



## **Fissure swarm and central volcano at the divergent plate boundary in northern Iceland : the Krafla fissure swarm as a case example**

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The Krafla fissure swarm is part of the axial rift zone in North Iceland. It corresponds to a flat area covered with Holocene lavas. At depth extension processes at work result both in normal faulting and dyking whereas pure tension fractures and normal faults are the main visible structures at the surface. They are distributed on a 80x10 km area. A central volcano rounded by a 8 km caldera is regularly active at Leirhnjúkur, in the southern third of the swarm.

The 1975-1984 rifting episode that occurred at Krafla has shown very high local deformation rates. Almost the whole fissure swarm has dilated, up to 9 m across some part of it. During the same period about 30% of the swarm has been covered by lavas, mostly north of Leirhnjúkur.

This paper presents a structural analysis of the fault and fissure swarm that existed before the rifting episode and compare it with the post rifting state. Fortunately, aerial photos taken in 1960 offer the possibility to map most of the structures, including the area now covered with new lavas.

We performed a complete mapping of the swarm, north of Leirhnjúkur. Offsets along the normal faults have been measured using a photogrammetric approach. This allows us to estimate the amount of vertical displacement and its variation along the main faults or along the nested grabens.

The brittle deformation style changes when approaching the caldera. The number of fissures and fault decreases, whereas the offset on the remaining faults increase as if the deformation concentrates progressively on only a few discontinuities. This could be related to the decreasing of the brittle layer near the central volcano.