Comment on wcd-2022-31

Anonymous Referee #3

Referee comment on "Non-linear intensification of monsoon low-pressure systems by the BSISO" by Kieran M. R. Hunt and Andrew G. Turner, Weather Clim. Dynam. Discuss., https://doi.org/10.5194/wcd-2022-31-RC3, 2022

This paper proposed to investigate the relationship between the Boreal Summer Intraseasonal Oscillation and the monsoon low-pressure systems, which is a novel topic with respect to the dynamics near the Indian ocean. The authors studied the precipitation, water vapor, vorticity and the SLP genesis during all eight phases of BSISO and selected phases 2 and 5 as representatives of opposing phases. The energetics was then illustrated through linearization and omega function based on the two typical phases. The nonlinear features in the vertical velocity and vorticity within the SLPs were highlighted by subtracting the linear part from the full fields.

The manuscript is nicely drafted but still has some problems that need to be fixed before publishing

Major opinions:

- Are Figures 1,2 and 3 colorblind-friendly? I know you are trying to use rainbow colors to represent different phases but should be careful with the selection of colors. It looks a bit messy especially when you assign three levels of brightness to each color. Here are two potential options to better show these plots:

  1). Instead of using darkness or brightness to represent the intensity, try using contours with different line types, for example, the one on the left, use dashed contours for >20%, solid contours for 100% and no contours for 50%

2). Separate each plot into three according to the intensity.

- In line 34, you stated that BSISO is identical to MJO. The phases of MJO are usually shown by the outgoing long-wave radiation, how about BSISO? Is it often shown by OLR or precipitation or any other fields? Can you make a schematic plot to show the eight phases? An amplitude-latitude or an amplitude-time or a time-latitude diagram is suggested when introducing the eight phases.
- In Line 64. The "symmetric" feature also exists in part of the TCWV. So it is not plausible enough to be considered a "difference".

Minor opinions:

- A typo at Line 59, should be Fig.3.
- It should be marked when the first time the abbreviation "TCWV" shows up.
- Please write the full name of BSISO in the title.
- Please write the full name of ERA5 in the subtitle in Line 90
- When you say the LPS genesis is half a phase behind the vorticity maxima from Line 140 to 145, what do you mean by "half a phase". Can you do a lag regression to show that? Show the order of water vapor, vorticity and LPS genesis reaching their maxima using lag regressions or any better method.
- A question: why do you use relative latitudes and longitudes instead of the absolute ones in most of your plots? If you would like to state the topologies and locations, the absolute ones would be more helpful.

I'm looking forward to seeing your response to the abovementioned questions.