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NICE - an amphibian seismic experiment in North Iceland, II. Preliminary results

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The Tjörnes Fracture Zone (TFZ) in Northern Iceland accommodates the transform motion between the spreading centres of the on-land Northern Volcanic Zones (NVZ) and the submerged Kolbeinsey Ridge (KR). Based on geochemical evidence, it has been postulated that the TFZ acts as a sharp boundary between the ridge-generated melts of the KR and the plume generated melts of the Northern Volcanic Zone (NVZ). Within the TFZ, the Húsavík-Flatey Fault (HFF) is seismically very active, despite its orientation oblique to the prevailing stress regime. Does this imply that the HFF is a weak fault? To help unravel the TFZ and the transition from oceanic to Icelandic crust and upper mantle, a passive seismic experiment has been conducted in the region. In a joint venture between the universities of Hamburg and Uppsala and the Icelandic Meteorological Office, 11 temporary land stations and 14 ocean bottom instruments were deployed for a period between June and September 2004. Combined with the permanent network, this resulted in 35 seismic stations which recorded more than 900 earthquakes during the period of operation. Preliminary results indicate that the mechanical properties vary along the HFF, and substantial variations in crustal thickness are observed. The variations along the fault might indicate pore pressure variations or pathways for ascending fluids.