

## ***Interactive comment on “Acquisition of isotopic composition for surface snow in East Antarctica and the links to climatic parameters” by A. Touzeau et al.***

### **Anonymous Referee #1**

Received and published: 22 December 2015

#### Review

General comments: The topic of this manuscript is up-to-date. Interpreting the climate signal from water isotope records of low accumulation rate site has a lot of difficulties. To understand how the climatic and environmental signature is imprinted in the water isotopic composition of the surface snow is an important step in the process of understanding. My impression is that this study is thoroughly done and can provide new insights into the understanding of water isotope signal. The manuscript has a clear overall structure and good readability. However, the figures and method description need some improvements. The topic fits the scope of “The Cryosphere” and should be

C2577

published after some minor revisions.

Specific comments: A more detailed description of the sampling method is needed.

P 6283 L17 surface samples of 10-30 cm pits- what is the annual resolution? Is the mean value an average over depth or over time? What about changes in the accumulation rate along the different transects?

Vostok p 6287 f: The description of the sampling strategy at Vostok needs more details. What is the sample volume? How long is a precipitation event? Is there sublimation expected?

Dome C P 6288 L 25ff: Soft surface snow was scraped and sampled- Which distance is between the sampling area(s), is there information about drift? What about the topography of the snow surface? Where there any changes during the year eg dunes?

Fig. 4: What about the correlation between d18O and temperature or d excess and precipitation? What happens June/July 2011 that there is a peak in temperature but not in the d18O samples? Is there any information about wind and drift at Dome C?

Fig. 5: Why is there no correlation given at the top or bottom of the pit? What does the dotted line mean? If it is the confidence interval write it in the figure caption. What about the correlation changes for d18O and d excess?

P 6284 L5 If the increase of d excess for decreasing d18O is linked to distillation is there a possible reason why at -40 the relationship between d18O and 17O excess changes?

Technical corrections: I would appreciate a description of the general climatic conditions like mean temperature or wind speed for the study sites Vostok and Dome C. This could either be part of the methods chapter where the different sampling strategies are described or earlier in the introduction. Table 1 gives a good overview but is located too late in the text (p. 6292). It would be helpful to have this information earlier/ before the sampling methods description.

C2578

Fig. 2: Reference for MCIM factors as on p. 6285 is not given in the figure caption.

Fig. 3: This figure is too small. The “a)” and “b)” for the left and right subfigure is not given, however it might be clear that the left one should be “a)”. I also would recommend to write “Vostok” and “Dome C” at the top of the figures. In figure 3a) the A (yellow) and B (blue) letters are too small and difficult to find.

Fig 5: Too small. Reference for Vostok\_winkler is not given.

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Interactive comment on The Cryosphere Discuss., 9, 6275, 2015.