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Estimation of Residence Times and Recharge Area of Groundwater in the Moulares Mining Basin by Using Carbon and Oxygen Isotopes (South Western Tunisia)

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Author(s)

Younes Hamed, Moncef Zairi, Wassim Ali, Hamed Ben Dhia

ABSTRACT

Radiogenic carbon (^{14}C) of the DIC (Dissolved Inorganic Carbon) and oxygen-18 were used to understand the hydro-dynamic functioning of the multilayer aquifer system in the Moulares mining basin, southern Tunisia. The results of this study permits identify two groundwater types. A- an old paleoclimatic groundwater, marked by low carbon-14 (^{14}C) activities. B - a recent groundwater, was distinguished by relatively high carbon-14 activities. In addition to these two water types, other groundwater, indicating a mixing effect, is resulting presumably from upward movement from the deeper groundwater. Based on ^{14}C activity and the piston flow type theory the groundwater residence time varies from 5 Kyear to 35 Kyear. Carbon-14 activity and oxygen-18 in Groundwater are active since Mio-Plio-Quaternary and Upper Cretaceous aquifers lead to the identification of paleorecharged water probably during Late Pleistocene and Early to Middle Holocene. The water feedings of these aquifers are mainly provided by infiltration of precipitations, infiltration of irrigation water, lateral feeding from cretaceous relieves from the South and the North and along recent and fossil drainage networks that constitute major fresh water sources in groundwater tables.

KEYWORDS

Carbon and Oxygen Isotopes, Residence Time, Paleo-Recharge, South-Western Tunisia

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