The interplay of global and polar regimes

Oran R. Young

The growing salience of interactions between the functionally broad but geographically narrow regimes for the polar regions and the geographically broad but functionally specific regimes emerging to deal with global environmental changes directs attention to the issue of institutional interplay. Interplay among regimes can cause mutual interference or foster synergy. Adopting a pragmatic stance that assumes no fundamental changes in international society, this essay suggests ways to: (1) adapt global regimes dealing with ozone depletion, climate change and biodiversity to the conditions prevailing in the polar regions; and (2) ensure that concerns arising in the polar regions receive serious consideration in global forums. Specific suggestions range from modest initiatives involving monitoring and assessment to more ambitious initiatives, such as the establishment of a chamber of regions in global regimes.

O. R. Young, Institute of Arctic Studies, Dartmouth College, 6214 Fairchild, Hanover, NH 03755, USA.

Introduction

The onset of global environmental change has tightened the links between global systems and processes occurring in the polar regions (IASC 1994; Maxwell et al. 1998). The depletion of stratospheric ozone is a consequence of releases of chlorofluorocarbons (CFCs) and several related families of chemicals throughout the world and especially in the mid-latitudes. But the impacts of ozone depletion are felt with particular force in the high latitudes, taking such forms as a seasonal "ozone hole" over Antarctica. Emissions of greenhouse gases everywhere in the world contribute to climate change. Yet the consequences of climate change are expected to be felt "first and worst" in the Arctic (Peterson & Johnson 1995; AMAP 1997). There are good reasons to expect that climate change will also trigger feedback processes in which polar events become driving forces at the global level. Evidence is mounting that the Arctic is already undergoing a transition from sink to source in terms of fluxes of carbon dioxide and quite possibly methane (Oechel et al. 1993). The melting of freshwater locked in glaciers and ice sheets in the Arctic and especially Antarctica could raise sea levels and figure in complex feedback processes by lowering the albedo of sizable portions of the Earth's surface.

What are the institutional implications of this tightening of the biophysical links between global systems and polar processes? In recent decades, the polar regions have become sites of particularly effective efforts to create and operate international regimes that are functionally broad but geographically specific. The Antarctic Treaty System, which began in 1959 and has since grown into an interlocking set of arrangements dealing with a broad range of issues, is a striking example (Joyner 1998). Although cooperation got off to a slower start in the north polar region due to the strategic importance of the Far North during the cold war, regional arrangements in the Arctic are now developing rapidly (Chaturvedi 1996; Rothwell 1996). Today, the Arctic Council presides over a set of arrangements dealing with a variety of functional concerns (Young 1997). The onset of global environmental change, by contrast, has spawned a collection of international regimes that are functionally narrow, even though their geographical reach is global. The most important of these are the regimes for the protection of the ozone layer formalized in the 1985 Vienna Convention for the Protection of the Ozone Layer

and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer (Parson & Greene 1995; Benedick 1998); the climate change regime articulated in the 1992 Framework Convention on Climate Change together with the 1987 Kyoto Protocol (Victor & Salt 1994), and the biodiversity regime encapsulated in the 1992 Convention on Biological Diversity (Raustiala & Victor 1996). Efforts are underway at present to create global regimes dealing with persistent organic pollutants and forests (World Resources Institute 1996: Ch. 9; Bankes 1998).

The arrangements dealing with stratospheric ozone, climate and biodiversity apply to the polar regions just as they apply to other regions. Conversely, the polar regimes cover a range of concerns that are pertinent to global environmental change. Little effort has been made to think through interactions between these two sets of institutional arrangements, either in forming regimes or in implementing them. But even if unintentional, institutional overlaps can have far-reaching consequences (Young et al. 1999).

Institutional interplay

It has become conventional to draw a distinction between systemic and cumulative environmental changes (Kates et al. 1990). Systemic changes affect structures or processes that are global in scope in that disturbances or alterations occurring in any part of the world are expected to have planetary effects (e.g. climate change). Cumulative changes, by contrast, affect many systems that are regional or even local in scope in ways that are comparable from one part of the world to another. Ultimately, these regional or local alterations cumulate into larger patterns of change whose significance is global (e.g. loss of biodiversity). The relevance of this distinction for present purposes lies in the fact that the problems of institutional interplay associated with systemic changes differ from those involving cumulative changes.

Systemic changes

Efforts to solve systemic problems featuring the creation of global regimes often have far-reaching consequences for regional cooperation, especially in areas that are marginal in policy terms. Some links between global initiatives and regional arrangements are mutually beneficial. The Arctic Monitoring and Assessment Programme (AMAP) could collect regional data – on matters like the behaviour of permafrost and sea ice – that are needed in connection with ongoing efforts to deal with climate change (AMAP 1997). A similar role might be appropriate for the Committee on Environmental Protection in Antarctica.

Yet even when efforts to coordinate regional and global programmes are rooted in mutual interests, the intrusion of global concerns is apt to skew the priorities of regional regimes. Outsiders have little interest in the polar regions as such. They tend to take note of polar processes, such as the Antarctic ozone hole or the changing behaviour of sea ice in the Arctic, when and to the extent that these phenomena seem relevant to the pursuit of global objectives, like the regulation of climate change. Harmless under some circumstances, this dynamic can divert attention and material resources from other concerns, such as the sustainable use of living resources, that are of higher priority from a regional perspective than global issues like climate change (Peterson & Johnson 1995). Similar observations are in order regarding the relative neglect of local problems in other regions (e.g. the Amazon) that have acquired a high profile in connection with global environmental changes (Hurrell 1992). But skewed priorities are particularly pronounced in the polar regions. The absence of permanent residents in Antarctica and the widely scattered character of the Arctic's sparse population make it difficult to provide the polar regions with an effective voice in deliberations stimulated by global concerns.

The interplay between global and polar regimes thus raises a number of policy issues. Although protecting the taiga as a carbon sink makes sense in global terms, more pressing economic and political imperatives may take precedence over this concern at a regional level. Similarly, the idea that the polar regions are interesting to the outside world primarily as an early warning system or as a laboratory for the study of resilience and social vulnerability can hardly be expected to sit well with residents of the circumpolar north concerned about matters of sustainability or with members of advocacy groups concerned with the impacts of ecotourism in the south polar region. How can those who focus on global issues make use of the polar regions for purposes of early warning and social experimentation without appearing to re-

sidents of the Arctic and defenders of the Antarctic as exploitative outsiders? How can those whose primary interest is the well-being of the polar regions find ways to articulate their concerns in global forums without hampering efforts to solve global problems?

Cumulative changes

The problems of institutional interplay arising from cumulative global environmental changes feature a different dynamic. Efforts to deal with cumulative changes cannot succeed unless they focus directly on regional or even subregional processes. Although a number of problems (e.g. the protection of forests of international significance) fit this description, the cumulative effects of many individual threats to biodiversity constitute a particularly striking example. Efforts to protect biodiversity in the polar regions must not only recognize the distinctive features of high latitude ecosystems but also take into account the provisions of relevant regional regimes. Thus, the facts that polar systems are relatively species-poor but feature large populations of individual species and that they are slow to regenerate in the wake of disturbances must be taken into account in any successful effort to protect biodiversity in the high latitudes (Chapin & Körner 1995; CAFF 1997a). Contrast this set of circumstances with the conditions prevailing in the moist tropical forests of the Amazon Basin, which contain many species with small populations existing in close proximity. What is more, regimes currently in place in the polar regions contain numerous provisions that are relevant to the problem of protecting biodiversity. These range from the arrangement designed to protect polar bear habitat to the whole ecosystems provisions of the Convention on the Conservation of Antarctic Marine Living Resources, or CCAMLR (Prestrud & Stirling 1994; Stokke 1996). The secret to success in addressing a cumulative issue like the protection of biodiversity thus lies in building on existing regional regimes rather than attempting to create alternative overarching regimes.

Even so, the overlay of global concerns on regional arrangements is bound to have an impact on institutional arrangements designed for regional problems. With regard to biodiversity, two major issues stand out. First, applying the perspectives embedded in the biodiversity convention to the polar regions highlights the need to think in terms of systems in contrast to the sustainable harvesting of individual species on the part of consumptive users (Hoel 1999). This perspective directs attention to the dynamics of large marine and terrestrial ecosystems, underlines the importance of protecting habitat as well as organisms, and leads to an emphasis on the establishment of protected natural areas and the conduct of environmental impact assessments prior to initiating significant human actions. Generally compatible with the newer elements of the Antarctic Treaty System, this set of concerns requires some restructuring of arrangements in the Arctic which are animated more by a desire to promote sustainable uses of individual species than by a commitment to the protection of biodiversity (Chaturvedi 1996; Joyner 1998).

A second major issue centres on differences between the polar regions with regard to the discourses of environmental protection and sustainable development (Dryzek 1997). In the Antarctic, efforts to devise a mining regime based on the idea of sustainable development failed (Joyner 1996), clearing the way for the development of the 1992 Protocol on Environmental Protection which prohibits consumptive uses of most Antarctic resources (van der Lugt 1997). In the Arctic, by contrast, extensive exploitation of both renewable and nonrenewable resources for subsistence, recreational and commercial purposes is a fact of life. This explains the growing tension in the north between initiatives inspired by the discourses of environmental protection and sustainable development. It is no accident, for instance, that those whose principal concern is the protection of biodiversity have focused on the efforts of the Working Group on the Conservation of Arctic Flora and Fauna (CAFF) set up under the Arctic Environmental Protection Strategy and now operating under the auspices of the Arctic Council (CAFF 1997a). Conversely, those more concerned with the sustainability of consumptive uses of living resources (e.g. caribou/reindeer, seals) have turned their attention to the Sustainable Development Programme initiated under the terms of the 1996 Declaration on the Establishment of the Arctic Council (Scrivener 1999). Though the perspectives of the two groups overlap, the overlay of the global concern for biodiversity on these regional regimes produces a juxtaposition of interests that could prove difficult to reconcile.

Developments at the regional level can also play a role in refining or even redirecting efforts to

address cumulative concerns at the global level. Experience with the problems of implementing management strategies based on whole ecosystems perspectives under the terms of CCAMLR, which entered into force in 1982, has clearly contributed to our understanding of the differences between managing consumptive uses of individual species and managing complex ecosystems encompassing both harvested and unharvested species (Stokke 1996). Efforts to manage consumptive uses of Arctic species in a manner that protects the systems to which they belong have brought to our attention the importance of making use of traditional ecological knowledge as well as western, scientific knowledge (Hansen 1994). They have also led to experiments with co-management regimes in which representatives of government agencies and of user groups together attempt to regulate human uses of living Arctic resources in the interests of achieving sustainability and protecting larger ecosystems (Osherenko 1988). Experience in the Arctic has reinforced the proposition that it is essential to strike a balance between top-down initiatives and bottom-up efforts in order to maintain the integrity of ecosystems in which human users play important roles. In short, success in dealing with global changes that are cumulative in nature requires effective partnerships between global initiatives and arrangements articulated at the regional level.

Although the preceding account focuses on biodiversity as a particularly prominent case, analogous concerns arise in connection with other cumulative changes, like the destruction of northern forests and transboundary fluxes of airborne and waterborne pollutants in both polar regions. In the case of forests, the critical concern is the need to regulate the harvest of the larch and spruce forests of the Russian taiga, which contain quantities of carbon comparable to those sequestered in the tropical forests of the Amazon Basin (World Resources Institute 1996: 208). With regard to pollutants, the main concern involves movements from mid-latitude sources to high-latitude sinks, a situation that threatens to transform the polar regions and especially the Arctic into sacrifice zones for advanced industrial societies (CARC 1998). The specific issues of institutional interplay that arise in connection with these cumulative changes differ from those associated with the loss of biodiversity. Yet they share features, such as the need to design region-specific approaches, that set these issues apart from their counterparts involving systemic changes.

Institutional adaptations

The need to adapt global arrangements, which are necessarily framed in general terms, to the particular conditions prevailing in distinct regions is a problem arising in every area of human affairs. One response emphasizes combining broad principles stated in generic terms with regional implementation strategies intended to translate these global prescriptions into more specific arrangements applicable to particular regions. To return to the example of biodiversity, this means starting with the development of generic guidelines, like the precautionary principle, and then proceeding to flesh out these guidelines taking into account the specific conditions prevailing in individual regions. In the case of the Arctic, this approach to institutional interplay has produced a concerted effort to apply the basic ideas articulated in the biodiversity convention to circumpolar conditions through the articulation of a "Co-operative Strategy for the Conservation of Biological Diversity in the Arctic Region" (CAFF 1997b). Developed by CAFF, this strategy should now serve as a blueprint for efforts of the Arctic Council to safeguard biodiversity. Similar efforts may emerge in Antarctica from the work of the Committee on Environmental Protection (Joyner 1998).

Beyond this, it is possible to forge productive links between regimes dealing with global environmental changes and regional regimes through the development of collaborative activities. Obvious opportunities arise in connection with monitoring and assessment programmes. The recent expansion of AMAP to collect and process data relating to ozone depletion and climate change in the north polar region, for instance, is clearly sensible. Similar opportunities could arise in the south polar region as activities under the environmental protocol get underway. There may well be advantages also in developing shared capabilities to handle matters like implementation review and authoritative interpretation (Victor et al. 1998). All regimes require mechanisms for resolving disagreements about the application of their provisions to specific situations. At the same

time, a proliferation of such mechanisms with overlapping jurisdictions is surely a recipe for confusion and may well lead to failure or mediocre performance in terms of problem solving.

Global environmental change is already a fact of life in the polar regions. But these impacts do not carry much weight when it comes to policymaking regarding such matters (Young 1992). What can be done to rectify this situation? One response already beginning to bear fruit features the forging of mutually beneficial links between scientific organizations dealing with polar matters – the Scientific Committee on Antarctic Research (SCAR) and the International Arctic Science Committee (IASC) – and their counterparts focusing on matters of global environmental change – the World Climate Research Programme, the International Geosphere-Biosphere Programme, and the International Human Dimensions Programme on Global Environmental Change.

Useful as these connections are in developing a knowledge base, however, they constitute only a first step in bringing polar concerns to the attention of forums dealing with global environmental change. A more ambitious step might feature according bodies that represent polar interests – the Arctic Council in the north and the Antarctic Treaty Consultative Meetings in the south – a voice in the deliberations of global bodies, like the Conferences of the Parties operating under the regimes for ozone, climate and biodiversity. This is not a matter of gaining voting rights; the COPs operate largely through consensus procedures. Rather, the need is to ensure that regional concerns will be taken seriously in global level deliberations. Eventually, this approach might even result in the creation of a chamber of regions operating under the auspices of the various global regimes. The need to consider regional variations – especially regarding impacts – is now well-established even in efforts to address systemic problems (Watson et al. 1998). In the case of cumulative problems, the importance of regional concerns is self-evident. Accordingly, the establishment of procedures to articulate regional concerns within the global regimes may emerge as a welcome development from a global perspective, just as it enhances the voices of the regions.

Finally, both the regimes for the polar regions and the regimes dealing with problems of global environmental change operate in a broader setting featuring other environmental regimes as well as institutions dealing with other issue areas (e.g. trade and financial flows) that bear on environmental concerns. Some analysts have proposed the creation of a World Environment Organization – treated as a counterpart to the World Trade Organization – to serve as a forum in which to address issues of institutional interplay. There are reasons to doubt whether a formal World Environment Organization will come into existence anytime soon (von Moltke 1997). But this does not mean that there is no role for *ad hoc* arrangements intended to provide opportunities to compare notes about issues relating to interactions between functionally orientated global regimes and geographically delimited regimes. Similar opportunities may arise in connection with geographically specific regimes based on different principles of delimitation (e.g. the regime for the Arctic and the trade regime established under the North American Free Trade Agreement).

Conclusion

The growing salience of interactions between the functionally broad but geographically narrow regimes that have developed in the polar regions and the geographically broad but functionally specific regimes that are now emerging in connection with problems of global environmental change directs our attention to the issue institutional interplay. Overlooked by many students of international institutions due to a preoccupation with the complexities of individual regimes, the problem of institutional interplay already constitutes an important phenomenon; it is destined to loom larger on the institutional horizon as the collection of distinct regimes grows in international society. Institutional interplay can cause mutual interference or foster synergy. The challenge is to find ways to avoid the former and reinforce the latter. Adopting a pragmatic stance that assumes no changes in the fundamental character of international society, this essay suggests a number of ways to adapt the provisions of global regimes dealing with issues like climate change and biodiversity to the particular conditions prevailing in the polar regions and to ensure that the concerns arising in the polar regions will receive serious consideration in global forums. Creativity in the development of effective procedures for dealing with institutional interplay will pay off both in the polar regions and elsewhere in

the form of improvements in the overall quality of governance in world affairs.

References

AMAP 1997: *Arctic pollution issues: a state of the Arctic environment report.* Oslo: AMAP.

Bankes, N. 1998: Steps towards the international regulation of POPs. *Northern Perspect. 25(2)*, 18–21.

Benedick, R. 1998: *Ozone diplomacy: new directions in safeguarding the planet.* Cambridge (USA): Harvard University Press.

CAFF 1997a: *Report to the senior Arctic officials of the Arctic Environmental Protection Strategy.* Alta, Norway.

CAFF 1997b: *Co-operative strategy for the conservation of biological diversity in the Arctic.* Helsinki: Ministry of the Environment.

CARC 1998: *Special issue on Arctic contaminants. Northern Perspect. 25(2)*, 1–27.

Chapin, F. S. & Körner, C. (eds.) 1995: *Arctic and alpine biodiversity: patterns, causes and ecosystem consequences.* Berlin: Springer.

Chaturvedi, S. 1996: *The polar regions: a political geography.* Chichester (UK): John Wiley.

Dryzek, J. S. 1997: *The politics of the Earth.* New York: Oxford University Press.

Hansen, B. V. (ed.) 1994: *Arctic environment: report on the Seminar on Integration of Indigenous Peoples Knowledge.* Copenhagen: Ministry for the Environment (Iceland), Ministry of the Environment (Denmark), and the Home Rule of Greenland.

Hoel, A. H. 1999: Institutional interplay among environmental institutions in the Arctic. Paper presented at the Open Meeting of the Human Dimensions of Global Environmental Change Research Community, Shonan Village, Japan, 24–26 June.

Hurrell, A. 1992: Brazil and the international politics of Amazonian deforestation. In A. Hurrell & B. Kingsbury (eds.): *The international politics of the environment.* Pp. 398–429. Oxford: Clarendon Press.

IASC 1994: *A regional research programme in the Arctic on global change.* Washington, D.C.: National Academy Press.

Joyner, C. 1996: The effectiveness of CRAMRA. In O. S. Stokke and D. Vidas (eds.): *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty System.* Pp. 152–173. Cambridge: Cambridge University Press.

Joyner, C. 1998: *Governing the frozen commons: the Antarctic regime and environmental protection.* Columbia (USA): University of South Carolina Press.

Kates, R. W., Turner, B. L. & Clark, W. C. 1990: The great transformation. In B. L. Turner et al. (eds.): *The Earth as transformed by human action.* Pp. 1–17. Cambridge: Cambridge University Press.

Maxwell, B. et al. 1998: The Arctic and the Antarctic. In R. T. Watson et al. (eds.): *The regional impacts of climate change: an assessment of vulnerability.* Pp. 85–103. Cambridge: Cambridge University Press.

Oechel, W. C., Hastings, S. J., Jenkins, M., Reichers, G., Grulke, N. & Vorlitis, G. 1993: Recent change of Arctic tundra ecosystems from a carbon sink to a source. *Nature 361*, 520–526.

Osherenko, G. 1988: Can comanagement save Arctic wildlife? *Environment 30(6)*, 6–13; 29–34.

Parson, E. A. & Greene O. 1995: The complex chemistry of the international ozone agreements. *Environment 37(3)*, 16–20; 35–43.

Peterson, D. L. & Johnson, D. R. (eds.) 1995: *Human ecology and climate change: people and resources in the Far North.* Washington, D.C.: Taylor and Francis.

Prestrud, P. & Stirling, I. 1994: The International Polar Bear Agreement and the current status of polar bear conservation. *Aquat. Mamm. 20(3)*, 113–124.

Raustiala, K. & Victor, D. G. 1996: Biodiversity since Rio: the future of the Convention on Biological Diversity. *Environment 38(4)*, 16–20; 37–45.

Rothwell, D. R. 1996: *The polar regions and the development of international law.* Cambridge: Cambridge University Press.

Scrivener, D. 1999: Arctic environmental cooperation in transition. *Polar Rec. 35(192)*, 51–58.

Stokke, O. S. 1996: The effectiveness of CCAMLR. In O. S. Stokke & D. Vidas (eds.): *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty System.* Pp. 120–151. Cambridge: Cambridge University Press.

van der Lugt, C. 1997: An international environmental regime for the Antarctic: critical investigations. *Polar Rec. 33(186)*, 223–238.

Victor, D. G. & Salt, J. E. 1994: From Rio to Berlin: managing climate change. *Environment 36(10)*, 16–15; 25–32.

Victor, D. G., Raustiala, K. & Skolnikoff, E. (eds.) 1998: *The implementation and effectiveness of international environmental commitments: theory and practice.* Cambridge (USA): MIT Press.

von Moltke, K. 1997: Institutional interactions: the structure of regimes for trade and the environment. In O. R. Young (ed.): *Global governance: drawing insights from the environmental experience.* Pp. 247–272. Cambridge (USA): MIT Press.

Watson, R. T., Zinyowera, C. & Moss, R. C. (eds.) 1998: *The regional impacts of climate change: an assessment of vulnerability.* Cambridge (UK): Cambridge University Press.

World Resources Institute 1996: *World resources, 1996–1997.* New York: Oxford University Press.

Young, O. R. 1992: *Arctic politics: conflict and cooperation in the circumpolar north.* Hanover (USA): University Press of New England.

Young, O. R. 1997: Arctic governance: bringing the high latitudes in from the cold. *Int. Environ. Affairs 9(1)*, 54–68.

Young, O. R. (with contributions from Arun Agrawal, Leslie A. King, Peter H. Sand, Arild Underdal & Merrilyn Wasson) 1999: Institutional Dimensions of Global Environmental Change (IDGEC) Science Plan. *IHDP Report No. 9.*

Polar Research thanks the specialists listed below, and others who prefer not to be named, for serving as referees or giving editorial advice during the past year.

K. Aagaard, University of Washington, USA
Eyvind Aas, University of Oslo, Norway
Torbjörn Andersson, Gothenburg University, Sweden
John T. Andrews, University of Colorado, USA
Kevin R. Arrigo, Stanford University, USA
Claude M. Bachelard, Terres Australes et Antarctiques Françaises, France
Robert T. Barrett, Tromsø University Museum, Norway
Claus Bech, Norwegian University of Science and Technology, Norway
Steffen Gunnar Bergh, University of Tromsø, Norway
Krzysztof Birkenmajer, Polish Academy of Sciences, Poland
Lars Olof Björn, Lund University, Sweden
Roger J. Braithwaite, University of Manchester, UK
Noel D. Broadbent, Umeå University, Sweden
Terry V. Callaghan, University of Sheffield, UK/Abisko Scientific Research Station, Sweden
Richard A. Caulfield, University of Alaska Fairbanks, USA
Torben R. Christensen, Lund University, Sweden
Winfried K. Dallmann, Norwegian Polar Institute, Norway
Edward De Fabo, George Washington University Medical School, USA
Reinhard Dietrich, Dresden Technical University, Germany
Christopher S. M. Doake, British Antarctic Survey, UK
Hajo Eicken, University of Alaska Fairbanks, USA
Ashton Embry, Geological Survey of Canada, Canada
Bernd Etzelmüller, University of Oslo, Norway
Wilhelm Foissner, University of Salzburg, Austria
S. L. Forman, University of Illinois, USA
Carl Fredrik Forsberg, Norwegian Polar Institute, Norway
Theodore D. Foster, University of California San Diego, USA
Robert William Furness, University of Glasgow, UK
Geir Wing Gabrielsen, Norwegian Polar Institute, Norway
Johan Garssen, National Institute of Public Health and the Environment, The Netherlands
Carola Gehrke, Lund University, Sweden
Louwrens Hacquebord, University of Groningen, The Netherlands
Jon Ove Hagen, University of Oslo, Norway
Erik Halvorsen, Telemark College, Norway
Svein-Erik Hamran, Norwegian Defence Research Establishment, Norway
Nils-Martin Hanken, University of Tromsø, Norway
Markus Harder, University of Kiel, Germany
Peter M. Haugan, University of Bergen, Norway
O. W. Heal, University of Edinburgh, UK
Harold Heatwole, North Carolina State University, USA
Gregory H. R. Henry, University of British Columbia, Canada
Páll Hersteinsson, University of Iceland, Iceland
Alf Håkon Hoel, University of Washington, USA
Kim Holmén, Stockholm University, Sweden
Børge Holte, County Governor's Office in Tromsø, Norway
Haakon Hop, Norwegian Polar Institute, Norway
David D. Hunt, University of Manchester, UK
Philippe Huybrechts, Alfred Wegener Institute for Polar and Marine Research, Germany
Ólafur Ingólfsson, Gothenburg University, Sweden
Lionel Johnson, Freshwater Institute (retired), Canada
Sven Jonasson, University of Copenhagen, Denmark
Bror Jonsson, Norwegian Institute for Nature Research, Norway
Thomas Jung, University of Kiel, Germany
Susan A. Kaplan, Peary-MacMillan Arctic Museum, USA
Bjørn M. Knudsen, Danish Meterological Institute, Denmark
Nalan Koç, Norwegian Polar Institute, Norway
Jack Kohler, Norwegian Polar Institute, Norway
Andrea Kornhauser, Food and Drug Administration, USA
Arve Kylling, Norwegian Institute for Air Research, Norway
Sheldon Landsberger, University of Texas, USA
Manfred A. Lange, University of Münster, Germany
Bernard Lefauconnier, University of Silesia, Poland
Harald Loeng, Institute of Marine Research, Norway
Ole Jørgen Lønne, University Courses on Svalbard, Norway

Reidar Løvlie, University of Bergen, Norway
Amanda H. Lynch, University of Colorado, USA
Willy Maenhaut, University of Gent, Belgium
Harmon D. Maher Jr., University of Nebraska Omaha, USA
Stewart James Marshall, University of Nottingham, UK
Seelye Martin, University of Washington, USA
Douglas Martinson, Columbia University, USA
Rolf Mjelde, University of Bergen, Norway
Mark A. Moline, California Polytechnic State University, USA
Pedro O. Montiel, British Antarctic Survey, UK
Rolf Müller, Research Centre Jülich, Germany
Lawrence A. Mysak, McGill University, Canada
Kåre Tormod Nilsen, Saga Petroleum, Norway
K. Nordberg, Gothenburg University, Sweden
Torgeir Nygård, Norwegian Institute for Nature Research, Norway
Walter C. Oechel, San Diego State University, USA
Gail Osherenko, Dartmouth College, USA
Nicolai S. Panikov, Russian Academy of Sciences, Russia
T. Påsse, Geological Survey of Sweden, Sweden
Carol Helene Pease, Great Water Associates, USA
Jean Francis Pinglot, Centre National de la Recherche Scientifique, France
Hans-Peter Plag, Norwegian Mapping Authority, Norway
Julian Priddle, British Antarctic Survey, UK
Andrey Proshutinsky, University of Alaska Fairbanks, USA
Detlef Quadfasel, Niels Bohr Institute for Astronomy, Physics and Geophysics, Denmark
Eric J. Rignot, California Institute of Technology, USA
Howard K. Roscoe, British Antarctic Survey, UK
Bert Rudels, Finnish Institute of Marine Research, Finland
Liliane E. Ruess, Aachen University of Technology, Germany
Don Russell, Canadian Wildlife Service, Canada
Egil Sakshaug, Norwegian University of Science and Technology, Norway
Otto Salvigsen, Norwegian Polar Institute, Norway
Ursula Schauer, Alfred Wegener Institute for Polar and Marine Research, Germany
Josh Schimel, University of California Santa Barbara, USA
Björn Sohlenius, Swedish Museum of Natural History, Sweden
Enio Soliani Jr., Federal University of Rio Grande do Sul, Brazil
Tom W. Spier, Institute of Environmental Science and Research Ltd., New Zealand
Hans Staaland, Agricultural University of Norway, Norway
Michael Steele, University of Washington, USA
Eiliv Steinnes, Norwegian University of Science and Technology, Norway
Rodney Stevens, Gothenburg University, Sweden
Robert E. A. Stewart, Freshwater Institute, Canada
John Svendsen, University of Bergen, Norway
Alan H. Teramura, University of Hawai'i, USA
Paul Treguer, Institut Universitaire Européen de la Mer, France
Nicholas Tyler, University of Tromsø, Norway
Michiel van den Broeke, Institute for Marine and Atmospheric Research, The Netherlands
Roderik van de Wal, Utrecht University, The Netherlands
Maria Vernet, University of California San Diego, USA
Bo Wallén, Lund University, Sweden
David W. H. Walton, British Antarctic Survey, UK
G. Warrington, British Geological Survey, UK
Paul Wassmann, University of Tromsø, Norway
Margareta Wedborg, Gothenburg University, Sweden
Lawrence J. Weider, University of Oklahoma, USA
Thomas J. Weingartner, University of Alaska Fairbanks, USA
Gunter E. Weller, University of Alaska Fairbanks, USA
Gerd Wendler, University of Alaska Fairbanks, USA
Frank Wilhelms, Alfred Wegener Institute for Polar and Marine Research, Germany
Craig E. Williamson, Lehigh University, USA
Jan-Gunnar Winther, Norwegian Polar Institute, Norway

ERRATUM

Polar Research 17(2) contains an error on page 132. The incorrect sentence is: "The other species of diploxyl pines found in Siberia, *P. pumila*, is an unlikely source since it is a dwarf tree (Farjon 1984)." It should have been: "The species of haploxyl pine found in Siberia, *P. pumila*, is an unlikely source since it is a dwarf tree (Farjon 1984)." The editor thanks the author, S. Johansen, for bringing this to our attention.