Research Networking Programmes

Short Visit Grant ☒ or Exchange Visit Grant ☐

(please tick the relevant box)

Scientific Report

The scientific report (WORD or PDF file – maximum of eight A4 pages) should be submitted online within one month of the event. It will be published on the ESF website.

Proposal Title: Comparison of fabric analysis of snow samples by Computer-Integrated Polarization Microscopy and Automatic Ice Texture Analyser

Application Reference N°: 7154

1) Purpose of the visit

At the SLF, we are currently developing a computer-integrated polarization microscope for the measurement of the snow fabric. To process such measurements, we are adapting the image proceeding and analysis software SMX, initially developed for non-porous media, for snow. Our goal is thus to have a new method (SLF's method) for the investigation of the snow fabric.

In this context, the aim of the short-term exchange was the comparison of the fabric results obtained by the SLF's method and by the Automatic Ice Texture Analyzer (AITA) of LGGE.

2) Description of the work carried out during the visit

I spent two days in March 2015 at the LGGE with Maurine Montagnat to learn how the AITA works (image acquisition, image processing) and how to use it (setting up in cold lab). Then, I brought the AITA to the SLF, set it up in our cold lab, and performed measurements of the fabric of the snow samples from Antarctica. From each snow sample, a thin section of 100 µm is cut using a polycut in

cold room at -15°C. This operation is delicate and time consuming. The thin section is then set up in the AITA, also operating in the cold room, for the measurement. A total of 30 measurements on different samples were done. These data will be compared latter to the one that I will obtain using the SLF's method on the same snow samples. I brought the AITA back to the LGGE after the measurement campaign. The AITA was then set up in the LGGE cold-lab, with the help of Maurine Montagnat.

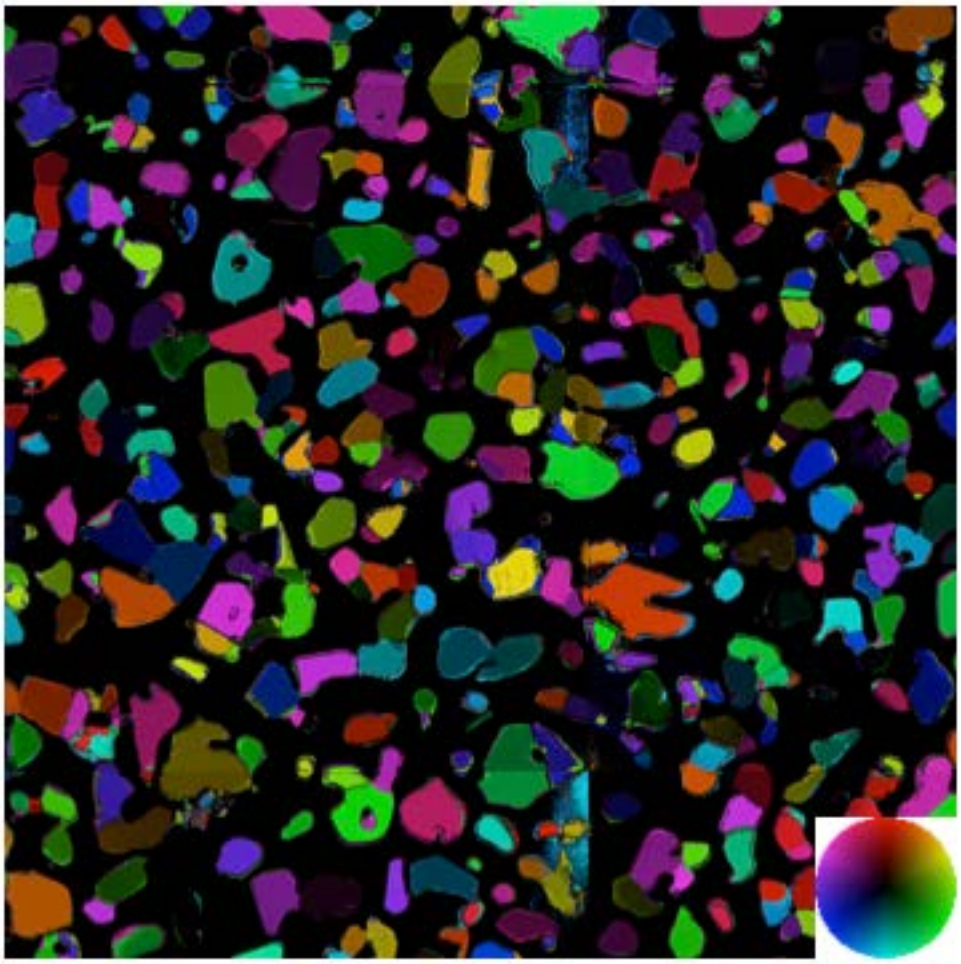
Short visit details:

- 22 march: travel by private car from Davos to Grenoble.
- 23 and 24 march: stay at the LGGE
- 25 march: travel by private car from Grenoble to Davos with the AITA.
- 29 march - 17 april: AITA at the SLF, measurements campaign
- 17 april: travel by private car from Davos to Grenoble with the AITA
- 18 april: travel by private car from Grenoble to Davos.

Length of the stay at the host institute LGGE (including travel days): 6 days.

3) Description of the main results obtained

The fabric of around 30 samples of different snow types were obtained. The figure below shows a typical result: a thin section of snow analyzed by the AITA. The ice grains of snow are shown in color, while the interstitial air is shown in black. The colors indicate the azimuth of the c-axis of each ice grains, as defined by the color wheel.



4) Future collaboration with host institution (if applicable)

I will continue to collaborate with M. Montagnat, LGGE. The results obtained thanks to the visit grant will be statistically analyzed with her help. Moreover, two others measurement campaigns with the AITA are planned for the coming summer and will include M. Montagnat.

5) **Projected publications / articles resulting or to result from the grant *(ESF must be acknowledged in publications resulting from the grantee's work in relation with the grant)***

We plan to write an article "New method for the measurements of snow fabric based on Computer-Integrated Polarization Microscopy: comparison with the Automatic Ice Texture Analyser".

6) Other comments (if any)