

# Modelling mixotrophy in eutrophied coastal ecosystems

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Human pressure has considerably altered the nutrient loads to estuarine and coastal systems, increasing the quantity and modifying the stoichiometric balance (N:P:Si) and chemical forms (organic/inorganic) of nutrients available to phytoplankton. This cultural eutrophication has led to harmful algal blooms in many coastal areas, often dominated by mixotrophic species (Burkholder *et al.*, 2008). Such is the case in the 'excess nitrate - low phosphate' Southern Bight of the North Sea dominated by *Phaeocystis globosa*. This haptophyte has been reported to use organic resource to compensate for P deficiency (van Boekel and Veldhuis, 1990). Yet, little is known on mechanisms allowing this shift from phototroph to mixotrophy and how this affects food web interactions and biogeochemical cycles. As first step in this direction we here present a mechanistic model of *Phaeocystis globosa* metabolism that includes the up regulation of alkaline phosphatase, an enzyme that hydrolyses the dissolved organic phosphorus (DOP) to release phosphate. After studying the sensibility of the model to nutrient conditions and parameters controlling the hydrolysis of DOP, this simple model will be integrated into existing MIRO model of Lancelot *et al.* (2005) and tested for its capacity to describing diatom/*Phaeocystis globosa* and nutrient cycling in the Southern Bight of the North Sea. Further analysis of model results will explore conditions for mixotrophy emergence and the effect on food web interactions.

## References

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