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The isotopic δD(H_2O) variability in precipitation over the Sub-Saharan Africa

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The isotopic composition of precipitation is a useful tool to better understand the atmospheric water cycle and to reconstruct past climate, for example to understand the changes in the evolution of the West African monsoon (WAM) system in present day and in the past. A better understanding of the factors controlling the isotopic composition from present-day observations is therefore valuable to understand the past WAM variability.

In the present work we use the observations from the Global network of Isotopes in Precipitation (GNIP) database of δD(H_2O) and δ^{18}O(H_2O), and examine the isotopic composition of precipitation over the Sub-Saharan Africa. In regions with sparse observational coverage, the Regionalized Cluster-based Water Isotope Prediction (RCWIP) Model is included to complement the measurements and provide a more complete overview, the observed isotopic compositions in precipitation are compared with the output from stable water isotope enabled model. The focus is on the relation between the long-time variability of WAM precipitation and how this is reflected in the δD-ratio. To identify dependence of water isotopes on local climate, we compare the arid region Sahara with WAM region to gain a better understanding for the evolution of the precipitation patterns and the related δD-variability.