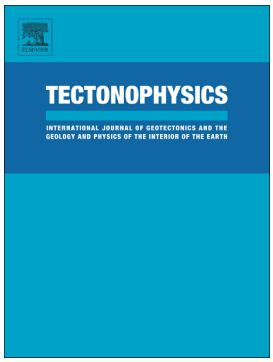

A comparison between mid-Paleozoic New England, USA, and the modern western USA: Subduction of an oceanic ridge-transform fault system

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A comparison between mid-Paleozoic New England, USA, and the modern western USA: subduction of an oceanic ridge-transform fault system

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Abstract

A detailed comparison is made between the mid-Paleozoic Norumbega fault system (NFS) in Maine, USA, and the San Andreas fault system (SAFS) of coastal California, USA, and their tectonic settings. The SAFS formed following subduction of an oceanic ridge-transform system, and the NFS is interpreted as having formed the same way. The parallel evaluation of mid-crustal processes associated with the NFS and surface processes associated with the SAFS gives a unique perspective on modern and inactive crustal-scale strike-slip fault systems.

The SAFS is separated from the Cascadia subduction zone by the Mendocino triple junction. Similarly, the mid-Paleozoic NFS is interpreted as having been separated from a convergent zone to the southwest by the interpreted Norumbega triple junction. The SAFS cuts a subduction complex, the Franciscan Complex, that formed when the margin was still convergent. No equivalent subduction complex associated with the NFS has been recognized, perhaps because it was eroded away or displaced, or because it never formed. The SAFS experienced periods of transpression and transtension, whereas the NFS shows transpressive structures only. Slab window magmatic rocks exist along the SAFS. Devonian to earliest Carboniferous plutonic rocks along the NFS may in part be slab window magmatic rocks, although the effects of the Acadian and prior orogenies in the Appalachians complicate their identification. Magmatic rocks along the SAFS are offset due to the high rate of displacement (20-40 mm/yr). Magmatic rocks along the NFS show little offset, consistent with the low rate of displacement (~3 mm/yr) in the model. Transverse structures are associated with both the SAFS and NFS.

Other Mendocino-type triple junctions may have existed in the past, but may be difficult to recognize. Where a past crustal-scale intracontinental strike-slip fault system terminates on an along-strike contemporaneous convergent system, such a fault-fault-trench triple junction may be considered.