2005 Fall Meeting
Search Results

Cite abstracts as **Author(s) (2005), Title, *Eos Trans. AGU, 86*(52), Fall Meet. Suppl., Abstract xxxxx-xx**

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HR: 14:40h
AN: **T33G-05 INVITED**
TI: Geophysical Constraints on the Nature of Atlantis Massif, 30° N MAR
AU: ***Blackman, D**
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AU: **Ildefonse, B**
AU: **John, B**
AU: **Ohara, Y**
AU: **Miller, DJ**
AU: **MacLeod, C**
AU: **Expeditions 304/305 Science Party**
AB: Recent drilling at Atlantis Massif, Mid-Atlantic Ridge 30°N, provides new insights into oceanic core complex (OCC) development. IODP Expeditions 304/305 had high recovery in the footwall of the detachment capping the central dome of the massif: Hole U1309B, 100 m deep; Hole U1309D, 1415 m. Recovery of a dominantly gabbroic sequence challenges prior interpretations that this OCC was mainly ultramafic, geophysical data having suggested much of the uplifted core was mantle peridotite, with Moho less than 1 km deep. Although models based on prior analysis fit the data well and were consistent with outcrops of serpentinized peridotite on the south face of Atlantis Massif, it is now clear that additional complexity needs to be incorporated in the geophysical analysis. The southern ridge is morphologically distinct from the central dome. Does this indicate that the south and central parts of this OCC are fundamentally different? Or, is the serpentinized peridotite exposed on the south wall (and found in a few loose fragments on top of the central dome) a thin veneer of mantle rock that has deformed around a dominantly gabbroic core? The occurrence of many gabbroic samples from the southern ridge could support the latter but models of serpentinization that drives the Lost City hydrothermal system near the peak of the massif might favor the former. New analysis of geophysical data provide further constraints on the scale of possible variability. Prior seismic analysis suggested fresh mantle might shoal by a couple hundred meters 1-2 km north of Site U1309. In contrast, gravity data suggest the highest density rocks occur at and to the south of the site. These observations will be combined in a 3D model of Atlantis Massif and we expect to report initial results. Downhole logging indicates that bulk density increases steadily from 2.8 to 2.9 g/cc downhole. Log and core sample seismic velocity are variable within a 5.5-6.8 km/s range, lower values where degree of alteration is greatest, higher values in olivine-rich units. Initial analysis of borehole seismometer recordings of airgun shots suggests a high

velocity interval occurs within the fresnel zone (100's m) of this experiment. Postcruise analysis is required to rule out noise bias so we expect to report whether this indication of velocity greater than 7 km/s at 580-635 m depth is confirmed. If it is, this could indicate that prior refraction analysis detected a lens of high velocity rock but not the regional Moho.

DE: 8150 Plate boundary: general (3040)
DE: 8178 Tectonics and magmatism
DE: 8416 Mid-oceanic ridge processes (1032, 3614)
SC: Tectonophysics [T]
MN: Fall Meeting 2005

New Search