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## ***Interactive comment on “Wavelet analysis for non-stationary, non-linear time series” by J. A. Schulte***

### **Anonymous Referee #2**

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This paper considers the problem of detecting and quantifying nonlinearities in nonstationary time series with wavelet-based approaches. The author aims to study abilities of the higher-order wavelet analysis in application to the Quasi-biennial Oscillation time series. He considers five objectives, namely, to develop significance testing methods for higher-order wavelet analysis, to apply statistical methods controlling false positive detection, to develop a procedure for calculating confidence intervals corresponding to the sample estimates, to solve the problem of selection of a time interval for calculations, and to introduce a local biphase spectrum.

The paper is well written and contains a clear description of approaches for wavelet bicoherence estimation that could be interesting for researchers dealing with nonstationary and nonlinear time series. In my opinion, the description of the methods and

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their geophysical applications can be used as a part of a review paper or a monograph devoted to the higher-order wavelet analysis. However, I have doubts concerning publishing this manuscript as a research paper. Actually, earlier known approaches are applied to simple testing signals and geophysical data, and the originality and the novelty of the discussed approaches and the obtained results is unclear.

Thus, in particular, the significance testing method used the author has only minor distinctions from those discussed in other papers (e.g., Grinsted et al, 2004). Also, I did not find novelty in the used statistical methods controlling false positive detection and in calculating confidence intervals corresponding to the sample estimates. The author did a good work in application of known techniques and their description with pointing out many important things, however, the claimed objectives are different from the presented results.

In conclusion, I think that the considered topic may be interesting for a broad physical community, but I do not recommend publication of this work in its present form.

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Interactive comment on Nonlin. Processes Geophys. Discuss., 2, 1705, 2015.

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