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Three-dimensional velocity structure at the Mendocino Triple junction area from traveltime tomography and earthquake relocation

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The effect of the Mendocino Triple Junction northward migration on the three-dimensional velocity structure of the area and the boundaries between the Pacific, Gorda and North America plates was studied by seismic traveltime tomography of the entire 1992-1994 PASCAL three-dimensional dataset. The experiment consist of wide-angle seismic data collected around the Mendocino triple junction, in and offshore northern California in a area covering roughly 280km$\times$270km. The results of a first arrival model are complemented with results of a P_g arrival model and relative relocated earthquake events with the use of the source-specific station terms and waveform cross correlation techniques. This unifying picture of the Mendocino triple junction's velocity structure is in agreement with most previously published seismic studies and within their overall context. High velocity bodies within the North America crust are possibly related to outliers of the Coastal Range ophiolites. The San Andreas boundary separates the Pacific plate from North America and passes onshore north of Point Delgada, with the King Range terrane being a part of the Pacific plate or a sliver in the boundary zone. Offshore, within the Vizcaino block, an oceanic high velocity body is observed within the upper crust being independent from the underlying lower crust. North of the Mendocino fault the subducting Gorda slab seems to be internally deformed as it approaches the triple junction, in a series of vertical velocity offsets. The southern edge of the slab is located at the northernmost boundary of the King Range terrane. The Petrolia earthquake, in April 1992, is a thrust event directly associated with the Gorda - North America convergence.