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Managing IceBridge airborne mission data at the National Snow and Ice Data Center

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Operation IceBridge is a NASA airborne geophysical survey mission collecting laser altimetry, ice-penetrating radar profiling, gravimetry and other geophysical measurements to monitor and characterize the Earth's cryosphere. The IceBridge mission, begun in 2009, will continue through the launch of ICESat-II (currently planned for 2015), and provides continuity of measurements between that mission and its predecessor. In addition, selected flights are coordinated with ESA to support validation of CryoSat data and enable future cross-correlation of related measurements. Data collection sites include the Greenland and Antarctic ice sheets and the sea ice pack regions of both poles. These regions include some of the most rapidly changing areas of the cryosphere. IceBridge is also collecting data in East Antarctica via the University of Texas ICECAP program and in Alaska via the University of Alaska, Fairbanks glacier mapping program. The NSIDC Distributed Active Archive Center at the University of Colorado at Boulder provides data archive and distribution support for the IceBridge mission. Our IceBridge work is based on two guiding principles: ensuring preservation of the data, and maximizing usage of the data. This broadens our work beyond the typical scope of a data archive. In addition to the necessary data management, discovery, distribution, and outreach functions, we are also developing tools that will enable broader use of the data, and integrating diverse data types to enable new science research. Researchers require expeditious access to data collected from the IceBridge missions; our archive approach balances that need with our long-term preservation goal. We have adopted a "fast-track" approach to publish data quickly after collection and make it available via FTP download. Subsequently, data sets are archived in the NASA ECS system, which ties data discovery and distribution with robust backup, documentation, and metadata to assure data availability for future research purposes. NSIDC is designing an IceBridge data portal to allow interactive data search, exploration, and subsetting via a map-based interface. This portal will provide flight line rendering and multi-instrument data previewing capabilities to facilitate use of the wide array of data types, resolutions, and configurations in this dynamic airborne mission. Together with the IceBridge Science Team and Ice Bridge Science Working Groups, NSIDC is generating value-added products from the IceBridge data streams and other ancillary data. These products will provide simple, useful combinations of IceBridge products and regional maps of important geophysical parameters from other sources. Planned value-added products include gridded products in which new profiles from IceBridge (such as elevation or ice thickness) are combined with existing DEMs or bed maps to produce revised grids; and flight-profile multi-instrument products in which data from several instruments are combined into ice sheet profiles (surface elevation, ice thickness, internal reflection data, bed reflection intensity, and gravimetry), sea ice profiles (freeboard, snow cover, and thickness), and surface data profiles (elevation, slope, roughness, near-surface layering, and imagery).