The authors wish to thank the editors and reviewers for their effort in reviewing our manuscript. We appreciate the constructive criticisms, and we hope the changes listed have made the manuscript suitable for publication.

Referee 1:

General Comments:

ENSO has huge influence on precipitation in east Asia. This paper investigated the impact of different ENSO regimes on rainy-season precipitation in China at the developing and decaying phases, and it also explored the possible physical mechanism of precipitation change from the large-scale atmospheric circulation aspect. It will contribute important new knowledge to the study of the spatiotemporal rainy-season precipitation variability in China under different ENSO types. There are significant opportunities for improving the paper, which are presented as the following points:

Major comments

1) ***Comments:***

In study area and data part, how did the authors select the precipitation stations for analysis? How about the data quality? Any missing data? As far as I know, there might have much more precipitation stations in China Meteorological Data Sharing Service System. What are the screening conditions for the selected stations?

Response

Thanks for the comment. It is true that more precipitation stations are shown in China Meteorological Data Sharing Service System as compared to stations selected in this paper. The screening conditions for the selected stations are:

a) Daily precipitation data at each station is deleted if the missing data is more than 5% per year.

b) Missing data is interpolated by the average value of effective daily precipitation 3 days before and after the missing data.

c) The data period for selected station is no less than 40 years.

2) ***Comments:***

In the methodology part, this paper defined the CPW, EPC and EPW regimes based on the definition proposed by Kim et al. (2009), and presented the years dominated by CPW, EPC and EPW regimes. However, the determination of conventional ENSO and ENSO Modoki in this paper is judged by the

rainy reason rather than the whole year based on SD values. Could you explain why did do like this?

Response

Thanks for the comment. The difference is determined by different definitions of CPW, EPC, EPW and ENSO, ENSO Modoki.

a) The definition of CPW, EPC and EPW

Niño 4 warming exceeding 1 standard deviation (SD), while Niño 3 stays below this range, for CPW; Niño 3 or Niño 3.4 cooler than 1 SD, for EPC; Niño 3 warming greater than 1 SD, for EPW(Kim et al., 2009). Warming and cooling events are defined based on the detrended SST anomaly index for August to October (Kim et al., 2009).

It can be pointed out that the determination of CPW, EPC and EPW is based on SSTA and SD indices for August to October. Hence, the three ENSO types can only be determined by years rather than rainy season.

b) The definition of ENSO and ENSO Modoki

The conventional EN (LN), abbreviated as CEN (CLN), was defined as SSTA above (below) 0.7 SD (-0.7 SD) in the area of 5°N − 5°S, 90°W − 140 °W. Similarly, warm (cold) episodes of ENSO Modoki, abbreviated as MEN (MLN), was defined as EMI above (below) 0.7 SD (-0.7 SD).

SD in definitions of ENSO and ENSO Modoki represents the standard deviation of the specific period you select. Therefore, we can judge the type of ENSO and ENSO Modoki of the rainy season.

3) ***Comments:***

Line 194: the authors need to present a brief introduction why 850-mb vector is selected for the analysis of composites of circulation.

Response

Thanks for the comment. We agree that the reason why choosing 850-mb vector winds to analyze circulation and monsoon is missing. A brief introduction is presented after the paragraph at ***Page 3, Line 67*** as:

“850hpa wind variability is associated with SSTA in the equatorial Pacific and precipitation anomalies in China (Zhang et al., 1999;Zhou and Chan, 2007;Wang et al., 2004;Zhang et al., 2016b). Fan et al. (2013) pointed out that 850 hPa vector winds are related to the moisture transportation from western tropical Pacific to the subtropical region, which determines the precipitation over the Yangtze-Huai River

Valley region. Huang et al. (2004) and Zhang et al. (2014a) presented the atmospheric circulation and monsoon variability by the composite distribution of wind anomalies at 850 hpa in different phases of El Niño and La Niña to explain precipitation variation in China. Feng et al. (2011) compared the difference of 850 hPa wind anomalies in decaying ENSO and ENSO Modoki phases to explain the physical mechanism of seasonal precipitation variation in China. Hence, 850 hpa vector winds reflecting atmospheric circulation and monsoon variability is used to explore the underlying causes of precipitation anomalies in this study. ”

4) ***Comments:***

In the Results and Discussion part, the climate in China is largely affected by East Asian monsoon, which determines the spatiotemporal patterns of precipitation. How could you explain the connections between the monsoon effects and precipitation anomalies under different ENSO types?

Response

Thanks for the comment. We use the spatial patterns of 850-mb vector winds to explain the connections between the monsoon effects and precipitation anomalies under different ENSO types. The reason why 850-mb vector winds are selected is presented in comment 3. We have cited more references to further show the teleconnection by revising the paragraph at ***Page 10 Line 219*** as:

“Generally, stronger western and southwestern winds are related to increasing precipitation. It is in agreement with the research of Zhang et al. (1996) and Wang et al. (2000), who pointed out that southeastern and southwestern winds could substantially enhance the moisture transportation to China. Wu et al. (2003) also found that East Asian monsoon is positively related to precipitation variations, which is consistent with our result.”

The explanation of the teleconnection can also been shown at ***Page 10 Lines 194-196*** as:
“There is a strengthening of westerly and southwesterly wind in the decaying year of CPW (Fig.5b), which brings more moisture to China, compared to developing CPW (Fig.5a). This may explain the enhanced precipitation in decaying CPW (Fig.2b).”

at ***Page 10 Lines 205-207*** as:
“Compared to developing CEN, developing MEN experienced reduced precipitation in western China and generally enhanced precipitation in eastern parts under the combined influence of stronger monsoon and weakened anti-cyclone (Fig.6a-b).”

at ***Page 11 Lines 211-213*** as:
“The difference of wind composites between decaying CLN and MLN indicates similar configuration, with stronger westerly wind and anti-cyclone causing enhanced precipitation for decaying MLN. ”

Minor comments

1) ***Comments:***

Lines 13-14: higher than normal average precipitation doesn't always mean flooding unless you conduct hydrological modeling. I would use precipitation anomaly only rather than "flood". I suggest "the precipitation anomaly can reach up to 30% above average precipitation during decaying CPW and EPW phase"

Response

Thanks for the comment. We will use precipitation anomaly only rather than "flood" or "drought".

P. 1, it is written: < Results showed that there is a higher probability for flooding during decaying CPW and EPW phases in most parts of China with a largest precipitation anomaly reaching 30% above average precipitation. >

revise the paragraph at ***Page 1, Lines 12-14*** as:

"Results showed that the precipitation anomaly can reach up to 30% above average precipitation during decaying CPW and EPW phases."

P. 1, it is written: < Developing EPW could trigger droughts over large areas in China with 10-30% lower than average precipitation in most areas. >

revise the paragraph at ***Page 1, Lines 14-15*** as:

"Developing EPW could cause decreasing precipitation over large areas in China with 10-30% lower than average precipitation in most areas."

P. 1, it is written: < Decaying ENSO also showed larger effect on the occurrence of drought and flood, compared to decaying ENSO Modoki.>

revise the paragraph at ***Page 1, Lines 16-17*** as:

"Decaying ENSO also showed larger effect on precipitation anomalies, compared to decaying ENSO Modoki."

P. 6, it is written: < In summary, the CPW decaying phase (EPC developing phase) deserves more attention than the developing (decaying) phase, since it has higher possibility to trigger flooding.>

revise the paragraph at ***Page 6, Lines 143-144*** as:

"In summary, the CPW decaying phase (EPC developing phase) deserves more attention than the developing (decaying) phase, since it show more prominent wet signals."

P. 8, it is written: < Flooding or drought is more easily triggered for the warm episodes of conventional ENSO, in comparison to the other three regimes.>

revise the paragraph at ***Page 8, Lines 167*** as:

"Wet or dry signals are more easily shown for the warm episodes of conventional ENSO, in comparison to the other three regimes."

P. 8, it is written: < Most parts of China presented increasing precipitation for decaying CEN, with more than 30% above average precipitation identified in north China, which is more likely to trigger flooding>

revise the paragraph at ***Page 8, Lines 169-171*** as:

"Most parts of China presented increasing precipitation for decaying CEN, with more than 30% above average precipitation identified in north China."

P. 13, it is written: < Conventional ENSO in the decaying phase is more likely to cause flooding and drought in comparison to the corresponding ENSO Modoki regimes.>

revise the paragraph at ***Page 13, Lines 246-247*** as:

"Conventional ENSO in the decaying phase is more likely to show wet and dry signals in comparison to the corresponding ENSO Modoki regimes."

2) ***Comments:***

Line 25: what does "rainy season characteristics represent?"

P. 1, it is written: < Rainy season characteristics, however, are less considered, which are of immense significance to rain-fed agriculture in many countries like China. >

Response

Thanks for the comment. Rainy season characteristics represent onset, withdrawal and precipitation of the rainy season mentioned below. We have now revised the paragraph at ***Page 1, Line 25*** as:

"Rainy season characteristics (e.g., onset, withdrawal and precipitation of rainy season), however, are less considered, which are of immense significance to rain-fed agriculture in many countries like China."

3) *Comments:*

Line 29: Provide references for the statement “china is an ENSO-sensitive country”

P. 2, it is written: < China is an ENSO-sensitive country and prone to flood and drought occurrence. >

Response

Thanks for the comment. We agree that the statement needs to be expanded to be made more clearly. We have now revised the paragraph at ***Page 2, Line 29*** as:

“China is an ENSO-sensitive country and prone to flood and drought occurrence (Zhang et al., 2016a;Feng et al., 2011;Feng et al., 2010;Wang and Wang, 2013;Zhang et al., 2014b;Feng and Li, 2011)”

4) *Comments:*

Line 30: delete “Chinese”

P. 2, it is written: < Thus, it is significant to investigate Chinese rainy-season precipitation under ENSO regimes.>

Response

Thanks for reading thoroughly. We have now revised the paragraph at ***Page 2, Line 30*** as:

“Thus, it is significant to investigate rainy-season precipitation under ENSO regimes.”

5) *Comments:*

Line 31: Nino3 ⟶ Niño 3. Global check over the manuscript.

Response

Thanks for reading thoroughly. This point has been corrected.

6) *Comments:*

Line 53: suggest revise “in different parts of China” to “among locations in China”

P. 2, it is written: < It can be seen that the influence of ENSO regimes on precipitation varies in different parts of China.>

Response

Again, thanks for reading thoroughly. We have now revised the paragraph at ***Page 2, Line 53*** as:

"It can be seen that the influence of ENSO regimes on precipitation varies among locations in china."

7) ***Comments:***

Lines 74-78: Suggest delete the introduction of paper structure. It is more like the statement in a report.

Response

Thanks for the comment, we agree that it may be not appropriate to include the introduction of paper structure in a research article and we have corrected it.

8) ***Comments:***

Line 81: delete "Climate of"

P. 3, it is written: <Climate of China is mainly dominated by monsoon climate and mountain plateau climate, which lead to pronounced rainfall differences among different seasons and regions.>

Response

Again, thanks for reading thoroughly. We have now revised the paragraph at ***Page 3, Line 81*** as:

"China is mainly dominated by monsoon climate and mountain plateau climate, which lead to pronounced rainfall differences among different seasons and regions."

9) ***Comments:***

Line 106: "Mann-Kendall test at 0.05 confidence level". Do you mean significance level?

P. 5, it is written: < at 0.05 confidence level.>

Response

Thanks for the comment. We have now revised the paragraph at ***Page 5, Line 106*** as:

"at 0.05 significance level."

10) ***Comments:***

Line 130: delete "It is seen that"

Response

Again, thanks for reading thoroughly. It has been corrected.

11) ***Comments:***

Line 226: try not to use vague words like “seems to”

P. 11, it is written: <As a consequence, WNP anti-cyclone seems to have larger effect on East Asia precipitation on the inter-annual or inter-decadal scale,>

Response

Again, thanks for reading thoroughly. We have now revised the paragraph at ***Page 11, Line 226*** as:

“As a consequence, WNP anti-cyclone has larger effect on East Asia precipitation on the inter-annual or inter-decadal scale,”

12) ***Comments:***

Line 240: “most parts of China”: this statement should be more specific at which part. It is not good to use vague words like “most” in research paper.

P. 13, it is written: <It was found that most parts of China experience increasing precipitation for decaying CPW and EPW,>

Response

Thanks for the comment. We agree that it is not appropriate to use vague words in research paper, and “most parts of china” has been replaced by specific regions and locations in China. We have now revised the paragraph at ***Page 13, Line 240*** as:

“It was found that northwestern, central and southeastern China experience increasing precipitation for decaying CPW and EPW,”

13) ***Comments:***

Lines 241-242: “the positive and negative anomaly ranges from 0 to 30%...”, Is this change significant at a certain confidence level?

Response

Thanks for the comment. The significance level of precipitation anomaly of each precipitation station is truly considered. However, the paper has induced station data into grid data with a resolution of 0.2 ° ×

0.2 °by Kriging interpolation, because the stations are distributed unevenly. Hence, the spatial patterns of precipitation anomaly shown in this paper do not present the significance level. The significance level of stations are shown as Table. 1 (which is shown in the supplement PDF). The precipitation anomalies in most of selected stations are statistically significant at the 0.05 significance level, as shown in Table.1

Table 1. Number of stations which are statistically significant or insignificant at the 0.05 significance level during various ENSO regimes.

Phase	The developing phase		The decaying phases	
Number of stations	Statistically significant stations	Insignificant stations	Statistically significant stations	Insignificant stations
CPW	480	56	484	52
EPC	475	61	454	82
EPW	429	107	487	49
CEN	435	101	475	61
CLN	439	97	409	127
MEN	464	72	476	60
MLN	451	85	459	77

Reference

Fan, L., Shin, S.-I., Liu, Q., and Liu, Z.: Relative importance of tropical SST anomalies in forcing East Asian summer monsoon circulation, Geophys. Res. Lett., 40, 2471-2477, doi:10.1002/grl.50494, 2013.

Feng, J., Wang, L., Chen, W., Fong, S. K., and Leong, K. C.: Different impacts of two types of Pacific Ocean warming on Southeast Asian rainfall during boreal winter, J. Geophys. Res. Atmos., 115, D24122, doi:10.1029/2010jd014761, 2010.

Feng, J., Chen, W., Tam, C. Y., and Zhou, W.: Different impacts of El Niño and El Niño Modoki on China rainfall in the decaying phases, Int. J. Climatol., 31, 2091-2101, doi:10.1002/joc.2217, 2011.

Feng, J., and Li, J.: Influence of El Niño Modoki on spring rainfall over south China, J. Geophys. Res., 116, D13102, doi:10.1029/2010jd015160, 2011.

Huang, R., Chen, W., Yang, B., and Zhang, R.: Recent advances in studies of the interaction between the East Asian winter and summer monsoons and ENSO cycle, Adv. Atmos. Sci., 21, 407-424, 2004.

Kim, H.-M., Webster, P. J., and Curry, J. A.: Impact of shifting patterns of Pacific Ocean warming on North Atlantic tropical cyclones, Science, 325, 77-80, doi:10.1126/science.1174062, 2009.

Wang, B., Wu, R., and Fu, X.: Pacific–East Asian teleconnection: how does ENSO affect East Asian climate?, J. Climate, 13, 1517-1536, 2000.

Wang, B., Zhang, Y., and Lu, M.: Definition of South China Sea monsoon onset and commencement of the East Asia summer monsoon, J. Climate, 17, 699-710, doi:10.1175/2932.1, 2004.

Wang, C., and Wang, X.: Classifying El Niño Modoki I and II by Different Impacts on Rainfall in Southern China and Typhoon Tracks, J. Climate, 26, 1322-1338, doi:10.1175/jcli-d-12-00107.1, 2013.

Wu, R., Hu, Z.-Z., and Kirtman, B. P.: Evolution of ENSO-related rainfall anomalies in East Asia, J. Climate, 16, 3742-3758, doi:10.1175/1520-0442(2003)016<3742:EOERAI>2.0.CO;2, 2003.

Zhang, Q., Wang, Y., Singh, V. P., Gu, X., Kong, D., and Xiao, M.: Impacts of ENSO and ENSO Modoki+A regimes on seasonal precipitation variations and possible underlying causes in the Huai River basin, China, J. Hydrol., 533, 308-319, doi:10.1016/j.jhydrol.2015.12.003, 2016a.

Zhang, R., Sumi, A., and Kimoto, M.: Impact of El Niño on the East Asian monsoon : A Diagnostic Study of the '86/87 and '91/92 Events, Journal of the Meteorological Society of Japan. Ser. II, 74, 49-62, doi:10.2151/jmsj1965.74.1_49, 1996.

Zhang, R., Sumi, A., and Kimoto, M.: A diagnostic study of the impact of El Niño on the precipitation in China, Adv. Atmos. Sci., 16, 229-241, 1999.

Zhang, R., Li, T., Wen, M., and Liu, L.: Role of intraseasonal oscillation in asymmetric impacts of El Niño and La Niña on the rainfall over southern China in boreal winter, Clim. Dyn., 45, 559-567, doi:10.1007/s00382-014-2207-4, 2014a.

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, doi:10.1002/2014GL060130, 2014b.

Zhang, W., Jin, F. F., Stuecker, M. F., Wittenberg, A. T., Timmermann, A., Ren, H. L., Kug, J. S., Cai, W., and Cane, M.: Unraveling El Niño's impact on the East Asian Monsoon and Yangtze River summer flooding, Geophys. Res. Lett., 43, 11375-11382, doi:10.1002/2016GL071190, 2016b.

Zhou, W., and Chan, J. C.: ENSO and the South China Sea summer monsoon onset, Int. J. Climatol., 27, 157-167, doi:10.1002/joc.1380, 2007.