# The Reykjanes Peninsula Oblique Rift, a zone of crustal extension and strike-slip faulting

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The structure of the plate boundaries in Iceland is relatively complex. Several of the plate boundary segments are oblique to the over-all plate velocity vector between the North America and Eurasia Plates. Oblique and immature plate boundaries are frequently characterized by complicated fault patterns, which makes their seismogenic potential and seismic hazard difficult to assess. The Reykjanes Peninsula oblique rift has an over-all trend of 70°, highly oblique with respect to the spreading direction, 101° in this region. It contains both volcanic systems and seismogenic strike-slip faults. Oblique spreading leads to extensive volcanism and large earthquakes, a combination that is otherwise uncommon in Iceland. The fissure swarms of individual volcanic systems contain normal faults and fissures, with a NE-trend, also quite oblique to the plate boundary. The fissure swarms fade out towards the NE and SW as they extend into the plates on either side. Overprinting this pattern of volcano-tectonic structures are sets of parallel, northerly striking transcurrent faults that generate the largest earthquakes in this zone, up to M 6.5. Their surface expressions are en echelon fracture arrays and push-up structures. The sense of displacement is right-lateral. The distance between them varies from 0.5 to 5 km, and together they form a bookshelf-type fault system taking up the left-lateral component of plate movements across the oblique rift zone.

It has been suggested that the plate spreading vector is partitioned into extension and transcurrent motion. The transcurrent motion then appears to be taken up by bookshelf faulting, i.e. by a series of parallel, strike-slip faults that are perpendicular to the plate boundary, and the extensional structures of the fissure swarms are activated primarily during magmatic events when dykes are intruded into the crust.