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Interactive comment on "Large-scale atmospheric circulation control on stable water isotopes in precipitation over the northwestern and southeastern Tibetan Plateau" *by* Xiaoxin Yang et al.

Anonymous Referee #2

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In this paper a new seven-year dataset of d18O and d2H measurements in precipitation is presented. Although the dataset as such is an interesting one in my opinion, the interpretation in terms of the impact of different large scale patterns of climate variability like the El Niño – Southern Oscillation Index and the Northern Annular Mode is made in a very superficial and qualitative way. Many arguments brought forward to show the link between the isotope signals and the different climate variability patterns are not clear to me from a mechanistic point of view. Furthermore, the seven-year dataset is too short to show robust connections between these climate variability modes and isotope signals in precipitation over the Tibetan plateau. The dataset as such is unpublished

yet, as far as I understand, and could be very useful to investigate the processes affecting the atmospheric water cycle on the Tibetan Plateau but the interpretation of the data should be done more carefully. The relatively high temporal resolution of the measurement data (event-scale) is not exploited.

In addition to the (in my opinion) inappropriate focus of the data interpretation, I have several scientific and technical remarks that lead my to recommend a rejection of the paper in this form:

1) Many of the Figures (5,7 and 8) and their interpretations are not clear to me. In the case of Figure 5 for example the correlation coefficient of the measurement data with the simulations are mentioned but I don't find this quantity in the Figure. In Figure 7 I do not understand the color coding and which variable from which dataset is actually shown.

2) It is mentioned only very late in the manuscript (Section 4) that data from two isotope enabled general circulation models (GCMs, IsoGSM and LMDZ4-iso) is used. These datasets and their technical properties should be presented in the methods section. Also it is not clear how the measurement data is compared to the model data and over which time period.

3) For me Figure 6 and the paragraph referring to it is not relevant and not very well embedded in the text. What insight can we get from a correlation analysis of the isotope signals in different water bodies of the isotope enabled GCMs with the precipitation isotope signal? For me the result that large-scale atmospheric circulation generally dominates the moisture supply to precipitation in the Tibetan plateau region as opposed to regional recycling is quite obvious. However taking the d18O signal averaged over the total atmospheric water column as a representative variable indicating the strength of the large-scale moisture transport is not adequate. Strong regional moisture recycling also contributes to the total atmospheric water column.

4) I do not understand how the composite analysis mentioned at L233 is done, which

period it concerns and what it refers to.

5) Event though the English of the paper is mostly satisfactory the writing is confusing in many places, not very well structured and it is difficult to get an overall picture.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-876, 2016.