Geoscientific
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Discussions

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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

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 multisystem 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, line29: 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, line25: 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.