Clim. Past Discuss., 4, S142–S144, 2008
www.clim-past-discuss.net/4/S142/2008/

Climate of the Past Discussions

Interactive comment on "Borehole paleoclimatology – the effect of deep lakes and "heat islands"on temperature profiles" *by* V. T. Balobaev et al.

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Received and published: 6 May 2008

We do not agree with the opinion of Dr. Mareschal that our paper will not be useful in borehole climatology. The Interactive Comment is titled: "Can temperature depth profiles be corrected for borehole paleoclimatology?" This is a misleading statement and shows that Dr. Mareschal did not comprehend the objective of our study and how it can be utilized in borehole paleoclimatology. As we stated in our paper, the proposed method makes possible to estimate the maximum (underlined by the authors of the paper) effect of deep lakes and "heat islands" on the boreholes temperature profiles. The ultimate objective of our study is to assist in choosing drilling sites for borehole climate observatories where the effect of lakes and non-climatological factors will be minimal. In our paper we do not suggest that this method can be used to correct

existing borehole temperature profiles.

We present two responses to comments presented in the Interactive Comment.

Comment 1. Also, the proposed correction is not applicable for the heat island effect, as suggested by the authors. Deforestation and urbanization are recent perturbations of the surface boundary condition and thus a time dependent correction is required.

Response 1. We agree with this comment. However, as we mentioned before, we are proposing only to evaluate the maximum effect of "heat islands". For example, from the study conducted by Taniguchi (2006) follows that the expansion of urbanization in Bangkok reaches up to 80 km from the city center. Therefore, to avoid the effect of urbanization, a drilling site for an observational well should be located at a distance more than 80 km from the city center.

Comment 2. About of approximating the surface of the lake by a circle of radius $R = \sqrt{S/\pi}$, with S the area of the lake. This maybe adequate when the drillhole is located at some distance from the lake, but I (Dr. Mareschal) have seen many drillholes extremely close to the lake shore. If the suggested procedure is strictly followed, we may have the effective radius of the lake R larger than the distance of the hole to the center.

Response 2. We agree with this comment. In this case one should use the first option: to assume that the lake has a circular shape with a radius $R = \rho_{max}$, where ρ_{max} is the maximum value of the set $\rho_1, \rho_2, ..., \rho_n$ (see Figure 1 of our paper).

And a final comment. In Interactive comment (Abstract) Dr. Mareschal notes that analytic formulas (Balobayev and Shastkevich, 1974) are not new. Indeed, this exact 3-D analytical solution which describes the steady temperature field of rocks beneath the lakes of arbitrary contour was published a long time ago. However, to best of our knowledge, the 2-D analytical solution was used by us for the first time to estimate the maximum effect of deep lakes and "heat islands" on the boreholes (located within the lake or outside the lake area) temperature profiles.

CPD
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References

Balobayev, V.T. and Shastkevich, Yu.G.: The estimation of the talik zones configuration and the steady temperature field of rocks beneath the lakes of arbitrary contour, In: Lakes of the Siberia Cryolithozone (in Russian), Novosibirsk, Nauka, 116-127, 1974.

Taniguchi, M.: Anthropogenic effects on subsurface temperature in Bangkok, Climate of the Past Discussions, 2, 832-846, 2006.

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Interactive comment on Clim. Past Discuss., 4, 415, 2008.