

Interactive comment on “Tropical and mid-latitude teleconnections interacting with the Indian summer monsoon rainfall: A Theory-Guided Causal Effect Network approach” by Giorgia Di Capua et al.

Anonymous Referee #1

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TITLE: Tropical and mid-latitude teleconnections interacting with the Indian summer monsoon rainfall: A theory-guided causal effect network approach
AUTHORS: Di Capua G, Kretchmer M, Donne RV, van den Hurk B, Vellore R, Krishnan R, Coumou D

In this study the authors want to identify causal effect networks for the ISM and tropical and extra-tropical regions. According to the authors the causal network applied is able to test physical hypothesis, to explore for causal links and to quantify relative

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contributions. The idea of the analysis is interesting and the potential for the results is high, nevertheless I don't see much of what claimed in the present analysis. The main problem with this manuscript is that it is really hard to read: there are clear limitations due to the large numbers of acronyms in the text, hard to remember and that require back and forth from the results sections to the methodology section. In terms of results, I can see the verification of the results as found in previous works cited, but I hardly see here new results and a quantification of the relative role of influence on the MT rainfall. In my opinion revisions is needed before the work can be accepted for publication in the journal. Below main and minor comments are listed in details.

Main comments: 1 - the manuscript is really hard to read because of too many and complex acronyms. I think the authors need to find a way to simplify the reading using nick-names for the tools applied instead of rude acronyms difficult to remember; 2 - the list of the new findings using these tools should be clearly highlighted in the manuscript, as well as the different weights of the different precursors considered. These capabilities of the tools used are claimed also in the abstract but the results are not clearly extrapolated and summarized in the text; 3 - Fig 2e,f: how do you explain the propagation in t2m and precipitation? what about winds? 4 - Figs 3,5,6 and 7: in these type of figures arrows indicate the intensity of the beta coefficients, while the color of the circle the auto-correlations: how are these information combined in interpreting the results? Also what is the real meaning of the intensity of the beta coefficient. It seems in most of the case quite small, thus indicating a very small relationship (?), and it is large only in the case of linking W1 to MT rain (Fig 7) and in MJO2 linking W1 (Fig 7). How are these measures able to weight for the different factors influencing MT rainfall?

Minor comments: 1 - Line 43: MJO first referenced but without expanding acronym; 2 - End of Introduction: the content of the manuscript (what in sect 2, sect 3 and so on) should be detailed at the end of the Introduction to simplify reading; 3 - Line 156: "conditioning first on one condition", quite uneasy sentence to read; 4 - Line 197: how do you have chosen those dates? 5 - Line 242: I don't understand how if -0.06 is

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non-significant, the value -0.03 related to EOF1 (previous line 233) can be significant (statistically?) 6 - Line 271: likely worth repeating what conditions you are exactly referring to; 7 - Fig 5: the intensity of the link for this figure is not done in the text, as instead it was done for Fig 3. Why this difference in the treatment of the interpretation of the same kind of figure? 8 - Line 329: "internal" to what? what does this mean exactly? 9 - Lines 378-379: I don't understand how/why this differs from what stated before for Fig 3.

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