



## **Analysis and indications on long-term forecasting of the Oceanic Niño Index with wavelet-induced components**

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In this talk, we provide an analysis and a long-term forecasting scheme of the Oceanic Niño Index (ONI) using the continuous wavelet transform. First, it appears that oscillatory components with main periods of about 17, 31, 43, 61 and 140 months govern most of the variability of the signal, which is consistent with previous works. Then, this information enables us to derive a simple algorithm to model and forecast ONI. The model is based on the observation that the modes extracted from the signal are generally phased with positive or negative anomalies of ONI (El Niño and La Niña events). Such a feature is exploited to generate locally stationary curves that mimic this behavior and which can be easily extrapolated to form a basic forecast. The wavelet transform is then used again to smooth out the process and finalize the predictions. The skills of the technique described in this paper are assessed through retroactive forecasts of past El Niño and La Niña events and via classic indicators computed as functions of the lead time. The main asset of the proposed model resides in its long-lead prediction skills. Consequently, this approach should prove helpful as a complement to other models for estimating the long-term trends of ONI.

### **References:**

- 1 A. Delière and S. Nicolay, Analysis and indications on long-term forecasting of the Oceanic Niño Index with wavelet-induced components, *Pure and Applied Geophysics* (2017), 174(4), 1815-1826.
- 2 A. Delière and S. Nicolay, Extracting oscillating components from nonstationary time series: A wavelet-induced method, *Physical Review E* (2017), 96, 033307.