

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.

D. Verfaillie et al.

dverfaillie@lgge.obs.ujf-grenoble.fr

Received and published: 19 September 2012

Dear reviewer,

Here are some answers to your last comment :

-No, we have not measured this movement, and indeed, we may have jumped to conclusions. I have just measured the horizontal shift we observe on the figures between R1 and R2 undulation crests: it is of 1km maximum in 211 years. The ice speed in this part of the transect is 3-4m/ year, so we can estimate the shift induced by ice dynamics between R1 and R3 to be 650-900m. Thus in the end the slight shift we observe could be due to ice dynamics, although some possible upwind movement of the undulation

C1644

crests cannot be excluded. It is difficult to choose one process over the other considering our margin of error. We have thus removed the last sentence and introduced two new sentences:

“Regarding undulations variations with time, the progressive steepening of fold limbs visible in Fig. 7 is a well-known feature caused by spatial variations in accumulation rates (see e.g. Arcone et al. (2005b)).

To conclude, the undulations we observe would be the result of accumulation variations caused by interactions between katabatic wind and local topography. These processes are described in Arcone et al. (2005b).”

-I forgot to mention this in my last reply, but we have now plotted accumulation vs. slope AND elevation (in two separate panels for clarity) in figure 8 and 9, and the link with slope is mentioned in §4.1.

-Vertical resolution: it seems indeed that we have mixed up the concepts of accuracy and resolution. What we want to write about here is our ability to separate two reflectors. We will check this and correct our statement accordingly.

-We have now inserted a panel showing horizons details in figure 2. Of course tracking the horizons depends on the interpretation of the user, and is a source of error (this is mentioned in our article in §2.1, first paragraph, it has been added after reviewer 1 asked us to mention the disadvantages of GPR). But we did not encounter major problems when following horizons from DC to the end of the transect, except in a portion of a radargram ~465km from DC, as explained in §2.3.

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