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# Geochemical modeling of subsurface fluid generation in the Gulf of Cadiz

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During RV METEOR cruise M86/5 in 2012 a number of deep-sea mud volcanoes were discovered at about 4500 m water depth west of the deformation front of the accretionary wedge in the Gulf of Cadiz (NE Atlantic). Fluid flow at these locations is mediated by an active strike-slip fault marking the transcurrent plate boundary between Africa and Eurasia. Geochemical signals of emanating fluids have been interpreted as being a mixture of various deep-sourced processes such as the alteration of oceanic crust, clay-mineral dehydration, and recrystallization of carbonaceous, Upper Jurassic sediments (Hensen et al. 2015). In the current study we present results of a geochemical reactive-transport model that was designed to simulate major fluid-affecting processes, such as the smectite to illite transformation or recrystallization of carbonates in order to provide a proof of concept. Preliminary results show that the model is able to reproduce pore water signatures (e.g. for chloride, strontium, 87Sr/86Sr) in subsurface sediments that are similar to those of MV fluids.

Hensen, C., Scholz, F., Nuzzo, M., Valadares, V., Gràcia, E., Terrinha, P., Liebetrau, V., Kaul, N., Silva, S., Martínez-Loriente, S., Bartolome, R., Piñero, E., Magalhães, V.H., Schmidt, M., Weise, S.M., Cunha, M., Hilario, A., Perea, H., Rovelli, L. and Lackschewitz, K. (2015) Strike-slip faults mediate the rise of crustal-derived fluids and mud volcanism in the deep sea. Geology 43, 339-342.