

Interactive comment on “Evaluation of the snow regime in dynamic vegetation land surface models using field measurements” by E. Kantzas et al.

Anonymous Referee #2

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The 2 main results claimed by the authors both suffer from serious misconceptions which make them either irrelevant or wrong.

Density estimation

The estimation of fresh snow density is based only on SWE observations recorded a few days after a period with no snow on the ground. It does not make sense for the following reasons:

- the method samples only early or late season snowfalls and hence provides fresh snow density values which are absolutely not representative of the very cold conditions prevailing in these regions during mid-winter. The authors do not mention any possible issue related to this aspect.

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- the method uses only SWE measurements from very shallow and light snowpacks not older than a few days. Consequently, the measurement itself should be very inaccurate since it is quite difficult to extract a very shallow snow core, especially in the forest where snow is very heterogeneous. The authors do not provide any estimation of the accuracy of such measurements.

- there are several hundreds thousands daily records of both precipitation and fresh snow depth available from NCDC which should be more appropriate for such a study (provided wind effects on rain gauges are taken into account), instead of only 60 pairs of measurements extracted from 600 000 SWE survey records.

Monthly sublimation estimation

The sampling method retains only consecutive non-increasing values of SWE measurements. It undoubtedly leads to a wrong estimation of the sublimation for the following reasons:

- the authors do not consider any cases where SWE is increasing between 2 measurements because of higher condensation than sublimation during the considered period! Hoar formation or riming is a common phenomenon during mid-winter which is neither considered in the method nor even mentioned in the results interpretation.
- the authors do not consider any possible effect of bottom melting which cannot be excluded in the south-western part of Russia.
- cases where SWE is decreasing in spite of light snowfalls (cases where sublimation would be higher than precipitation) are neither excluded nor mentioned.
- even without these limitations, the method is very inaccurate since the sublimation/condensation between 2 measurements (5 or 10 days apart) is probably much smaller than the SWE observation accuracy.

Interactive comment on The Cryosphere Discuss., 7, 2333, 2013.

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