The Cryosphere Discuss., 5, C1370–C1372, 2011
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The Cryosphere Discussions

Interactive comment on "Stable water isotopes of precipitation and firn cores from the northern Antarctic Peninsula region as a proxy for climate reconstruction" *by* F. Fernandoy et al.

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This is a comprehensive study of stable water isotopes from the northern Antarctic Peninsula and South Shetland Islands. The paper is well written and addresses the meteorological controls on isotopic composition of precipitation and their suitability as a proxy for climate reconstruction. The results will be of value when interpreting future ice cores from this region and contribute to our understanding of the relationship between isotopes and temperature in the high southern latitudes. The year-round precipitation sampling is particularly useful as few such records exist for the Peninsula.

The results show that for the firn cores deuterium excess exhibits the most consistent

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correlation with local air temperature while δ18O poorly captures seasonal temperature fluctuations. Of the seven firn cores collected only the sites above 600 masl are not affected by melt-percolation processes although even they do not exhibit a clear seasonality in δ18O. The study concludes by selecting the Plateau Laclavere as the most promising site for a future deep drilling campaign.

Comments and questions:

In section 4.1.1 you say that δ18O values at OH are more depleted than FP and explain this difference as sampling bias. Could you not remove the winter samples from OH to directly compare with FP to confirm that this is the case?

In section 4.2 and 4.3 you refer to the relationship between δ18O and d-excess with SSTs and sea ice fraction (SIF). I consulted the method section to see that the SST data is from HadSST but I am a little unclear as to what SIF means. You say that "sea ice fields were derived from in situ sea surface observations and satellite derived estimates" so is SIF the same as sea ice coverage? A little extra information here would be helpful.

For both the SST and SIF you don't explain which region the data comes from. Does the SIF refer to sea ice for the whole of the Bellingshausen Sea? Or just the area closest to your sites? The same goes for SSTs, is this a whole ocean value or have you selected a region? Does this region correspond to the origin of your back trajectories? Please just clarify this in the text.

For the firn cores can you give an estimate of how many samples you have per year? You say 5 cm resolution but it's useful to know what this equates to in time/ age resolution. Alternatively it might be useful to add the annual accumulation for each site to table 1.

Minor comments:

Page 960 line 12-15. This sentence needs restructuring or splitting into two. Remove

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"of" to read "therefore enhance the...".

Page 961 line 3 - insert a comer after “both lines,.....”

Page 961 line 13 – replace “of” with “in”.

Page 961 line 14 - Remove “as well as compared to” and replace with “and”. Remove “of” to read “despite the”

Page 961 line 19 – 21 – Consider restructuring the sentence perhaps change to “allow us to compare the precipitation and firn samples”.

Figure 8 – could you make the GMWL a dashed line to make it clearer in the figure?

Page 965 line 2 - change “smoothened” to “smoothed”. Consider removing “, and by this.....”

Page 965 line 19 – remove the comer after “core values”

Page 968 line 2 - remove significantly

Interactive comment on The Cryosphere Discuss., 5, 951, 2011.