The Cryosphere Discuss., 5, C481–C482, 2011
www.the-cryosphere-discuss.net/5/C481/2011/

The Cryosphere Discussions

Interactive comment on "Modelling the temperature evolution of permafrost and seasonal frost in southern Norway during the 20th and 21st century" *by* T. Hipp et al.

Anonymous Referee #3

Received and published: 19 May 2011

Comments

The scientific problems discussed in this paper are very relevant to the scope of the Cryosphere journal. Recent climate warming has a profound effect on permafrost in most areas of the Northern Hemisphere. The rapid climate and surface condition changes such as increase in winter air temperatures and increased snow depths seem to be the most important factor that should be carefully monitored. Changes in permafrost should be realistically predicted in any efforts related to prediction and mitigation of below ground surface changes in this part of the Nordic permafrost domain. The most important achievement of this paper is exactly the combination of field observa-

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tions from a permafrost thermal monitoring network with the permafrost temperature dynamics modeling. A very simple heat conduction model to estimate ground temperature evolution over two centuries at three study sites in Norway was used. At the same time some procedures and methodology are beyond of my understanding just because it is unclear described. This paper brought a new data and knowledge on permafrost behavior in Norway. Publication of this kind of paper will be timely and beneficial for researchers studying permafrost, as well as for many other researchers conducting a wide spectrum of environmental studies. The paper in review needs a revision before it could be published in the Cryosphere journal.

1. Page 817, line 26-27. The authors say about active layer thickness of 10.7 and 11.1 m. Is it still freeze up during the winter time? Does the winter frost penetration reach 11 m?

2. page 821, 3.3 Model calibration and validation. It is too short period for model calibration (2009/2010). Can you provide more details on procedure of model calibration?

3. Page 822, Section 3.4 (Historic and future temperature data). The methodology of the historic air temperatures producing is unclear for me.

4. Page 822, line 16. Why year 1957 chosen like kind of threshold?

5. Page 826, lines 3-4. Authors say about beginning of a talik development and refer to figure 4e, but from the figure 4e I can not see 'talik development'. It looks like seasonal frozen ground.

Interactive comment on The Cryosphere Discuss., 5, 811, 2011.