



Analysis of the intermittent nature of the turbulence from micro-structure profiles

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We present a statistical analysis of the intermittent nature of turbulence. One usually characterizes the nature of the intermittency with the scaling properties of the structure functions of the velocity or a scalar field, like the temperature. Oceanic measurements with a micro-structure profiler allow the determination of the transverse velocity structure functions. And following the refined Kolmogorov similarity hypothesis (K62), this scaling is directly related to the scaling of the rate of dissipation of turbulent kinetic energy. In aquatic ecosystems, turbulent oscillations of various scales influence aggregation, incubation and foraging processes of small-scale planktonic organisms. Internal intermittency can affect phyto and zooplankton species less than several millimeters in size, specifically, floating microscopic algae that are responsible for photosynthesis in coastal oceans. Zooplankton larger than 1 cm usually do not react to small-scale intermittency of turbulence. This is the first time, to our knowledge, that the structure functions come from space series. Previous results in air and in water were obtained from a static sensor in the atmosphere, ocean or in a laboratory setup. Furthermore, previous works were mainly focused on the longitudinal structure functions, while the results we present here relate to the transverse structure functions.

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