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Nonlinear Processes in Geophysics
Discussions

Interactive comment on "Seasonal predictability of the winter precipitation over Iberian Peninsula and its relationship with finite-time Lyapunov exponents" *by* Daniel Garaboa-Paz et al.

Anonymous Referee #1

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The manuscript calculates the local atmospheric mixing using finite time Lyapunov exponents and finds that summertime changes in this field are correlated with winter changes in precipitation over the Iberian peninsula. Thus, they suggest this field could be used as a predictor of precipitation in this region.

The topic is very relevant and important because seasonal prediction is still a very active area of research. Thus, any advance in this area will be welcome. However, I am not convinced about the interpretation and the mechanism that connects mixing in summer with rainfall in winter. As the authors mention other works have already found a connection between summertime north Atlantic SST and winter rainfall in Europe. Here, the authors try to explain their results expanding on those based on composites.

But, I could not follow the reasoning of the authors: what is the causality link between changes in mixing in summer and rainfall in winter? Through changes in the SST? Does the SST somehow force a certain teleconnection pattern during winter, which in turn changes rainfall?

Also, changes in mixing are very small, close to 3%... are they significant? Moreover, are the SST, geopotential height, and wind anomalies statistically significant for positive and negative cases of FTLE? Authors need to quantify this, maybe through a test of differences between positive/negative years and neutral years.

Lines 285-287 and 292-295 imply that climatological winds are westerly between the Caribbean and the Iberian Peninsula, but south of 25N the easterly trade winds dominate. Thus, these sentences are incorrect.

Other comments:

-the sentence "less wind than normal" does not sound right. Please change to "weaker winds" or similar.

- why did you chose the 850 hPa level, which is usually just above the boundary layer? Does mixing change significantly depending on the level? If the deformation due to vertical movement is not taken into consideration, shouldn't you pick a level where the atmosphere tends to behave in 2D? Maybe upper levels?

- why did you chose tau=5 days? Is it to capture the mixing due to synoptic variability? Have you performed a sensitivity test by changing tau within 1 or 2 days?

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