Geophysical Research Abstracts
Vol. 21, EGU2019-16888-1, 2019
EGU General Assembly 2019

Studying the effects of magma chamber emplacement depth, groundwater flux, and local advection on the regional thermal structure of the Los Humeros Volcanic Complex, Mexico

Jon Limberger (1), Damien Bonté (1), Eszter Békési (1), Fred Beekman (1), Thomas Kretzschmar (2), Jan-Diederik van Wees (1,3)

(1) Utrecht University, Earth Sciences, Amstelveen, Netherlands (j.limberger@uu.nl), (2) CICESE, Ensenada, Mexico, (3) TNO, Utrecht, the Netherlands

The Los Humeros volcanic complex (LHVC) consists of a large active caldera and is part of the Trans-Mexican Volcanic Belt (TMVB), a volcanic arc stretching from the Pacific Ocean in the east, to the Gulf of Mexico in the west. Inside the LHVC lies the Los Humeros geothermal field. It is the third largest producing geothermal field in Mexico with a total installed capacity of 94 MW. The field can be considered as a volcanic convection-dominated geothermal system. Tapping into high permeability zones is therefore key for successful development of such a system. As part of the joint Mexican-European GEMex project, we develop fast and efficient thermal models. These are used to infer the presence of high-permeability zones, as strong anomalies of the regional conductive thermal field are often caused by local advection associated with groundwater flow. A first requirement for detecting local advection is a good understanding of the regional thermal structure. To this end, we study the effects of magma chamber emplacement depth, regional groundwater flux, and local advection on the thermal structure of the LHVC by inverse modelling of temperature measurements from wells.