Geophysical Research Abstracts
Vol. 13, EGU2011-11460, 2011
EGU General Assembly 2011

Temporal and spatial scaling properties in polychaete populations from the North Atlantic European continental shelf

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The existence of general patterns in biodiversity suggests that these are the result of equally underlying processes. Power-laws are well-known to biologists and ecologists in the form of bivariate relationships of power-law type, called scaling relationships. Scale invariance describes phenomena that are not associated with a particular or characteristic scale, that is, they possess the same statistical properties at any scale of observation and that the same principles or processes are at work no matter what the scale of analysis. This property makes scaling and power-law relationships very well suited for the study of ecological systems, the analysis of power-law and scaling relationships can help us to identify general principles that apply across a wide range of scales and levels of organizations, revealing the existence of universal principles within the seemingly idiosyncratic nature of ecological systems. The objective of this study is to characterise the scaling properties of the distributions of polychaete populations, the dominant group of organisms in marine benthic communities, at different time and space scales in the North Eastern Atlantic continental shelf (from the Bay of Biscay to the North Sea) using databases of species richness and abundance.The species richness and abundance of populations display high temporal and spatial variability, which is analysed using scaling approaches such as species area relationships, species time relationships, the estimated slope of the distance decay relationship and the Taylor's power law in its temporal and spatial facets.