

Interactive comment on “SEAS5: The new ECMWF seasonal forecast system” by Stephanie J. Johnson et al.

Anonymous Referee #1

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The paper describes the SEAS5 seasonal forecast system and documents its performance compared to its predecessor. SEAS5 has a number of enhancements compared to SEAS4, such as substantial increases in resolution of the atmosphere and ocean models and the introduction of a prognostic sea-ice model. The authors provide a very balanced evaluation of biases and skill, noting both improvements and deficiencies in the forecast system and highlighting aspects requiring future research. The range of diagnostics employed provides a good overview of performance, aptly setting the scene for other, more focussed studies on specific elements of the prediction system.

The paper is a valuable resource for both users of SEAS5 and other model and seasonal forecast system developers wanting to understand, for example, how adding

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complexity (such as increasing resolution or introducing a sea-ice model) might impact on the performance of seasonal predictions. Given that the outputs of ECMWF's seasonal prediction system are widely used, including through the Copernicus multi-system seasonal forecast service, the paper will be of interest to a wide range of climate scientists.

The manuscript was a pleasure to read. It is very well written, clear, concise and well-structured. The results are appropriately analysed and presented. I do not think that any major changes are required.

Minor comments:

There are numerous instances of usage of "summer" and "winter" when results relevant to both hemispheres are being discussed (e.g., abstract line 17; multiple occurrences in section 4.1, some instances in Section 5.1). Either preface with boreal/austral or use actual months (DJF/JJA...).

Page 7, Lines 11-15: Are the forecasts also initialised with the seasonally varying ozone climatology?

Page 8, Section 2.4.1 and 2.4.2: How does the SEAS5 ensemble generation differ from SEAS4?

Page 8, Section 2.4.1: It is not clear to me how the 5-member ensemble analysis is related to or used to create the 25-member ensemble.

Page 11, Section 3.1.4: Define the abbreviation "CRPSS"

Figure 2: It would be good to add the ensemble spread to panel (d).

Page 16, line 13: Should read in a "positive" IOD event, a cold anomaly...

Page 37: The configuration of SEAS5 appears to be very close to that of the ENS monthly system. Are there plans to run just one system, across the timescales?

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I am curious – how much more computationally expensive is SEAS5 given the increases in complexity compared to SEAS4?

Technical corrections:

Page 2, line 28: Remove the double "all": "...to document all all of them. ..."

Page 6, line 29: change "where as" to "whereas"

Page 11, line 8: change "If follows" to "It follows"

Page 16, line 2: "12 months" should be "11 months"

Page 20, line 23: change "Figures" to "Figure"

Page 32, line 25: Remove the "a": "...also show a useful of skill."

Page 35, line 5: Remove the double "with": "Regions with with negative. ..."

Page 37, line 11: change "forecast" to "forecasts"

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2018-228>, 2018.