

Contribution Details

Deep sea seismic stratigraphy of the Amundsen Sea and Ross Sea, West Antarctica: Preliminary results of the first linking record

Abstract 1

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Abstract

Seamless circum-Antarctic palaeosedimentary and palaeobathymetry maps and grids spanning the Cretaceous to present are important, because sedimentary thickness and sedimentation rates are needed to reconstruct more realistic seafloor geometries, palaeotopography and long term climate change models. To create such a dataset around Antarctica, a complete network of cross-linked deep-sea seismic reflection profiles is necessary. In this context, the multinational Circum-Antarctic Stratigraphy and Palaeobathymetry (CASP) initiative was born to provide constraints for palaeo-climate modelling. Existing international seismic data cover most of Antarctica's continental rise, but from 130°W to 160°W, a completely unsurveyed sector on the western margin of Antarctica, between the Ross Sea and Amundsen Sea, prevents closure of the Circum-Antarctic sedimentary grids, and palaeostratigraphic link. During the RV Polarstern cruise, from January to March 2010, the Alfred Wegener Institute acquired ca. 5000 km high resolution multichannel seismic data on the West Antarctic margin, using a 3 km streamer and 3 GI-guns. Among these profiles, is a ca. 1500 km multichannel seismic reflection profile - the first crossing the previously unsurveyed sector. Preliminary results show minimum sediment thickness of ~0.75s two-way-time (TWT) in the Ross Sea and maximum sediment thickness of ~2.5s TWT in the Amundsen Sea. A clear acoustic basement occurs at ~6 to 8s TWT depth and similar to the internal reflectors, is traceable across the entire length of the profile. The basement topography is slightly rugged at the Ross Sea, becoming undulating and then smooth up to 123°W, where it meets the Mary Byrd Seamount region, and becomes more rugged towards the continental shelf. The continuous seismic reflectors of three distinct sedimentary packages are mostly horizontal and undisturbed, and thus provide the first possibility to link the seismic stratigraphy of pre-glacial, transitional and glacially dominated sedimentary packages in the Ross Sea, with similar stratigraphy in the Amundsen Sea. This data brings us a significant step closer to the circum-Antarctic isopach maps and grids.

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