



Master Thesis (MA, 30 ECTS)

Glacial movement monitoring at the Pasterze using InSARTrac

Description

The Pasterze, located in the Mölltal, is with 8 km length the largest glacier of the eastern alps. During the last century, not only the volume halved, but also the movement rate of its tongue decreased from about 40 m/year to 7 m/year. The new measurement system InSARTrac allows displacement analysis of this glacier at a much higher resolution than the current yearly measurements which are based on single rock displacements on the ice surface. InSARTrac, is a hybrid measurement instrument combining an interferometric synthetic aperture radar (InSAR) with image based “feature tracking” (FT) for 3D displacement vector assessment.

The goal of this thesis is to gain further insight into intraday glacial movement patterns and to assess the general applicability of InSARTrac, with special focus on glacial monitoring. For data acquisition, approximately four to five weeks of in-field measurements at the Pasterze glacier should be planned during the summer of 2022, requiring alpine experience. Partial support for overnight costs can be provided. The data should be analysed using the software Guardian OpenCV (Python scripting, prior knowledge of advantage, but not required).

Workflow

1. Literature research concerning:
 - a. The formation, size, movement and retrieving rates of glaciers with special focus on the Pasterze
 - b. Displacement analysis using (terrestrial) InSAR
 - c. Feature Tracking for monitoring purposes
2. Performing first tests using InSARTrac to establish knowledge in system handling and data analysis
3. Conduct monitoring at the Pasterze for approximately 4-5 weeks
4. Evaluation and interpretation of the results

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