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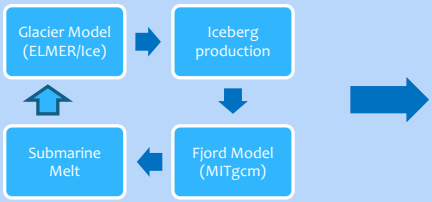
Ice discharge split into solid iceberg production and submarine melt

The overall objective is to develop a coupled glacier-fjord model allowing to separate the ice discharge to the ocean into iceberg production and submarine melting at the glacier front. It will be applied as a test case to Hansbreen-Hansbukta system in Svalbard.

With the increasing impact of the ocean on the glaciers, our model is a good tool for estimating the **share of submarine melting and iceberg production** (calving) **to the Frontal Mass Loss:** calving 54%, submarine melt: 46%. Datasets used in the model are glacier velocity and thickness, temperature and salinity in the fjord obtained in collaboration with the Hornsund station.

The model components



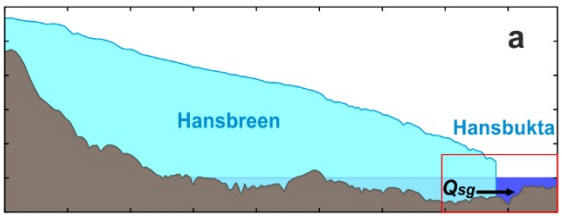
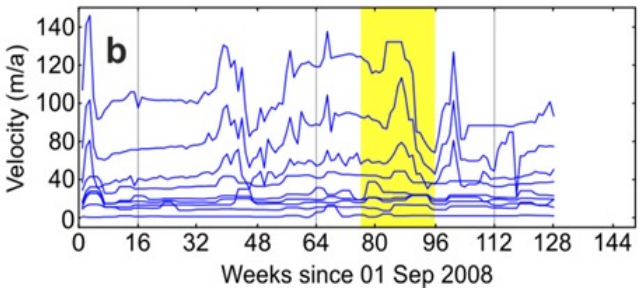


Figure 2. Section of the modelled glacier-fjord system, and the location of the subglacial discharge current (Qsg) entering the fjord waters from underneath the glacier



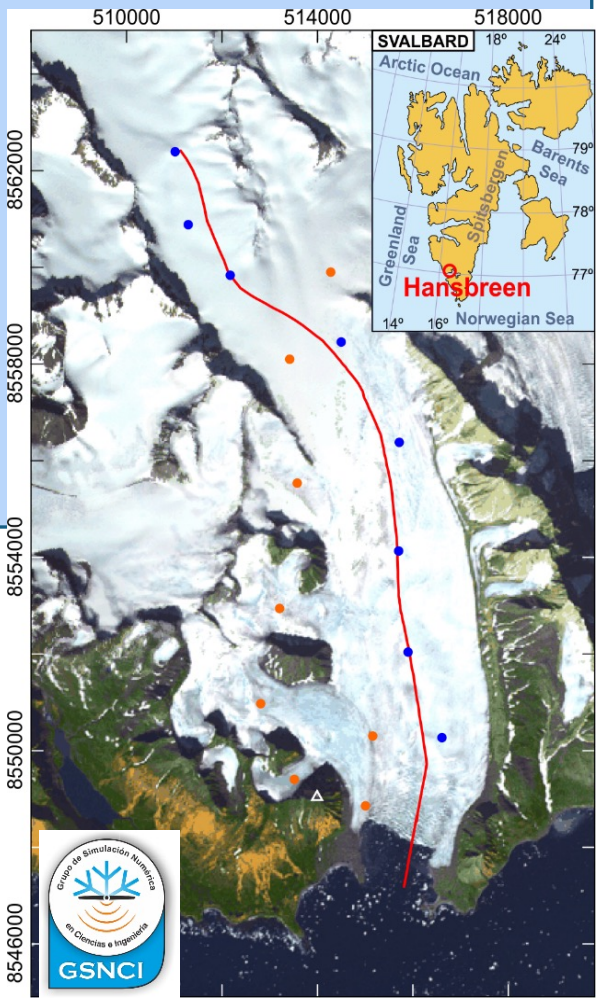


Figure 1. (above) Hansbreen glacier with location of velocity and mass balance stakes and the modelled central flowline.

Figure 3 (right) Ice velocity data at the glacier surface, for the stakes at the central flowline. The highest velocities corrrespond to the stakes closer to the glacier front.

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