Guest editorial

Poles together

In March 1993 the Atmospheric Environment Service's monitoring network across Canada registered ground-level fluxes of solar ultraviolet-B radiation (UVBR) that were the highest on record. This effect was correlated with the spring-time depletion of ozone in the northern upper atmosphere, and AES predicted that the average depletion over Canada could be this severe or worse for the next 15–20 years. These reports heightened awareness amongst the Canadian public as well as the scientific community about the Antarctic ozone hole, and about the most recent UVBR and atmospheric research findings from Antarctica. The causes and biological impacts of high latitude ozone depletion is but one example where information derived from one polar zone is of vital interest to those living in, or otherwise concerned with the other. In this and other research areas the time is appropriate for a bipolar perspective on Antarctica.

The bipolar approach has a long-standing historical precedent. On 31 May 1831, James Clark Ross located the position of the North Magnetic Pole in Arctic Canada. Some eight years later he set out from England on a 4½ year quest for the South Magnetic Pole, a voyage that included the discovery of McMurdo Sound and the Ross Ice Shelf. Several other Antarctic explorers (Drygalski, Gerlache, Nordenskjöld, Amundsen, Ellsworth) are also well known for their accomplishments in the north polar zone.

Today, many high latitude researchers seem to have only a limited knowledge of related studies at the opposite pole, yet there are compelling reasons to adopt a comparative Arctic-Antarctic approach. Joint bipolar symposia in speciality subject areas (glaciology; polar oceanography; high latitude limnology) have already proven to be highly productive occasions for the cross-transfer of information and ideas. In the aquatic sciences (e.g. sea ice and marginal ice zone studies) and microbial ecology, comparisons between specific Arctic and Antarctic sites have resulted in an improved understanding of key ecological processes such as microalgal production and nutrient cycling. Global climate change effects are likely to be most pronounced in the polar zones, and more frequent exchange between scientists working in the North and South may lead to predictions which are more accurate and allow greater insight. Snow, ice, permafrost and cold ocean research are obvious areas that will continue to benefit from the transfer of technology and information between the two poles.

The bipolar approach need not involve an expansion of research effort in the Arctic and Antarctic, but it demands a willingness on the part of high latitude investigators to develop an interest in new findings from the opposite hemisphere, and an improved level of communication between the two polar regions. There is now an increasing commitment by several nations to long term ecological research and monitoring sites in the Arctic and in Antarctica. A communication network that interconnects these high latitude programmes would provide a major opportunity for bipolar exchange and research progress.

The north and south polar zones share many features in common; the pervasive influence of cold temperatures and ice; the extreme seasonality of incoming solar radiation; the strong coupling between biological processes and the annual melt cycle. There are also striking differences. In the process of understanding the nature of these similarities and differences we will gain fresh insights into the structure and dynamics of Arctic and Antarctic environments.

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