Comparison of image matching algorithms for rock glacier displacement mapping. A case study for the Laurichard rock glacier, French alps.

Geo 411 - Landschaftsmanagement und Fernerkundung

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1 Introduction

Rock glaciers are distinctive morphological features of high mountain periglacial environments. Their deformation processes are strongly linked to permafrost degradation (Haeberli et al. 2010). Thus, research of deformation velocities of rock glaciers does not only provide insights into periglacial morphology but also in time evolution of permafrost. Several authors have used rock glaciers as proxies for permafrost presence/absence in permafrost distribution models (Boeckli et al. 2012,Marcer et al. (2017)).

In recent years, multi-method approaches have been used in this field of research; Buchli et al. (2018) combine laser scanning, terrestrial radar and in-situ measurements at the Furggwanghorn rock glacier in Switzerland. Remote sensing data, especially radar interferometry (Barboux et al. 2015), optical imagery and laser scanning (L. U. Arenson, Kääb, and O'Sullivan 2016) have become more and more common for rock glacier deformation analysis.

- Photogrammetry (besides other remote sensing data: InSAR)
- Image matching methods: History: General and used methods
- IMCORR and bUnwrapJ
- What did we do in short
- What did we want to achieve?

2 Study Area

The Laurichard rock glacier is situated in the French Alps, with an approximately 800m long and 100-200m wide tounge flowing from south to north-east. Due to its morphological features it can be considered an active rock glacier (Bodin et al. 2018). Especially, hillshades generated from available digital elevation models (DEMs) exhibit scarps, oriented perpendicular to the flow direction as well as a steep rising frontal lobe.

Since the beginning of the 1980s, the Laurichard rock glacier has been subject to in-situ and

remote sensing photogrammetry research. Refer to Bodin et al. (2018) for the most current research work as well as for an overview over the history of site studies.

3 Data and Methods

3.1 Used Data

3.2 IMCORR

3.3 ImageJ BUnwrapJ

4 Results

5 Discussion

6 Conclusion

7 Outlook (or: Conclusion and Outlook?)

References

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