



Abstract ID : 42

xLASM: A new extra-Large Area Scanning Macroscope/microtome system to analyse the microstructure of firn and ice cores up to 55 cm in length

Content

The microstructure (i.e. the grain boundary network, grain size, grain shape, grain boundary curvature and length, ...) provides important, basic information about the processes involved in the compaction of polar firn and in the deformation/flow of ice. The preparation of the samples is time consuming and raises the questions how representative the relatively few samples are. Standard microstructural analysis is based on section lengths not larger than 10 cm until now.

In our poster we introduce the development of a microtome and a LASM system to analyse full core sections up to a length of 55 cm and 10 cm in width in a resolution of 5 μm . Both instruments, the microtome and xLASM are computer controlled. Special ice core holders were developed to fulfil the needed precision for moving the microtomed/polished core sections between the two instruments. To obtain the high resolution (5 $\mu\text{m}/\text{pixel}$) the surface of a core is scanned three times in stripes of 42 mm in width later stitched together to a single image. First results obtained from a firn core (eg18s6) and a deep ice core (NEEM IS19/20) are presented. The precision of both instruments is so high that the 3-dimensional reconstruction of the grain shape seems possible over the full length of 55 cm. The large images require new techniques to process the images of the obtained images in an efficient way.

Primary authors: FREITAG, Johannes (AWI); FRENZEL, Andreas (AWI); KIPFSTUHL, Sepp (Alfred Wegener Institute, Bremerhaven, Germany); LAMOTT, Andre (Schäfer+Kirchhoff GmbH); MIGUEL, Moreno (Physics of Ice, Climate and Earth, Copenhagen); DAHL-JENSEN, Dorthe (PICE); NIELSEN, Karl-Emil (PICE); WEIKUSAT, Ilka (AWI)

Presenter: KIPFSTUHL, Sepp (Alfred Wegener Institute, Bremerhaven, Germany)

Track Classification: Progress in proxy development and interpretation