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## ***Interactive comment on “Climatic signals from 76 shallow firn cores in Dronning Maud Land, East Antarctica” by S. Altnau et. al***

### **Anonymous Referee #1**

Received and published: 24 December 2014

The manuscript submitted by Altnau et al. present a compilation of surface mass balance (SMB) and water isotopic records from 76 shallow cores in the sector of Dronning Maud Land after a separation in different sectors. The main conclusion is that there is a clear difference in the relative variations of SMB and d18O of ice between the coast and the plateau, the plateau showing coherent variations of SMB and d18O since d18O is controlled by Rayleigh distillation and thermodynamic effects while on the coast, atmospheric circulation effects create strong unrelated variations of SMB and d18O ice. In general, this compilation is interesting and should be published. Still, there are several comments that should be taken into account to improve the manuscript that has too many figures and lacks from some clear conclusions: - It seems that all data from this paper are already published. Still, it would also be nice to mention what is really new in this study compared to previous studies and what is the real novelty of this study. -

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The main conclusions of the paper are not clear except the difference between the behaviors of d18O vs SMB in the plateau and on the coast. In particular, the link with the SAM is totally unclear and the conclusion part of the paper should be rewritten. It is not clear from what is written if the SAM has or not any influence on the ice d18O or SMB in coastal area since contradictory conclusions are presented. The authors also seem annoyed by a lack of clear signal with sentences such as “The reasons are not yet entirely clear”. I do not see any problem to have a signal that is not clear or inexistent but the conclusion should be written more clearly to avoid a false take-home message.

- A discussion on how post-deposition effects also affect d18O of snow is missing (only post deposition noise on SMB is mentioned).
- Part 5.2.1 (and 5.2.2) could be rewritten for more clarity. More should be explained on the 11 cross-correlations and what are exactly the 3 cross-correlations of d18O that are significant. What does it mean? What conclusions can be driven for the different sites? For the meaning of the d18O signal in shallow ice cores? There are too many figures in this part (and the following) that are only briefly mentioned and do not seem central for the final conclusion of the paper. Either some figures should be deleted or the text should be more explicit on what can be learnt from these figures.
- Part 5.2.3 on opposite is much more clear and useful for the final conclusion of the paper and associated figures are really useful.
- Some typing mistakes should be corrected (e.g. “Eat” instead of “East” on p. 5966).

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Interactive comment on The Cryosphere Discuss., 8, 5961, 2014.

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