

Description of a new model of phytoplankton nutrient uptake dynamics at Oualidia lagoon

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Abstract

The main objective of the present work is to provide an overview of the mechanistic modelling strategies available in the literature for some of the key biogeochemical processes involved in the dynamics of phytoplankton in pelagic marine ecosystems. We focus on the most advanced work in terms of mechanistic understanding, including the nutrient uptake by primary producers (phytoplankton at Oualidia lagoon, Atlantic, Moroccan). The treatment of the latter process includes cases of phytoplankton growth limitation by several nutrients. For each of the aforementioned processes, a set of several potential formulations will be detailed, including empirical as well as mechanistic models when available.

The present work has the main characteristic of gathering together all the components to build a mechanistic model for the phytoplankton dynamics in the pelagic water column. As a result of our investigations, we propose a generic phytoplankton model that includes the available mechanistic formulations from literature only when they handle readily measurable variables and parameters. This new class of phytoplankton models will provide the basis of the multi-element and multi-plankton-group models associated with different marine pelagic ecosystems that will be presented in future work.

Mots-clés: Modelling, phytoplankton uptake, Oualidia lagoon,