



## **Paleoclimate inversions at the Mallik 3L-38 borehole, including latent heat effects**

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The Mallik 3L-38 borehole is located in the Mackenzie Delta, NWT, Canada, and is characterized by the occurrence of a 600 m thick permafrost layer. Temperatures down to a depth of 1156 m were measured within this research well, which was drilled as part of the Mallik 2002 Gas Hydrate Production Research Well Program. Over a period of 3.5 years after drilling, temperatures were monitored using fiber-optic distributed temperature sensing (DTS) technology. Additionally, geophysical logging data were available, allowing to give a detailed profile of rock matrix properties and porosities under in-situ conditions published elsewhere. Based on these data and an equilibrium temperature profile we inverted for the ground surface temperature history (GSTH), using a smooth Tikhonov type deterministic inversion scheme, as well as an adaptive stochastic (MCMC) method. For the success of any GSTH inversion in this setup it is crucial to include the basal heat flow assumed at the base of the model (6 km) into the inverse process. It was determined to be rather high ( $> 60 \text{ mW m}^{-2}$ ). We show results from the both types inversion, and will discuss the interpretation in terms of paleoclimatic signals of different kind, and possible disturbing effects.