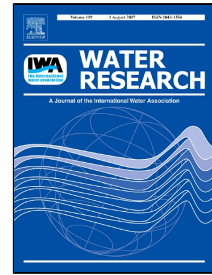


Accepted Manuscript

Development of groundwater vulnerability zones in a data-scarce eogenetic karst area using Head-Guided Zonation and particle-tracking simulation methods

Dua K.S.Y. Klaas, Monzur Alam Imteaz, Arul Arulrajah



PII: S0043-1354(17)30420-7
DOI: 10.1016/j.watres.2017.05.056
Reference: WR 12935
To appear in: *Water Research*
Received Date: 11 August 2016
Revised Date: 21 March 2017
Accepted Date: 27 May 2017

Please cite this article as: Dua K.S.Y. Klaas, Monzur Alam Imteaz, Arul Arulrajah, Development of groundwater vulnerability zones in a data-scarce eogenetic karst area using Head-Guided Zonation and particle-tracking simulation methods, *Water Research* (2017), doi: 10.1016/j.watres.2017.05.056

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.

1 **Development of groundwater vulnerability zones in a data-scarce eogenetic karst area**
2 **using Head-Guided Zonation and particle-tracking simulation methods**

3

4 Dua K.S.Y. Klaas^{1,2}, Monzur Alam Imteaz¹, and Arul Arulrajah¹

5 1. Department of Civil and Construction Engineering, Swinburne University of Technology,
6 Melbourne, VIC, Australia.

7 2. Department of Civil Engineering, Politeknik Negeri Kupang, Indonesia. email:

8 dklaas@swin.edu.au, duaklaas@yahoo.com

9

10 **Abstract**

11 Delineation of groundwater vulnerability zones based on a valid groundwater model is crucial
12 towards an accurate design of management strategies. However, limited data often restrain the
13 development of a robust groundwater model. This study presents a methodology to develop
14 groundwater vulnerability zones in a data-scarce area. The Head-Guided Zonation (HGZ)
15 method was applied on the recharge area of Oemau Spring in Rote Island, Indonesia, which is
16 under potential risk of contamination from rapid land use changes. In this method the model
17 domain is divided into zones of piecewise constant into which the values of subsurface
18 properties are assigned in the parameterisation step. Using reverse particle-tracking simulation
19 on the calibrated and validated groundwater model, the simulation results (travel time and
20 pathline trajectory) were combined with the potential groundwater contamination risk from
21 human activities (land use type and current practice) to develop three vulnerability zones. The
22 corresponding preventive management strategies were proposed to protect the spring from
23 contamination and to ensure provision of safe and good quality water from the spring.

24

25 **Keywords:** vulnerability zones, groundwater contamination, model calibration, particle tracking,
26 eogenetic karst aquifer.

Download English Version:

<https://daneshyari.com/en/article/5759366>

Download Persian Version:

<https://daneshyari.com/article/5759366>

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