Geophysical Research Abstracts
Vol. 18, EGU2016-3707, 2016
EGU General Assembly 2016

How warm was Greenland during the last interglacial period?

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The last interglacial period (LIG, ∼129-116 thousand years ago) provides the most recent evidence for the response of Greenland and Antarctic ice sheets to polar warming above pre-industrial level, and a valuable test bed for ice sheet models. Key constraints on past changes in both ice sheet topography and surface temperature are derived from Greenland ice cores. The large warming estimated from the recent NEEM ice core drilled in northwest Greenland (8 ±4°C above pre-industrial) together with the evidence for limited local ice thinning have led to the "NEEM paradox", suggesting more stability of the ice sheet than simulated by ice flow models in response to such large warming. Here, we provide a new assessment of the LIG warming using ice core air isotopic composition (d15N) together with available relationships for Greenland between accumulation rate and temperature. The temperature at the upstream NEEM deposition site is estimated to be between -20°C to -24°C which is consistent with the 8±4°C warming relative to pre-industrial previously determined from water isotopic records measured on the NEEM ice, although we feel the lower end of this range to be more likely. Moreover, we show that under such warm temperature, melting of snow probably led to a significant firn shrinking by 15 m. We show that confirmation of this high temperature range for the LIG in Greenland is difficult to reconcile with climate modeling experiments