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Intercomparison of ice surface velocity determination using SAR-Interferometry and Feature Tracking

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Satellite remote sensing is one of the most powerful tools to estimate precise area-wide flow velocities with a high spatial resolution as needed for many important glaciological and/or climatic investigations. There are two major methodologies to derive flow velocities from satellite imagery: general matching techniques and interferometric SAR processing. Both methods have different preconditions, vantages and limitations.

Interferometric processing for instance requires coherence between two satellite images which is sometimes not retained, not only over a longer period of time but also for quicker moving objects such as larger ice streams. Matching techniques, in contrast, can be applied over a relatively long period of time and do not require coherence. Even though they depend on trackable features and/or texture, estimated image offsets directly translate into two-dimensional flow velocities. Interferometric SAR processing is only sensitive to changes in the line of sight which makes it difficult to separate directions as well as horizontal and vertical changes.

This presentation will show results for both, matching techniques and interferometric processing applied over parts of the Riiser-Larsen ice shelf and the grounded Vestfjella region. Overlapping areas will be used for an accuracy assessment as well as for further investigations utilizing the vantages of both approaches. The presentation will close with a discussion of what can be expected from a combined analysis, emphasizing the additional information that can be derived, particularly for the grounding zone region and the ice shelf.