

## Comment from Paul Pukite

Dear Dr Paul Pukite,

Thank you very much for your comment. Here, you can find our answer.

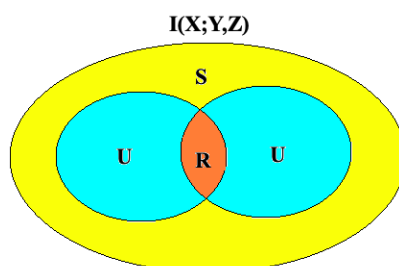
Reviewer comments in: Black

Our reply in: Blue

“Since it has become obvious that common-mode tidal forcing’s control the majority of climate indices, as a first step one should consider how the tidal factors play into the models. See attached figures for AMO and ENSO. Once this causality is understood, then it will be much easier to deal with other interactions. ENSO and IOD have just slight variations on the tidal forcing,,

We agree with your argument on the common-mode forcing influence on the information sources and causal interactions. This is an issue in causality detection and information transfer quantification, where the common-mode forcing’s on sources are usually ignored or misinterpreted. Our manuscript, entitled “Quantification of information exchange in idealized and climate applications” (<https://www.mdpi.com/1099-4300/21/11/1094>) precisely raised this concern on the attribution of causality. The manuscript concludes that care has to be taken while interpreting the results of information exchange/causality/correlation especially in case of common-mode forcing’s.

But there is an ongoing discussion/debate on the causality between IOD and ENSO. However, the current manuscript deals with the interactions of IOD and ENSO on the Indian Monsoon Summer Rainfall (IMSR). With the methodology in the current manuscript, we could quantify the redundant of synergistic information exchange from sources i.e., IOD, ENSO to target, IMSR (please refer to the Methodology Section).



In the above figure (Figure 1 in the manuscript),

U represents unique information exchange from IOD and ENSO respectively to IMSR

R represents redundant information from IOD and ENSO respectively to IMSR.

S represents synergistic information from IOD and ENSO respectively to IMSR.

Our method disentangles the interactions which are redundant or synergistic. If the IOD and ENSO share a common-mode forcing, then their influence on ISMR would be redundant. However, in our manuscript with the observational data, we see synergistic information exchange from IOD and ENSO to ISMR over Indian Monsoon core region (Figure 6 in our manuscript), which implies they are influencing ISMR tandemly (this shows they act as independent modes as far as their influence on ISMR is concerned). Establishing the causality between IOD and ENSO within the models needs a further detailed investigation which is beyond the research focus of the present manuscript.

Thank you again,  
Authors.