



Structural control on geothermal circulation in the Tocomar geothermal volcanic area (Puna plateau, Argentina)

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The reconstruction of the stratigraphical–structural framework and the hydrogeology of geothermal areas is fundamental for understanding the relationships between cap rocks, reservoir and circulation of geothermal fluids and for planning the exploitation of the field. The Tocomar geothermal volcanic area (Puna plateau, Central Andes, NW Argentina) has a high geothermal potential. It is crossed by the active NW–SE trans-Andean tectonic lineament known as the Calama–Olacapato–Toro (COT) fault system, which favours a high secondary permeability testified by the presence of numerous thermal springs.

This study presents new stratigraphic, structural, volcanological, geochemical and hydrogeological data on the geothermal field.

Our data suggest that the main geothermal reservoir is located within or below the Pre-Palaeozoic–Ordovician basement units, characterised by unevenly distributed secondary permeability. The reservoir is recharged by infiltration in the ridges above 4500 m a.s.l., where basement rocks are in outcrop. Below 4500 m a.s.l., the reservoir is covered by the low permeable Miocene–Quaternary units that allow a poor circulation of shallow groundwater. Geothermal fluids upwell in areas with more intense fracturing, especially where main regional structures, particularly NW–SE COT-parallel lineaments, intersect with secondary structures, such as at the Tocomar field.