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On some relationships between storms and plankton dynamics

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Abstract. The physico-chemical fields of the pelagic environment are constantly fluctuating at different spatial and temporal scales. Storms are extreme events of such fluctuations that cascade down to small scales to alter nutrient availability to microscopic algae or swimming and mating behaviour of motile plankton. Mediterranean storms sometimes are also responsible for the transport of micro and macronutrients from Saharan origin, albeit the significance for marine production is still under question. In coastal ecosystems, storms represent dissolved nutrient injections via run-off and resuspension that trigger planktonic succession events. Storms may also have a role in the development and mitigation of harmful algal blooms, events with economic and health consequences that are of growing societal concern. Based on laboratory experiments on the effects of turbulence on swimming behaviour and population growth of dinoflagellates, a conceptual sequence of events is proposed for bloom initiation.

Overall, storms affect, directly or indirectly, the dynamics of plankton and hence ecosystem production and cannot be considered catastrophic or hazardous in this context. The full potential of such relationships will be evidenced once biological time series match the resolution and spatial coverage of meteorological and oceanic data. As the frequency and intensity of storms is subject to global change, future oceanic ecosystem production should be affected as well.

Full Article in PDF (PDF, 848 KB)

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