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Effects of changes in frictional strength and mantle viscosity on the stress behaviour in northeastern Canada

R. Steffen, P. Wu, D.W. Eaton, and H. Steffen
University of Calgary, Department of Geoscience, Faculty of Science, Calgary, Canada

The North American craton has remained relatively stable for the last 1.7 billion years; however, some parts such as northern Hudson Bay are characterized by moderate intraplate seismicity. The most active region is the Boothia Uplift - Bell Arch structure, which is a Palaeozoic weak zone within the craton. Regional uplift due to postglacial rebound (Glacial Isostatic Adjustment, GIA) is observed from geodetic and geophysical methods (e. g. GPS measurements, gravity data, relative sea levels). This uplift is associated with changes in stress that can reactivate existing faults. The analysis of local earthquakes showed thrust-faulting mechanisms, which agrees with modeled fault mechanisms using GIA models. Stress-inversion results obtained by focal mechanisms show discrepancies compared to modeled stress values. Real faults are not included in previously published models of GIA, which could account for a factor for the differences in the stress direction. Moreover, mantle viscosity has been shown to be an important factor in determining the stress direction in these areas. We will present an analysis that evaluates a realistic regional stress field, including the presence of known faults in the GIA models. In addition, the sensitivity of mantle viscosity on stress direction after the inclusion of faults will be investigated.