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TanDEM-X DEMs and feature-tracking of Helheim and Kangerdlugssuaq glaciers in south-east Greenland

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We use sequences of TanDEM-X acquisitions over 'supersites' Helheim and Kangerdlugssuaq glaciers in south-east Greenland to generate interferometric digital elevation models (DEMs) and to feature-track surface displacement between image acquisitions.
The high spatial resolution, day/night, and cloud-penetrating capabilities of the X-band SAR system enabled the production of more than 20 DEMs for each glacier with a spatial resolution of 8 m or better. The DEMs span the period June 2011 to March 2012, at 11-day intervals, with a few breaks. Time-lapse animations of Helheim DEMs reveal the development of troughs in surface elevation close to the front. The troughs propagate down flow and develop into the rifts from which calving takes place. On both glaciers, regions of high variance in elevation can be identified caused by the transit of crevasses. In addition, on Helheim, a 1 km wide band of high variance adjacent to the calving front may be interpreted as the response to tidal forcing of a partially floating tongue.
In addition to the DEMs we will also present featured tracked high-quality surface velocity fields at a spatial resolution of 2 m coincident with the DEMs. On Helheim these velocity fields indicate a winter deceleration of less than 10% at a point 4 km behind the calving front.