The Geoscience Laser Altimeter System (GLAS) is the sole instrument developed to fly on the Ice, Cloud, and land Elevation Satellite (ICESat). The ICESat mission is an integral part of the NASA Earth Science Enterprise (ESE). ICESat launched on January 13, 2003. The National Snow and Ice Data Center (NSIDC) archives Level 0, Level 1A, Level 1B and Level 2 products from the GLAS instrument. NSIDC currently has an 8 day sample data set (GLA01 to GLA15) from Laser 1 available to users.

#### Sample Images from GLAS

**ICESat/GLAS (Laser Data) vs. Radar Data**

#### Applications

The ICESat mission has two sets of objectives.

- To provide accurate, high resolution elevation measurements of the Greenland and Antarctic ice sheets.
- Determine the present-day mass balance of the ice sheets and estimate past and future contributions of the ice sheets to global sea level rise.
- These data will also increase our understanding of the way that changes in the ice sheets affect changes in polar climate, such as precipitation, temperature, and cloudiness.

- To measure cloud heights and the vertical structure of clouds and aerosols in the atmosphere:
  - To measure land topography and vegetation canopy heights;
  - To measure sea ice roughness and thickness;
  - To measure ocean surface elevations;
  - To measure surface reflectivity.

#### Tools

Sample source code, written in Fortran 90, that will read ICESat/GLAS data and dump it to ASCII format is available. Currently this code will compile only on Hewlett-Packard and some Sun Unix platforms. Thie code is provided so users can modify the code or create different programs to suit their needs.

Interactive Data Language (IDL) and Fortran 90 multi-platform code will be available in the future. Additionally, IDL-based visualization software for ICESat/GLAS data will be available in the future.

All products are in a flat binary format, except for GLA16, which will be in Hierarchical Data Format - Earth Observing System (HDF-EOS). GLA16/ICESat Global Elevation and Atmosphere HDF-EOS Data is a global product containing elevation, elevation distribution, average reflectivity, optical depth, cloud layer, aerosol and Planetary Boundary Layer heights. The data rates are 40, 5, 1, 25, and 05 Hz. Grennells contains 14 orbits of data.

The images below are examples of the output of the visualization software that NSIDC will be able to provide users in the future.

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**NSIDC User Services Staff is responsible for providing responses to user inquiries related to ICESat data. Send e-mail to “nsidc@nsidc.org” or call +1-303-492-6199.**

Further information regarding ICESat data can be found at [http://nsidc.org/daac/icesat](http://nsidc.org/daac/icesat).