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Broad-band seismological observations at Hengill triple junction geothermal system.

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We present observations from the broadband seismological network set-up from June 2006 till October 2006 at Hengill geothermal area. The Hengill geothermal system is located in volcanic centres (up to 2000 m depth), within a triple junction between the Reykjanes Peninsula oblique rift, the West Volcanic Zone and the South Iceland Seismic Zone. Intense seismic activity has been recorded since 1990 by the South Iceland Lowland network. In addition, with the use of temporary seismological networks, Hengill volcanic system has been intensively studied, including tomography and anisotropy and seismicity patterns studies. Cooling, mostly due to natural heat loss, and consequential thermal contraction and cracking in the heat source, are thought to be responsible for the continuous small-magnitude earthquake activity in this area. This mode of earthquake induction was suggested following the observation that many of the earthquakes have merely non-double couple focal mechanisms with large explosive components. Tectonic earthquakes have generally a double couple source mechanism, as they correspond to strike-slip motion only. When fluids are involved, tensile and explosive components of the moment tensor are involved, which are representative of non-double couple mechanisms. The mechanism responsible for the non-double couple in Hengill seismicity may be fluid flow into newly formed cracks. Recent studies in volcano-seismology have suggested that long period (or low-frequency) earthquakes, i.e., 0.2-5 Hz are due to the interaction between fluid and solid, and are best observed by using network of broadband seismometers. Within

the framework of the European project Integrated Geophysical Exploration Technologies (I-GET, 6th PCRD network), a network of 7 broadband seismological stations was set-up in summer 2006 in order to record broadband characteristics of the seismicity at Hengill geothermal area. Our network recorded more than 600 earthquakes in the period ranging June 2006 to October 2006. Our present study aims at analyzing the high-quality, high-dynamic records of ground motion in this area and at relating the inferred source mechanisms to the exploitation of the geothermal system or/and to the seismic activity of the rift zone.