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## AAPG Bulletin

### Abstract

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## Title: Geology of the Eel River Basin and Adjacent Region: Implications for Late Cenozoic Tectonics of the Southern Cascadia Subduction Zone and Mendocino Triple Junction (1)

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Abstract:

Two upper Cenozoic depositional sequences of principally marine strata about 4000 m thick overlie accreted basement terranes of the Central and Coastal belts of the Franciscan Complex in the onshore-offshore Eel River basin of northwestern California. The older depositional sequence is early to middle Miocene in age and represents slope basin and slope-blanket deposition, whereas the younger sequence, late Miocene to middle Pleistocene in age, consists largely of forearc basin deposits.

Youthful tectonic activity related to Gorda-North American plate convergence indicates an active Cascadia subduction zone and strong partial coupling between these plates. Structures of the northeastern margin of the Eel River basin are principally north-northwest-trending, east-northeast-dipping thrust and reverse faults that form imbricate thrust fans. Many faults merge downward into sole thrusts that extend to or near the Gorda-North American plate interface. In the southern part of the region, these structures have been modified by northward encroachment of the Pacific plate.

The Coastal belt fault, the early Tertiary accretionary suture between the Franciscan Central and Coastal belts, can be traced from Arcata Bay northward offshore to the southern Oregon border. It is tentatively extended farther northward based on aeromagnetic data to an offshore position west of Cape Blanco. Thereafter, it may coincide with the offshore Fulmar fault. If so, the Franciscan Coastal belt in California is correlative with the offshore Fulmar terrane in Oregon.

The Cascadia subduction zone (CSZ) does not join the Mendocino transform fault at the commonly depicted offshore location of the Mendocino triple junction (MTJ). Instead, the CSZ extends southeastward around the southern Eel River basin and shoreward along Mendocino Canyon to join the Petrolia shear zone. Similarly, the Mendocino fault may extend shoreward via Mattole Canyon and join the Cooskie shear zone. These two shear zones intersect onshore north of the King Range, and the area of their intersection is the probable location of the MTJ.

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