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Interactive comment on "A surface model for water and energy balance in cold regions accounting for vapor diffusion" *by* Enkhbayar Dandar et al.

Anonymous Referee #1

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The authors try to propose a surface model to analyze the water and energy exchange in cold regions, and use it to analyze the moisture and thermal states and changes in the upper Tuul River basin in Ulaabbaatar (Mongolia). The model and some in-situ data may be helpful to the readers, however, the following questions should be addressed before its publication: 1. There are many softwares, such as CoupModel, Hydrus and SHAW, for simalating moisture and heat changes in cold regions, and their validations were fully calibrated. Please clearly tell the reader what is the advantages of your model compared with current models? 2. The proposed model was not fully calibrated by some in-situ data although there are lots of field data, so the reader can not judge whether the model reflect the actual moisture and heat states and changes. 3. There is

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plenty of air in the soil, however, it is neglected in the proposed model, why? 4. There are some minerals in the soil, which makes the freezing point lower than 0 âĎČ, but the freezing point is 0 âĎČ in the manuscript. 5. Some parameters in the proposed model are changing with temperature and moisture content of soil, which makes the mathematical formulae nonlinear, while they are solved by the linear idea and method. 6. Although the reader can understand what the authors want to express, the English grammar and vocabulary are needed to be polished before its publication.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-659, 2017.