

2008 Fall Meeting  
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HR: 0800h  
AN: **B21A-0322**  
TI: **3D Seismic Reflection Imaging of Crustal Formation Processes on the East Pacific Rise, 9°57-42'N**  
AU: **Purdy, G M**  
EM: [mpurdy@ideo.columbia.edu](mailto:mpurdy@ideo.columbia.edu)  
AF: *Lamont-Doherty Earth Observatory, Po Box 1000, PalisadesNY, 10964, United States*  
AU: \* **Mutter, J C**  
EM: [jcm@ideo.columbia.edu](mailto:jcm@ideo.columbia.edu)  
AF: *Lamont-Doherty Earth Observatory, Po Box 1000, PalisadesNY, 10964, United States*  
AU: **Carbotte, S M**  
EM: [carbotte@ideo.columbia.edu](mailto:carbotte@ideo.columbia.edu)  
AF: *Lamont-Doherty Earth Observatory, Po Box 1000, PalisadesNY, 10964, United States*  
AU: **Canales, J P**  
EM: [jpcanales@whoi.edu](mailto:jpcanales@whoi.edu)  
AF: *Woods Hole Oceanographic Institution, 360 Woods Hole Road, Woods Hole, MA 02543, United States*  
AU: **Nedimovic, M R**  
EM: [mladen@dal.ca](mailto:mladen@dal.ca)  
AF: *Dalhousie University, Edzell Castle Circle, Halifax, NS B3H4J1,*  
AU: **Carton, H**  
EM: [hcarton@ideo.columbia.edu](mailto:hcarton@ideo.columbia.edu)  
AF: *Lamont-Doherty Earth Observatory, Po Box 1000, PalisadesNY, 10964, United States*  
AU: **Newman, K R**  
EM: [knewman@ideo.columbia.edu](mailto:knewman@ideo.columbia.edu)  
AF: *Lamont-Doherty Earth Observatory, Po Box 1000, PalisadesNY, 10964, United States*  
AU: **Marjanovic, M**  
EM: [milena@ideo.columbia.edu](mailto:milena@ideo.columbia.edu)  
AF: *Lamont-Doherty Earth Observatory, Po Box 1000, PalisadesNY, 10964, United States*  
AU: **Xu, M**  
EM: [minxu@mit.edu](mailto:minxu@mit.edu)  
AF: *Woods Hole Oceanographic Institution, 360 Woods Hole Road, Woods Hole, MA 02543, United States*  
AU: **Aghaei, O**  
EM: [mladen@dal.ca](mailto:mladen@dal.ca)  
AF: *Dalhousie University, Edzell Castle Circle, Halifax, NS B3H4J1,*  
AU: **Stowe, L C**  
EM: [ics2123@columbia.edu](mailto:ics2123@columbia.edu)  
AF: *Columbia University, 2960 Broadway, New York, NY 10027, United States*  
AB: Between June 29th and August 19th 2008 the research vessel Marcus G Langseth carried out its first multi-streamer 3D seismic reflection imaging cruise, MGL08-12, by conducting a program research on the East Pacific Rise centered around 9°50'N. The primary goals were to create an accurate 3D seismic reflection image of the magmatic-hydrothermal system at this Integrated Study Site of the Ridge2000 program by imaging the structure of the axial magma chamber (AMC) lid and oceanic crust at a resolution, accuracy, and scale comparable to seafloor observations. The vessel acquired data with four, 6-kilometer solid streamers each comprising 468 active channels deployed with a total separation of 450 meters. Four gun strings with total volume of 3300 cubic inches in two groups fired alternately provide the source for a shot spacing of 37.5 meters. This configuration yields eight CMP lines for each of the sail lines that were spaced 300 m apart, and a static bin size of 6.25 m × 37.5 m in the along-track and across-track directions, respectively, providing a nominal fold of 40. The cruise accomplished the acquisition of ~3,782 km of sail line data. There are 111 across axis lines that required 10 repeated lines and 14 infills. Average feathering during the cruise was 0° ± 5° (one standard deviation), with maximum values of up to 11°. This means that 18% of the total cross axis acquisition was needed for reshoots and infilling. A 25% multiplier on planned lines for a 3D grid is probably a useful figure to use in cruise planning and is fairly standard in the seismic industry. Data quality meets or exceeds industry standards. 3D coverage was achieved in two areas. The larger comprises a set of 93 equally spaced lines forming the 3D grid between 9°57'N and 9°42'N. This grid is made up of lines from all of racetracks #1 and #2 and the northern lines of racetrack#3 and covers two principal hydrothermal vent areas in a continuous fashion. The second 3D area is comprised of 14 southern lines of the incomplete racetrack#3, and is separated from the larger grid by a gap of 11 lines or 3.3 km. South of this region we acquired a pair of lines that crossed the ridge at about 9°35'N and a single line just south of 9°30'N. Along axis lines also extend throughout the entire ridge segment from the Clipperton to Siqueiros Fracture Zones. Between the Clipperton Fracture zone and 9°41'N we acquired three parallel lines along the axis. Between this latitude and 9°20'N we obtained two parallel lines and one axial line south from that latitude, including both limbs of the Overlapping Spreading Center. Because each of the sail lines acquired represents eight CMP profiles CMP line acquisition is 30,255.60 km. This comprises 99,888 shots and 186,998,336 source-receive pairs and with a sampling rate of 2 milliseconds for a total of 957,890,520,320 data samples. In this overview presentation we will describe the work carried out and the lessons learnt from the cruise. Accompanying presentations will describe initial findings from the cruise and plans for data analysis.  
DE: 7220 Oceanic crust  
DE: 7245 Mid-ocean ridges  
DE: 8178 Tectonics and magmatism  
DE: 8416 Mid-oceanic ridge processes (1032, 3614)  
SC: Biogeosciences [B]  
MN: 2008 Fall Meeting

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