Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2020-102-AC1, 2020

Hydrology and Earth System Sciences
Discussions
Open Access
EGU

Interactive comment on "The precipitation variability of wet and dry season at the interannual and interdecadal scales over eastern China (1901–2016): The impacts of the Pacific Ocean" *by* Tao Gao et al.

Tao Gao et al.

wq2006126@126.com

Received and published: 24 May 2020

This paper attempted to investigate the variability of precipitation in China using a longterm dataset and integrating multiple statistical methods such as PCA/EOF, wavelet analysis, and Bayesian dynamical linear model. However, the results presented in this paper are very well understood in the literature, and the impacts of ENSO and PDO have been studied extensively in existing studies (the authors also introduce some of them in their introduction section). The authors should have done a thorough investigation of the research gap, and the novelty of their current paper

Printer-friendly version

Discussion paper

should be clearly stated. It seems that the authors thought utilizing April–September as the wet half year (wet season) and October–March as the wet half-year is novel. That is not convincing. Some similar studies are as follows (there are much more than that): Ouyang, R., Liu, W., Fu, G., Liu, C., Hu, L., & Wang, H. (2014). Linkages between ENSO/PDO signals and precipitation, streamflow in China during the last 100 years. Hydrol. Earth Syst. Sci, 18(9), 3651-3661. Yang, Q., Ma, Z., & Xu, B. (2017). Modulation of monthly precipitation patterns over East China by the Pacific Decadal Oscillation. Climatic change, 144(3), 405-417. Yang, Q., Ma, Z., Fan, X., Yang, Z. L., Xu, Z., & Wu, P. (2017). Decadal modulation of precipitation patterns over eastern China by sea surface temperature anomalies. Journal of Climate, 30(17), 7017-7033. Xiao, M., Zhang, Q., & Singh, V. P. (2015). Influences of ENSO, NAO, IOD and PDO on seasonal precipitation regimes in the Yangtze River basin, China. International Journal of Climatology, 35(12), 3556-3567.

Response: Thank you so much for your constructive comments. We have made a substantial revision of the paper to address all the issues. The research gap and novelty have been highlighted in the revised manuscript as follows. Most existing studies focusing on the effects of ENSO and PDO on precipitation over eastern China mainly examine the spatial pattern of rainfall during different phases of climate variability modes, while the time-varying linkages between eastern China rainfall and large-scale modes have not been investigated, which are of great importance for developing skillful precipitation forecasting model (Zhang et al., 2014). In this study, we used wavelet analysis and Bayesian dynamical linear model to analyze their time-varying relationships at the century-scale, this may fill the research gap of the century-scale time-varying linkages between climate variability modes and regional rainfall events. We have added related descriptions and discussions in abstract (lines 44-46), and introduction (lines 131-135), as well as discussion and conclusions (lines 500-510).

Although the rainfall events mainly occur in summer (June-August), the rainy season extends April–September over eastern China, since the rainfall in eastern China is

principally concentrated during April–September (Bao 1987; Domroes and Peng 1988; Zhai et al., 2005). Usage of boreal standard seasons may therefore unavoidably break the natural rainy distribution at the temporal scale, affecting the robustness of the analytical results. Zhai et al. (2005) have investigated trends of precipitation extremes during wet season (April–September) and dry season (October–March) in China, and suggested that utilization of six months as the dry (wet) half year facilitates to characterize the variations in extreme events. While up to now, the issue on whether the ENSO and PDO can contribute to the interannual and interdecadal rainfall variability in major rainy seasons over eastern China is still unclear. In this study, we utilize April–September as the wet half year (wet season) and October–March as the dry half year (dry season), respectively, to examine the effects of ENSO and PDO on the precipitation variability at the space-time scale.

References ïĄň Bao, C. L. : Synoptic Meteorology in China. China Ocean Press, 209 pp, 1987. ïĄň Domroes, M., and G. Peng: The Climate of China. SpringVerlag, 361 pp, 1988. ïĄň Zhai, P., Zhang, X., Wan, H., and Pan, X.: Trends in total precipitation and frequency of daily precipitation extremes over China, J Climate, 18, 1096-1108, https://doi.org/10.1175/JCLI-3318.1, 2005. ïĄň Zhang, W., Jin, F. F., and Turner, A.: Increasing autumn drought over southern China associated with ENSO regime shift, Geophys Res Lett, 41, 4020-4026, http

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2020-102, 2020.