



## **Petrology of fast-spreading lower oceanic crust exposed at Hess Deep: Preliminary results from cruise JC-21**

C.J. Lissenberg (1), K.A. Howard (1), C.J. MacLeod (1), D.J. Shillington (2), D.A.H. Teagle (3), K.M. Gillis (4),  
and JC-21 Scientific Party (1)

(1) Cardiff University, Earth & Ocean Sciences, Cardiff, United Kingdom (lissenbergcj@cardiff.ac.uk), (2) Lamont-Doherty  
Earth Observatory, Columbia University, Palisades NY, United States, (3) National Oceanography Centre, Southampton,  
United Kingdom, (4) University of Victoria, Earth & Ocean Sciences, Victoria, Canada

Hess Deep (equatorial Pacific) is a rift valley formed as a result of the propagation of the Cocos-Nazca spreading centre into oceanic lithosphere formed along the East Pacific Rise. It exposes all levels of oceanic lithosphere, including lower crust and mantle, providing a rare opportunity to study the plutonic basement of fast-spreading oceanic crust. Cruise JC-21 aboard the RRS James Cook (January-February 2008) visited Hess Deep with the aim of studying the lower crustal section. ROV Isis was used to obtain microbathymetry and in situ samples. On-bottom observations and microbathymetry indicate that the exposed crustal section is dissected by normal faults, which separate blocks exposing different crustal levels. The recovered gabbroic samples occur in at least three distinct fault blocks, and span a large range in compositions from primitive to highly evolved. When restored to their relative original positions, the gabbros display an upsection increase in differentiation indices. However, significant variation occurs on small scales. Many gabbros contain zoned phases and traces of FeTi-oxides, suggesting melt migration by porous flow was an important process.