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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.

L. Eppelbaum

levap@post.tau.ac.il

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We can agree with some comments of Anonymous Referee No. 2. At the same time the review, as a whole, has expressive negative spirit and we will discuss the comments in detail.

Comment 1. The authors reason that these heat island effects would manifest themselves in borehole thermal profiles in a manner analogous to the effect of nearby lakes on boreholes, and that these non-climatic effects can be removed from the global borehole data set using one set of calculations.

Response 1. Here we forced to repeat our response to Referee No. 1. This is a mis-

leading statement and shows that the Anonymous Referee No. 2 as and Referee No. 1 do 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 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 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.

The CPD Editor asked us to concretize the title, Abstract and Conclusions in our final paper presentation. It was done (for instance, the revised title of our paper is "Borehole paleoclimatology – the maximum effect of deep lakes and "heat islands" on temperature profiles").

Comment 2.1. After a somewhat disjointed review of papers dealing with non-climatic effects on borehole thermal profiles, the authors derive and solve the heat conduction equation in cylindrical coordinates.

Response 2.1. We had no aim to compile in our short paper a general review of non-climatic effects on borehole thermal profiles.

Comment 2.2. This is followed by a single example, and almost no discussion about the sensitivity, significance or generality of the results. The authors failed to show the relevance of these calculations in borehole climatology.

Response 2.2. The main aim of our paper was to acquaint our colleagues with un-

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known (practically forgotten even in Russia) approach (Balobayev and Shastkevich, 1974) and demonstrate it applicability on one example of studying anthropogenic influence to near-surface temperature. If the proposed approach will have some followers, they will calculate other examples with necessary statistical support. We repeat again that this method is intended to estimate the maximum effect of deep lakes and "heat islands" on the boreholes temperature profiles, but not for correction of borehole thermal profiles.

Comment 3. Abstract is poorly constructed and uninformative. One cannot get an idea of what the paper's content is about from the abstract nor get an idea of the conclusions or importance of the work.

Response 3. Abstract is revised.

Comment 4.1. English in the introduction is poor.

Response 4.1. We partially agree with this comment. Introduction is revised.

Comment 4.2. If it is a review of past work that is intended in the introduction, then the effort is lost.

Response 4.2. In our past work (Eppelbaum et al., 2006) some estimation of methods used in the studying past climate changes were performed. It is possible that the conclusions of this work must be placed not to Introduction, but in a separate paragraph.

Comment 5. I would suggest to the authors to rethink the problem in a way that addresses the real problems encountered in borehole climatology. That is, show in detail whether these 'lake effects' are possible to simulate, to estimate the magnitude of such perturbations in time and space, and then evaluate whether such corrections are applicable.

Response 5. As shows the Comment 5, again the problem of misunderstanding is arising. The article just intended to estimation of the magnitude of such perturbations in time and space. We do not suggest to apply this method for correction of borehole

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thermal profiles.

Reference

Eppelbaum, L.V., Kutasov, I.M., and Barak, G.: Ground surface temperatures histories inferred from 15 boreholes temperature profiles: comparison of two approaches, Earth Sciences Research Journal, 10, No. 1, 25–34, 2006.

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.

L.V. Eppelbaum (levap@post.tau.ac.il), Dept. of Geophysics and Planetary Sciences, Tel Aviv University, Israel

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