Geophysical Research Abstracts
Vol. 13, EGU2011-847, 2011
EGU General Assembly 2011

Moment tensors, state of stress and their relation to postglacial rebound in northeast Canada

Rebekka Steffen, David W. Eaton, and Patrick Wu
University of Calgary, Department of Geoscience, Faculty of Science, Calgary, Canada

Northeastern Canada is cored by the North American craton, called Laurentia. As all cratons in the world, Laurentia has been remained relatively stable for the last 600 million years. However, some parts of Hudson Bay are seismically active with moderate intraplate seismicity along the Boothia Uplift - Bell Arch structure, which is a Palaeozoic weak zone within the craton. Additionally, regional uplift due to postglacial rebound is observed from geodetic and geophysical methods (e.g. GPS measurements, gravity data, relative sea levels). This uplift is associated with a change in the strain and stress, which can reactivate the Palaeozoic faults giving earthquakes mainly with thrust faulting mechanism.
Since 2006, a temporary seismograph network has been in operation in this region as part of the Hudson Bay Lithospheric Experiment (HuBLE). This network provides the opportunity to investigate earthquakes in that region in more detail than has been previously possible. In this preliminary study we investigated four earthquakes that have occurred in northern Hudson Bay since 2007 and have been observed with the network. The moment magnitudes of these earthquakes are between 3.6 and 3.9. The focal mechanisms are determined using a waveform-fitting procedure for surface waves, in which the best double-couple mechanism is obtained through a grid search over strike, dip and rake angles. These events exhibit a thrust fault mechanism which is in agreement with mechanisms of previously analysed earthquakes in the literature and is consistent with postglacial uplift as the trigger mechanism.