

Guest editorial

The future of scientific drilling in Antarctic waters

Over the past twenty years, nine legs of the Ocean Drilling Programme (ODP) and its predecessor the Deep Sea Drilling Project have been conducted at high southern latitudes ($>45^{\circ}\text{S}$). Only four have taken place near the margins of the Antarctic continent ($>60^{\circ}\text{S}$), the last off the Amery Ice Shelf in 1988. At present, *JOIDES Resolution* is drilling on the Chile Rise-Chile Trench triple junction (46°S), but she will return to lower latitudes at the end of this leg (#141). The Planning Committee of ODP has already approved a schedule that precludes a return to the Antarctic prior to the 1994–95 austral summer at the earliest. Few proposals for Antarctic drilling have even been submitted in recent years; none has received high ranking. This should be a matter of considerable concern to the Antarctic earth sciences community. The *JOIDES Resolution* is an international asset with a unique sampling capability but the lifetime of the ODP may not extend beyond 1998.

The Antarctic/Southern Oceans regional panel of ODP no longer exists, so there is no regional "lobby" within the JOIDES planning structure. However, the ODP Long Range Plan (1990) does target high-latitude science as a high and continuing priority; aspects of all four major thematic categories highlighted as the primary foci for ODP in the 90's and beyond can apply to the Southern Ocean. There is an urgent need for co-ordinated Antarctic proposals that directly address the principal goals of the four JOIDES thematic panels: Structure and Composition of the Crust and Upper Mantle; Dynamics, Kinematics and Deformation of the Lithosphere; Fluid Circulation in the Lithosphere; and Cause and Effect of Oceanic and Climatic Variability. Viewed from the planning structure, even climate-related work appears to be shifting towards the Arctic. Perhaps recent uncertainties over the future of seismic work and drilling in the Antarctic Treaty area have slowed existing efforts. There may be a perception that it is difficult to convince the thematic panels, comprising mainly scientists with no Antarctic expertise, of the value of drilling at high southern latitudes. Whatever the cause, it is time for closer and more active co-operation between the different groups holding Antarctic marine geophysical data if we are to see *JOIDES Resolution* tackling Southern Ocean problems again. There have been encouraging signs recently of this, but the highly-ranked proposals to drill, for example, the rifted margins of the North Atlantic have involved open interchange of data and ideas from scientists working in many nations. The success of the Prydz Bay drilling (Leg#119) provides an encouraging example of what can be done.

There are severe limitations on the drilling one vessel can do, especially when there are strong arguments for spending time drilling deep holes at single sites. Why not add another approach for problems that do not require the use of a deep sea drilling vessel? High resolution seismic surveys around the Antarctic continent indicate the Neogene strata are often within the reach of shallow drilling (<50 m sub-bottom). Moreover, drilling strategies could be designed to sample overlapping parts of the stratigraphic column. The small remote drilling systems now under development could be deployed from conventional ice-strengthened research vessels and icebreakers to obtain a comprehensive record of the continent's climatic/glacial history. The cost is likely to be modest compared with funds routinely expended on research vessel operations annually. The Antarctic earth sciences community could devise a programme to purchase or lease such a system and manage it internationally.

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