

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

Astrid Fremme and Harald Sodemann

astrid.fremme@uib.no

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We would like to thank the anonymous referee 4 with their considerate comments and help in making the manuscript more understandable. Following is a list of how the comments have been addressed:

Specific comments

1. The introduction puts forward the main scientific problem of the present research at Line 12-15 of Page 3. However, the main assignment of this study, which is outlined

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in Line 13-15 of Page 3, does not clearly provide sufficient information on how to resolve the problem. Moreover, I do not find the direct answer to problem throughout the manuscript. The sentence “Without the ability to compare in detail, the results of these past studies are similar and do not contradict the results of this study” may make the readers think that the problem are not really solved in this study. I suggest the authors to improve the proposal of the scientific problems.

Page 3, Line 13-15 has been rewritten: “The lack of agreement with respect to both location and magnitude of the moisture sources for the YRV highlights the need for further attempts to locate the spatial distribution of moisture sources to the YRV, the moisture contributions from land and ocean, and the seasonal cycle of the moisture sources. ” We have also made our comparison with other studies clearer. Page 13, Line 8-10: “Based on the location of the moisture sources and the seasonal cycle, the study of Rodriguez et al. (2017) and that of Pan et al. (2017) showed the most similarities to our results. As this study used a very different method to these, we conclude that these results are the most reliable.”

2. The manuscript have studied too many issues regarding the moisture sources for the rainfall in YRV, which are too dispersed for the readers to understand the central idea of the study. So I suggest the authors to reorganize the results and discussion section (Section 3) to make it more concentrated.

As stated in the response to referee 2, the sections of the manuscript have been rearranged, with two revised section titles (3. Data and method validation, and 5. Discussion). This limits the number of subsections in the Results section, and provides an overall more logical structure. In addition, some of the subsections have been given new titles to better reflect what we want to convey through each of them. The subsections under Results are now: 4.1 Climatological mean moisture sources of YRV precipitation, 4.2 Mean seasonal cycle of YRV moisture sources, 4.3 Continental recycling and regional evaporation recycling in the YRV, 4.4 Second-order moisture sources of recycled precipitation, 4.5 Factors governing local recycling, and 4.6 Interannual

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variability of local recycling and distant contribution in summer. The total number of subsections has been kept the same, as we think they provide the best way to make our findings accessible to the readers.

3.Line 23-29 of Page 9. The paragraph gives the reasons for the disagreement among existing studies from the perspective of the way of considering second-order continental sources. However, no more detail is provided here. I suggest the authors to give the ways how existing studies track the moisture beyond the last place of evaporation, which may provide the evidence supporting the assertion.

These lines have been rewritten: "An advantage of the approach used here is the ability to quantify the degree to which moisture undergoes multiple recycling events (see Sec. 2)." In Section 2 some methodological aspects are addressed.

Minors

1.Line 32 of Page 4. Why sources for precipitation over the ocean are excluded by including the sources above 25 m elevation, not zero m? The area of the land regions with elevation <25 m is actually not small.

This sentence was unclear and has been rewritten: "The target region is limited to land areas with a threshold of 25 m minimum elevation. " The 25m threshold is used to delineate the YRV target region. Here, the difference between using 0 and 25m is small (0.6% of the region). For moisture sources over land and ocean a land mask is used.

2.Line 9-11 of Page 8. The sentence is hard to understand.

The sentence has been rewritten: "Previous studies which considered land contributions to YRV precipitation reported between 30% and 60% continental recycling for different seasons and slightly different target regions, with a gradient of lower continental recycling to the southeast in the region, and more land contributions to the northwest (Sun and want, 2015; Zhao et al., 2016; Pan et al.,2017)."

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3.Line 15-16 of Page 8. Fig. 7a only shows the results in the southeast part of Asia, how can the ET results over the whole Asia be seen?

- The phrase "Asia" has been changed to (Page 8, Line 28): "South and East Asia".

4.The title of the manuscript does not exactly match the results of the present study and is thus misleading. The title suggests that the manuscript aims to study the effect of surface wind velocity and land evapotranspiration variations on the variations of the moisture sources for the rainfall in YRV. This is actually only one of the issues of the manuscript (Section 3.6). So the title should be revised according to the scientific problem of the manuscript.

- As suggested by the reviewers, the title of the manuscript has been changed to "The role of land and ocean evaporation on the variability of precipitation in the Yangtze River Valley" to better reflect the overall contents.

5.Line 31 of Page 10. This sentence emphasizes the role of soil moisture and solar forcing in causing the late peak of local recycling in August. However, this sentence contradicts with the results shown in Line 13-18 of Page 10. Also, I do not find any evidence for the solar forcing throughout the manuscript.

- "A sentence has been added to the first results on soil moisture. (Page 10,Line 32)" We recognize that the soil moisture may participate in causing the late peak in local recycling, but is not a driving factor." - (Page 11, Line 13): "Solar forcing" has been changed to "evaporation rates".

6.Line 5-6 of Page 11. The meaning of the sentence is hard to understand because what the precipitation deviations are is not provided. Also I do not find the corresponding supporting data in Table 3.

- Part of this information is now given together with Fig. 2d, where the WaterSip underestimation of precipitation during summer can be seen. Page 6, Line2-3: "While there is an overestimation during most months of the year, WaterSip underestimates ERA

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Interim precipitation in summer (JJA) with an average of 20.5%^a.

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