Atlantic Meridional Overturning Circulation around Heinrich-Stadials 1 & 2

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The Atlantic Meridonial Overturning Circulation (AMOC) is a major component of the earth`s climate system and affects the heat distribution and carbon cycle at higher latitudes. Therefore, it is important to understand the underlying processes that change its strength and structure. This study focusses on how excessive freshwater input through abrupt melting of continental ice sheets may affect its overturning vigor. This can be tested by investigating its behavior during extreme iceberg discharge events into the open North Atlantic, the so called Heinrich-Events [H. Heinrich 1988; S. R Hemming 2004].

Sedimentary $^{231}Pa/^{230}Th$ has been increasingly used as a kinematic circulation proxy in the Atlantic Ocean over the past decade [McManus *et al*. 2004; Bradtmiller *et al*. 2014; Boehm *et al*. 2015]. In general, a $^{231}Pa/^{230}Th$ signal close to the production ratio of 0.093 points to a weakened or suppressed AMOC, while ratios below indicate export of ^{231}Pa out of the Atlantic and hence an active AMOC.

Here we present a compilation of $^{231}Pa/^{230}Th$ measurement results from numerous sediment cores across Heinrich Stadials 1 and 2 (approx. 17 ka BP and 24 ka BP respectively).

Since ^{231}Pa has a pronounced affinity to biogenic opal, $^{231}Pa/^{230}Th$ ratios above the production ratio may indicate the influence of particle flux composition. Therefore our data set is accompanied by measurements of biogenic opal concentrations.

Preliminary qualitative results from the new data set point to a different AMOC strength during Heinrich Stadial 1 and 2. The impact of iceberg discharges on the North Atlantic deep-water formation appears stronger during Heinrich-Stadial 1 compared to Heinrich-Stadial 2.