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Lower Crustal and Moho Melt beneath the East Pacific Rise, 9°-10°N, from Seafloor Compliance Measurements

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We report lower crustal shear velocities and corresponding melt estimates beneath the East Pacific Rise from 9°-10° N, determined from seafloor compliance measurements. We measured seafloor compliance, the low-frequency seafloordeformation under ocean waves, at 35 sites along and across the EPR. Compliance measurements are particularly sensitive to low velocity bodies and to melt because the measured displacement signal is inversely proportional to the crustal shear velocity. A line of compliance measurements across the rise axis at 9°48'N reveals an asymmetric and narrow (5-7 km wide) lower crustal melt body centered beneath the rise axis. A second line of compliance measurements at 9°33'N reveals an identical melt body shifted 0.7-0.8 km west of the rise axis. We will present a joint compliance-seismic refraction analysis of this site to improve constraints on the melt amount in this body. A third line of compliance measurements at 9°08'N, just north of an overlapping spreading center (OSC), reveals a much broader melt body with even lower shear velocities. The compliance data also reveal melt or mush at the Moho beneath the rise axis and at sites 9-10 km east of the rise axis, but not in between. The narrowness of the melt zone to the north, the change in its width near the OSC, and the bimodal distribution of Moho melt/mush support a broad upwelling model with deep hydrothermal circulation controlling the amount and location of crustal melt.