

# ***Interactive comment on*** “The influence of wind and land evapotranspiration on the variability of moisture sources and precipitation of the Yangtze River Valley” *by* **Astrid Fremme and Harald Sodemann**

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We would like to thank anonymous referee 1 with their considerate comments and help in making the manuscript more understandable. Following is a list of how the specific comments have been addressed:

*Page 5, Lines 24-26 and Page 11, Lines 4-6: information inconsistency. In former, I have learned that 95% of moisture source is attributable by WaterSip to precipitation. However, in latter, it says, I quote, "The WaterSip summer precipitation deviations . .*

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. with an average of -20.5%. This is a typical bias for Lagrangian diagnostics (Sodemann et al., 2008)." Which one the actual WaterSip accuracy in terms of estimating precipitation?

Concerning the accuracy of WaterSip in terms of estimating precipitation, we clarify our statements to show that there is no inconsistency. P5, L24-26 (P6, L2-5) in the revised version read: "While there is an overestimation during most months of the year, WaterSip underestimates ERA Interim precipitation in summer (JJA) with an average of 20.5%. Of the precipitation estimated by the WaterSip method, 95% is attributed to a source, while 5% is not accounted for, for example due to moisture sources further back in time than 15 days."

*P6, L18: In the sentence, "the two-month anomalies" is mentioned without giving the referring mean. By reading the caption of Figure 3, I learn that this is the anomaly against the whole wet season (April-September). However, it is confusing without an explicit mention in the text.*

Page 6, Line 18 (now Page 6, Line 30): How "the two-month anomalies" is calculated is now mentioned in the text. "Comparing each two-month period to the overall wet season mean we obtain the two-month anomalies (Fig. 3d-e)."

*Section 3.5: I cannot find information on how is the local fraction of continental recycling calculated (and in Figure 8b). Without this information, I cannot justify the validity of the second-order continental moisture source, and therefore, the whole section 3.5. In my opinion, the innovation of this study largely comes from this section.*

Section 3.5 (now 4.4): Information on how the local fraction of continental recycling has been added in the revised manuscript. A new paragraph in the method section (Page 4, Lines 20-29) now reads: "The WaterSip diagnostic tool is also used to obtain the so-called second-order moisture sources. This measure gives us more information on the number of times moisture goes through precipitation and re-evaporation over land before reaching the target region. Obtaining the second-order moisture sources

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is a three step process in addition to obtaining the YRV moisture sources. Firstly, the moisture sources to a larger region of Asia are calculated, and the land fraction to the Asian region is obtained. This land contribution fraction is found by analyzing each trajectory separately. Knowing the moisture sources and relative contribution to each precipitation event, the land fraction is calculated. Secondly, the monthly mean land fraction over the Asian region is obtained by weighting by the contribution from each trajectory to precipitation over the region. For the third step we assume that continental moisture originates from precipitation in the same region within the same month. Folding the YRV land moisture sources by the fraction of land contribution to the source regions then gives the second-order moisture source land fraction to the YRV."

*Page 13, Lines 4-5: I do not know how is the mass-average moisture source distance defined. Is it defined from the furthest boundary of moisture source to the center of the YRV along the great circle? What does the deviation stand for, monthly variation or interannual variation? And, why there is not deviation for the centroid of moisture sources?*

Page 13, Lines 4-5 (now Page 13, Lines 22-26): Definitions for the mass-average moisture source distance and the centroid of the moisture sources are now stated, as well as their monthly standard deviations. "For example, the summer mass-average moisture source distance for our results is 2420 km with a monthly standard deviation of  $\pm 376$  km. The mass-average moisture source distance describes the distance between all moisture source evaporation events and the corresponding target region precipitation events, weighted by their contribution to precipitation in the target area. This is equivalent to the distance between the centroid of the moisture sources. The centroid of the moisture sources in our results is located at  $19^\circ$  N and  $100^\circ$  E."

*Page 8, Lines 9-11: please put citations in the correct parentheses.* Parentheses of citations were corrected.

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*Page 9, Lines 24-25: this sentence is incomprehensible.* Page 9, Lines 24-25: The sentence “Tracking moisture beyond the last place of evaporation is one of the reasons results of between previous studies, but also between this study and others differ.” has been changed to (Page 10, Lines 2-3): “An advantage of the approach used here is the ability to quantify the degree to which moisture undergoes multiple recycling events (see Sec. 2).”

*Figure 8. The red dashed lines is shown in the wrong panel; or the caption is wrong.*

Red dashed lines were changed to the correct panel (Fig. 8a).

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