



Sampled precipitation and atmospheric water vapour from NEEM – The North Greenland Eemian Ice Drilling

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To interpret the climatic signal obtained from stable isotope records from ice cores, it is important to understand the processes governing the snow-atmosphere interaction and the processes which bring moisture from the source to the ice core site. This requires sampling of precipitation and water vapour above the snow, which is not often performed simultaneous at ice core drill sites.

As a side project under NEEM - a new deep drilling project in NW Greenland (77.5N, 50.9W, 2484m a.s.l.) - precipitation and atmospheric water vapour were sampled in the season of 2008 from end of June to end of August on a sub-event and sub-daily basis, respectively. We present here the results of δD and $\delta^{18}O$ measurements on all samples collected.

The precipitation samples were collected on a table during snow events about every three hours. Atmospheric water vapour was sampled at three meters height above the snow surface and was collected using cryogenic cooling. The atmospheric water vapour was collected every morning and evening.

The water vapour samples reveal large sub-daily variations of up to 30 per mill change in δD during 24 hours and a spread of 100 per mill in δD during the season. During precipitation events it is found in general that the isotopic composition of the atmospheric water vapour is in equilibrium with that of the precipitating snow.

It is furthermore found that plotting δD vs. $\delta^{18}O$ for the water vapour samples and for the precipitation samples reveal a good linear correlation. For the sampled water vapour the slope is 6.9 while for the precipitation samples the slope is 7.6. The slope of the precipitation samples is comparable to the slope of the summer snow retrieved from a shallow firn core drilled in the vicinity.