Geophysical Research Abstracts
Vol. 14, EGU2012-9076, 2012
EGU General Assembly 2012

What do earthquakes on the endglacial faults tell us about the current stress field?

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The endglacial fault scarps in northern Fennoscandia are the surface expressions of large earthquakes that occurred at the end of the latest ice age, approximately 10,000 years ago. The faults strike in a north-northeasterly direction and have reverse faulting throw in excess of 10 m. Based on Quaternary deposits, landslides and liquefaction structures they are inferred to have ruptured as a one-step events, implying magnitudes up to 8.2. Since 2004 the Swedish National Seismic Network has recorded microearthquakes in the endglacial fault province in Sweden, and during 2007-2010 the Pärvie fault, largest of them all, was monitored by a temporary seismic network. The location of earthquakes in northernmost Sweden show a very strong correlation with the endglacial faults. North of 66 degree latitude 63% of the earthquakes fall within 30 km southeast and 10 km northwest of an endglacial fault. Previous speculations that there is a north-south lineament of seismicity just west of the Swedish-Finnish border is instead probably seismicity related to endglacial faults. Seismic lineaments uncorrelated to know endglacial faults may be related to such faults that either did not break the surface, or are under the Bay of Bothnia. Focal mechanisms related to the faults show a very varied style of faulting. The events are mainly strike-slip and reverse, but there are a number of well determined normal mechanisms in the data as well. When inverted for the causative state of stress, focal mechanisms along the Pärvie fault show a mostly reverse state of stress, but with a significant strike-slip component. The direction of the maximum horizontal stress is mainly northwest-southeast, but varies along strike of the fault. Situated in a cratonic area with slow strain accumulation, the current stress field around the faults may still be influenced by stress redistribution during rupture. We separately investigate focal mechanisms from events associated with the faults and mechanisms from events in areas unaffected by fault rupture. The resulting stress states are compared and we determine the general seismogenic stress field in northernmost Sweden.