

Interactive comment on “Comparison of aeolian snow transport events and snow mass fluxes between observations and simulations made by the regional climate model MAR in Adélie Land, East Antarctica” by A. Trouvilliez et al.

Anonymous Referee #2

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This paper compares observed blowing snow transport rates with output from a regional climate model for a site in East Antarctica. The authors find a reasonable agreement between model and observations for wind speed, but the model underestimates observed drifting snow fluxes.

Although the subject suits well for The Cryosphere, and the paper is potentially interesting for the glaciological community, I am afraid that it is, in its current state, not suited for publication. The paper contains really little new information (compared to e.g. Gallée et al., 2013 or Trouvilliez et al., 2014), discusses a really short time series (whereas,

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according to the authors, three years of observations are available), does not discuss model sensitivity to several parameters, and the use of English language is really poor. Therefore, I strongly recommend declining publication in the The Cryosphere.

I have several suggestions for improvement if the authors would like to resubmit the manuscript.

(1) the manuscript needs thorough (!) revision of language. The manuscript contains many language errors and vague statements. A shortlist of language comments is found below, but this list is certainly not complete. I am astonished that with such a large group of well-respected authors, the quality of the text is so poor.

(2) the analysis needs to be strongly enhanced:

(a) The time series need to be extended, as –apparently- there are much more data available. The model needs to be evaluated in more detail, e.g. surface pressure, temperature, SMB, etc. More stations could/should be used in the evaluation.

(b) The explanation of the underestimation of wind speed is extremely poor. It is not clear why the authors do not try to improve the model instead of just remarking its deficiency.

(c) The bias of relative humidity is large, but this is barely discussed in the paper. Conversely, relative humidity could/should be also used as a parameter to tune the blowing snow model and improve the modeled blowing snow!

(d) If the model is used, its sensitivity for input parameters needs to be discussed, especially since it underestimates the transport with a factor of 10. Which improvements are necessary to increase correspondence to the observations? Many more model tests are necessary. Equation 5 is used for correction, but the resulting transport is wrong.

(e) Then, if the model works better, the authors should present and analyse the spatial fields. Blowing snow transport is clearly a spatially homogeneous process, and exactly

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for that reason you need a model. Otherwise, the reason to use a model in this context is absent.

Language and text (not complete)

P6009

L2: "compared with Aeolian snow mass fluxes". I guess "observed" needs to be added.

L17: "It will conduct the MAR". Poor English, I guess the authors mean that "Our results indicate that MAR, with..."

L26: 10%. Transport does not contribute to the ASMB. The contribution comes from erosion or sublimation.

P6010:

L24: "wind speed of around 100 km inland". Interesting value for wind speed.

P6011

P23-30: it is not clear how the height of the sensors (which of course varies throughout the year) is determined.

P6014

Saltation is described, but how is suspension parameterized?

P 6016

Equation 5: If I can do my math, the number in the exponent is just 2.4.

L21: "can be associated with the MAR outputs". What does this mean?

Interactive comment on The Cryosphere Discuss., 8, 6007, 2014.