Hydrology and Earth System Sciences Discussions

Interactive comment on "Insights from a joint analysis of Indian and Chinese monsoon rainfall data" *by* M. Zhou et al.

Anonymous Referee #2

This paper presents an analysis into the relationship between SSTa and Chinese and Indian monsoon rainfall. PCA is used to first assess the main patterns of Chinese monsoon rainfall and, separately, Indian monsoon rainfall. Correlations between the two were then investigated. A joint PCA is then performed and correlations between the joint PCA and individual PCA are investigated. /the various joint and individual PCs are then compared with SSTa and indices of the monsoon to see what insights can be found.

Overall the methodology appears sound and the conclusions are also good. However, the conclusions do seem to come in a rush at the end of the paper. Would be good to intersperse more of this type of discussion (i.e. relating PCAs etc to actual physical

mechanisms throughout the paper at appropriate sections) and then summarise in a more concise way at the end. As it stands all the info in the body of the paper is just relating to comparing PCx with PCy or SSTa from some place and no actual indication as to what the PCs actually mean is included until the very end (i.e. what are the physical mechanisms the PCs might represent). Because of this the first sentence of the Discussion/Conclusion reads as a bit of an unsubstantiated claim (i.e. you say you have identified and explained teleconnection between SSTa and monsoon rainfall but you haven't really done that yet....it is not until the following paragraphs that you actually attempt to explain what the PCA analysis actually means in terms of real physical mechanisms).

It is important to link the PCs to actual physical mechanisms as soon as possible but should also comment on the strengths and weaknesses of the PCA approach in realistically representing or providing any real insights into inherently non-linear, non-stationary and (in some cases) non-independent climate driving mechanisms. PCA is one way to do this but there are many others and all have their pros and cons....some discussion along these lines is needed and appropriate caveats on the results and conclusions is required.

Also, it is not actually clear to me from the description in Section 3.2 what was actually done. What exactly do you mean when you say "...the joint PCA on the first two leading PCs of india and china separately..."??? if you are doing it separately then how is it different from what you did in Section 3.1? I am also not clear how 4 PCs emerge from the joint PCA. Also the numbers in Table 2 seem funny to me.....for example, why is the correlation between joint PC1 and India PC1 the same as the correlation between joint PC4 and India PC1. Similar for many other cases. Also in some cases the magnitude of the correlation is the same but the sign is reversed. What is going on here? More explanation and discussion is needed as to the meaning of the individual and joint PCs.

A major concern I have is the question as to what is the novel contribution of this paper.

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

At the moment it reads something like "we did this and got these results and they agree with X and then we did this and got some more results and they agree with Y....". This is particularly the case in Section 3.1 and Section 4. Hence, I think it needs to be more clearly spelt out as to what in this paper is just supportive of previous work and what is actually a new and significant contribution?

A Figure to show the exact study area (and location of some of the places mentioned) would be useful.

Section 2....JJAS was chosen as study area...this is fine...however, it should be noted somewhere that variability in the timing and duration of the monsoon is also very important but it is not something that has been considered here.....ideally, some sort of analysis of this would be good but I think it is beyond the scope of this paper....however, the variability in timing and duration of monsoon and potential relationship with climate driving mechanisms investigated here should at least be mentioned....

Correlations are used throughout the paper....yet no mention is made as to what is a significant and what is a non-significant correlation...this should be included so the strength of the relationships can be interpreted better...(i.e. yes there is a correlation but does it really matter or is it just noise or an artefact of the method?)...

Reference is made in the intro to a few climate drivers (ENSO, subtropical ridge, SST)....however, within the paper subtropical ridge is not really mentioned.....also not considered in any detail (if at all) are interdecadal to multidecadal variability (e.g. as represented by IPO or PDO), ENSO Modoki, IOD etc.....some of the drivers beyond ENSO need to be considered and discussed to make true sense of the PCs relationships with SSTa...

Final sentence...."Hence there is predictability for Indian and Chinese monsoon rainfall through PC1 and PC2".....this claim is not justified by anything presented in this paper....as mentioned the significance of the correlation has not been indicated and even if the correlations are significant it does not necessarily mean that skill in predic-

tion will follow. . ...suggest this bit be removed or some analysis included which actually demonstrates the predictive skill. . ..

MINOR COMMENTS Abstract, 2nd line: "understanding its rule. . ...". . ..not sure what you mean by this?

Page 3169, intro, 4th line. . ..upward and downward trend. . ..over what time period were these trends based on??......

Also page 3169, intro, line 7-8. . ."primarily linked to variations over the warm pool and Indian ocean". . ..where exactly (lat and long boundaries or specific locations would be helpful)

Section 2, line 7: "the entire India". . .suggest change to "the whole of India" or similar. . .

Section 3.3, 1st line. . .ref to Fig 4 I think should be a ref to Fig 3.???

Throughout Section 3.4 and in Table 3 there is ref to "lowest value years". . .what exactly does this mean??

Section 4, page 3175, line 22. . .ref to "warmer tropical SST". . ..where exactly in the tropics are you talking about?? Or do you mean all along the equator?? How far north and south??

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 3167, 2011.