

**HIGH-RESOLUTION REFLECTION SEISMIC INVESTIGATIONS IN THE  
WEDDELL SEA DURING THE ANTARKTIS V/4 EXPEDITION**

**Heinz MILLER**

(\*) Alfred-Wegener Institut für Polar- und Meeresforschung  
Columbusstrasse – 2850 Bremerhaven  
Federal Republic of Germany

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## ABSTRACT

The ANTARKTIS V/4 expedition organized by the "Alfred-Wegener-Institut für Polar- und Meeresforschung" from December 1986 to March 1987 in the south-eastern Weddell Sea covered a broad spectrum of scientific programmes, ranging from glaciological land investigations to oceanographic and marine geological and geophysical surveys. In addition, the R.V. "Polarstern" provided logistic support to the permanent "Georg-von-Neumayer" base.

Due to exceptionally unfavourable ice conditions in the southern Weddell Sea, the initially planned Filchner shelf ice programme had to be cancelled. Instead, an integrated glaciological, geodetic and geophysical survey was carried out on the Ekstrom ice shelf, which should yield a better insight in the dynamics and the mass balance of this ice basin.

Once that the glaciological land programme had started, emphasis could be laid on the parallel execution of the main part of the marine survey.

The problem of cold bottom water formation in the Weddell Sea was addressed by CTD-profiling and current measurements with moored current meter arrays, sometimes implemented with sediment traps. The Weddell Sea dynamics were further analysed by tracer investigations.

Information on the recent environmental and climatic history of the Weddell Sea was acquired by sampling the shallow sea bottom sediments with box-corer and gravity corer. Early diagenesis of organic material was investigated by on the spot analyses of the sediment pore fluids. Sampling spots were carefully selected by preliminary site surveys with a 3.5 kHz subbottom profiler and a detailed three-dimensional mapping of the sea bottom morphology with the SEABEAM system of "Polarstern".

The deeper structure and stratigraphy of the continental margin of the eastern Weddell Sea was probed by high-resolution reflection seismic profiling, achieving penetration depths down to a couple of thousand metres below sea bottom. Parallely recorded magnetic profiles should yield more information about the nature and structure of the underlying crustal material. In addition, deep refraction work with ocean bottom seismographs was carried out for analysing the seismic velocity structure of the continental shelf.

Throughout this multidisciplinary programme, due attention was paid to the stimulation of communication between the various pools of scientists through regular briefings, seminars and informal lab visits.