

## The use of isotopes to constrain the source of groundwater recharge in areas with variable rainfall: Case study of Cameroon.

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The use of stable isotopes to constrain the source of groundwater recharge in areas with variable rainfall: Case study of Cameroon.

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The Guinean monsoon and harmattan air masses are the pristine sources of meteoric events in Cameroon. Along a S-N transect, the meteoric path has contrasting relief (0-4095 masl), rainfall (300-9000 mm/yr), climate (humid to Semi-arid) and vegetation (forest to steppe). These factors generate 32,200 million meter cube of water resources in Cameroon. Out of this total, 6,300 million meter cube occurs in the semi-arid north with 3,600 million meter cube and 2,700 million meter cube as surface water and groundwater respectively. While 25,900 million meter cube occurs in the humid south with 22,900 million meter cube and 3000 million meter cube as surface and ground waters respectively. The occurrence of almost equal volume of groundwater in such contrasting climatic zones is the basis of this investigation with objectives to: 1) Attempt an isotopic characterization of precipitation in Cameroon and 2) Trace which precipitation recharges groundwater in Cameroon. Plots of mean delta values of oxygen-18 and deuterium in precipitation and groundwater in previous studies and this study suggest that precipitation could be tentatively classified into 3 types: type A (oxygen-18= +1.5 to -1.5 per mil and deuterium= +10 to -0.7 per mil); type B (oxygen-18= -3.1 to -5.2 per mil and deuterium= -19.4 to -35 per mil); and type C (oxygen-18= -7 to -51.6 per mil). The type A is common in Far North Cameroon, the type B occurs mostly within the forest and savannah zones, and type C seems diagnostic to 1500-4095 masl on Mt Cameroon. Only category B evidently recharges ground waters in Cameroon.