

Clim. Past Discuss., referee comment RC1  
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## Comment on cp-2021-182

Fei Liu (Referee)

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Referee comment on "Mechanisms of hydrological responses to volcanic eruptions in the Asian monsoon and westerlies-dominated subregions" by Zhihong Zhuo et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-182-RC1>, 2022

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Review of **"Mechanisms of hydrological responses to volcanic eruptions in the Asian monsoon and westerlies-dominated subregions"** by Zhuo et al

Summary and recommendation

Understanding the regional hydrological responses to volcanic eruptions at different locations is important to predict the potential climate disasters after future eruptions. This work found a "wet get drier, drier gets wetter" response after the NHVAI, while a significant wetting effect after SHVAI. The relative effects of dynamic and thermodynamics were also investigated. The motivation and results are very interesting, and this manuscript is well organized. I would like to see this work to be published in CP, while before that some Minor revisions are needed.

My major concern centers around the discussion on "wet response" or "dry response". This work mainly focused on the PDSI, which response is not only related to precipitation variation but also to temperature change. The increase of precipitation doesn't mean that the PDSI should be increased (Aiguo Dai 2013 Nature Climate Change). In the introduction and main text, the authors should be very carefully to avoid mixing the precipitation and PDSI change.

Line 14: You mainly focused on the three years after the eruption, which does not belong to the decadal prediction.

Lines 38-40: What are the main results of these works? Are they consistent with your finding?

Line 58: More details of this local cloud feedback are appreciated. Do you mean that the longwave radiation of the cloud will increase the convection?

Line 70: The dataset of Ammann et al. 2007 was used in IPSL model. Please check whether you used this model or not?

Line 124: I don't know how the correlations are calculated. Did you calculate it among different eruptions or among the 11 selected years? More details are needed.

Figure caption 3: Definition of the Asian monsoon region is necessary.

Lines 138-139: The reconstructed PDSI response of Asian monsoon to different eruptions was first discussed by Liu et al. 2016 SR. Comparison with this reconstruction analysis is necessary.

Figure 5: Definitions of these ASM land and ocean regions are needed.

Line 188: Figure 6 exhibits the temperature anomalies, not the PDSI.

Fig. 8: Significant test is needed in Figs. 8b and 8c.

Line 250: I don't think the mechanisms are totally the same. The change of PDSI include both precipitation and temperature related evaporation variations. Previous works mainly focus on the precipitation change.

Line 295: The RDA region is actually located at central Asia.