ORCHESTRA, a Simple Tool for Complex Reactive Transport Simulations Across Scales and Disciplines

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Introduction

Reactive transport processes take place everywhere around (and even inside) us at very different spatial and temporal scales. More often than not reactive transport is not only a physical processes but also involves chemical reactions and/or biological transformations[1]. To increase the scientific understanding of such interdisciplinary processes, collaboration between e.g. physical, hydrological, chemical and biological experts is essential. This kind of interdisciplinary collaboration greatly benfits from simulation tools that are capable to accommodate and combine process descriptions from different research fields.

This contribution demonstrates the suitablity of the ORCHESTRA[2,3] framework for this purpose. The open modular structure of ORCHESTRA, with a user accessible process object library, make it an versatile tool to combine complex geochemical models with biological and phsycial transport process descriptions.

The main concepts of ORCHESTRA will be discussed, and illustrated by examples from very different fields of application, ranging from e.g.; radioactive waste disposal, electromigration, organic colloid transport and plant root uptake.

References

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[2] ORCHESTRA: an object-oriented framework for implementing chemical equilibrium models, J.C.L. Meeussen, (2003) Environmental science & technology 37 (6), 1175-1182.

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