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Interactive comment on "The spatial variability of snow water equivalent" *by* T. Skaugen

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First of all, I would like to thank all for the interest in my paper. I feel this has been a very constructive process.

The Editor had two major points in the last comment, and also some questions. Regarding the first point on ergodicity. I think we can exclude the whole ergodicity issue. I have performed a spatial analysis of precipitation at both Norefjell and the Aursunden from precipitation stations in the area. The number of stations is regretfully small, but the results show that, if we limit our analysis to spatial distributions which are guaranteed bounded to the left by zero (as we should when defining the stochastic unit fields as distributed with a two parameter gamma distribution), the spatial standard deviation appears as a linear function of the spatial mean. This is the case for both areas. This means that we can choose a spatial mean suitable as mean of the stochastic unit field and estimate the standard deviation. Thus we can parameterise the unit stochastic fields without bringing ergodicity into the discussion. PS It turns out that the spatial

and temporal standard deviation are practically identical for equal spatial and temporal means, but the implications are perhaps best left for another paper devoted to such a topic.

The spatial distribution of melt: I have analysed data from four snow pillows located very close to each other which may indicate the spatial behaviour of snowmelt. The spatial scale is tiny, but the observed behaviour of spatial CV versus spatial mean is consistent with how it is modelled in the paper, and thus lends support to the approach.

Other questions: Yes, the covariance is the only calibrated parameter. Input is the spatial mean of an event (from which the u parameter is estimated. u is the number of units comprised in an event), and spatial standard deviation and the entire distribution is estimated by the model. This point must obviously be made clearer in the revised text.

Calibration and validation periods: Regretfully, these data of SWE is all we have. However, if we split the sample and calibrate c on the data from 2002-2003 and validate on the data from 2003-2004, very good results are obtained (calR2=0.86 and valR2 =0.90). This point will be inserted in the revised text.

A revised version (revised according to the discussion on the web) of the paper has been submitted for publication in HESS.

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