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The Mihályi-Répcelak natural CO_2 occurrence ¬ main lessons from a well-studied storage complex

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Prediction of the behavior of injected CO_2 in geological formations is strongly based on geochemical modeling, laboratory and field testing. However, all of these approaches have their major drawbacks, the first being much too simplistic, and the latter two out of realistic timescales (1–100 days vs. 100–1000 years) for deep subsurface storage. Natural CO_2 occurrences provide an exceptional opportunity to study long term reactions in the scCO_2-porewater-reservoir rock system. Despite their sometimes complex evolution, these occurrences in the last decade have been successfully used to recognize and classify CO_2-related reaction features as well as to test and fine-tune geochemical models. The Mihályi-Répcelak occurrence in the Danube Basin, NW Hungary, with abundant core material available, not only provides a general insight into subsurface reaction processes related to CO_2, but represents one of the best known deep saline aquifers in the Pannonian Basin, it also behaves as a natural laboratory for this potential Late Miocene saline reservoir. The multi-layered structure of the occurrence with separated hydrodynamic units enables the simultaneous analysis and the identification of reaction features both in the reservoirs and their sealing cap rocks providing a further step in understanding the long term performance of storage complexes.
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