Geophysical Research Abstracts
Vol. 16, EGU2014-11641, 2014
EGU General Assembly 2014

Recent North West Greenland climate variability documented by NEEM shallow ice cores

Valérie Masson-Delmotte (1), Hans-Christian Steen-Larsen (1), Trevor Popp (2), Bo Vinther (2), Hans Oerter (3), Pablo Ortega (1), Jim White (4), Anais Orsi (1), Sonia Falourd (1), Benedicte Minster (1), Jean Jouzel (1), Amaelle Landais (1), Camille Risi (1), Martin Werner (3), Didier Swingedouw (1), Xavier Fettweis (5), Hubert Gallée (6), Arny Sveinbjornsdottir (7), Hera Gudlaugsdottir (7), and Jason Box (8)

(1) LSCE, CEA-CNRS-UVSQ/IPSL, Gif sur Yvette cédex, France (valerie.masson@lsce.ipsl.fr, 33169087716), (2) Ice and Climate Center, Niels Bohr Institute, Copenhagen, Denmark, (3) AWI Bremerhaven, Germany, (4) INSTAAR, Boulder, USA, (5) Université de Liège, Belgique, (6) LGGE, UJF-CNRS, St Martin d'Hères, France, (7) Institute of Earth Sciences, Reikjavik, Iceland, (8) GEUS, Copenhagen, Denmark

Short water stable isotope records obtained from NEEM ice cores (North West Greenland) have been shown to be sensitive to NW Greenland temperature variations, and sea-ice extent in the Baffin Bay area (Steen-Larsen et al, JGR, 2011), with maximum snowfall deposition during summer, therefore providing information complementary to other Greenland ice core records.

At the NEEM deep drilling camp, several snow pits and shallow ice cores have been retrieved and analysed at high resolution (seasonal to annual) for water stable isotopes using mass spectrometry and laser instruments in order to document recent climate variability, complementing and facilitating the interpretation of the long records obtained from the deep ice core which extends back to the last interglacial period (NEEM, Nature, 2013).

The different pits and shallow ice core records allow to document the signal to noise ratio and to produce a robust stack back to 1750, and up to 2011. The stack record of annual mean d18O depicts a recent isotopic enrichment in parallel with the Greenland warming inferred from coastal weather stations, and shows that many features of decadal variations are in fact well captured by the low resolution profiles measured along the deep ice core data. Recent variations can therefore be compared to long-term trends and centennial variations of the last Holocene, documented at about 5 year resolution.

For the past decades to centuries, the NEEM isotopic records are compared with estimations and simulations of local temperature for different seasons, results from NEEM borehole temperature inversions, d18O records from other Greenland ice cores, large scale modes of variability (NAO and AMO) and with simulations from atmospheric general circulation models equiped with water stable isotopes.