

Consideration on the formation of transform faults on land, using the San Andreas fault and the Alpine fault as examples

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The San Andreas and Alpine faults are typical transform faults on land. However, there are enigmas on these faults. The San Andreas fault system is located within the continental margin of North America, i.e., the Coastal Ranges. The South Island of New Zealand was located within the Pacific Ocean when it were reconstructed on the basis of the plate motion for the past 25 Ma. However, the geological unit, such as the Jurassic-Triassic boundary, is continuous to the North Island. These enigmas can be solved as follows. In the case of the San Andreas, I assume that the Farallon plate was joined with the Pacific plate before the mid-ocean ridge between them encountered the coast (Bohannon et al., 1995). The shear traction at the base of the wedge reactivated the transcurrent motion of strike-slip faults, which had been formed in the wedge due to oblique subduction. In the case of the Alpine, the slivers in the forearc of the North Island are translated to the SW and put on the Pacific plate, which has subducted from the southern end of the Hikurangi Trough, in the Marlborough region of the South Island. Therefore, essentially, both of the transform faults are the strike-slip faults in the forearc wedge in the subduction zone. This idea for the formation of the transform faults might be applicable to other major faults, such as the Anatolian faults, and the Altyn Tagh and Kunlun faults in Tibet.