

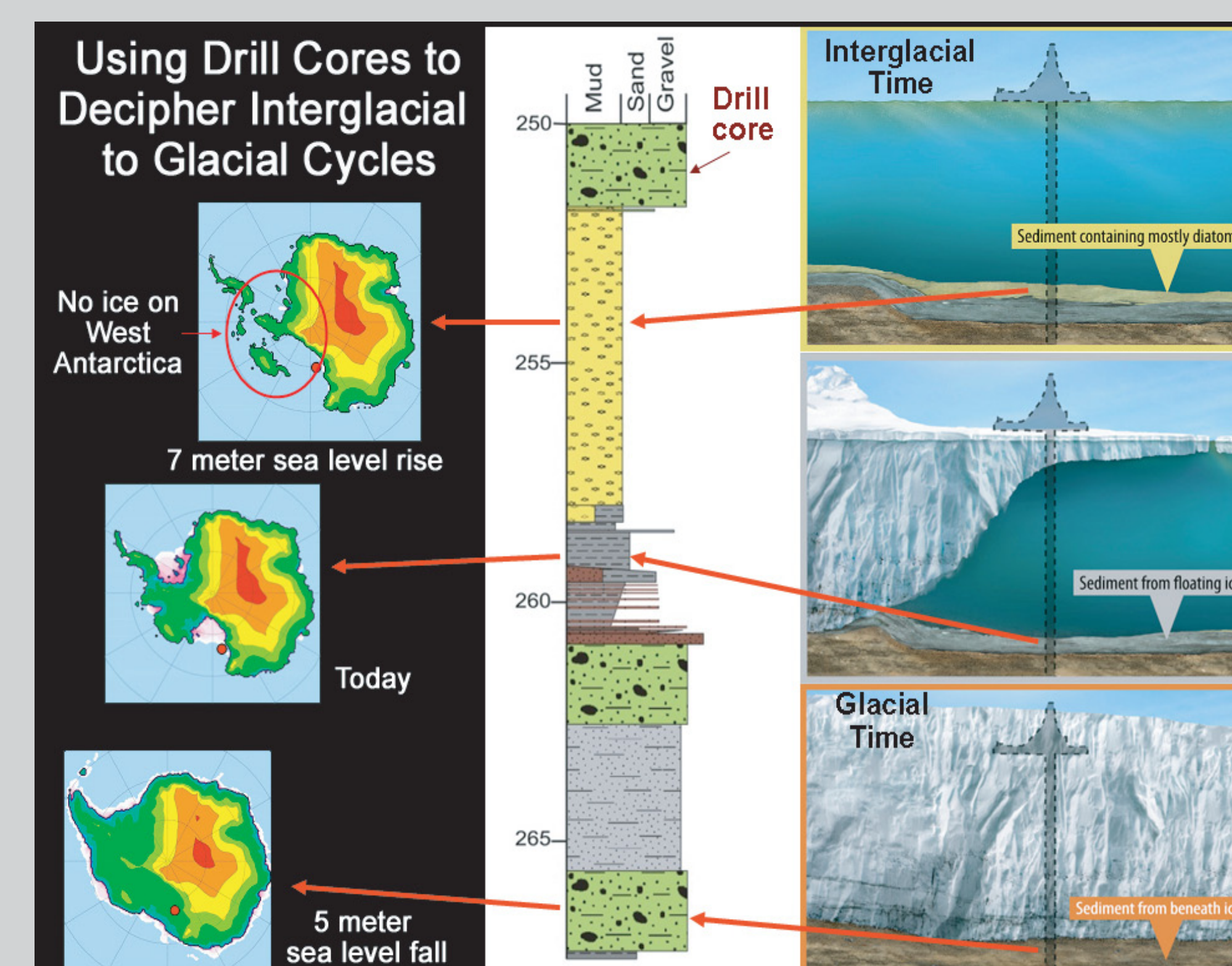
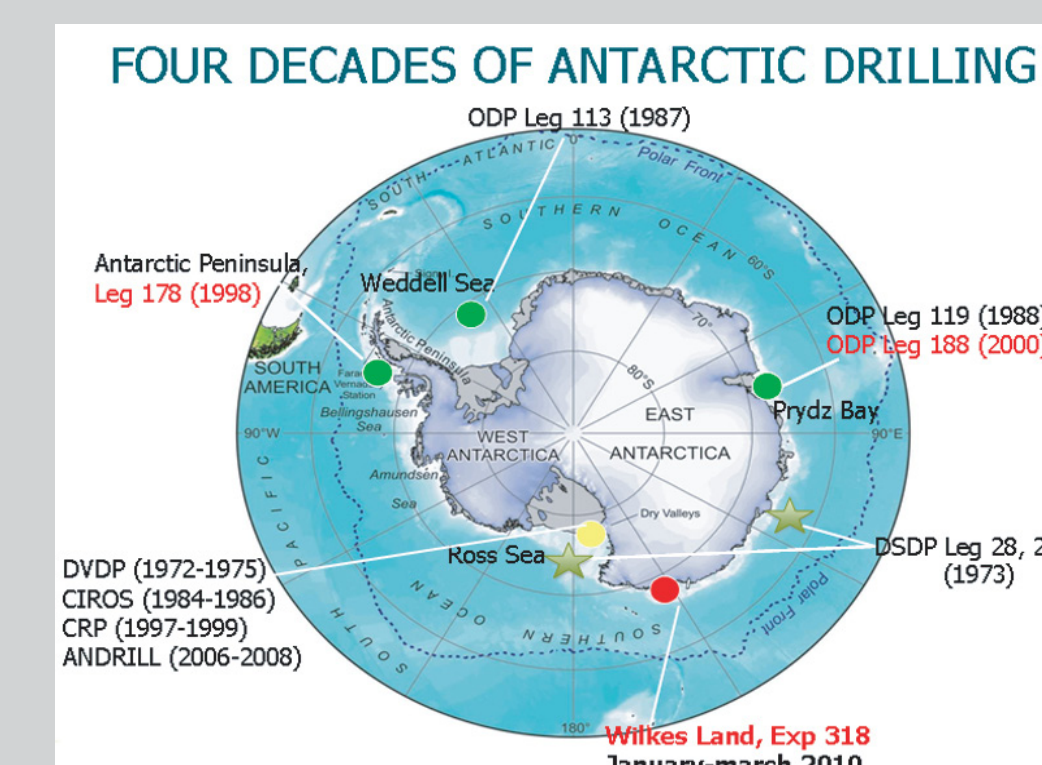
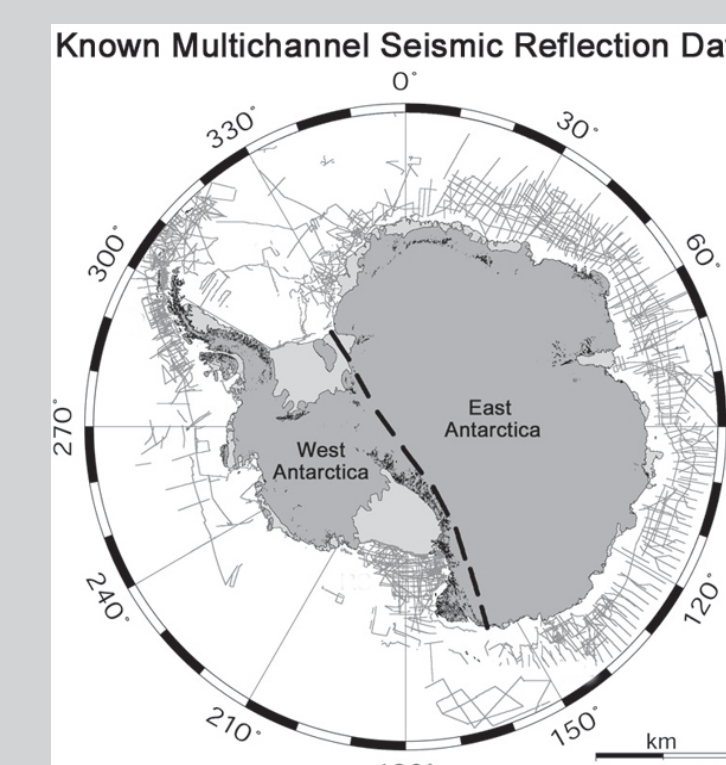
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**Two SCAR programs have had great successes** in deciphering past ice-volume and climate changes from the rock record:

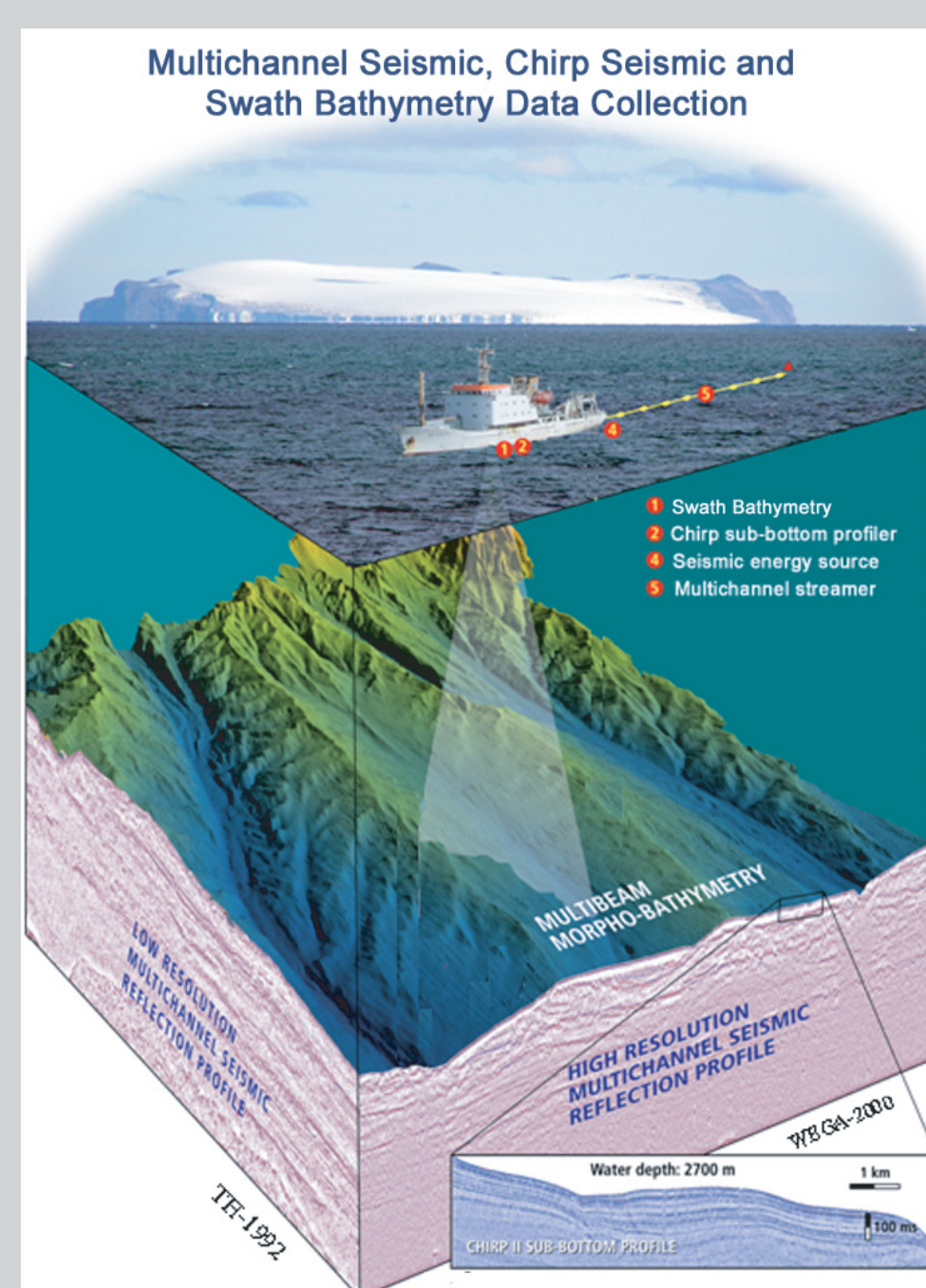
- For 18 years**, the geologic paleoclimate studies in these two SCAR programs have been linked to the Antarctic Treaty System via the Antarctic Seismic Data Library System for Cooperative Research (SDLS), which is guided by ATCM Recommendation XVI-12.

\* **Collaborations:** joint efforts in collection, exchange and interpretation of seismic reflection data have made great advances in deciphering and understanding ocean-basin and ice-sheet histories. **The SDLS has been key** to promoting and facilitating the sharing of the ~350,000 km of highly valued (\$350 million) seismic data and in advising on safely collecting seismic data in the future.

- \* **Scientific drilling and coring:** multinational efforts to fund and conduct rock drilling around Antarctica over the last four decades have acquired essential "ground truth" data needed to resolve paleoclimates of the last 35-40 m.y. since the initial growth of the Antarctic Ice Sheet.
- \* **Innovations:** Seismic data are now being used in innovative ways to
  - \* study ocean circulation processes that relate to historic climate changes,
  - \* map locations of seafloor biohabitats and Vulnerable Marine Ecosystems (e.g., SCAR SAVAnt action group); and
  - \* search for geologic environments that can be drilled for deep biosphere microbes.



## Seismic data collection



This map of Antarctica displays ice flow velocity and sediment thickness offshore. The map uses a polar projection with latitude and longitude grid lines. Ice flow velocity is indicated by a color scale from 0.1 to 1000 m/yr, with blue representing lower velocities and red/yellow representing higher velocities. Sediment thickness is shown in five categories: 1-2.0 km (light yellow), 2.0-4.0 km (yellow), 4.0-6.0 km (light green), 6.0-8.0 km (green), and > 8 km (dark green). The Ross Sea is labeled in the lower center. The map is titled 'Total Sediment Thickness Offshore' and 'Ice Flow Velocity Onshore'.

**Total Sediment Thickness Offshore**

**Ice Flow Velocity Onshore**

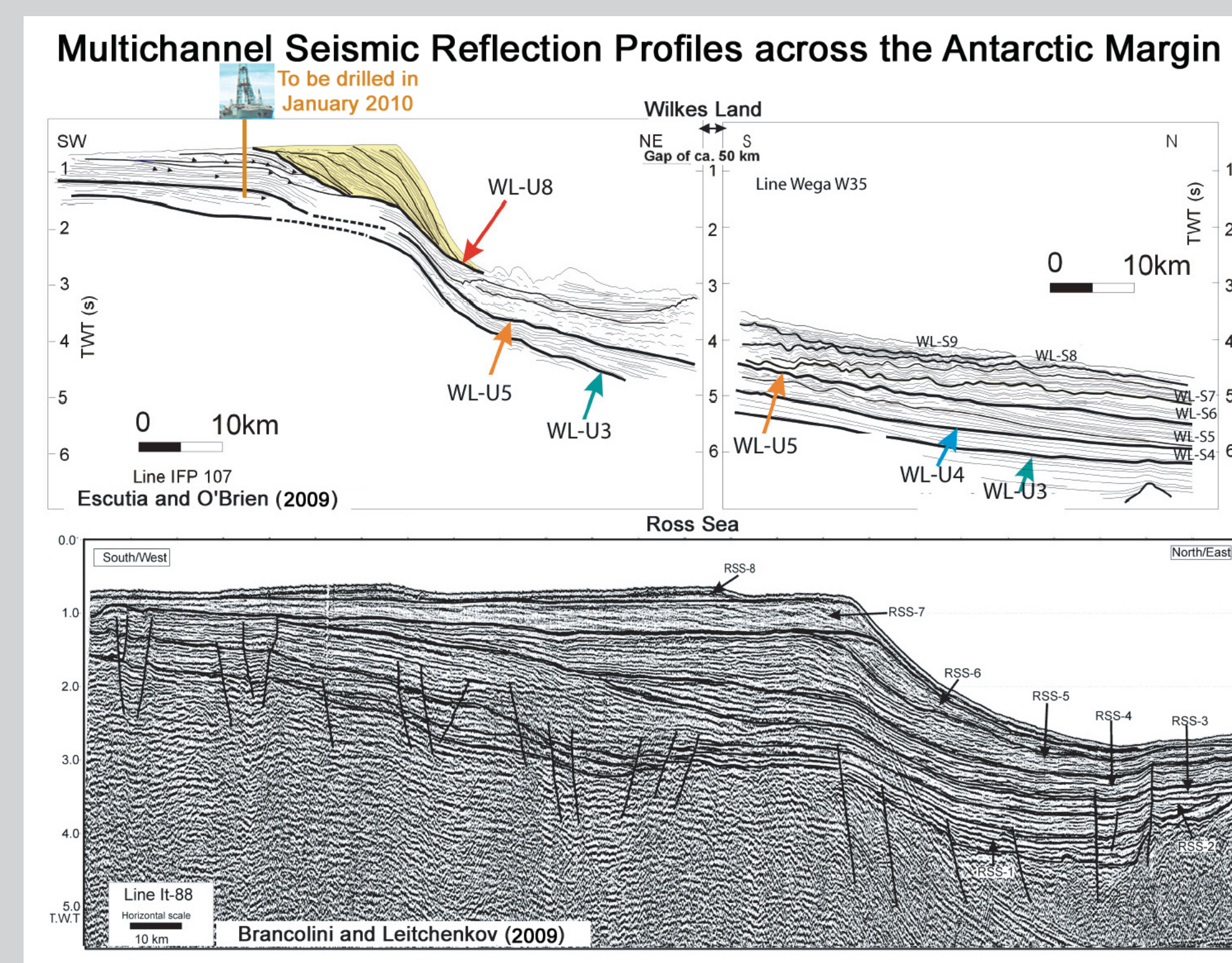
**Ross Sea**

**Sediment thickness compiled**

**Ice Flow**

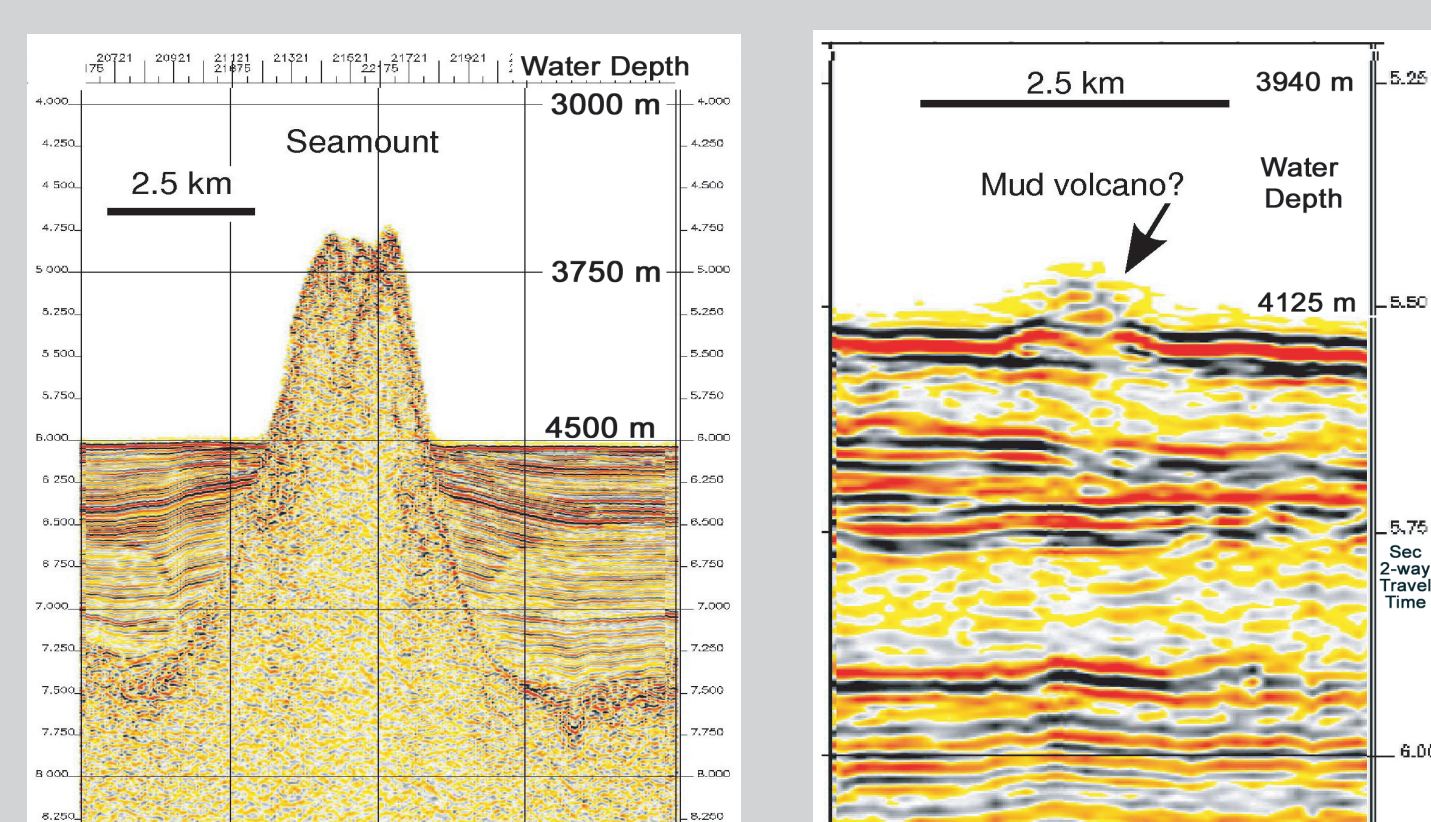
**ERS 1 Ice flow**

The multichannel seismic profiles on the right show some of the horizons that are now being mapped around Antarctica by the Circum-Antarctic Stratigraphy Project (CASP) as part of the SCAR ACE program. Drilling by IODP leg 318 in January 2010 will sample the rocks offshore Wilkes Land (upper profile).



Map of current systems near the Falkland Islands. The map shows the Falkland Islands in the South Atlantic Ocean, with latitude from 50°S to 54°S and longitude from 296° to 306°. A color scale on the right indicates current speed in km (1 to 7) and m/s (0.1 to 1.7). A red arrow points to a specific current system.

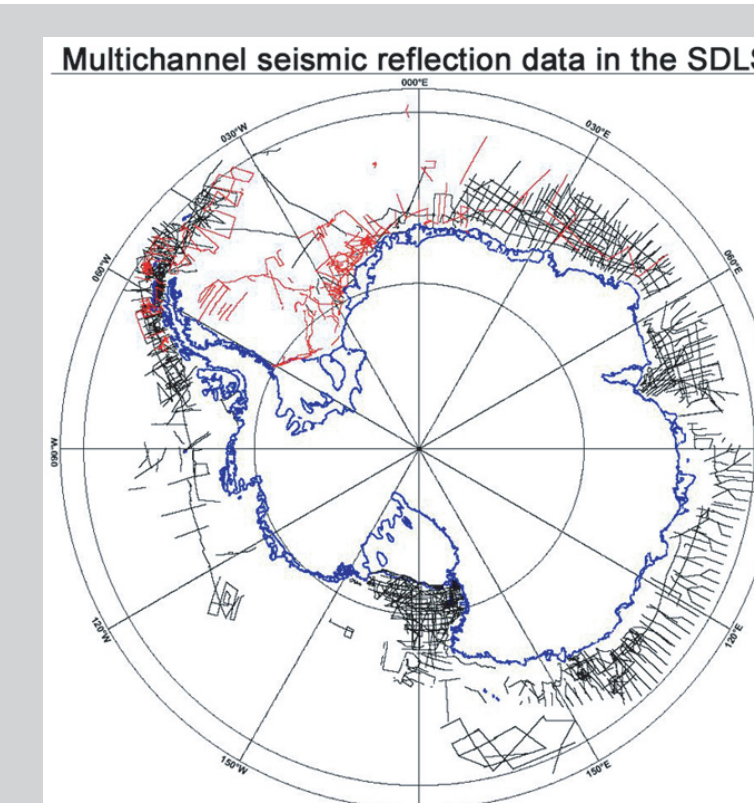
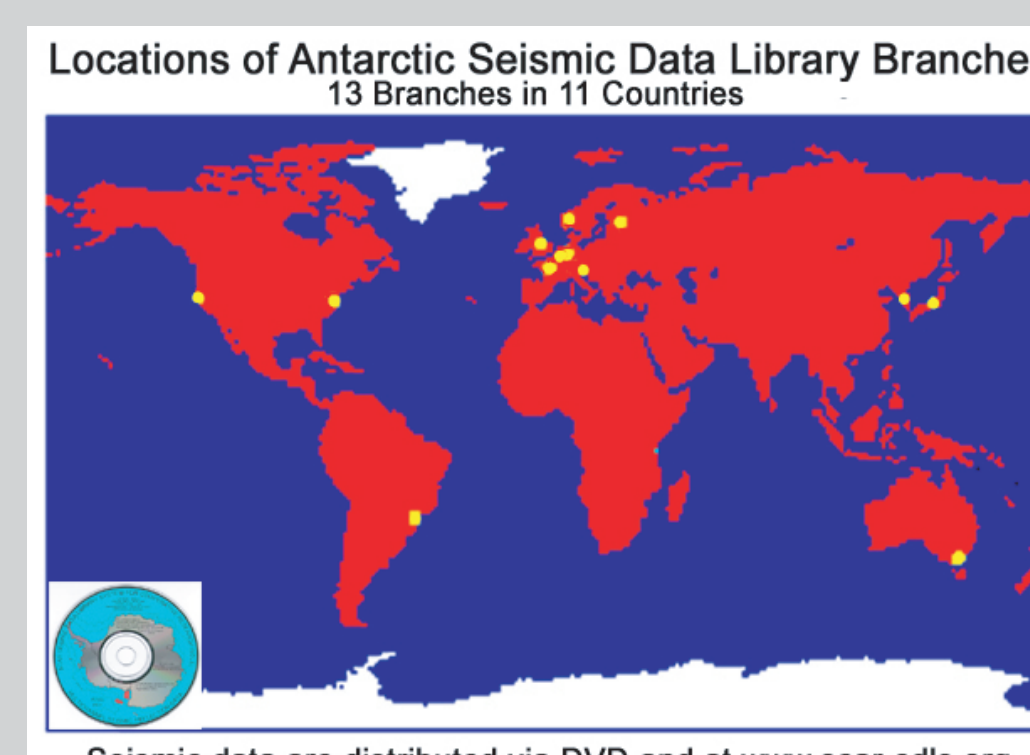
The profile shows large-scale internal waves, fronts and eddies in the water column that transport water and heat around the Falkland Is.



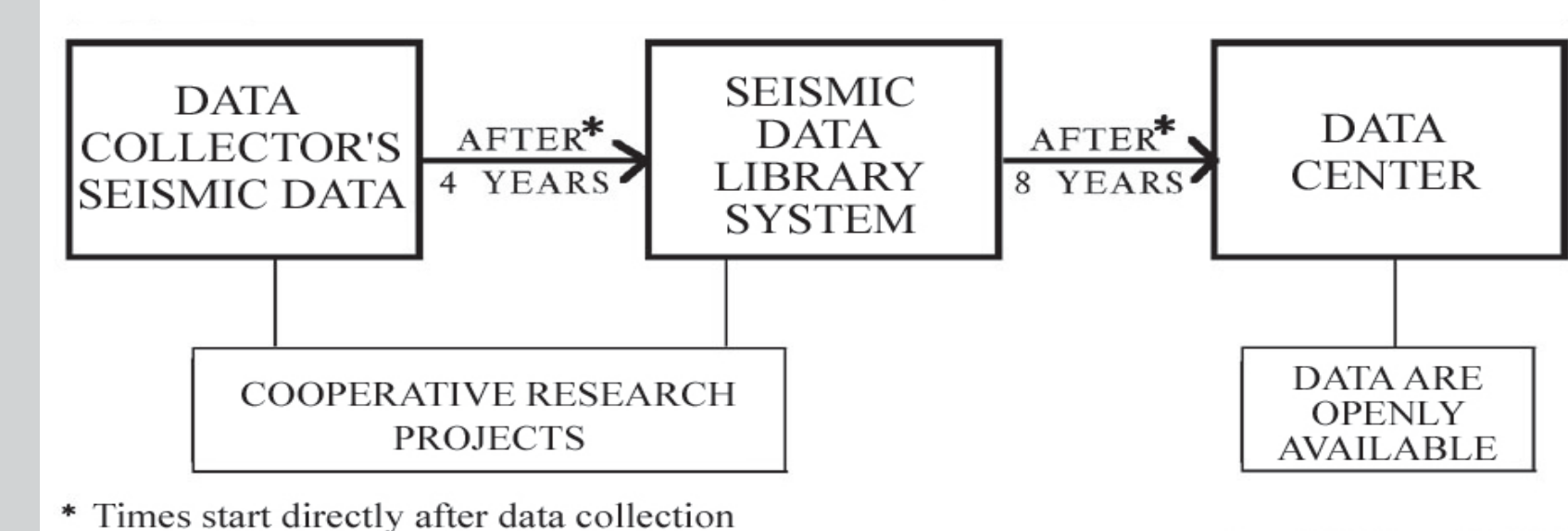
The two seismic profiles show examples of seafloor habitats where biological colonies may exist near seamounts and mud vents. Some are considered Vulnerable Marine Ecosystems to be protected.

We see the priorities for more successes in the "next generation" as being:

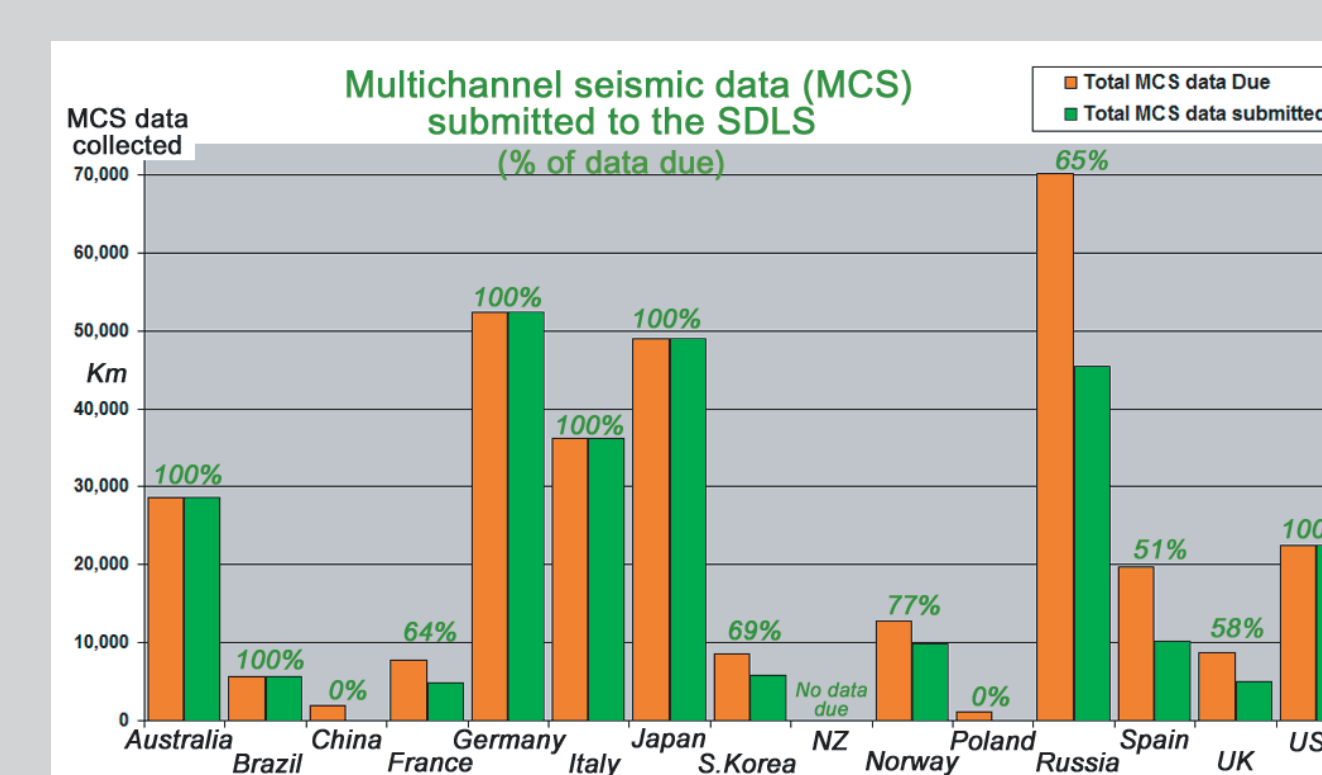
- \* Continued emphasis on data sharing and collaborations (e.g. SDLS);
- \* Funding for "ground truth" rock drilling for paleoclimate studies;
- \* Greater use of seismic data for
  1. mapping circum-Antarctic ocean-circulation (and ocean-heat) distribution affecting Antarctic Ice sheet melting/stability.
  2. mapping seafloor biohabitats and Vulnerable Marine Ecosystems



The SDLS is a **unique** agency, designed in 1991 by consensus of seismic data collectors, to facilitate sharing of highly valued seismic data and promote greater collaboration in large scale geologic studies (e.g., paleoclimate studies, drill-site surveys, etc.). Initiated at a time of the "Madrid Protocol" discussions, the SDLS was adopted under ATCM Recommendation XVI-12, and has since been an increasingly useful tool for the geoscience community.



A great success for the SDLS (and Treaty) is that most countries have submitted all or most of their data that are due at the SDLS (84% submitted).



We ask that the countries with overdue data now submit these data, to expedite the ongoing paleoclimate research.