



Abstract ID : 241

## A snapshot on the buildup of the stable water isotopic signal in the upper firn column

### Content

The isotopic composition of stable water isotopologues in firn and ice cores provides valuable information on past climatic conditions. Because of uneven accumulation and post-depositional processes, time series derived from adjacent cores differ significantly and do therefore not directly reflect the temporal evolution of the precipitated snow isotopic signal. Characterization of isotope-profile building processes is hence needed. By combining digital elevation models of the snow surface and repeated snow sampling of a transect at a typical ice-coring site, we are able to visualize the buildup of the snow column across one season. To this end, 30 cm deep profiles were sampled in 2 cm resolution on six dates throughout the summer at 20 nearby locations in the accumulation zone of the Greenland Ice Sheet in northeast Greenland. Near-daily photogrammetry provided snow height information for the transect from the same study area. This unique dataset demonstrates the buildup of the strong horizontal heterogeneity with some locations showing winter snow (low isotopic values) and others with summer snow (high values) at the same depth. The spatial variability can be attributed to the observed strong influence of the prevailing surface features on the location and the amount of newly accumulated snow. Our dataset suggests that this uneven accumulation has a major impact on the imprint of the atmospheric temperature signal in the snow and firn column, and also allows for quantification of how post-depositional modifications influence the snow column after deposition.

**Primary author:** ZUHR, Alexandra M. (Alfred-Wegener Institute Helmholtz-Center for Polar- and Marine Research)

**Co-authors:** WAHL, Sonja; STEEN-LARSEN, Hans Christian (University of Bergen); HÖRHOLD, Maria (Alfred-Wegener-Institute Helmholtz-Zentrum für Polar- und Meeresforschung); MEYER, Hanno (AWI Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research); LAEPPLÉ, Thomas (AWI, Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung)

**Presenter:** ZUHR, Alexandra M. (Alfred-Wegener Institute Helmholtz-Center for Polar- and Marine Research)

**Track Classification:** Progress in proxy development and interpretation