

Weather Clim. Dynam. Discuss., referee comment RC2
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Comment on wcd-2021-19

Anonymous Referee #2

Referee comment on "Seasonal forecasts of the Saharan heat low characteristics: a multi-model assessment" by Cedric G. Ngoungue Langué et al., Weather Clim. Dynam. Discuss., <https://doi.org/10.5194/wcd-2021-19-RC2>, 2021

Seasonal Forecasts of the Saharan Heat Low characteristics: A multi-model assessment by Cedric G. Ngoungue Langué et al.

General comments:

The Saharan Heat Low (SHL) is one of the important drivers of summer-time precipitation over the West African Monsoon. The authors discussed the performance of two state-of-the-art seasonal forecasting systems SEAS5 (ECMWF) and MF7 (MeteoFrance) in forecasting the Saharan Heat Low (SHL) against ERA5 reanalysis data for the period 1993-2016. SEAS5 and MF7 show opposite biases and both models under-estimate the interannual variability of the SHL. Statistical bias correction methods reduce biases; however, they do not add much in terms of skill beyond 1 month. A lot has been done, but there are several critical issues that hamper the suitability of the current MS for its publication in WCD. Below are some points both major and minor that Authors should consider during their revision.

Some points are (major and minor):

- Introduction can be organized better. Line 19: poor precipitation forecast skill is for what seasonal? Subseasonal? The reference provided showcased 1-5 day precipitation skills. Line 37: Adding a demographic map will be good mentioning names of countries etc. Line 41 to 50: the references mentioned are from CMIP5 models, these may be fine, but not much relevant in the current research – this paper is concerning with initialized models aka seasonal forecasting system, so suitable references are those that utilized such models for SHL analysis. Line 51: Mentioning the “Climate Models”, in “above studies”, these are IPCC models, and Author mentioned seasonal forecasting models, so valid reference should be provided, if no reference available, just relying on OBS studies might be enough. Authors should take this concern, as it could avoid a lot of confusion present in the current MS. Line 56-60: rewrite, these are confusing and not clear. Line 60: remove “some”. Line 61: Climate models or seasonal forecasting models? Line 63: Prediction skill is for SF models. Line 62-63: Rewrite. Line 64: Need more details about this, by looking at this one can observe the low skill in SHL in current state-of-the-art SF models, how SHL then can be used as a predictor for the rainfall? “Seasonal models” must be seasonal forecasting models.
- Line 75: Add topography figure as mentioned above.
- Line 80-85: 30E must be 30 N, here and others as well.
- Boreal summer is JJA. A study considering June to September, and some places June to November. Be consistent
- Related to above, Figures 2 and 3, captions say the computation for SHL is performed for June to November period. While text section 2.3 (Line 113) says June to September period. Which one is right?
- Line 95: Be specific, Is this 2m temperature?
- Native SEAS5/MF7 is 36/37 KM, and ERA5 is 0.25, then why remap at 1x1.
- Line 108: SEAS5 forecast is for 0.5 to 5.5. What you mean by “for a period of 6-12 months for SEAS5”
- Line 115 to 120: Organize intro well, otherwise readers will remain in the state of constant confusion. Provide a reference/references that use either NWP or SF models.
- Line 134: Since T850 hPa is used, I would recommend using this term instead of simply stating temperature.
- Line 135: If no detection is performed, better to use a different heading for 2.4.1.
- Line 154: The period of the analysis is also the same for OBS. Make it clear. Are you focusing June to Sep or all 6-months?
- Line 158: “reservoirs” may be better replaced by being components.
- Section 2.4.3: Bias correction depends upon the data. You can consider other OBS datasets as well, matching your analysis window, and may add this OBS sensitivity as supplementary material.
- Line 211: Which “previous analysis”???
- Line 215: Provide the definition of CRPS, that it is a quadratic measure of the difference between the forecast CDF and OBS CDF.
- Line 225: This agreement is in terms of OBS and models? Or just in terms of observation. Better to rewrite this sentence.
- Line 229: SEAS5 should be ERA5.
- Line 240: “similar behavior” in SEAS5 and MF7? Rephrase this sentence.
- Line 260: Move this to the Methods section.
- Line 265: The analysis period is from June to September when SHL is active. Why did you add here other months? Is there any reason? And you used Lead-0 in this case. This is strange to see a contrasting behavior in models at Lead-0.
- Line 273: Hot may be replaced by warm.
- Line 275: What is “observed bias”. Rewrite for clarity.
- “hotter trend”, What does this mean? Confusing? Rewrite.
- Line 270 to 280: Why two models show completely opposite bias? Authors must provide some plausible reason for these opposite behaviors in these models? Please also use other observations for a comparison. Maybe adding RMSE is also valuable

here.

- Line 301: Avoid “trend”, when explaining bias analysis. This is confusing.
- Line 330-335: Move this to the Method section.
- Line 335: Not clear.
- Line 364: AEJ is defined already. Please check for this and others.
- What is DACCIW?
- Line 406: All datasets mean both SEAS5 and MF7?