocol* to require that all vessels registered to parties operating in the Antarctic comply with these standards. Of indirect relevance to climate change is Annex V of the *Environmental Protocol*, which permits parties to designate Antarctic Specially Protected Areas ('ASPAs') and Antarctic Specially Managed Areas ('ASMAs') for the purpose of protecting vulnerable and/or valuable ecosystems.¹²⁴ Thus, sites particularly vulnerable to the impacts of climate change may be so designated and benefit from the creation of a targeted management plan designed to protect the site in light of a range of threats and challenges, including climate change. Moreover, sites which are valuable for the purposes of climate change research or which provide ideal locations for the monitoring of climate change impacts within the region can be similarly designated and protected as ASPAs or ASMAs.¹²⁵ For example, both ASPA No 119 (Davis Valley and Fordidas Pond, Dufek Massif) and ASPA No 163 (Dakshin Gangotri Glacier, Dronning Maud Land) were so designated partially on the basis that both sites are of immense value to developing an understanding of the response of the Antarctic icesheet to climate change.¹²⁶

Notwithstanding the applicability of a number of *Environmental Protocol* obligations to climate change challenges, the topic has, until very recently, only been discussed under the auspices of the ATCM within the context of scientific research or in connection with other issues such as the management of invasive species. However, in 2007, the CEP, responding to the SCAR report, SASOCS,¹²⁷ decided to add climate change as a specific sub-item on the environmental monitoring and reporting agenda.¹²⁸ The Committee also formally identified climate change as a high priority issue within the CEP Work

¹²² *International Convention for the Prevention of Pollution from Ships*, opened for signature 15 January 1974, 1340 UNTS 184, as modified by the *Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973*, opened for signature 1 June 1978, 1340 UNTS 61 (entered into force 2 October 1983) ('*MARPOL 73/78*').

¹²³ This is unsurprising as Annex IV of the *Environmental Protocol* was negotiated prior to the adoption of Annex VI to *MARPOL 73/78*. Annex VI of *MARPOL* was recently revised in 2008. See Marine Environment Protection Committee ('MEPC'), *Amendments to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution from Ships, 1973, as Modified by the Protocol of 1978 relating thereto* (MEPC Resolution 176(58), 10 October 2008).

¹²⁴ *Environmental Protocol*, above n 65, annex V, arts 3–4.

¹²⁵ *Ibid.*

¹²⁶ See XXVIII ATCM – CEP VIII, *Final Report of the Twenty-Eighth Meeting* (Report, Stockholm, 6–17 June 2005) measure 2, annex D (*Antarctic Specially Protected Area – Designations and Management Plans: ASPA 119 – Davis Valley and Fordidas Pond, Dufek Massif*); XXVIII ATCM – CEP VIII, *Final Report of the Twenty-Eighth Meeting* (Report, Stockholm, 6–17 June 2005) measure 2, annex M (*Antarctic Specially Protected Area – Designations and Management Plans: ASPA 163 – Dakshin Gangotri Glacier, Dronning Maud Land*).

¹²⁷ SCAR, SASOCS, above n 10.

¹²⁸ XXX ATCM – CEP X, *Final Report of the Thirtieth Antarctic Treaty Consultative Meeting* (Report, 30 April – 11 May 2007) [275].

Programme.¹²⁹ In support of these developments, the XXX ATCM adopted *Resolution 3* (2007), which encourages and recommends the long-term scientific monitoring and sustained observations of environmental change in the Antarctic environment by national Antarctic programs in order to detect, understand and forecast the impacts of environmental and climate change. A controversial information paper on climate change submitted by Norway and the UK to the 2008 CEP meeting¹³⁰ (CEP XI) generated significant debate among the parties as to the extent to which climate change should be discussed and addressed within the ATCM as opposed to at the global level, and the practical and ethical significance of Antarctic emissions reductions to the wider international community.¹³¹ At the XXXII ATCM – CEP XII meeting held in April 2009, SCAR presented its *Antarctic Climate Change and the Environment (ACCE) Review Report*.¹³² This report builds on the SASOCS report (published in 2007) and synthesises available information about the current and predicted impacts of climate change in the Antarctic. It is comparable to, although much more limited than, the ACIA. In this report, SCAR recommended that further research into climate change and the Antarctic environment and, in particular, the impact of climate change on species distribution be encouraged and, that future findings be communicated to SCAR. Moreover, SCAR also suggested that all treaty parties assess their Antarctic operations with a view to mitigating their emissions.¹³³ The report and its recommendations were strongly endorsed by the CEP¹³⁴ and the ATCM decided that it should be forwarded to the UNFCCC for consideration at Copenhagen later this year.¹³⁵ Moreover, the inclusion of climate change within the CEP's work agenda was both recognised and supported by the decision adopted at the 2009 ATCM to convene a meeting of experts in order to discuss matters related to the implications of climate change to the governance of the Antarctic region in Norway in 2010.¹³⁶

Although the parties to the *Antarctic Treaty* have been much slower than the Arctic states in recognising the challenges posed by climate change to the governance of the region, the issue is now firmly and prominently on the ATCM agenda. Nevertheless, the response so far to climate change by states parties to the *Antarctic Treaty* is analogous to the response of the Arctic states to this threat; an emphasis on scientific research, minimal policy initiatives and hortatory recommendations. This is despite the fact that in contrast to the Arctic, the Antarctic benefits from a comprehensive, legally-binding regime within which measures designed to mitigate greenhouse gas emissions and adapt to the impacts of climate change might more easily be developed. Perhaps the latent

¹²⁹ Ibid appendix 1. Climate change was ranked the third most important issue (after invasive species and tourism) within the Antarctic.

¹³⁰ 'Antarctic Climate Change Issues' (Working Paper No 35 submitted by Norway and the UK to XXXI ATCM, Ukraine, 2–13 June 2008).

¹³¹ XXXI ATCM – CEP XI, *Final Report of the Thirty-First Antarctic Treaty Consultative Meeting* (Report, 2–13 June 2008) [296]–[305].

¹³² SCAR, *ACCE Review Report*, above n 10.

¹³³ Ibid.

¹³⁴ XXXII ATCM – CEP XII, *Final Report of the Thirty-Second Antarctic Treaty Consultative Meeting* (Report, 6–17 April 2009) [232], [333].

¹³⁵ XXXII ATCM – CEP XII, *Letter to UNFCCC* (ATCM Decision 8, 6–17 April 2009).

¹³⁶ XXXII ATCM – CEP XII, *Meeting of Experts on Climate Change* (ATCM Decision 1, 6–17 April 2009).

advocacy role at the global level will also provide a spur to internal developments.

V THE POLAR REGIONS: ADAPTING TO CLIMATE CHANGE

The impacts of climate change are already being felt within both the Arctic and the Antarctic. Consequently, adaptation is an equally, if not more important component of the polar institutional response to climate change. Both the Arctic Council and the ATCM have recognised the importance of adaptation within their respective regions, and are increasingly managing activities in light of the actual or potential impacts of climate change. For example, recognising the increased opportunities for hydrocarbon development which may result from a warmer Arctic climate,¹³⁷ the Arctic Council has recently adopted the revised *Arctic Offshore Oil and Gas Guidelines*, which recognise the relationship between the oil and gas industry and climate change, and include recommendations to reduce emissions from offshore activities related to flaring and to promote energy-efficiency savings.¹³⁸ In the Antarctic, parties to the *Antarctic Treaty* have long-recognised the role that a warming climate may play in facilitating the successful colonisation of the Antarctic by invasive species.¹³⁹ The presence of non-native species in Antarctica has been designated the number one priority area for CEP action,¹⁴⁰ and ballast water exchange guidelines have been adopted for ships operating within Antarctic waters.¹⁴¹ However, it should be noted that Annex II of the *Environmental Protocol*, which seeks to regulate the introduction of non-native species to Antarctica, focuses primarily on the deliberate introduction of species rather than accidental introduction,¹⁴² and the revised Annex II text agreed at the 2009 ATCM makes only minor changes to these provisions.¹⁴³ However, at the same meeting, the CEP did decide to

¹³⁷ Magdalena Muir, 'Hydrocarbon Development and Maritime Shipping for the Circumpolar Arctic in the Context of the Arctic Council and Climate Change' (2008) 8(3) *Sustainable Development Law and Policy* 38, 38.

¹³⁸ PAME, *Arctic Offshore Oil and Gas Guidelines* (Arctic Council Report, 29 April 2009) 35, available from <<http://arctic-council.org>>. These Guidelines revise earlier Guidelines adopted in 2002, which themselves revised the 1997 Guidelines.

¹³⁹ Yves Frenot et al, 'Biological Invasions in the Antarctic: Extent, Impacts and Implications' (2005) 80 *Biological Review* 45, 61. For a discussion of the biological, legal and economic implications of invasive species in the Antarctic, see Michelle Rogan-Finnemore (ed), *Non-Native Species in the Antarctic Proceedings* (2008).

¹⁴⁰ XXX ATCM – CEP X, above n 128, appendix 1.

¹⁴¹ XXIX ATCM – CEP IX, *Practical Guidelines for Ballast Water Exchange in the Antarctic Treaty Area* (ATCM Resolution 3, adopted 23 June 2006). These Guidelines support the 2004 *International Convention for the Control and Management of Ships' Ballast Water and Sediments*, opened for signature 1 June 2004, IMO Doc BWM/CONF/36 (13 February 2004) (not yet in force), and recommend that vessels exchange their ballast water north of the Antarctic Polar frontal zone or 60° South (whichever is furthest North) and at least 200 nautical miles from land and in waters of at least 200 metres deep. These Guidelines were adopted by the International Maritime Organization ('IMO') in 2007 and are consequently of general (non-binding) application: see MEPC, *Guidelines for Ballast Water Exchange in the Antarctic Treaty Area* (MEPC Resolution 163(56), 13 July 2007). It should be noted that hull fouling, which is a particularly significant vector for the transport of alien species to the Antarctic, is not yet regulated at a regional or global level: see Patrick Lewis, 'Marine Introductions in the Southern Ocean: An Unrecognised Hazard to Biodiversity' (2003) 46 *Marine Pollution Bulletin* 213, 215.

¹⁴² *Environmental Protocol*, above n 65, annex II art 4, appendix B–C.

¹⁴³ XXXII ATCM – CEP XII, *Amendment of Annex II*, above n 66.

establish an Intersessional Contact Group on non-native species with the overall objective of developing key principles for managing invasive species.¹⁴⁴

The area where Arctic, Antarctic and indeed international institutions have been most active is shipping. As noted above, temperature increases in the Arctic have already caused a significant reduction in sea-ice, and it is predicted that the North-West Passage may be open for commercial shipping by 2020.¹⁴⁵ The long-standing bilateral dispute between the US and Canada over the status of the passage — international strait versus internal waters¹⁴⁶ — shows no sign of abating; rather, Canada's position has become more entrenched over the last three years.¹⁴⁷ Moreover, with an increasingly politicised Arctic there is a danger that this bilateral dispute may become a multilateral dispute as other nations seek to avoid the Panama Canal and reduce the journey between Europe and Asia by 6000 miles.¹⁴⁸ An increase in shipping in the Arctic carries with it greater environmental as well as political risks. The *Arctic Marine Shipping Assessment*, published by the Arctic Council in 2009, notes that whilst climate change may improve access to the region and lengthen the navigational season, this does not mean that ice conditions will be necessarily less difficult.¹⁴⁹ Moreover, a warmer climate may lead to other hazards in the polar regions such as an increase in fog and a consequent decrease in visibility.¹⁵⁰ A significant increase in tourist vessels operating within both the Arctic¹⁵¹ and the Antarctic¹⁵² has occurred over the last ten years, and many of these vessels are not suited to the harsh conditions of polar waters as illustrated by the recent spate of incidents off the coast of

¹⁴⁴ XXXII ATCM – CEP XII, *Final Report*, above n 134, [192].

¹⁴⁵ Arctic Council, *Arctic Marine Shipping Assessment 2009 Report* (Report, 2009) 5.

¹⁴⁶ The dispute over the North-West Passage, which in Canada's view has the status of historic internal waters, and was enclosed by straight baselines in 1986 (Edward Lee, 'Canadian Practice in International Law: At the Department of External Affairs' (1987) 25 *Canadian Yearbook of International Law* 391, 406), is currently reasonably successfully managed by the bilateral agreement between Canada and the US: *Agreement on Arctic Cooperation*, Canada–US, 1852 UNTS 59 (signed and entered into force 11 January 1988). Under this agreement, the US pledges that all navigation by US icebreakers within waters claimed by Canada to be internal will be undertaken with the consent of Canada, which, in turn, pledges to give that consent. Nevertheless, as Gillian MacNeil points out, this agreement is unlikely to protect either Canadian or US interests in the (not-too-distant) event that the North-West Passage becomes navigable by ice-strengthened as opposed to ice-breaking vessels. See Gillian MacNeil, 'The Northwest Passage: Sovereign Seaway or International Strait? A Reassessment of the Legal Status' (2006) 15 *Dalhousie Journal of Legal Studies* 204, 238. For a rigorous examination of the status of the North-West Passage and associated political issues, see Donat Pharand, 'The Arctic Waters and the Northwest Passage: A Final Revisit' (2007) 38 *Ocean Development and International Law* 3.

¹⁴⁷ In 2006, Canada officially changed the name of the North-West Passage to 'Canadian Internal Waters': see Nathan VanderKlippe, 'Northwest Passage Gets Political Name Change: "Internal Waters" Hoped to Bolster Canada's Case', *Edmonton Journal* (Resolute Bay, Nunavut, Canada) 9 April 2006, 1.

¹⁴⁸ Elizabeth Elliot-Meisel, 'Politics, Pride and Precedent: The United States and Canada in the Northwest Passage' (2009) 40 *Ocean Development and International Law* 204, 215.

¹⁴⁹ See Arctic Council, above n 145, 5.

¹⁵⁰ Carl Anderson, 'Global Warming and Canada's Shipping Lanes: An Oceanographer's View' (2003) 17 *Ocean Yearbook* 563, 576.

¹⁵¹ Arctic Council, *Arctic Marine Shipping Assessment 2009 Report*, above n 145, 5.

¹⁵² See Esther Bertram, 'Antarctic Ship-Borne Tourism: An Expanding Industry' in John Snyder and Bernard Stonehouse (eds), *Prospects for Polar Tourism* (2007) 149; Asia Wright, 'Southern Exposure: Managing Sustainable Cruise Ship Tourism in Antarctica' (2008) 39 *California Western International Law Journal* 43.

Antarctica.¹⁵³ Whilst Arctic coastal states may take unilateral action to address these risks within their maritime zones under art 234 of *UNCLOS*,¹⁵⁴ this option is not available to Antarctic states. In the long term, the increased (climate change-related) risks posed by shipping to both polar regions can only be appropriately managed at the international level under the auspices of the IMO.¹⁵⁵

Thus, to a greater or lesser extent polar states are putting in place directly or indirectly, adaptation measures in response to climate change and the more general implications of a warmer climate to both regions. However, the lack of a binding, comprehensive regime for the Arctic undoubtedly limits that region's ability to develop adaptive responses in contrast to the Antarctic. Moreover, in both regions, adaptation is taking place on a piecemeal and issue-by-issue basis. There is as yet no overall adaptation strategy dealing with all or a range of climate change implications, including those impacts likely to affect Inuit communities within the Arctic.

VI THE POLAR REGIONS AND CLIMATE CHANGE — THE WAY FORWARD

The above survey has illustrated that climate change is now an undoubtedly prominent issue for both the Arctic Council and the ATCMs. So far, discussion within these institutions has focused on the science of climate change, and research within both regions has made important contributions to regional and global knowledge. Nevertheless, the development of regional policy and regulatory responses to climate change have been fairly minimal to date; although it is clear that both regions are considering the impacts of climate change when developing policy on issues such as oil and gas exploration, the management of non-native species and shipping. The original perception that climate change is not an issue which can be addressed regionally is slowly beginning to change. Although we recognise that a polar regional response to climate change constitutes only a partial solution to what is undeniably a global problem, there are (at least) three areas we have identified within which action can and should be undertaken by polar states.

First, states responsible for, or operating within, both regions must, as far as possible, take measures to mitigate and minimise local greenhouse gas emissions. In the Antarctic, operators should reduce emissions from bases, camps, aircraft and vessels through the adoption of regional standards under the auspices of the *Environmental Protocol* and/or through the implementation of

¹⁵³ See discussion in the references, above nn 151–152.

¹⁵⁴ On the operation of art 234 of *UNCLOS* in the Arctic, see Lee Clark, 'Canada's Oversight of Arctic Shipping: The Need for Reform' (2008) 33 *Tulane Maritime Law Journal* 79; Donald McRae and D J Goundrey, 'Environmental Jurisdiction in Arctic Waters: The Extent of Article 234' (1982) 16 *University of British Columbia Law Review* 197.

¹⁵⁵ A discussion of the many regional and international initiatives that have been developed in recent years to manage the risks associated with polar shipping is beyond the scope of this commentary. However, mention should be made of the 2002 *Guidelines for Ships Operating in Arctic Ice-Covered Waters* (MSC/Circ 1056, MEPC/Circ 399) which were adopted with minor amendments and applied to the Antarctic in 2004 under the auspices of the ATCM *Shipping Guidelines* (ATCM Decision 4, 2004). These Guidelines are in the process of being revised by the IMO and are expected to be adopted in December 2009. Moreover, at the 86th Meeting of the Maritime Safety Committee of the IMO, held in May – June 2009, the decision was taken to develop a mandatory Polar Code of application to both regions.

global standards such as the recently revised Annex VI of *MARPOL 73/78*. Although Antarctic emissions make only a negligible contribution to climate change, states parties have an ideal opportunity to demonstrate international leadership in responding to climate change through the development of regional energy efficiency measures and the promotion of renewable energy within Antarctica. In the Arctic, the local contribution to global climate change is more acute; black carbon and methane emissions are increasing and the emerging oil and gas industry represents a significant source of future greenhouse gas emissions. As such, Arctic states should be wary of extensively developing new oil and gas fields, but if they do decide to significantly develop offshore energy sources, meaningful consideration must be given to the options for the sequestration of associated greenhouse gas emissions. The challenge, of course, in the Arctic is the lack of a comprehensive legal framework of application to all activities and all Arctic states.

Second, states must develop appropriate regional responses for the purpose of adapting to climate change and for managing activities in light of climate change and its environmental and (to a lesser extent) political implications. Both regions are already developing policy initiatives in light of climate change with respect to the issues discussed above. However, in neither region is a comprehensive proactive approach being developed. We suggest that both Arctic and Antarctic institutions begin the process of developing regional plans and policies, in order to proactively and strategically manage polar activities, and to address all environmental threats, including climate change, on a precautionary and integrated basis. Moreover, adaptation to climate change in both regions is also likely to require states to examine the linkages between regional and global rules with a view to ascertaining the extent to which multilateral rules and frameworks allow for the appropriate regulation of regional complexities.

The third area for action focuses on the responsibilities of polar states at the global level to reduce and mitigate greenhouse gas emissions, and to represent and promote the interests of these regions within appropriate international fora such as the COP. The parties to the *Antarctic Treaty* generally characterise themselves as effectively operating as trustees for the region with special responsibility for its management and protection. Although the sovereign status of the Arctic is quite different from that of the Antarctic, the Arctic states can nevertheless also be characterised as trustees with responsibility for protecting not only the environment but also the peoples of the region. This special responsibility for the management and protection of the Arctic was arguably confirmed and possibly strengthened by the *Ilulissat Declaration* that was adopted by the five Arctic states in May 2008, and which emphasised that '[b]y virtue of their sovereignty, sovereign rights and jurisdiction in large areas of the Arctic Ocean the five coastal states are in a unique position to address [the] possibilities and challenges' posed by climate change to the region.¹⁵⁶ As trustees (in effect) for the polar regions, Arctic states and parties to the *Antarctic Treaty* have a special responsibility to support and advocate polar interests within international fora. Moreover, the decisions of both the Arctic Council and the ATCM in 2009 to present polar-related climate change research at the

¹⁵⁶ Arctic Ocean Conference, *The Ilulissat Declaration* (Declaration, 29 May 2008) <http://www.oceanlaw.org/downloads/arctic/Ilulissat_Declaration.pdf>.

UNFCCC COP in Copenhagen in December are extremely positive. Nevertheless, polar states need to move beyond the (important) roles of presenting scientific findings and engaging in hortatory hand-wringing, which have generally characterised their response to climate change to date.¹⁵⁷ In light of their special responsibilities for the Arctic and the Antarctic, and the (now) general acceptance that climate change represents the most significant and serious threat to both regions, polar states must engage positively with the current negotiations, and participate in the development of measures, including emissions reductions, which provide a realistic opportunity to protect both these vulnerable regions, and the earth more generally.

VII POSTSCRIPT: REGIME INTEGRITY

In addition to recognising the causal relationship between climate change and its negative impact on the polar regions, the ‘backdrop’ of global climate change is also an expedient way to assess the current health of the regional legal regimes — as noted above, ‘regime’ is used here rather tentatively in the case of the Arctic. It is undoubtedly the case that both the Antarctic Treaty System and the Arctic Council have some singularly positive qualities. But regardless of historic strengths (particularly in relation to the Antarctic Treaty System), are they ‘fit for purpose’ when it comes to climate change? Of course, one response is to note that as climate change is a global issue, the institutional focus must inevitably always be in the first instance on the global regime established under the UNFCCC and the *Kyoto Protocol*. This is true. But regional regimes cannot abrogate complete responsibility; many other treaties can play their part in seeking to move towards a carbon-neutral economy and, as importantly, mitigate the likely effects of climate change as well as adapt thereto. Both the Antarctic and the Arctic are resplendent with a myriad of legal rules, institutional frameworks and decision-making procedures — perhaps as many national as regional in the case of the Arctic — but the point still holds. But for all this, and despite recent scientific and policy initiatives, climate change is under-regulated in the polar regions. Thus, here is the paradox: there is both *too much* rhetoric¹⁵⁸ and *too little* regulation. Unfortunately, before we have a chance to resolve this conundrum, the global reality may overtake the normative endeavour; in other words, it will also be *too late*.

¹⁵⁷ For example, whilst states at the 2009 Meeting of the Parties to the *Polar Bears Agreement* engaged in significant discussion relating to scientific research into the impacts of climate change on polar bears, that included recommendations relating to the management of polar bears in light of climate change in their outcome document, they emphasised that the document creates no legally-binding obligations on the states parties. See Arctic Council, *Outcome of 2009 Meeting*, above n 26. Moreover, this unwillingness to move beyond science and rhetoric has been reinforced at the national level by the US Administration’s confirmation in May 2009 of the so-called ‘4(d) rule’ adopted by President George W Bush in December 2008. The rule clarifies that the designation of the polar bear as an endangered species under the 1973 *Endangered Species Act* does not give the Secretary of the Interior the authority to limit greenhouse gas emissions outside of the polar bears’ range: Department of the Interior, US, ‘Salazar Retains Conservation Rule for Polar Bears’ (Press Release, 8 May 2009) <http://www.doi.gov/news/09_News_Releases/050809b.html>.

¹⁵⁸ This is not to decry the necessary level of scientific endeavour, but to suggest that polar states cannot hide behind supporting scientific research as their principal response to climate change within the polar regions.