

Accepted Manuscript

Use of global sensitivity analysis to assess the soil poroelastic parameter influence

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PII: S0165-2125(17)30048-3

DOI: <http://dx.doi.org/10.1016/j.wavemoti.2017.04.001>

Reference: WAMOT 2150

To appear in: *Wave Motion*

Received date : 12 May 2016

Revised date : 14 March 2017

Accepted date : 4 April 2017

Please cite this article as: A. Mesgouez, et al., Use of global sensitivity analysis to assess the soil poroelastic parameter influence, *Wave Motion* (2017), <http://dx.doi.org/10.1016/j.wavemoti.2017.04.001>

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9 **Abstract**

In this study, we show how a global sensitivity analysis method can be used to obtain relevant information for the interpretation of the mechanical wave propagation phenomena involved in a poroelastic soil that takes into account the presence of water. The present investigation addresses the issue of the identification and the ranking of the most influential parameters. The sensitivity indices provide a variance-based measure of the uncertainty effects of the input parameters on the mechanical outputs of the model. It allows quantification of, on the one hand, the influence of each parameter and on the other hand, the possible interactions between all the parameters. Numerical simulations are performed in a laboratory-scale configuration: a fluid medium overlying a poroelastic material is submitted to a transient excitation, and the coupling of the acoustic and Biot models is solved using a semi-analytical approach. The analysis of the temporal and spatial evolution of partial variances highlights the most important parameters and the complementary information contained in the signals in function of both the time and the receiver location. In particular, we show that the description of

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