Geophysical Studies near the Ascension Transform: Evolution of Ridge Segmentation and Crustal Structure - Auswertung

Responsible: Timothy John Reston, Jörg Bialas, Ingo Grevemeyer, IFM-GEOMAR Leibniz-Institut für Meereswissenschaft, Kiel

In late 2004 Meteor cruise M62/4 collected a large geophysical dataset in the region of the Ascension Transform fault with the aim of studying the segmentation of the spreading axis. The dataset consisted of four long wide-angle profiles, two grids of shorter wide-angle profiles suitable for tomographic analysis, two microseismicity datasets, a deep-tow seismic reflection survey, magnetic, bathymetric and continual gravity measurements. Specific questions to be addressed using these data are: the change in crustal and upper mantle structure moving from the centre of a spreading segment towards the end and between spreading segments with a well-developed median valley and a well-developed axial high; the asymmetry between segment ends adjacent to the active transform and the inactive fracture zone (inside and outside corners respectively); the evolution of oceanic core complexes (domal exposures of deep crustal and mantle rocks exhumed by movement along detachment faults and characterised by corrugated upper surfaces. The wide-angle seismic profiles will be used to determine crustal structure through modelling or tomographic inversion and in conjunction with existing and new gravity data to constrain the thermal structure of the uppermost mantle; high resolution seismic reflection studies (including a deep tow streamer) to image magma chambers within the upper oceanic crust; tomographic studies using a grid of ocean bottom instruments to determine local 3-D crustal structure, microseismicity studies to constrain fault activity and mechanics. This proposal requests further support to enable the complete analysis of these data. The aims of the project are in complete agreement with those of SPP1144, and the project is geographically and thematically closely linked to project De 572/21 which uses quite different methods to investigate the same segmentation.