

IceHydro, a new runoff routing model for Greenland ice sheetSebastian Mernild[†]; Glen Liston[†] Los Alamos National Lab., USALeading author: mernild@lanl.gov

Ample evidence indicates the Arctic climate, cryosphere, and hydrological cycle is changing. Long-term temperature observations show warming trends of variable strength throughout the Arctic and Greenland, with an average increase almost twice the global average rate in the past 100 years. Fluctuations in mass balance and freshwater runoff from the Greenland Ice Sheet (GrIS) follow climate fluctuations. Still, the temporal and spatial distribution of freshwater runoff from GrIS and Greenland is weakly understood, even though half of the mass loss from the GrIS originates from surface melting and subsequent freshwater runoff into the ocean (spatially distributed along the coastline), and the other half from iceberg calving. Here, we present the development of a new runoff routing model, IceHydro, for GrIS, a submodel to SnowModel, which will improve our quantitative understanding of the temporal and spatial distribution of freshwater runoff to the ocean. Specifically, in order to address the spatial and temporal distribution of runoff we need to work at the level of individual drainage basins and stream/flow networks within each basin, to track melt water flow from snow-covered ice, snow-free ice, snow-covered land, and rain from snow-free land, to the ocean.