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The next generation U.S. National Science Foundation Ice Core Facility: supporting state-of-the-art science.

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The National Science Foundation Ice Core Facility (NSF-ICF, fka NICL) is in the process of building a new facility including freezer and scientist support space. The facility is being designed to minimize environmental impacts while maximizing ice core curation and science support. In preparation for the new facility, we are updating research equipment and integrating ice core data collection and processing by assigning International Generic Sample Numbers (IGSN) to advance the “FAIR”ness and establish clear provenance of samples, fostering the next generation of linked research data products. The NSF-ICF team, in collaboration with the US ice core science community, has established a metadata schema for the assignment of IGSNs to ice cores and samples. In addition, in close coordination with the US ice core community, we are adding equipment modules that expand traditional sets of physical property, visual stratigraphy, and electrical conductance ice core measurements. One such module is an ice core hyperspectral imaging (HSI) system. Adapted for the cold laboratory settings, the SPECIM SisuSCS HSI system can collect up to 224 bands using a continuous line-scanning mode in the visible and near-infrared (VNIR) 400-1000 nm spectral region. A modular system design allows expansion of spectral properties in the future. The second module is an updated multitrack electrical conductance system. These new data will guide real time optimization of sampling for planned analyses during ice core processing, especially for ice with deformed or highly compressed layering. The aim is to facilitate the collection of robust, long-term, and FAIR data archives for every future ice core section processed at NSF-ICF. The NSF-ICF is fully funded by the National Science Foundation and operated by the U.S. Geological Survey.