Geophysical Research Abstracts
Vol. 20, EGU2018-737-1, 2018
EGU General Assembly 2018


# Use of stable isotopes of precipitation at different time scales to understand the regional climatic circulation pattern over the Gulf of Guinea region, humid tropical area: characterization test from Douala rainwater Dataset

Bertil Nlend (1,2), Helene Celle-Jeanton (2), Frederic Huneau (3,4), Benjamin Pohl (5), Pascal Roucou (5), Pierre Camberlin (5), Beatrice Ketchemen-Tandia (1), and Jacques Etame (1)

(1) University of Douala, Department of Earth Sciences, Cameroon (nlendbertil@yahoo.fr), (2) University of Franche-Comte, UMR 6249 CNRS Chrono-Environnement, Besançon, France (helene.jeanton@univ-fcomte.fr), (3) University of Corsica, Hydrogeology Dept., Corte, France (huneau@univ-corse.fr), (4) CNRS UMR 6134 SPE, Corte, France, (5) Centre de Recherches de Climatologie, UMR 6282 Biogéosciences CNRS/UBFC; Dijon, France (benjamin.pohl@u-bourgogne.fr)

The Gulf of Guinea region is one of the rainiest areas in the world. The city of Douala (Cameroon), located in the northern part of the Guinean coast, receives moisture inputs directly from the Atlantic Ocean and the mean annual rainfall is reaching 4000 mm. However, only limited knowledge does exist on the impact of relief morphology and regional atmospheric circulation patterns on the precipitation origin, transport, and isotopic composition. This study analyzes the influence of local and regional climatic factors on the stable isotopic composition of rainfall in Douala. Monthly rainfall samples have been collected from 2006 to 2016 and daily rainfall samples from March to August 2017.

At a monthly scale, Local Meteoric Water Lines (LMWL) have been established. At this timescale, there is no correlation between isotope ($\delta$18O) and local climatic settings: precipitation amount, air temperature and vapor pressure. The high values of deuterium excess suggests that an isotopically fractionated evapotranspiration flux contributes to the atmospheric water balance over the region. Completing these first observations, the investigation at a daily scale allows observing the northward migration of the Intertropical Convergence Zone (ITCZ). The backward trajectories indicate the strong influence on the origin and the circulation of air masses. Four main moisture transport mechanisms can be implied: the Upper level Jet streams, the circulation of coastal cells linked to sea breeze effects, localized convection events and arrival of continental moisture.