

Interactive comment on “Blowing snow at D17, Adélie Land, Antarctica: atmospheric moisture issues” by H. Barral et al.

M. Frezzotti (Referee)

massimo.frezzotti@enea.it

Received and published: 7 July 2014

The paper provides results of blowing snow and meteorological observations collected in katabatic wind area Adélie Land (East Antarctica) and comparison with global meteorological model and snow-pack model. The paper contributes to knowledge of blowing snow process and error estimation using atmospheric models that do not include wind driven erosion processes. The results are very interesting and appropriate for TC certainly worth being published, however the paper is not clearly finalised and several items (e.g. Crocus vs observation; Bulk vs profile methods; how improvement the models?) are introduced without a real discussion and conclusion.

Details Comments

C1106

Pag 2762 and everywhere The elevation distribution of blowing snow as surveyed by observation (Mahesh et al., 2003) or satellite images (Scarchilli et al., 2010; Palm et al., 2011) are not taken in account in the manuscript.

SMB estimation in Terre Adélie has been reported in previous papers using AWS and ice core (Bintanja, 1998; Pettre et al., 1986; Frezzotti et al., 2004) provide complementary information to the presented result.

Pag 2763 2.1 Observation data A figure with the geographic information of the site and katabatic wind drainage basin is helpful to the readability of manuscript.

Pag 2765 ECMWF appear to reproduce well only temperature, whereas wind (mainly in winter) is not adequately simulated.

Pag 2766 Is homogeneous ECMWF operational analysis during the analysed period?

The “spin off” problem should be taken in account in the use of ECMWF analysis.

Pag 2768 line 8-15, it is very difficult to follow, rephrase

Describe the choice of blowing snow flux threshold of $300 \text{ g m}^{-2} \text{ s}^{-1}$

Temporal variability of blowing snow and relative RH during the two years should be shown.

Pag 2770 Comparison with other atmospheric models are interesting, but is hanging without any discussion, develop or remove

Paragraph “4 snow-pack modelling” and part of “5 bulk and profile moisture flux calculation” should be in methods

Pag 2776 The flowcapt threshold $4 \text{ g m}^{-2} \text{ s}^{-1}$ is two order of magnitude less than that used previous, explain the choice of thresholds.

Pag 2776 and 2777 It is not clear why MO theory that does not include blowing snow and katabatic condition could be applicable in D17 condition.

C1107

Pag 2778 It is not correct to use an average of snow fall, see seasonal variability of precipitation in Antarctica (e.g. Marshall, 2009; Bromwich et al., 2011)

Pag 2779 Fig. 8 shows a very small agreement between Obs profile and Crocus bulk, also in absence of wind.

Pag 2780 Line 7-9, it is not clear the meaning

Fig. 6 Gill, red and black curves are not visible

Fig 7 it is not clear the different initial condition of the two red line of Crocus

Interactive comment on The Cryosphere Discuss., 8, 2759, 2014.