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A first attempt to start to address short-term turbulence and nutrient load variability as factors to determine coastal production

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Turbulence has been shown to affect nutrient uptake in the laboratory and to influence phytoplankton growth and composition and community structure. We here study the interaction between the natural variability of turbulence in a coastal zone and the nutrient load to determine community production. In a shallow coastal location in Barcelona, we monitored turbulence continuously during one week in November 2005 and took chemical and biological samples several times per day. The water column appeared vertically mixed. We had a weak meteorological frontal system passing through during the first two days and a somewhat stronger one with rain by the end of of the survey, days 6-7. Water temperature decreased between 0.5 and 1 degrees C to day 5 and then slightly increased to the end of the survey. Wind intensity was around 2-4 m/s with the exception of day 8 when it reached values of 12 m/s. No rain was recorded during the two weeks prior to the survey, but wind increased to 6 m/s on day -1. Phytoplankton biomass increased from 0.7 to 2.5 microg chl/l during the survey period, with the size fraction larger than 10 microm becoming more important. Mineral nutrients, probably related to wind-driven mixing produced on day -1, decreased to day 4 as a result of phytoplankton growth. After day 4, ammonium, nitrate and phosphate concentrations increased in the water probably as a result of atmospheric deposition and further fueld phytoplankton growth.