



## **Oblique spreading, extensional fractures, and faults growth in the rift zone of SW Iceland**

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A field study was made of 220 recent extensional fractures and normal faults in the fissure swarms of Vogar and Thingvellir, Southwest Iceland. We analyzed both fractures and faults in the rift zone with the aim to better define the mechanisms of spreading at the divergent plate boundary.

Along the Vogar fissure swarm tectonic fractures were measured for strike and direction of opening. Collected data were stored and analyzed for spatial variation in a GIS database. Most of the fractures show normal to slightly oblique extension, with a mean angle between normal to the strike of the fracture and the direction of opening of 8°. Observed lateral sense of motions are both left-lateral and right-lateral. Since the Reykjanes Peninsula is known to be a left-lateral obliquely-spreading ridge, with the plate boundary making an angle of 30° to the spreading direction, we interpret our measurements as evidence for strain partitioning along the divergent plate boundary in SW Iceland.

In both the Vogar and the Thingvellir fissure swarms, detailed analyses of several normal faults were conducted to determine the mechanism of fault growth. One possible criterion to determine whether the normal faults propagated to the surface from below, or propagated from the surface downwards, is the geometry of the faults tips. About 75% of the measured lateral fault terminations have titled hanging walls, suggesting a possible propagation of the fault from below. Fault tips with flat hanging walls were observed in the 25% of the studied normal faults in the axial regions of the ridge, indicating an initiation of faulting as pure tension fractures at the surface. The coexistence of both faulting mechanisms is probably linked to some degree with magma ascent in the rift zone.