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# Interglacial Greenland aerosol deposition: comparison of continuous high resolution chemical ice core records from the Eemian and Holocene

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Earth's climate system has been oscillating over the last million years between cold glacials and warm interglacials, leaving the imprints of their climate states in form of isotopes variations and chemical impurities in polar ice caps. In the course of the North Greenland Eemian Ice Drilling (NEEM) project, the NEEM ice core has been entirely analysed in very high depth resolution with a Continuous Flow Analysis (CFA) system for the concentrations of chemical aerosol tracers in the ice. Only in the brittle ice zone (600-1100 m depth equivalent to the time interval 3000-8000 years before present) most of the ice had to be discarded due to multifractured core material.

Based on the unique reconstructed age scale to unfold the stratigraphically disturbed part from about 2200 m depth downwards (NEEM community members, Nature, 2013), we are able to present the first Greenland chemistry record over the entire last interglacial, the so called Eemian period (about 128'000 to 115'000 years ago). As the Eemian is believed to have been 4 to 8 degrees C warmer than the modern climate, it can be used as an analogue for our present warming climate and, thus, contributes to a better understanding of processes causing natural variations.

By means of the chemistry records we are able to assess the natural variability of Greenland Eemian climate and gain insight in its biogeochemical state. Here, short-term variability as well as long term trends of soluble chemical impurities in the Eemian are investigated and compared with those in the Holocene. Changes of organic processes in soils and biomass burning for example are assessed through soluble ammonium and nitrate concentrations. In comparison to the Holocene, ammonium concentrations were about 25% higher during the Eemian. Nitrate, on the other hand, shows about 25% lower concentrations. Sodium concentrations, reflecting changes in sea salt aerosol, are about 35% lower during the Eemian than during the Holocene. Calcium, generally regarded as a long range transport proxy, shows similar concentration during both periods.