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3-D TOMOGRAPHIC IMAGING OF THE OCEANIC CRUST

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A 3-D seismic reflection and tomographic survey was conducted at the 9°03'N overlapping spreading center (OSC) to better understand the relationship between ridge-axis discontinuities and magmatic segmentation along the East Pacific Rise. Travel-time data from 19 ocean bottom hydrophones and 11 shot lines were analyzed by three-dimensional tomographic modelling to provide a 3-D mapping of velocity structure across the discontinuity. Tomographic inversions reveal that seismic layer 2A thickness is quite variable throughout the OSC area. Areas of thick Layer 2A seem to correlate with the distribution of relict overlap basins and ancient propagating ridge tips. An intense low velocity zone underlies both limbs of the overlapper and part of its basin. In addition, the multi-channel seismic reflection dataset shot within a dense 20 km by 20 km grid, reveals the tortuous geometry of the melt lens. We will present 3-D visualization of the melt sill reflector embedded within the 3-D velocity model. The co-visualization of both components of the composite magma chamber should provide additional insights into the interplay between the melt sill and the underlying low velocity region beneath this ridge axis discontinuity.