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Comparing Interglacial climates: a case study of Greenland ice core impurities

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The previous interglacial period, the Eemian, that approximately covered the time interval 130-115 kyr BP, is known to have had a warmer climate than present day climate. Although the Eemian period was without anthropogenic influence, the Eemian climate may in some regards resemble a future climate, if global warming continues as predicted by IPCC. A full understanding of the climate conditions during this 'natural' warm interglacial period is therefore of great interest. The NorthGRIP ice core from Central Greenland continuously covers the past 123 kyr, and it thus contains several thousand years of ice deposited during the Eemian period. In this case study we will measure the impurity content of an Eemian section of the NorthGRIP ice core and make comparison to well-known levels of the Holocene. We will analyze the ice core for its content of soluble sodium (mainly deriving from sea salt), soluble ammonium (related to biological processes and biomass burning events), insoluble dust particles (basically transported from Asian deserts to Greenland), and the electrolytic melt water conductivity (which is a bulk signal for all ionic constituents). The measurements will be made on a newly developed Continuous Flow Analysis instrument in high temporal resolution, and we attempt to determine if annual layers are present in the NorthGRIP Eemian ice.