Geophysical Research Abstracts, Vol. 7, 09000, 2005
SRef-ID: 1607-7962/gra/EGU05-A-09000

Seismic imaging of thermohaline fine structure in the eastern Atlantic

D. Klaeschen (1), C. Papenberg (1),**T. J. Reston** (1), P. Brandt (1), M. Visbeck (1)
(1) IFM-GEOMAR, Leibniz Institute of Marine Sciences, Kiel, Germany

Following pioneering work by Holbrook and collaborators, we have reprocessed seismic data from the European Atlantic margins to investigate the structure of and processes within the water column along the track of the seismic ship. Key aspects of the processing include the use of different filters (e.g. tau-p intercept-slowness) to suppress signals due to the direct acoustic energy, very careful acoustic velocity analysis to detect small horizontal and vertical variations representing the thermohaline fine structure and preliminary use of the variation of acoustic amplitude with offset (AVO) to constrain the nature of the physical boundaries. Using prestack depth migration techniques, we can determine the absolute large-scale acoustic velocity structure to an accuracy of about 5-10 m/s; from the AVO, we can determine the changes in the small scale acoustic velocity structure to within 2 m/s resolution.

So far we have examined data from the Porcupine Seabight (west of Ireland) and from the Gulf of Cadiz and adjoining regions west of the Strait of Gibraltar. Both data sets show clear evidence for reflectivity patterns within the water column, which we associate with thermohaline fine structure. Most spectacularly, data from offshore southern Portugal and Spain show clear images of Meddies - eddies transporting Mediterranean water at intermediate depths into the open Atlantic. These are characterised both by a large acoustic velocity anomaly and by strong but complex surrounding reflectivity patterns that correspond to internal waves of different scales.

In this poster we present the seismic images, discuss the technical details of the processing further and discuss the relative merits of seismic reflection methods for physical oceanography.