

# Effects of noise in the dynamics of complex planktonic systems: matching models and data

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## Abstract

Spatio-temporal dynamics of phytoplankton populations is investigated in a marine ecosystem by a 2D reaction-diffusion-taxis model. Specifically, the study focus on the spatial motion along the vertical direction (depth), indicated as  $z$ , and a given horizontal direction, indicated as  $x$ . The intraspecific competition of the phytoplankton populations for limiting factors [1, 2, 3, 4], i.e. light intensity and nutrient concentration, is taken into account. Moreover, random fluctuations of environmental variables, such as temperature and velocity field, are considered by inserting terms of multiplicative noise in the equation for nutrient dynamics. Theoretical results for phytoplankton abundances are converted in *chlorophyll a* concentrations [5, 6] and compared with experimental data collected in different sites of Mediterranean Sea. The statistical analysis, based on the chi-square test, shows a good agreement between theoretical and experimental distributions of chlorophyll concentration.

## References

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