Geophysical Research Abstracts,
Vol. 11, EGU2009-1133, 2009
EGU General Assembly 2009

Empirical Mode Decomposition and Hilbert Spectral Analysis of Coastal Environmental Time Series

Y.X. Huang (1,2), F.G. Schmitt (1), S.B. Zongo (1), Z.M. Lu (2), and Y.L. Liu (2)

(1) CNRS, Lab. Oceanology and Geosciences, Laboratory of Oceanology and Geosciences, Wimereux, France (francois.schmitt@univ-lille1.fr, +33 321 99 20 01), (2) Shanghai University, Shanghai Institute of Applied Mechanics and Mathematics, Shanghai, China

Recently a new general method, namely empirical mode decomposition (EMD), has been introduced to separate a given time series into different characteristic scale modes. It has been shown to be robust and efficient to analysis nonlinear and nonstationary time series. In this paper we apply this method on several daily coastal environmental time series: temperature, dissolved oxygen, pH, and Chl a. We show the signature of the nonlinear mechanism behind these data and the strong correlations among the annual cycle modes. We also consider high frequency time series (recorded every 20 minutes) of the sea parameters from a monitoring program (MAREL). We characterize the intermittency, the scaling exponents, and estimate the multifractal exponents using a new technique, the arbitrary order Hilbert spectral analysis. This is the first time this promising technique is used on environmental biogeochemical time series.