

Evidence of an underside lithospheric erosion beneath Southern California

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In traditional P-to-S receiver function imaging, PPs and PSs phases from the shallow layers can be miss stacked as Ps phases or interfere with deeper phases. We developed a new way of processing seismic receiver functions (Wavefield Iterative Deconvolution) which has enabled us to remove reverberations from layers within the crust that typically obscure P-to-S converted seismic waves from the lithosphere-asthenosphere boundary (LAB). This new processing enables us to produce better images of depths to the Moho (crust mantle boundary) and LAB (Fig. 1) than previously possible. These images show that the thinning of the lithosphere to the north of the Salton Trough is almost as severe as observed beneath the Salton Trough. This lithospheric thinning appears to be a series of small pockets of thinned mantle offset by shear flow in a pattern like which rifts separated by transform faults that are responsible for the opening of the Gulf of California. The thinning of the lithosphere in this region is much greater than the thinning of the crust, which implicates that northward propagation of Gulf of California related rifting is eroding the mantle portion of the lithosphere more rapidly than the crustal thinning due to extension as passive response to plate motion.

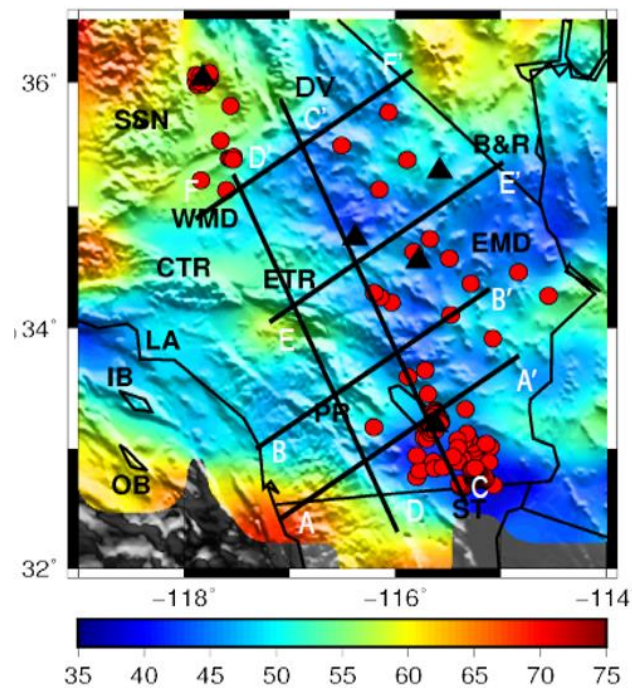


Figure. 1 LAB depth (km)