

Review of manuscript WCD-2022-555 entitled “Subseasonal precipitation forecasts of opportunity over southwest Asia” by Melissa Leah Breeden, John Robert Albers and Andrew Hoell

OVERALL RECOMMENDATION

Minor revision

SUMMARY

This study uses a statistical model to forecast precipitation at the subseasonal timescales (weeks 3-4 and 5-6) over a specific target region (southwest Asia). The statistical model is a Linear Inverse Model (LIM), and the main goal of the manuscript is to illustrate how some intrinsic characteristics of those LIM forecasts (based on signal-to-noise ratio) enable to “forecast the forecast skill” (Kalnay and Dalcher, 1987). The authors show that the LIM expected skill is a powerful tool to detect forecasts that are indeed truly skillful. Additional analysis shows that this expected skill indicator is more relevant to detect forecasts of opportunity than indices related to ENSO and the MJO. Finally, it also enables to identify another physical signal, namely OLR anomalies in the SPCZ, that is more closely related to these forecasts of opportunity.

MAJOR COMMENTS

This study builds on the LIM methodology, that has already been used by some co-authors of the current manuscript to identify subseasonal forecasts of opportunity (e.g Albers and Newman 2019). To my mind, the major advances that it proposes relative to previous LIM studies are:

- i) the forecast of a local meteorological parameter, i.e precipitation. This makes this study very relevant on the road to real-time and user-oriented applications of subseasonal forecasts
- ii) the comparison with usual climate indices (ENSO and MJO)
- iii) the identification of the SPCZ OLR anomalies as an additional physical indicator of forecasts of opportunity

Moreover, the manuscript is clearly written and provides interesting discussions on the “forecast of opportunity” concept. I think it will be fit for publication once the authors have addressed the minor revisions and my main concern below.

My main concern is about the description of the LIM forecast setup, which I feel is rather incomplete:

- 1) What is the frequency of initialization during the 1 January – 20 March period? Do you start a LIM forecast everyday? Every week?
- 2) I do not completely understand what the output of your LIM forecast is exactly. My assumption would be that it provides weekly values because it is fitted on weekly averages, but I am not certain. Then, where do the biweekly forecasts come from?

For instance, do you add the weekly forecast at day 15 and 22 in order to get week 3-4 precipitation?

3) Why do you mix up verification on weekly (Figures 1 and 4) and biweekly values? I would have expected all results to be shown on biweekly values.

4) By the way, you should be more explicit about the convention you use for week 2, week 3, etc.

All in all, I think some figure illustrating the outline of the LIM forecasting process for a specific example would be welcome.

MINOR COMMENTS

l. 23: Could you include a few words to help the reader visualize what you mean by “southwest Asia” (e.g names of countries or geographical features such as the Persian Gulf, the Caspian Sea, the Himalaya)?

Figure 1: Could you also show the distribution of PCC when considering all LIM forecasts (and not only the top or bottom 20% of expected skill)?

You could explicitly specify in the introduction that no numerical subseasonal forecast (e.g S2S, SubX) is used in this study, contrary to other previous studies such as Albers and Newman (2019).

TYPOS

l.299-300: “particularly – intuitively – during the strongest events”

There seems to be one adverb too many, at least for the clarity of the sentence. I suggest rephrasing.

l. 300-302: “While during either ENSO phases, (...) on the mean jet and circulation”. I do not understand this sentence, which seems too long. Isn’t there a missing verb? I suggest rephrasing.

l. 306 and elsewhere: “El Nino” → “El Niño”

l. 356 and elsewhere: “La Nina” → “La Niña”

l. 311: “during dry El Niño initializations there **are** cyclonic features” (missing word)

l. 319: “include stronger negative SST ~~anomalies~~ anomalies”

l. 321: “Maritime Continent” (upper case)

REFERENCES

E. Kalnay et A. Dalcher (1987). Forecasting Forecast Skill. Monthly Weather Review, 115(2): 349–356. doi: 10.1175/1520-0493(1987)115<0349:ffs>2.0.co;2.