



Recent earthquake swarm activity in Tjörnes Fracture Zone in N-Iceland

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The Tjörnes Fracture Zone (TFZ) in N-Iceland is a complex right lateral transform offset connecting the offshore Kolbeinsey Ridge in the north-west to the on-shore volcanic fissure zone some 100 km to the south-east. Seismicity recorded in the area suggests it is composed of two major parallel lineaments separated by 30-40 km and are mainly offshore. Here we investigate the southern lineament, the Húsavík-Flatey fault (HFF) which lies across the inhabited island Flatey and the coastal town Húsavík. New analyses of deformation data collected in the area suggests a locking depth of ~ 6.2 km, a slip-rate of ~ 6.8 mm yr⁻¹ and seismic potential equivalent to a Mw6.8 earthquake. Historical records of major earthquakes in the HFF describe e.g. the threat of extensive rockfall in nearby islands and fjords south of the fault.

Here we present analyses of recent intensive seismic activity in the western most part of the fault and its intersection of the Eyjafjarðaráll graben. Over a period of a few weeks in late October and first half of November in 2012, several hundred seismic events were recorded, both within the graben as well as on the HFF. The largest event, Mw 5.6 occurred in the graben and its source mechanism indicate normal faulting. The events on the HFF show however strike-slip behaviour and have a maximum magnitude of 3.5. This activity extended over some 30 km. In late September in 2013 another swarm occurred. Relative locations show that these events occurred in a very narrow depth range (at 9-10 km) and activated a 3 km part of the fault which was left out in the swarm in 2012. Interestingly this activity resembles more volcanic swarm activity in its temporal and magnitude distribution.