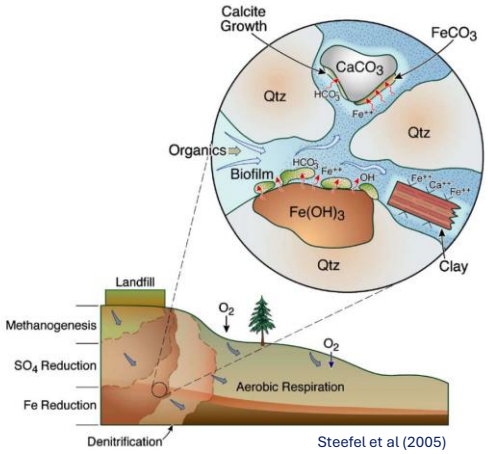
UNIVERSITÀ DEGLI STUDI DI MILANO
Corso di Dottorato in Scienze della Terra

Doctoral Program in Earth Sciences
University of Milan

23-27 February 2026 – Short course (4 CFU, 20 hours) – Aula Chiesa
Dipartimento di Scienze della Terra "A. Desio", via Mangiagalli 34, Milano

Multicomponent reactive transport modeling for the environment, circular economy and critical raw materials

By Prof. Muhammad Muniruzzaman , University of Bonn (Germany)



Steefel et al (2005)

Multicomponent reactive transport models combine fluid dynamic in the subsurface and biochemical reactions. This capability make these tools relevant for several transversal topics including hydrogeology, environmental geochemistry , critical raw materials, circular economy , geoengineering and geophysics. The course entails the construction of a groundwater flow and transport model, to which reactions such as cationic exchange, weathering and microbially-mediated reactions are coupled. Case studies proposed by the students are analyzed and modelled.

For more information and registration:
Prof. Daniele Pedretti (daniele.pedretti@unimi.it)

Course description and schedule

Day 1 – 23 February 2026

13.30-15.30 Introduction to multicomponent reactive transport models, with examples of applications

15.30-17.30 Construction of flow and conservative transport models

Day 2 – 24 February 2026

13.30 – 15.30 Cation exchange and absorption reactions

15.30 – 17.30 Redox-dependent reactions

Day 3 – 25 February 2026

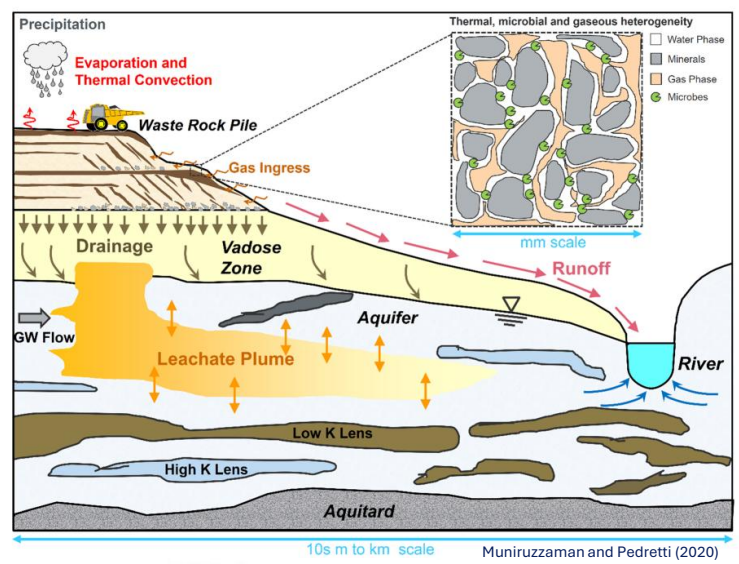
8.30 – 10.30 Rock weathering

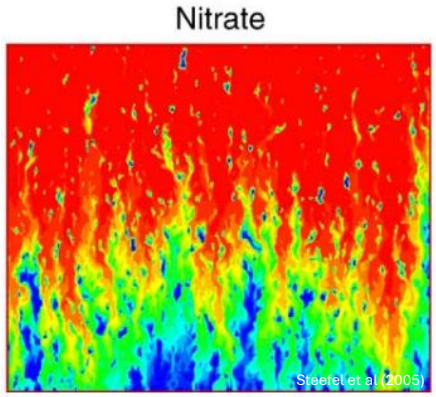
10.30 – 12.30 Biochemical reactions

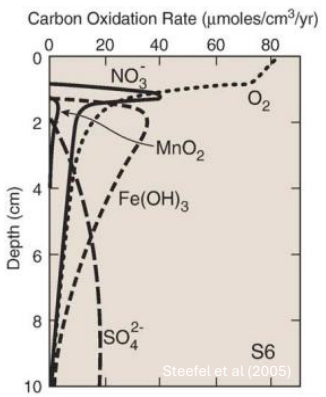
Day 4 & 5 (26,27) February 2026 h. 8.30-12-30

Analysis of case studies chosen by the attendants, based on

- environmental problems
- applications to circular economy and critical raw materials







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