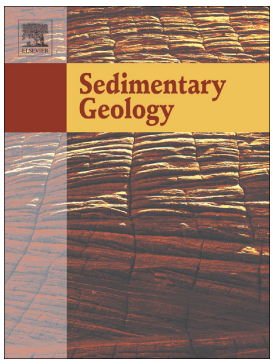

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Calcite veining and feeding conduits in a hydrothermal system: insights from a natural section across the Pleistocene Gölemezli travertine depositional system (western Anatolia, Turkey)

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Abstract

Linking the architecture of structural conduits with the hydrothermal fluids migrating from the reservoir up to the surface is a key-factor in geothermal research. A contribution to this achievement derives from the study of spring-related travertine deposits, but although travertine depositional systems occur widely, their feeding conduits are only rarely exposed. The integrated study carried out in the geothermal Gölemezli area, nearby the well-known Pamukkale area (Denizli Basin, western Anatolia, Turkey), focused on onyx-like calcite veins (banded travertine) and bedded travertine well exposed in a natural cross-section allowing the reconstruction of the shallower part of a geothermal system. The onyx-like veins represent the thickest vein network (more than 150 m) so far known. New field mapping and structural/kinematic analyses allowed to document a partially dismantled travertine complex (bedded travertine) formed by proximal fissure ridges and distal terraced/pools depositional systems. The banded calcite veins, WNW-trending and up to 12 m thick, developed within a more than 200m thick damaged rock volume produced by parallel fault zones. Th/U dating indicates a long lasting (middle-late Pleistocene) fluids circulation in a palaeo-geothermal system that, due to its location and chemical characteristics, can be considered the analogue of the nearby, still active, Pamukkale system. The isotopic characteristics of the calcite veins together with data from fluid inclusions analyses, allow the reconstruction of some properties (i.e.