

Accepted Manuscript

Residence time, mineralization processes and groundwater origin within a carbonate coastal aquifer with a thick unsaturated zone

S. Santoni, F. Huneau, E. Garel, V. Vergnaud-Ayraud, T. Labasque, L. Aquilina, J. Jaunat, H. Celle-Jeanton

PII: S0022-1694(16)30352-3

DOI: <http://dx.doi.org/10.1016/j.jhydrol.2016.06.001>

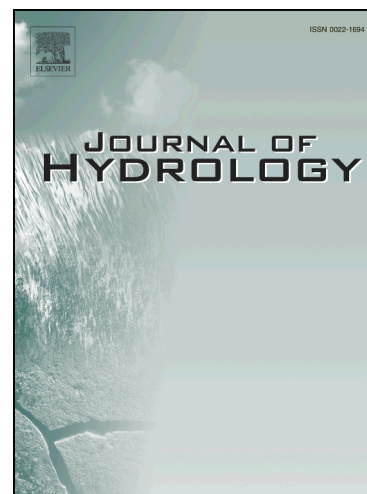
Reference: HYDROL 21319

To appear in: *Journal of Hydrology*

Received Date: 26 October 2015

Revised Date: 7 April 2016

Accepted Date: 1 June 2016



Please cite this article as: Santoni, S., Huneau, F., Garel, E., Vergnaud-Ayraud, V., Labasque, T., Aquilina, L., Jaunat, J., Celle-Jeanton, H., Residence time, mineralization processes and groundwater origin within a carbonate coastal aquifer with a thick unsaturated zone, *Journal of Hydrology* (2016), doi: <http://dx.doi.org/10.1016/j.jhydrol.2016.06.001>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Residence time, mineralization processes and groundwater origin within a carbonate coastal aquifer with a thick unsaturated zone

S. Santoni^{1,2}, F. Huneau^{1,2}, E. Garel^{1,2}, V. Vergnaud-Ayraud³, T. Labasque³, L. Aquilina³, J. Jaunat⁴, H. Celle-Jeanton⁵

¹Université de Corse Pascal Paoli, Faculté des Sciences et Techniques, Laboratoire d'Hydrogéologie, Campus Grimaldi, BP 52, F-20250 Corte, France

²CNRS, UMR 6134, SPE, F-20250 Corte, France

³OSUR, Géosciences Rennes, UMR 6118, CNRS/Université Rennes-1, F-35042 Rennes, France.

⁴Université de Reims Champagne-Ardenne, EA 3795 – GEGENAA, 2 esplanade Roland Garros, F-51100 Reims, France.

⁵Université de Franche-Comté, UFR Sciences et Techniques, CNRS UMR 6249 Chrono-Environnement, 16 route de Gray, F-25 030 Besançon Cedex, France

Abstract

This study aims at establishing groundwater residence times, identifying mineralization processes and determining groundwater origins within a carbonate coastal aquifer with thick unsaturated zone and lying on a granitic depression. A multi-tracer approach (major ions, SiO₂, Br⁻, Ba⁺, Sr²⁺, ¹⁸O, ²H, ¹³C, ³H, Ne, Ar) combined with a groundwater residence time determination using CFCs and SF₆ allows defining the global setting of the study site. A typical mineralization conditioned by the sea sprays and the carbonate matrix helped to validate the groundwater weighted residence times from using a binary mixing model. Terrigenous SF₆ excesses have been detected and quantified, which permits to identify a groundwater flow from the surrounding fractured granites towards the lower aquifer principally. The use of CFCs and SF₆ as a first hydrogeological investigation tool is possible and very relevant despite the thick unsaturated zone and the hydraulic connexion with a granitic environment.

Key words

Residence time, CFCs, SF₆, coastal aquifer, flow pattern, Corsica

1. Introduction

The residence time of groundwater is a fundamental parameter for the understanding of hydrogeosystems functioning (McCallum et al., 2014; Suckow, 2014). Indeed, the groundwater residence time documents on contaminant transport and sustainability of water

Download English Version:

<https://daneshyari.com/en/article/6409516>

Download Persian Version:

<https://daneshyari.com/article/6409516>

[Daneshyari.com](https://daneshyari.com)