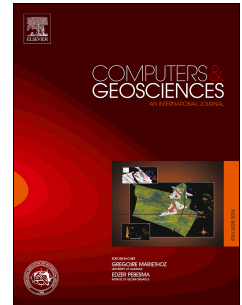


Accepted Manuscript

An innovative computationally efficient hydromechanical coupling approach for fault reactivation in geological subsurface utilization

M. Adams, T. Kempka, E. Chabab, M. Ziegler



PII: S0098-3004(17)30266-2

DOI: [10.1016/j.cageo.2017.10.007](https://doi.org/10.1016/j.cageo.2017.10.007)

Reference: CAGEO 4035

To appear in: *Computers and Geosciences*

Received Date: 7 March 2017

Revised Date: 17 August 2017

Accepted Date: 15 October 2017

Please cite this article as: Adams, M., Kempka, T., Chabab, E., Ziegler, M., An innovative computationally efficient hydromechanical coupling approach for fault reactivation in geological subsurface utilization, *Computers and Geosciences* (2017), doi: 10.1016/j.cageo.2017.10.007.

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.

An innovative computationally efficient hydromechanical coupling approach for fault reactivation in geological subsurface utilization

M. Adams^{1,*}, T. Kempka², E. Chabab² & M. Ziegler¹

¹ Geotechnical Engineering, RWTH Aachen University, Aachen, Mies-van-der-Rohe-Straße 1, 52074 Aachen, Germany

² GFZ German Research Centre for Geosciences, Fluid Systems Modelling, Telegrafenberg, 14473 Potsdam, Germany, kempka@gfz-potsdam.de

* Corresponding author

E-mail address: adams@geotechnik.rwth-aachen.de

Geotechnical Engineering, RWTH Aachen University, Aachen, Germany

Mies-van-der-Rohe-Straße 1

D – 52074 Aachen

Tel.: +49 241 80 25253

Keywords

Hydromechanical coupling; Semi-analytical coupling; Multiphase fluid flow; Geological faults; Numerical simulation; Subsurface gas storage

Abstract

Estimating the efficiency and sustainability of geological subsurface utilization, i.e., Carbon Capture and Storage (CCS) requires an integrated risk assessment approach, considering the occurring coupled processes, beside others, the potential reactivation of existing faults. In this context, hydraulic and mechanical parameter uncertainties as well as different injection rates have to be considered and quantified to elaborate reliable environmental impact assessments. Consequently, the required sensitivity analyses consume significant computational time due to the high number of realizations that have to be carried out. Due to the high computational costs of two-way coupled simulations in large-scale 3D multiphase fluid flow systems, these are not applicable for the purpose of uncertainty and risk assessments.

Download English Version:

<https://daneshyari.com/en/article/6922218>

Download Persian Version:

<https://daneshyari.com/article/6922218>

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