

## ***Interactive comment on “Reconciling North Atlantic climate modes: Revised monthly indices for the East Atlantic and the Scandinavian patterns beyond the 20th century” by Laia Comas-Bru and Armand Hernández***

**Anonymous Referee #2**

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The authors consider the second and third modes of SLP variability in the North Atlantic region and their influence on climate variables. In particular, they highlight the lack of instrumental indices and availability of long-term indices, key to study decadal climate variability. They calculate a new set of indices both based on reanalysis and instrumental data, dating back to 1850. The paper and the data are a very useful contribution to the field of climate variability and large-scale atmospheric pattern research. The text is clearly explained and overall well written. There are a few issues that I think should be considered:

C1

### General comments

1. Since the controlling mechanisms of the EA and the SCA are mentioned in the abstract, I would like to see a more careful description of the influence of these two patterns on climate variables and their physical meaning. Moreover, given the discrepancies across datasets and the lower percentage of variance explained by the patterns outside of the winter months, discussing their relevance would be appropriate.
2. The main contribution of this paper is, in my opinion, the introduction of the new, instrumental indices that date back longer than previously available ones and that have been proven consistent across different datasets. The correlation of the winter SCA with the Bergen station data is remarkably good. For this reason, I think it would be interesting to know more about the instrumental data, and mention which other stations were considered and why they were discarded.

### Specific comments

Page 1, Line 25: “The spatial structure of climate changes...” I would suggest talking about regional climate variability rather than ‘climate changes’, given the data span no longer than two hundred years.

Page 2, Line 21: A strong centre of positive SLP anomalies is said here to be associated with above-average temperature and wetter conditions in Northern Europe. Please review this. Is it possible that those effects correspond to the positive phase of the reverse EA index, as used in other publications? (i.e., Moore et al., 2011)

Page 3, Line 18: The orthogonality imposed by the EOF technique should be one of the constraints listed

Page 5, Line 6: Looking at Table 3, no discrepancies are observed across datasets for EOF 3 during MAM months

Page 5, Line 21: “Because of this spatial pattern, ...” I suggest rephrasing the sentence since the meaning is not entirely clear to me

C2

Page 6, Line 27: I think it is erroneous to assume that the datasets have to capture the climate modes, since the variability is in the SLP data themselves. Comparing different reanalysis datasets is out of the scope of this paper, but an indication of known quality issues that might account for the differences would be suitable

Figure 2: many data are shown on the same plot, so that it is a bit difficult to visually recognise the agreement between the series. Also, could the x axis show dates rather than number of months?

Figure 6: I suggest including DJF, MAM, JJA and SON instead of a, b, c and d on the top left corner of each panel, both for clarity and for consistency with Figures 3 and 4

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