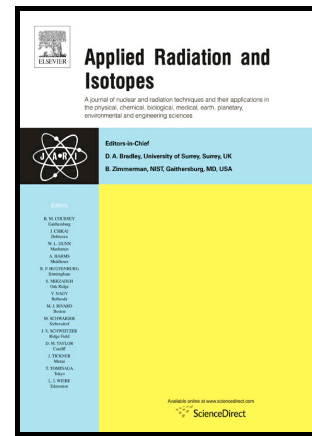


Author's Accepted Manuscript

Assessment of hydrochemical processes and groundwater hydrodynamics in a multilayer aquifer system under long-term irrigation condition: A case study of Nefzaoua basin, southern Tunisia

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PII: S0969-8043(16)30009-4
DOI: <http://dx.doi.org/10.1016/j.apradiso.2016.01.009>
Reference: ARI7369

To appear in: *Applied Radiation and Isotopes*

Received date: 2 March 2015
Revised date: 12 December 2015
Accepted date: 6 January 2016

Cite this article as: M. Tarki, M. Ben Hammadi, H. El Mejri and L. Dassi Assessment of hydrochemical processes and groundwater hydrodynamics in multilayer aquifer system under long-term irrigation condition: A case study of Nefzaoua basin, southern Tunisia, *Applied Radiation and Isotopes* <http://dx.doi.org/10.1016/j.apradiso.2016.01.009>

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**Assessment of hydrochemical processes and groundwater
hydrodynamics in a multilayer aquifer system under long-term irrigation
condition: a case study of Nefzaoua basin, southern Tunisia**

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Abstract

The hydrochemical and isotopic investigation of the Nefzaoua aquifer system demonstrates that groundwater mineralization is controlled by natural and anthropogenic processes including water-rock interaction and irrigation return flow. It identifies all of the water bodies that flow within the aquifer system and their circulation patterns. The isotopically depleted paleowaters, identified within the deep and intermediate aquifers, undergo significant enrichment by evaporation during irrigation and recharged the shallow aquifer by return flow. Subsequently, they infiltrate to the intermediate aquifer which receives also rainfall modern recharge.

Keywords: Hydrochemistry; Environmental isotopes; Nefzaoua aquifer system; Southern Tunisia.

1. Introduction

In arid and semi arid region, agricultural policy has been largely determined by considerations of food security and self-sufficiency. Even in areas with insufficient rainfall, irrigation is practiced to ensure a good crop development. In 2009, the most recent year for which global data are available from the United

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