

Geothermal noise at Ölkelduháls, SW Iceland

Ólafur Guðmundsson^{1,2} and Bryndís Brandsdóttir³

¹*Department of Science and Engineering, Reykjavík University, Menntavegi 1, 101 Reykjavík, Iceland*

²*Department of Earth Sciences, Uppsala University, Villavägen 16, SE-752 36 Uppsala, Sweden*

³*Institute of Earth Sciences, Science Institute, University of Iceland, Sturlugata 7, 101 Reykjavík, Iceland*

ogud@ru.is, bryndis@raunvis.hi.is

Abstract — *Seismic noise was recorded at 19 sites along a roughly linear array crossing the geothermal area at Ölkelduháls, SW Iceland. Noise in the frequency range between 3 and 7 Hz was identified as associated with the geothermal activity based on amplitude decay with distance and timing of energy in intra-station cross-correlation. This geothermal tremor is very stable in time, both in its amplitude and correlation relations. Differences of amplitude-spectral shape from one station to another and between the different components of motion at each station indicate a complex structure of the wave field, possibly due to a distributed source and scattering effects. The cross-correlation constrains horizontal group velocity weakly at about 1 km/s. Based on particle-motion diagrams and three-component polarization analyses the noise appears to be primarily composed of surface waves. The spatial decay of the noise away from the inferred source implies an elastic quality factor of $Q \sim 10$ assuming the geometrical spreading of a surface wave in a laterally homogeneous Earth.*