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The GreenLand Ice Sheet monitoring Network (GLISN)

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The GreenLand Ice Sheet monitoring Network (GLISN) is a new, international, broadband seismic capability for Greenland, being installed and implemented through the joint collaboration of USA, Denmark, Switzerland, Germany, Canada, Italy, Japan and Norway. GLISN is a real-time sensor array consisting of more than 20 broad band stations. The purpose of the project is to enhance and upgrade the performance of the scarce existing Greenland seismic infrastructure for detecting, locating, and characterizing both tectonic and in particular glacial earthquakes and other cryo-seismic phenomena. Complementing data from satellites, geodesy, and other sources, and in concert with these technologies, GLISN will provide a powerful tool for detecting change, and will advance new frontiers of research in the glacial systems as well as in the underlying geological and geophysical processes affecting the Greenland Ice Sheet.

The glacial processes that induce seismic events are all integral to the overall dynamics of glaciers, and seismic observations of glaciers therefore provide a quantitative means for monitoring changes in their behaviour over time. Long-term seismic monitoring of the Greenland Ice Sheet will contribute to identifying possible unsuspected mechanisms, 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 permanent and long-time stations in and around Greenland operated by members of GLISN. These stations will be upgraded to a common standard with real-time telemetry. The network will be expanded by installing new, telemetered, broadband seismic stations on Greenland's perimeter and ice sheet. An open virtual network is established were all GLISN data can be downloaded. 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 and the Ice Sheet. GPS will also be installed at sites on the Ice Sheet. All data from GLISN will be freely and openly available to anyone in real-time, without restrictions.