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**Analysis of the effect of principle stresses in the Bay of Fundy, Gulf of St. Lawrence, offshore Nova Scotia, and Grand Banks on faults in Nova Scotia and New Brunswick**

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ELLA GOLDBERG AND DJORDJE GRUJIC

*Department of Earth Sciences, Dalhousie University, 1459 Oxford St, P.O. Box 15000, Halifax, Nova Scotia B3H 4R2, Canada*  
<ella.goldberg@dal.ca>

Stress patterns were analyzed in parts of Atlantic Canada to determine tectonic regimes and whether reactivation of older faults could cause damage near Point Lepreau, New Brunswick. Point Lepreau is home to a nuclear power plant and seismic risk information in the Bay of Fundy is scarce and out of date. To put this information in perspective regionally, the study area extends from south of Grand Manan Island in the southwest to the Grand Banks of Newfoundland in the northeast.

This study investigated published focal mechanism data for earthquakes from ~1970 to 2011 in the study area. Four main regions of seismicity are the Bay of Fundy, Gulf of St. Lawrence, offshore Nova Scotia, and the Grand Banks. Earthquake and focal mechanism data were obtained from the Global Centroid Moment Tensor Catalogue (1976-present), the Canadian Earthquake Database, the U.S. Geological Survey/ National Earthquake Information Centre database (1973-present), and focal mechanism data from Geological Survey of Canada 1988 and 1989 files. Focal mechanism information is scarce for most regions and earthquake data is scarce for the Grand Banks and Bay of Fundy regions. In order to better characterize the principal stress pattern for the regions, the World Stress Map Data (2008) were included in the study.

Analysis of focal mechanisms showed the thrust-fault stress regime in the Gulf of St. Lawrence. In the Grand Banks region, stress orientations seem random and earthquakes could be the result of salt tectonics or submarine land slides. In offshore Nova Scotia, the stress orientations seem to coincide with the trend for North America and are compatible with the extension perpendicular to the passive Atlantic boundary. The Bay of Fundy region seems to partially mimic the stress orientations of the passive margin but some focal mechanisms show a strike-slip stress regime. Between the Bay of Fundy and the Gulf of St. Lawrence, World Stress Map data show thrust faulting with a strike-slip component closer to the Bay of Fundy and pure thrust faulting closer to the Gulf of St. Lawrence. The effect of these stresses on fault reactivation is currently unknown. Finally, in the St. Lawrence Channel, between Newfoundland and Nova Scotia, there was a chain of earthquakes of unknown source with depths of 18 km and magnitudes up to 4.2 M.

In summary, the preliminary data compilation indicates progressive change of relative magnitude and orientation of

the principal stresses in the study area and that locally some of the mapped faults may be seismically active. The available GPS data indicate very slow plate rates and therefore slow stress accumulation rates. Low density of seismic data does not allow firm conclusions but target areas have been identified for future detailed studies.