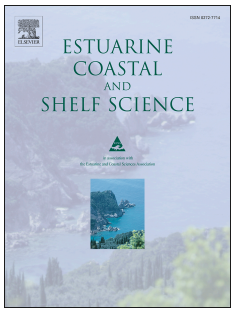
Accepted Manuscript



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PII: S0272-7714(17)30299-8

DOI: 10.1016/j.ecss.2018.01.010

Reference: YECSS 5724

To appear in: *Estuarine, Coastal and Shelf Science*

Received Date: 16 March 2017

Revised Date: 21 December 2017

Accepted Date: 11 January 2018

Please cite this article as: Liu, B., de Swart, H.E., de Jonge, V.N., Phytoplankton bloom dynamics in turbid, well-mixed estuaries: A model study, *Estuarine, Coastal and Shelf Science* (2018), doi: 10.1016/j.ecss.2018.01.010.

Phytoplankton bloom dynamics in turbid, well-mixed estuaries: a model study

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Abstract

To gain insight into mechanisms underlying phytoplankton bloom dynamics in turbid, well-mixed estuaries, experiments were conducted with an exploratory model that couples physical and biological processes. The motivation for choosing exploratory models is that they allow investigation of individual processes in isolation, therefore yielding fundamental insight into the mechanisms of the system.The Ems estuary (between the Netherlands and Germany) was selected as the prototype estuary, in which a zone of high turbidity is observed in the middle and upper reach. Results show that the model is capable of capturing the main features of the observed phytoplankton population density (P) patterns, that is, in the lower reach a spring bloom occurs, followed by a secondary bloom in autumn. Results of sensitivity studies reveal that the along-estuary distribution of suspended particulate matter (SPM) is a determining factor for the along-estuary location of blooms and it largely affects the intensity of blooms. The along-estuary advection of

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