



Continuous water isotope measurements during evaporation processes in the Atlantic realm

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Since July 2015, water stable isotopes (HDO and H_2^{18}O) have been continuously measured on board of the research vessel Polarstern, both in atmospheric vapour at 30 meters height and on a daily basis in surface ocean water samples. Until now, the dataset covers two Arctic seasons in summer 2015 and 2016 including measurements up to the North Pole, one Antarctica season from December 2015 to April 2016 and two Atlantic transits crossing the equator in November 2015 and April 2016. This global coverage of observations allows us to evaluate the isotopic composition of moisture evaporated from Atlantic surface waters in a broad range of climatic regimes.

Combining liquid and vapour isotopic measurements allows testing the validity of the often used closure assumption, which assumes the equality between the boundary layer vapour isotopic composition and the isotopic composition of the evaporative flux, over a broad latitudinal region.

Furthermore, our isotope measurements at the source of evaporation enable us to investigate the influence of local meteorological parameters, such as relative humidity at the sea surface, sea surface temperature and wind speed, on the deuterium excess signal of the near-surface moisture.