



A 1-year long event-based isotopic composition of precipitation in Bolivia: observations and modelling

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Over the last years, an increasing number of studies combining both observations and modelling works has been carried out to determine and to decipher the different climate controls on the isotopic composition of tropical precipitation. Most of those studies have dealt with seasonal to interannual timescales.

We present here the isotopic composition of precipitation collected on an event basis from September 1999 to August 2000 in the Zongo Valley (16 degrees S, 67 degrees W) from 945 to 4750 m. The delta records are fairly similar from one station to another and clearly show an intra-month variability superimposed on the seasonal cycle. Conversely, precipitation distribution and occurrence of extremes largely differ from one station to another, revealing that local precipitation has no control on delta. We thus explore potential regional controls (origin of airmasses, precipitation history along trajectories) using back-trajectories calculations. Deuterium excess available from one station is also examined as a proxy of water vapor recycling.

Based on a simulation zoomed over South America (60km resolution) and nudged by reanalyzed winds performed with the LMDZ-iso model, which is able to reproduce well the observations in the Zongo Valley, we examine in deeper details the climate controls that could explain the strong intra-seasonal variations in the isotopic composition of precipitation.