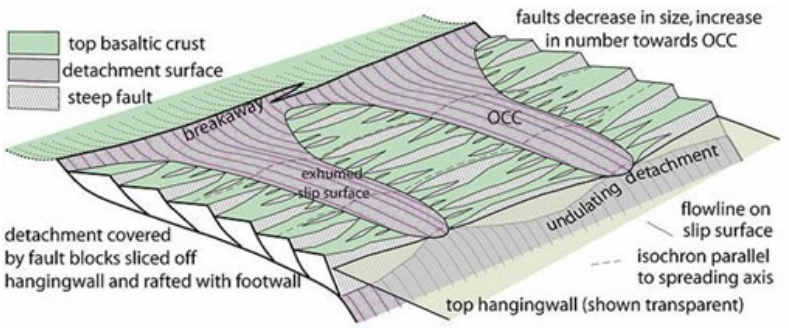
The role and extent of detachment faulting at slow-spreading mid-ocean ridges

At slow spreading ridges such as the Mid-Atlantic Ridge are large domal massifs of exhumed plutonic and mantle rocks, termed Oceanic Core complexes. These are thought to be the exhumed footwall of large-offset normal faults with a heave of up to tens of km. However the geometry, mechanics and lateral extent of these inferred detachments are currently unknown.

This Birmingham-led project sets out to investigate an active detachment fault through a combination of seismic reflection imaging of the detachment geometry, wide-angle seismic determination of the seismic velocity structures of the massifs and surrounding crust, microseismic investigation and mapping of the zone of active faulting, and high resolution mapping of the seafloor and its magnetism to determine spreading history.

The project is a collborative project with Durham (wide-angle seismic and magnetism), Cardiff (bathymetry), Woods Hole and Paris. The project has been funded by NERC but is awaiting shiptime scheduling.



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Project funding:

NERC. Birmingham budget: £513738 (£410990 from NERC)

Publications:

Relevant to the project but not from project funds:

Reston TJ and McDermott K. 2011. Successive detachment faults and mantle unroofing at magma-poor rifted margins. **Geology**, 39, 1071-1074

Reston TJ and Ranero CR. 3D geometry of detachment faulting at mid-ocean ridges. **Geochemistry, Geophysics, Geosystems**, vol. 12, Number 7, Q0AG05, doi:10.1029/2011GC003666.

Planert L, Flueh ER, Tilmann F, Grevemeyer I, Reston T (2010),Crustal structure of a rifted oceanic core complex and its conjugate side at the MAR at 5°S: implications for melt extraction during detachment faulting and core complex formation, **Geophys. J. Int.,** 14p., DOI: 10.1111/j.1365-246X.2010.04504.x

Planert L, Flueh E, Reston, TJ., 2009. Along and across-axis variations in crustal thickness and structure at the Mid-Atlantic Ridge at 5° South obtained from wide-angle seismic tomography: Implications for ridge-segmentation. **J. Geophys. Research**, 114, B09102, doi:10.1029/2008JB006103

Key periods of data collection/fieldwork activity:

Awaiting cruise scheduling

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