



## **Uncertainties and Shortcomings of Ground Surface Temperature Histories derived from Inversion of Temperature Logs**

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Analysing borehole temperature data in terms of ground surface history can add useful information to reconstructions of past climates. Therefore, a rigorous assessment of uncertainties and error sources is a necessary prerequisite for the meaningful interpretation of such ground surface temperature histories. This study analyses the most prominent sources of uncertainty. The diffusive nature of the process makes the inversion relatively robust against incomplete knowledge of the thermal diffusivity. Similarly the influence of heat production is small. It turns out that for investigations of the last 1000 to 100 000 years the maximum depth of the temperature log is crucial. More than 3000 m are required for an optimal inversion. Reconstructions of the last one or two millennia require only modestly deep logs (>300 m) but suffer severely from noisy data.