



Paleoclimate from the surroundings of the Kola deep drilling site: influences of topography and fluid flow?

D. Mottaghy, V. Rath

RWTH Aachen University

Inverting borehole temperatures near the Kola deep drilling site, we find that there is a considerable variability of resulting surface temperature histories (GSTH). Though some of this variability could be explained by lack of information and corresponding inverse artifacts, there is probably a residual component of physical origin. We have investigated the role of regional fluid flow as well as the role of local topography and the corresponding flow regime with numerical 3D models. As we lack sufficiently accurate elevation data and knowledge of the spatial distribution of permeability, these models must be considered with care. Considering the permeability as fracture-controlled, we have assumed an exponential decay of both porosity and permeability, based on the prior knowledge obtained in the Kola SG-3 borehole. In particular, the role of the open pit mines near some of the shallower boreholes is discussed, though here most of the information is lacking. All these investigations show that the interpretation of the temperature data from this area needs more, and more accurate information on local distribution of permeability and surface elevation.