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The GreenLand Ice Sheet monitoring Network (GLISN)

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GLISN is a new, international, broadband seismic capability for Greenland, being installed and implemented through collaboration of USA, Denmark, Switzerland, Germany, Canada, Italy, Japan, Norway and Poland. GLISN is a real-time sensor array of over 20 stations to upgrade the scarce network for detecting, locating, and characterizing both tectonic and glacial earthquakes and other cryo-seismic phenomena, and contribute to our understanding of ice sheet dynamics. GLISN will provide a powerful tool for detecting change, and will advance new frontiers of research in the underlying geological and geophysical processes affecting the Greenland Ice Sheet. The glacial processes that induce seismic events (internal deformation, sliding at the base, disintegration at the calving front, drainage of supra-glacial lakes) provide a quantitative means for monitoring changes in glacial behaviour over time. Long-term seismic monitoring of the Greenland Ice Sheet will contribute to identifying possible unsuspected mechanisms and metrics relevant to ice sheet collapse, and also detect if the areas of cryo-seismic events change and expand in the coming decades. GLISN will provide a new reference network in and around Greenland for monitoring these phenomena in real-time, and for the broad seismological study of Earth and earthquakes. The GLISN development takes its starting point in the existing stations in and around Greenland operated by members of GLISN. The network is being upgraded and expanded by installing new, telemetered, broadband seismic stations on Greenland's perimeter and ice sheet; here also with GPS. A virtual network is established where all GLISN data are archived and freely available for download. In collaboration with GLISN, the Global Centroid Moment Tensor Project will provide a near-real-time catalogue of glacial earthquakes. The development incorporates state-of-the-art broadband seismometers and data acquisition, Iridium and local internet, power systems capable of autonomous operation throughout the polar year, and stable, well-coupled installations on bedrock as well as on the ice sheet.