



Temporal variations in seismic velocities obtained from seismic tomography in the South Iceland Seismic Zone

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Local earthquake (LE) seismic tomography is generally performed assuming the seismic velocity structure is stationary. Seismic velocities are in turn controlled by mechanical properties that depend on such things as temperature, confining and pore pressure, and fluid saturation, which change with time. The reasons not to consider this when performing LE tomography should therefore mainly be attributed to technical and/or logistical difficulties. Another factor is that the seismicity rate normally is too low for obtaining a good enough dataset for performing an inversion with a meaningful fidelity. During the year 2000 more than 110,000 earthquakes occurred in the area of the Reykjanes Volcanic Zone (RVZ) and the South Iceland Seismic Zone (SISZ). This seismicity rate is much larger than normal, and is probably related to the two magnitude 6 earthquakes that occurred there in June 2000. The background P- and S-wave seismic velocity models that were used were based on data from 1973-98, and is considered to be very robust. The seismicity recorded since then was divided into suitable time windows and inverted separately. Within the region considered well-resolved, variations occur mainly in four regions. Two of those (the two strongest) coincide with two volcanic systems. The other two occurred in the SISZ, near the two large June 2000 earthquake hypocenters. The results are preliminary, and work is done to establish their robustness, and if the results can be confirmed by other independent observations, e.g. teleseismic observations.