

Interactive comment on “Snow accumulation variability in Adelie Land (East Antarctica) derived from radar and firn core data. A 600 km transect from Dome C” by D. Verfaillie et al.

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Dear Reviewer,

Thanks for your interest and interactive comment on our paper.

Please find below answers to your specific comments and questions:

-English usage errors: The paper has now been read and corrected by a native English person.

-Modeling and SMB: you suggest that modeling should not be presented as a way to accurately assess the mass balance. Your remark is relevant and our sentence on
C1302

page 2 was corrected as follows: “This is mainly achieved through field mass balance measurements, which are generally interpolated by the use of remote sensing data. The resulting SMB maps are used to validate model outputs.

-“Italian-French”: This will be corrected in the final version

-Disadvantages of the GPR: indeed, we should include the disadvantages of the GPR as well, although there aren’t many. The main problem of GPR is that - unlike stake measurements for example - it is an indirect measurement of SMB, thus requires an interpretation which could be a source of errors. Difficulties in signal processing or in signal interpretation and picking of the reflectors are the main possible sources of error. This disadvantage of GPR and the main sources of error will be included in section 2.1.

-“ReflexW”: This will be corrected in the final version

-“Sadly”: This will be removed in the final version

-“Maintenance”: This will be corrected in the final version

-Indeed, I forgot to renumber the sections in the introduction. I will correct this in the final version

-“Undulations”: This will be corrected in the final version. No megadunes have been reported before in this specific area. The ones described by Frezzotti et al. (2002) form a 70km² field located 200km East of Dome C, thus not in the same area. Megadunes have a very characteristic signature in satellite imagery (radar or visible), which has not been observed along the transect from Dome C to the coast. The undulations observed along our transect do not form a field, they are much sparser (only 3 main distinct undulations between 300 and 600 km from DC), and rather seem to reflect some local isolated phenomena. Moreover, megadunes have shorter wavelengths (2 to 4km, compared to our 10km wavelengths), and greater surface amplitude (2 to 4m) than undulations we observe (which are barely visible at the surface). However, their formation seems to be similar to megadunes formation. They result from local variable

accumulation, caused by topography variations and katabatic wind field divergence. Just as for megadunes, our undulations crests seem to move upwind with time.

-“... , it does not correspond to kriging”: what is meant is that van den Berg climatology has not been obtained by kriging field measurements, but was rather refitted by altitude intervals on Vaughan and Russell (1997) data. As a result, van den Berg model is less affected by possible punctual poor-quality field measurements (in comparison with Arthern’s interpolation method).

-“w.e.”: this will be corrected

-2871: We will change these paragraphs into a list

-Table 1: We will change the date intervals accordingly

-A and B in Figure 6 correspond to the position of two local elevation peaks, which link to undulations is discussed on p. 2868.

Interactive comment on The Cryosphere Discuss., 6, 2855, 2012.