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Earth System Dynamics Discussions

Interactive comment on "Identifying global patterns of stochasticity and nonlinearity in the Earth System" *by* F. Arizmendi et al.

Anonymous Referee #3

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This manuscripts could be helpful for researchers to decide whether to use linear or nonlinear measures when constructing climate networks. While the material seems to be suitable to the scope of the journal, there are a number of points that I would like to see addressed before the paper is accepted.

I am unclear why they choose d_i as their measure of nonlinearity. They have not referenced where it has been used before, but I get the impression that it is not being introduced here. There are also a large number of techniques for measuring nonlinearity, so a comparison with established methods would also be helpful. Additionally, nonlinearity in the atmosphere has been extensively studied, so a review of the pertinent material should be included in the introduction.

I'm unsure why they believe the large time lag over the Amazon rainforest is due to the

summer monsoon, and I would like them to more fully explain their reasoning.

The strong peak and low entropy values discussed are most likely a result of the binning procedure used, and a more thorough discussion of it is required.

On L:10,11 They define $y_i(t)$ to be the SAT, and $x_i(t)$ to be the solar insolation. However, Eq.1 and their choice of lags suggest that they are searching for the effect of the SAT on the solar insolation at a later time? This does not seem reasonable, and I believe they have included the lag in the wrong term in Eq.1.

As mentioned by other referees, the figures are improperly labelled and captioned, disagreeing with the text at some points.

Isolation is frequently mistakenly used where insolation is meant.

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