

Accepted Manuscript

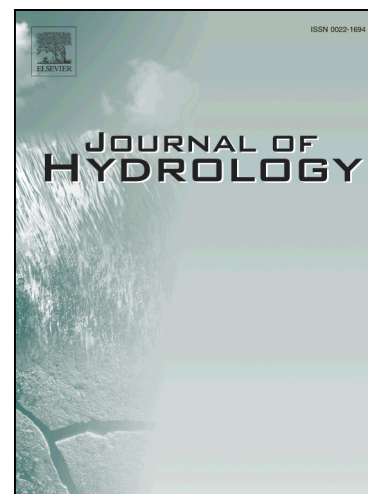
Heat tracer test in an alluvial aquifer: field experiment and inverse modelling

Klepikova Maria, Samuel Wildemeersch, Thomas Hermans, Pierre Jamin,
Philippe Orban, Frédéric Nguyen, Serge Brouyère, Alain Dassargues

PII: S0022-1694(16)30428-0
DOI: <http://dx.doi.org/10.1016/j.jhydrol.2016.06.066>
Reference: HYDROL 21384

To appear in: *Journal of Hydrology*

Received Date: 23 March 2016
Revised Date: 14 June 2016
Accepted Date: 16 June 2016



Please cite this article as: Maria, K., Wildemeersch, S., Hermans, T., Jamin, P., Orban, P., Nguyen, F., Brouyère, S., Dassargues, A., Heat tracer test in an alluvial aquifer: field experiment and inverse modelling, *Journal of Hydrology* (2016), doi: <http://dx.doi.org/10.1016/j.jhydrol.2016.06.066>

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.

Heat tracer test in an alluvial aquifer: field experiment and inverse modelling

Klepikova Maria^{a,c,*}, Samuel Wildemeersch^a, Thomas Hermans^d, Pierre Jamin^a, Philippe Orban^a, Frédéric Nguyen^b, Serge Brouyère^a, Alain Dassargues^a

^aUniversity of Liege, ArGEnCo, GEO³, Hydrogeology and Environmental Geology Unit, Liège, Belgium

^bUniversity of Liege, ArGEnCo, GEO³, Applied Geophysics Unit, Liège, Belgium

^cETH Zurich, Geological Institute, Zurich, Switzerland

^dDepartment of Geological Sciences, Stanford University

Abstract

Using heat as an active tracer for aquifer characterization is a topic of increasing interest. In this study, we investigate the potential of using heat tracer tests for characterization of a shallow alluvial aquifer. A thermal tracer test was conducted in the alluvial aquifer of the Meuse River, Belgium. The tracing experiment consisted in simultaneously injecting heated water and a dye tracer in an injection well and monitoring the evolution of groundwater temperature and tracer concentration in the pumping well and in measurement intervals. To get insights in the 3D characteristics of the heat transport mechanisms, temperature data from a large number of observation wells closely spaced along three transects were used.

Temperature breakthrough curves in observation wells are contrasted with what would be expected in an ideal layered aquifer. They reveal strongly unequal lateral and vertical components of the transport mechanisms. The observed complex behavior of the heat plume is explained by the groundwater flow gradient on the site and heterogeneities in the hydraulic conductivity field. Moreover, due to high injection temperatures during the field experiment a temperature-induced fluid density effect on heat transport occurred. By using

*Corresponding author

Email address: maria.klepikova@erdw.ethz.ch (Klepikova Maria)

Download English Version:

<https://daneshyari.com/en/article/6409608>

Download Persian Version:

<https://daneshyari.com/article/6409608>

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