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Earth System Dynamics Discussions

Interactive comment on "Mathematical modelling of positive carbon-climate feedback: permafrost lake methane emission case" *by* I. A. Sudakov and S. A. Vakulenko

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We would like to thank Referee #1 for a very constructive review and for the helpful lecture. We understand "what is thermokarst lake", however we are constructed the model for this realistic object, so-called permafrost lake (It's a term for our mathematical model). This is fundamental physical approach when you are approximated the realistic object or phenomena as a model of this object (for example, real gas and ideal gas). In addition, we are used a phenomenological approach which is based on the fundamental theory of the phase transitions (Ginzburg-Landau theory). If you apply this fundamental approach to study of the physical system you can concentrate on

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the process integrally and you don't study the details of local process in this system. It's a fundamental principle of the approach. For example, using of phenomenological theory of the phase transitions we are connected thawing process in permafrost lake and methane emission excluding the detail consideration of microbiological processes. Also, the model as presented in our paper is the end-point of two years of work. At some point in the development of a model, it becomes necessary to pause development and publish, even if the model is not "perfect" (no model ever is anyway). Although we are aware of a number of deficiencies in this model and a large number of avenues for future development of the model, pressure colleagues obliges us to publish something about the model in its current state. In our opinion, the model has reached a state where publication of its description is of interest to the community, even though we are aware of deficiencies and potential improvements.

Best Regards, Ivan and Sergey

Interactive comment on Earth Syst. Dynam. Discuss., 3, 235, 2012.