# Arctic ULINNIQ—underwater listening network for novel investigations of quakes

John C. Gosse[1], Mladen R. Nedimović[1], Calvin Campbell[2], George W. Wenzell[3], Björn Lund[4], Rebekka Steffen [4], Reginald L. Hermanns [5], James M. Savelle [6], Laura-Ann Broom [1], Tommy Tremblay [7], and Sageev Oore [8]

*1. Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia, B3H 4R2, Canada <john.gosse@dal.ca>*
*2. Geological Survey of Canada, NRCAN, Dartmouth, Nova Scotia B2Y 4A2, Canada*
*3. Department of Geography, McGill University, Montreal, Quebec, H3A 0B9, Canada*
*4. Department of Earth Sciences, Uppsala University 752 36 Uppsala, Sweden*
*5. Geohazard and Earth Observation, Geological Survey of Norway, 7040 Trondheim, Norway*
*6. Department of Anthropology, McGill University, Montreal, Quebec H3A 2T7 Canada*
*7. Canada-Nunavut Geoscience Office, Iqaluit, Nunavut X0A 0H0 Canada*
*8. Faculty of Computer Science, Dalhousie University, Halifax, B3H 4R2 Canada*

*Ulinniq* is an Inuktitut word for rapid inundation of land by seawater. Seismicity- and landslide-triggered tsunamis are arguably the most significant natural hazard for communities in Arctic Canada. Most of the communities and major infrastructure, including airports and hospitals, are less than 60 m above sea level and therefore vulnerable to *ulinniq*.

ULINNIQ is a multidisciplinary research project funded by the National Centre of Excellence MEOPAR to provide a comprehensive seismic and tsunamic risk analysis for Nunavut and Atlantic Canada. Initial goals include (i) deploying ocean-bottom sensors in Baffin Bay east of Pond Inlet, within a moderate-high seismic risk zone, to obtain precise position and timing of all seismicity over at least one year, (ii) interpret marine sediment records in and beyond fjords on eastern Baffin Island to extract a paleoseismology history, if possible, from chronostratigraphies that include mass transport deposits; (iii) establish the recurrence interval and location of past rock avalanches and currently gradually sliding or precarious massive slope blocks, with focus on failures that can trigger large displacement waves (such as the deadly 100 m high tsunami that affected Nuugaatsiaq, western Greenland, on June 17, 2017); (iv) after a process of consultation, obtain oral testimonies regarding *ulinniqs* and earthquakes from Inuit Elders in the hamlets of Pond Inlet and Clyde River; (v) develop a numerical model for Greenland and North America that computes the process of glacial isostatic adjustment and the accompanying lithospheric stress changes that may result in seismicity that could directly or indirectly trigger tsunamis; (vi) improve and use the already comprehensive record of habitational evidence on well-dated raised shorelines in the region to determine the timing and location of pre-historic tsunami where evidence is missing.

These models and data are needed to test hypotheses regarding how the rate and style of deglaciation may induce major earthquakes along otherwise inactive intraplate faults, such as the

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1929 M7.2 Grand Banks earthquake, and to provide a robust risk analysis for targeted eastern Arctic and Atlantic Canadian communities.


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