

Interactive comment on “A New Index For The Wintertime Southern Hemispheric Split Jet” by Stella Babian et al.

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For a better readability all reviewers' comments are written in italics. The associated responses are written in roman style and are blue colored. New paragraphs, which were added to the manuscript are also written in roman style (black).

1 Response to Referee #2

This manuscript proposed a new index for the wintertime Southern Hemispheric split jet based on the principal components. Compared with the existing split indexes, this new one considers the split jet as hemispheric rather than a regional feature. Fur-

ther analysis indicated that the newly defined index has a strong coherence with the Antarctic Oscillation (AAO), but the split jet variability is less dependent on the phases of ENSO. This paper is well written, and the proposed index could be used as an extra index for understanding the mechanism of the wintertime Southern Hemispheric split jet. I have major concerns regarding the ENSO modulation of the split jet variability as detailed below. At this point I cannot recommend publication of this paper.

Major comment:

The modulation of ENSO on the split jet index has not been investigated in great detail in this study, since the time scale studied here for the split jet index is the sub-seasonal, while the ENSO varies on seasonal to inter-annual time scales. The proposed index is highly correlated with AAO, which has a strong month to month variability, so it is not surprising to see that there is no correlation between the index and ENSO on the monthly time series. I would recommend investigating the relationship between the seasonal mean split jet index and the seasonal mean ENSO index.

The relationship between the split jet variability and ENSO is very complex and changing in time. The missing correlation between PSI and MEI stems from the fact, that both La Niña as well as El Niño events are associated with a strengthening of one of the jets (PFJ or STJ). This asymmetric response to the ENSO leads thus to a low and insignificant correlation to the MEI. The positive correlation during strong La Niña phases cancels the negative correlation during El Niño events out. Thus, the time series do not correlate on a significant level. Fig.4 shows further that the relationship is changing in time as well. That does not mean that there is no relationship between the split jet variability and ENSO, rather the true interdependency between both is hidden.

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