



Wavelet Myths Demystified

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Continuous wavelet analysis has become a widely used tool to study the time-frequency behaviour of earth system processes. As an extension, cross wavelet analysis is getting more and more popular to infer time and scale dependent interrelations between two processes. In fact wavelet analysis starts to outplay classical and well understood techniques as Fourier analysis. It is true that wavelet analysis, when correctly applied, makes features accessible that are invisible to classical time independent approaches. However, there is a certain tendency of applying the method without the necessary rigour, potentially leading to a variety of false positive results. In my contribution, I will briefly introduce wavelet spectral analysis and then discuss the following questions: When is a feature in the wavelet plot significant? Is the global wavelet spectrum an unbiased estimator of the Fourier spectrum? How to interpret a wavelet cross spectral plot? I will present recent developments, several examples and applications to explain subtle pitfalls and to show the benefits of wavelet analysis. The aim is to provide the user with an idea of when to use continuous wavelet analysis, and how to interpret its results.