Geophysical Research Abstracts
Vol. 14, EGU2012-2584, 2012
EGU General Assembly 2012

The stress shadow induced by the 1975-1984 Krafla rifting event

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The 1975 - 1984 Krafla rifting event (Iceland) is held responsible for a significant drop in the earthquake rate on the nearby Husavik Flatey Fault (HFF), although this has never been demonstrated quantitatively. Stress transfer to seismic areas is known to affect the statistics of earthquake occurrence: increases in earthquake rate, with time scale of weeks, have been studied extensively from a theoretical point of view and demonstrated in several cases. On the other hand, rate decreases are rarely observed and addressed. Here we compare theoretical predictions from the rate and state earthquake nucleation theory with seismological observations and historical accounts. We find the pattern of the rift-induced stress shadow to coincide with the areas where observed seismicity rates are significantly lower than estimated historical rates. We also find that the seismicity rates on the central part of the HFF have increased significantly in the last 17 years, with portions of the fault progressively setting off seismicity from West to East.