## Observing the isotopic water vapor above the snow surface in NW-Greenland at NEEM

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As part of the isotope surface program at NEEM - the deep drilling project in NW Greenland (77.45 N 51.05 W, 2484 m a.s.l.) - water vapour isotope analyzers were deployed during the field season of 2009 and 2010. Both the dD and d18O composition of the water vapor were measured in situ. We present here the measurements carried out during the 2010 field season for more than two months during June, July and August. The measurements were conducted in the clean air zone upwind from the NEEM camp. A 13-meter tower was erected and a system was sat up to take in air from six different levels of respectively 1.0, 1.5, 3.0, 7.0, 10.0, and 13.0 meters height above the snow surface. The isotopic composition of the vapor was measured for 15 minutes at each level before shifting to the next level. The isotopic water vapour was measured in continuous mode using a Picarro Inc. and a Los Gatos Inc. water vapor analyzer. As part of the field deployment a comparison between the two different isotopic water vapor analyzers were carried out together with a validation of both the long and short-term stability of the systems. We conclude from these tests that both analyzers present a large reproducibility and stability, which gives merits to the obtained results. On the daily time-scales we observe a clear diurnal cycles in humidity as well as in the isotopic composition of the water vapor above the snow surface with amplitude of about 15 o/oo in dD. This indicates a large flux of vapor from the snow surface to the atmosphere during the daily warming and reverse flux during the daily cooling. Over the complete field deployment we observe relative stable d-excess (d-excess = dD -8xd18O) level of about 20 o/oo only to be interrupted by intrusion of shorter periods lasting about 1-2 days with very high d-excess levels of up to 50 o/oo. We perform backtrajectory simulations and find that for periods with high d-excess level the air mass originates from the Arctic Ocean above the North American Continent.