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Evaluation of the glacial impact on the shallow heat-flow density in the North German Basin

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Paleoclimatic effects may still influence the present day subsurface temperature distribution and therefore the heat flow density calculated in affected depth levels. Cooling of several degrees Celsius into depths of up to 1.5 – 2 km were reported for areas which were strongly affected by the Pleistocene ice ages (e.g. Canada, Poland, and Denmark). However, although this phenomenon is well known, not much research has been performed to quantify these processes in Northern Germany, an area where Pleistocene ice margins of the last ice ages are located. To fill that gap we compiled new data from two boreholes in the eastern part of the North German Basin, one located beneath the former ice shield of the last glaciation, and one located in the foreland. We determined thermal rock properties (thermal conductivity, thermal diffusivity, and specific heat capacity) on drill core samples and used it as calibrator for well-log based calculations of thermal parameter profiles along the borehole. The results were used for heat-flow computations with depth and implemented as a base for an analytical solution of the heat equation as well as inversion modelling. By showing the discrepancy of observed and theoretical background temperature and heat flow density profiles, we aim to improve the understanding of the regional thermal response to the last glaciations.