

Manuscript # 2015_734 entitled 'Precipitation regime and stable oxygen isotopes at Dome C, East Antarctica – a comparison of two extreme years 2009 and 2010'.

This aim of this paper is to compare the precipitation at Dome C in East Antarctica for two years, 2009 and 2010. The authors present a clear and concise analysis of the circulation differences and their relationship with observed precipitation.

Comments

1. Abstract: Please define SAM and ZW3.
2. Page 30477, line 14. Please define w.e.
3. Page 30478, line 2. What is the word 'synoptics' referring to in this section?
4. Page 30478, line 22-24. Could the authors explain in more detail the sentence that precipitation is 'formed close to the upper boundary of the temperature inversion layer assuming that the largest moisture amounts are found where the air temperature is highest'? Which inversion layer is this referring to and why is the air temperature high there?
5. Page 30479, line 12. Does 'accumulation' refer to precipitation accumulation?
6. Page 30479, line 21. Are the authors claiming that it is not plausible to get high moisture levels above 500hPa? Frontal systems can transport moisture up to the tropopause in the warm conveyor belt airflow. This seems inconsistent with the author's statement.
7. Page 30483, line 10. What do the authors mean by 'mean annual course'?
8. Page 30484, line 10. Could the authors expand their reasons for thinking that there is an error in the observation of diamond dust for this event? Is this a systematic error in the observations or a single occurrence? If it is a systematic bias in the observations, would this affect the results?
9. Page 30485, line 17. A forecast bust of 25% seems to be very large. Are these missing precipitation events typically with low precipitation rates, just above the threshold, or are more substantial precipitation events missing?
10. Page 30486, line 25. How was the 'main moisture source' defined and how were the source regions estimated? Were the trajectories moisture weighted or are they simply the location of the back trajectories 5-days previously?
11. Page 30486, line 28. Why do the authors assume that the northernmost point of the trough corresponds to the northern limit of the potential moisture source? Does this assumption rely on steady state conditions, i.e. that streamlines and trajectories are equal?
12. Page 30487, line 1. What do the authors mean by 'inconsistencies'?
13. Page 30487, line 11. Please could the authors clarify what they are referring to by the meandering branch and zonal branch of the main flow?
14. Page 30487, lines 15-20. The authors present an account of a forecast bust but it is not clear how representative this is of the other missing precipitation events. Please could the authors expand on this section, to put the case-study analysis into context?
15. Page 30488, line 15. Should 'am SAM index' be 'a SAM index'?
16. Section 5.22 and 5.23. The authors link the precipitation differences to modes of variability for the two years in the study. It is not clear why this is done. Are the authors suggesting that predictability of large-scale modes of variability could inform seasonal prediction of Arctic precipitation, or are they going to use these relationships to look at multi-year analysis or changes in a warming climate, or some other reason? How do the differences in SAM and ZW3 compare to other years?
17. Page 30491, line 19. 'locatation' should be 'location'.
18. Figure 5. The contour labels on figure 5a are too small to read.

19. Page 30493 lines 16-18. The future work section here is very general and brief. It would be nice to discuss in more detail where this analysis could lead.