ICP 1.0: Stable Release Version of the Interface COMSOL Multiphysics®-Phreeqc

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Abstract

iCP (Nardi et al, 2014) is a software that couples two standalone simulation programs: COMSOL Multiphysics® and the geochemical simulator PHREEQC (Parkhurst & Appelo, 2013). The main goal of the interface is to maximize the synergies between the aforementioned codes.

The tool is ideal for those interested to apply multiphysics and geochemistry to different fields of Earth Sciences. The flexibility and wide range of application of the two coupled codes result in an extensive list of possible modelling areas, covering most of the needs of the industry and offering good opportunities for R+D. An example of possible simulation combinations is represented in Figure 1.

The iCP 1.0 is the version of the interface thought to be used by third-parties. In this version significant effort has been dedicated to improve and generalize the capabilities of the tool. New features as tailor-made physical interfaces and extensive logging have been incorporated to enhance the user experience. In addition, special emphasis has been put to easily import existing COMSOL Multiphysics® and PHREEQC user's models to new iCP models.

iCP can be obtained under different license agreements. Visit http://image-modelling.net/icp for more information.

Reference

1. Nardi, A. et al. (2014) Interface Comsol-PHREEQC (iCP), an efficient numerical framework for the solution of coupled multiphysics and geochemistry, Computers & Geosciences, doi:10.1016/j.cageo.2014.04.011

2. Parkhurst, D. L., and Appelo, C. A. J. (2013) Description of input and examples for PHREEQC version 3—A computer program for speciation, batch-reaction, one-dimensional transport, and inverse geochemical calculations, U.S. Geological Survey Techniques and Methods, book 6, chap. A43, 497 p., available only at http://pubs.usgs.gov/tm/06/a43/

Figures used in the abstract

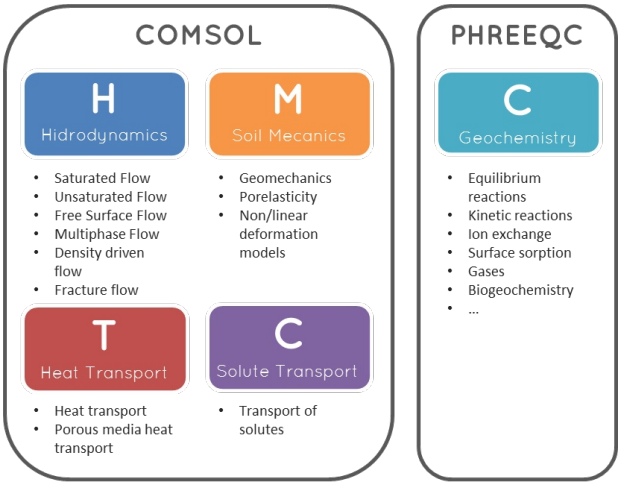

Figure 1: Possible simulation combinations of physics resulting from the coupling of both codes.