

## ***Interactive comment on “Multi-scale event synchronization analysis for unravelling climate processes: A wavelet-based approach” by Ankit Agarwal et al.***

### **Anonymous Referee #2**

Received and published: 3 August 2017

General comments In my opinion the manuscript is interesting and well written. The proposed approach is novel and original because it provides a new view in the use of ES method, increasing potentiality of this method in the investigation of climate processes. I also think that the subject of the manuscript is interesting for the Jnp's readers. For this reason I recommend the manuscript for the publication on JNP. I just would like suggest to the authors few modifications in order to make more accessible the subject also to readers who are not familiar with Wavelet and Event synchronization approaches. Although these suggestions have been put also into the comments of the pdf file in attachment, I summarize them in the following: a) The description of the methodological link between Multiresolution decomposition of

C1

signals and Event synchronization could be explained in more detail. Section 2.1 Discrete wavelet transform, in my opinion should be rewritten more clearly, probably using a less generic formalism and adding an more explicative figure than figure 1 of the multiresolution decomposition; b) How the continuous signals at the different scales have been converted in binary vectors in order to apply ES is just mentioned, but what thresholds have been used and why is never written in the manuscript; c) There are some parts of 'Section 4 Results' that should be developed in more detail, especially , the results concerning non stationary time series IIIa and IIIb. More discussion about the capability of the approach to treat with non-stationary time series and to capture emerging scales would enhance the paper contents. What are the differences between this approach and the multi-wavelet approach by Hu and Si (2016)? Since the papers use the same synthetic time series should be interesting to compare the two different approaches, their advantages and limitations. d) The quality of the figures should be improve: 1. Figure 1 has distorted axes. Font size should be increased. 2. Figure 2 Font size should be increased 3. Figure 5,6,7,8,9 have distorted axes. Eg. They are squeezed or elongated.

Please also note the supplement to this comment:

<https://www.nonlin-processes-geophys-discuss.net/npg-2017-19/npg-2017-19-RC2-supplement.pdf>

---

Interactive comment on Nonlin. Processes Geophys. Discuss., <https://doi.org/10.5194/npg-2017-19>, 2017.

C2