



## **Constraints on values of biological parameters by observed turbulence in a quasi-2D phytoplankton model of the North Atlantic**

Lisa Hahn-Woernle (1), Henk A. Dijkstra (1), and Hans J. van der Woerd (2)

(1) Institute for Marine and Atmospheric research Utrecht, Utrecht University, The Netherlands , (2) Institute for Environmental Studies, VU University, The Netherlands

Constraints on values of biological parameters by observed  
turbulence in a quasi-2D phytoplankton model of the North Atlantic

Session and Session Number: Scaling and complex Physical and Biogeophysical Processes in the Atmosphere, Ocean and climate (NP3.1)

Preferred Mode of Presentation: Oral

Lisa Hahn-Woernle<sup>1</sup>, Henk A. Dijkstra<sup>1</sup> & Hans J. van der Woerd<sup>2</sup>

1. Institute for Marine and Atmospheric research Utrecht, Utrecht University, Princetonplein 5, 3584 CC Utrecht, The Netherlands.

2. Institute for Environmental Studies, VU University, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands.

During the STRATIPHYT cruises in Summer 2009 and Spring 2011 in-situ plankton and nutrient concentrations as well as upper-ocean turbulence characteristics were measured from Las Palmas to Reykjavik [1,2]. The measurements agree with previous findings that the incoming light intensity and the stratification of the upper ocean set important conditions for the initiation of the phytoplankton bloom close to the surface and also for a possible shift to a deep chlorophyll maximum below the mixed layer. These strong characteristic spatial patterns and temporal cycles of phytoplankton surface concentration are also observed in satellite images of chlorophyll-a concentration in the Northern Atlantic. To understand the meridional depth (upper 200 m) variation of the phytoplankton distributions, a quasi-2D phytoplankton model was used. The results indicate that with the given profiles of the turbulent vertical mixing coefficient, only a very limited interval for the biological model parameters leads to the observed depth of the phytoplankton maximum.

[1] E. Jurado, H. van der Woerd and H. A. Dijkstra, Microstructure measurements along a quasi-meridional transect in the North Atlantic, *J. Geophysical Res. Oceans*, 117, C04016, doi:10.1029/2011JC007137, (2012).

[2] E. Jurado, H. A. Dijkstra and H. van der Woerd, Microstructure observations during the spring 2011 STRATIPHYT-II cruise in the northeast Atlantic, *Ocean Science*, 8, 945-95, (2012).