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Directs effects of small-scale turbulence on *Alexandrium spp.* ecophysiology

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Interdisciplinary research is increasing the understanding of the interaction between turbulence and the biology of plankton. Actually, the knowledge of the specific implications of turbulence near the Kolmogorov-scale on the ecophysiology of phytoplankton is an emergent line at present. Phytoplanktonic cells and colonies may interact with small-scale water turbulence in a variety of ways. Dinoflagellates appear to be a specially sensitive group to turbulence. Among others, it may play a crucial role in morfology changes, reproduction inhibition, cell cycle interferences, and preventing their vertical migration.

The interaction of small-scale turbulence with some aspects of the biology (net growth rates, toxins production and cysts formation) of *Alexandrium catenella* and *A. minutum*, two bloomforming dinoflagellates in the Catalan Coast, was examinated. Turbulence was generated with two setups: vertically oscillating grids or orbital. The turbulent energy dissipation rates, ε, experimentally generated (measured with a miniaturized ADV, from Nortek-AS) were approximately, 0.1, 1 and 35 cm^2s^{-3}. Results showed that, in both species, net population growth was only dropped under the highest$g\varepsilon$ (orbital shaker) influence and when it lasted for more than 5 days. In this turbulent condition, toxin content and temporary-like cyst production were reduced. This last fact could be indicating that for cyst development, which constitutes a phase of the dinoflagellate life cycle, certain stability of the water column is required.