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GeoChemFoam: an open-source toolbox for pore-scale simulation of complex processes

Wednesday, 1 June 2022 16:00 (15 minutes)

Pore-scale modelling is now routinely employed to investigate a wide range of applications such as carbon capture and storage, hydrogen storage, fuel cells, geothermal energy and enhanced oil recovery. Computational Fluid Dynamics (CFD) software such as OpenFOAM, Comsol and Fluent are great tools to investigate these applications by simulating simple processes, such as single-phase flow, multiphase flow or scalar transport, directly in micro-CT images of porous media. However, extending these workflows to more complex processes that include additional coupling relevant to porous media applications such as the link between multiphase flow and geochemistry, requires additional development. Many numerical models and codes have been developed in the literature, but they are often close-source and restricted to one application. The GeoChemFoam project aims at gathering such development into one open-source toolbox that can be used by the wider community. Our objective in presenting the toolbox is to increase our number of users and foster collaborations. GeoChemFoam can be installed and run directly from the source code for the OpenFOAM expert, or using Jupyter notebook on a docker container, so that pore-scale modelling of complex processes can be accessible to any porous media researcher. The capabilities of the code are aimed to grow but they currently include reactive transport, multiphase reactive transport, phase transfer, heat transfer, mineral dissolution and precipitation, and single-phase flow in multiscale porous media. Our objective is that the next developments are driven by the community and done collaboratively between our institute and new partners.

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Time Block Preference

Time Block A (09:00-12:00 CET)

Participation

In person

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