

Local and regional influences on the rainfall stable isotopes in north-eastern Borneo

H. Sodemann (1,2), J. Adkins (2), J. Lee (3), J. Worden (3)

(1) Norwegian Institute for Air Research, Kjeller, Norway.

(2) Geological and Planetary Sciences, Caltech, Pasadena, USA.

(3) Jet Propulsion Laboratory, Caltech, Pasadena, USA.

Borneo is located in a key region of the tropical atmospheric water cycle. Situated near the West Pacific Warmpool, and influenced by the progression of the ITCZ and the Asian monsoon system on the seasonal time scale, and ENSO variability on the interannual time scale, the stable isotopes in precipitation in the region contain information on seasonal and climate variability. In this study, we investigate the factors influencing the present-day seasonality and interannual variability of moisture sources and transport to north-eastern Borneo near a site where cave deposits have been retrieved for paeloclimate studies.

We apply a state-of-the-art particle tracking method that includes the influence of convective processes to trace water vapour leading to precipitation to investigate the factors shaping the observed precipitation isotope variability in Borneo and the surrounding areas. The method yields the general moisture transport characteristics of the region, as well as their modulation during recent ENSO cycles. In addition, ECMWF analysis data, deuterium observations from the TES satellite instrument and rainfall parameters from CloudSat are used to determine which processes are most likely to be relevant for the observed precipitation isotope seasonality.