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The thermal field of sedimentary basins in different tectonic settings

Abstract:

The thermal field in sedimentary basins is the result of superposed effects originating in the structural heterogeneity and related variations in thermal properties on one hand but also in the mechanisms of heat transport at work on the other hand. The main sources of heat are the heat entering the base lithosphere from the deeper mantle and the heat produced in the lithosphere. Of the latter, the radiogenic heat produced in the crust is of key importance. Concerning the heat transport mechanisms, conduction is the dominant way of heat transport on the scale of the lithosphere. A comparison of databased 3D thermal models from different tectonic settings indicates that, depending on the setting and the time since the last stretching event this conductive thermal field may vary considerably. Moreover, on the scale of a sedimentary basin, this conductive field may be severely overprinted by forced convective processes related to moving groundwater in response to hydraulic gradients.

The lecture will review recent results from 3 thermal models of different scales and tectonic settings and considering different mechanisms of heat transport.