

Interactive comment on “Thermal log analysis for recognition of ground surface temperature change and water movements” by M. Verdoya et al.

Anonymous Referee #1

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The paper presents results from borehole temperature analysis in central-northern Italy. Using existing methods for estimating POM and flow velocities, as well as GST histories some hundred years back in time, this interesting paper gives valuable new results. On the one hand it contributes to the knowledge of the local climate conditions in central-northern Italy. It confirms earlier results suggesting an absence of the Little Ice Age in this area. On the other hand, it addresses the currently discussed question about the application of GST history inversions on advectively disturbed temperature logs. It encourages to study those logs, since they may still contain useful information about past ground surface temperature variations. The paper is well organised, and the figures, as well as the number and quality of references are appropriate.

Some specific comments are given below, which I recommend to consider.

1. In the abstract, it should be stated which inversion method was used.
2. Page 96, line 22: For the sake of completeness, it should be mentioned that temperatures measured in deeper boreholes can reveal GST histories back to the last ice age, giving some references (e.g. Kukkonen, I.T. & Joeleht, A. (2003), Weichselian temperatures from geothermal heat flow data, *Journal of Geophysical Research* 108 (B3), 2163, doi:10.1029/2001JB001579).
3. Page 100, line 17: what numbers refer to "relatively elevated terrain"?
4. Page 103, line 27: I wonder if it is justified to give the warming rate and mean value for two or three digits after the decimal point. The variation in SAT allows maybe "0.04 k yr⁻¹" and 15.0 °C. The same would apply to the POM values in Table 2 and 3.
5. It would be nice to have a deeper discussion of the possible systematic model errors which are connected with the POM estimation.
6. The authors mention that the inversion were performed by a generalised least squares procedure, which should to give error estimates for the resulting GSTH - please check.

One technical note: a value's unit should follow both numbers when giving a range, such as 2 kg - 4.5 kg.

Interactive comment on Clim. Past Discuss., 3, 95, 2007.

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