Geophysical Research Abstracts
Vol. 20, EGU2018-15237, 2018
EGU General Assembly 2018

Using terrestrial radar interferometry to analyse calving activity

Andrea Walter (1,2), Martin Lüthi (1), and Andreas Vieli (1)

(1) University of Zurich, Geography, Zurich, Switzerland (andrea.walter@geo.uzh.ch), (2) ETH Zurich, VAW, Zürich, Switzerland

Recently, many marine-terminating glaciers of the Greenland ice sheet revealed rapid retreat, thinning and flow acceleration. These glaciers lose about half of their mass by calving, a process which can change on short timescales. Despite their importance for global sea level rise, major limitations in understanding the dynamics of these glaciers remain. To overcome such limitations, especially detailed observational data is needed. Terrestrial radar interferometry provides displacement and topographical data with a high spatial and temporal resolution. Using this technology, we observed an outlet glacier in West-Greenland in one minute intervals with a spatial resolution of 5 meters during four multi-day field campaigns in the summers 2014 to 2017. We use these data to establish detailed calving event statistics which are compared to environmental forcing like tides or weather conditions. By identifying source areas and ice volumes of individual calving events we quantitatively investigate the relationship between calving front geometry, calving rate and potential drivers. We find, for example, substantial differences in calving volume statistics between grounded and floating parts of the glacier front. Comparing the flux of the glacier and the calving volume of the floating part, allows us also to estimate the ice volume calved off below sea level.