Cite abstracts as **Author(s) (2010), Title, Abstract xxxxx-xxxx presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.**

Your query was:
nedimovic

0800h
OS21C-1514 ***Poster***

Three-dimensional seismic reflection images of axial melt lens and seismic layer 2A between 9°42'N and 9°57'N on the East Pacific Rise

***Carton, H D**
hcarton@ldeo.columbia.edu
Marine Geology and Geophysics, Lamont-Doherty Earth Observatory, Palisades, NY, USA
Carbotte, S M
carbotte@ldeo.columbia.edu
Marine Geology and Geophysics, Lamont-Doherty Earth Observatory, Palisades, NY, USA
Mutter, J C
jcm7@columbia.edu
Marine Geology and Geophysics, Lamont-Doherty Earth Observatory, Palisades, NY, USA
Canales, J
jpcanales@whoi.edu
Woods Hole Oceanographic Institution, Woods Hole, MA, USA
Nedimovic, M R
mladen@dal.ca
Department of Earth Sciences, Dalhousie University, Halifax, NS, Canada
Aghaei, O
omid.aghaei@Dal.Ca
Department of Earth Sciences, Dalhousie University, Halifax, NS, Canada
Marjanovic, M
milena@ldeo.columbia.edu
Marine Geology and Geophysics, Lamont-Doherty Earth Observatory, Palisades, NY, USA
Newman, K R
knewman@ldeo.columbia.edu
Marine Geology and Geophysics, Lamont-Doherty Earth Observatory, Palisades, NY, USA

We present results from 3D time-domain processing of the dual-source, four-streamer seismic dataset acquired in 2008 by R/V Langseth at the 9°50'N Integrated Study Site (ISS) on the East Pacific Rise. The survey was designed with a main goal to determine the fine-scale geometry of the magmatic system across three fourth-order ridge axis discontinuities (at 9°45.2'N, 9°48.7'N, and 9°51.5'N), and to study relationships with the hydrothermal system and eruptive/intrusive processes, in particular related to the 2005-06 eruption. Seismic processing included flexible binning to regularize the fold coverage, CMP stacking within 6.25m x 37.5m bins using

velocity functions derived from constant-velocity stack analyses, post-stack interpolation to 6.25m x 18.75m bin size, and 3D post-stack time migration, resulting in a fully migrated area of 18km across-axis by 27km along-axis. The axial melt lens is ~500-600m wide at 9°50'N beneath the northern vent cluster, and up to 1km wide beneath the southern vent cluster. The fourth-order segment boundaries, as defined from seafloor morphology and structure of the axial summit trough (AST), coincide with geometrically complex regions of the magmatic system, with cross-axis views showing two separate magma bodies distant by up to a few hundreds of meters. Discontinuities in the axial magma lens thus appear like mini-overlap basins encircled by north and south lens segments, which may trend at a slightly oblique angle to the average ridge axis direction. A deeper magma body, likely also part of the axial system, is imaged near 9°51'N at ~125m from the western edge of the axial melt lens, while near 9°47.5'N a bright near-axis magma body is imaged at ~1360m from the eastern edge of the axial melt lens, at a shorter travel time below seafloor. Seismic layer 2A is imaged both as a basal reflection-refraction event, spatially continuous but variable in brightness, and through shallow layering (reflections at ~30ms i.e. 70-120m interval), observed in particular in along-axis direction, delimiting the area of elevated topography of the ISS bull's eye. Regionally, layer 2A shows a classical off-axis thickening pattern and is thinnest beneath the AST, which is distinctly imaged in the seafloor reflection. Relationships between the variations in layer 2A through the seismic volume and magma lens geometry and seafloor morphology will be analyzed.

[0910] EXPLORATION GEOPHYSICS / Data processing
[7245] SEISMOLOGY / Mid-ocean ridges
[8135] TECTONOPHYSICS / Hydrothermal systems
[8416] VOLCANOLOGY / Mid-oceanic ridge processes
Ocean Sciences (OS)
2010 Fall Meeting

New Search

AGU Home