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Multi-scaling properties of remotely sensed oceanic chlorophyll maps

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Phytoplankton patchiness has been investigated with multifractal analysis techniques. We analyzed oceanic chlorophyll maps, measured by the SeaWiFS orbiting sensor, which are considered to be good proxies for phytoplankton. Multifractal properties are observed, from the sub-mesoscale up to the mesoscale (1-128km), and are found to be consistent with the predictions of the statistical theory of turbulence. This result indicates that, within this scale range, turbulent mixing would be the dominant effect leading to the observed variability of phytoplankton fields. Finally, it is shown that multifractal patchiness can be responsible for significant biases in the nonlinear source and sink terms involved in biogeochemical numerical models.