

2005 AGU Fall Meeting

G44A-02

Transient Deformation Preceding and Following the June 2000 Earthquake Sequence in Southwest Iceland

* **Arnadottir, T**

thora1@hi.is

Nordic Volcanological Center, Institute of Earth Sciences, University of Iceland, Reykjavik, IS-101 Iceland

Miyazaki, S

miyazaki@eri.u-tokyo.ac.jp

Earthquake Research Institute, University of Tokyo, Tokyo, 113-0032 Japan

Geirsson, H

dori@vedur.is

Icelandic Meteorological Office, Bustadavegur 9, Reykjavik, IS-150 Iceland

Two $M_w=6.5$ earthquakes and several $M\sim 5$ triggered earthquakes occurred in south Iceland over a period of 4 days in June 2000. The first main shock on June 17, triggered increased seismicity over a large area and significant slip on at least three distinct faults on the Reykjanes Peninsula, up to 90 km to the west of the main shock epicenter. Crustal deformation signals due to the earthquake sequence were observed with campaign and continuous GPS and InSAR. Seismic and geodetic data confirm that the faults that ruptured in the June 2000 sequence are oriented N-S, almost perpendicular to the trend of the plate boundary, with primarily right-lateral strike slip motion. The geodetic data from the Reykjanes Peninsula suggest that the event near Kleifarvatn had a significantly larger moment than seismic estimates, indicating a component of aseismic slip on the fault lasting no more than several hours. Kinematic GPS analysis of 30 second data from the two closest continuous GPS station in Iceland is used to constrain the timing of the aseismic component of the deformation. Transient deformation in the area of the two main shocks was observed with InSAR and GPS. A short term transient observed by InSAR has been explained by poro-elastic rebound due to post-earthquake pore-pressure changes. The longer term deformation signal can be explained by either afterslip at 8-14 km depth or viscoelastic relaxation of the lower crust and upper mantle in response to the coseismic stress changes. The June 2000 earthquake sequence was preceded by intrusive and intense seismic activity at the Hengill triple junction and an eruption at Hekla volcano, located at the western and eastern ends of the south Iceland seismic zone, respectively. Coulomb stress change calculations indicate that the Hengill intrusion decreased the stress at the western end of the SISZ. These events illustrate the importance of increasing the spatial and temporal resolution of continuous monitoring of crustal deformation in Iceland.