## A MODEL TO ASSESS INTERTIDAL MICROPHYTOBENTHIC PRIMARY PRODUCTION AT THE MACRO SCALE USING SATELLITE IMAGERY

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Quantifying large scale spatial variability in intertidal microphytobenthic productivity is necessary to better understand the amount of benthic organic carbon available for grazing, burial and transport to the pelagic zone, and to improve global estimates of carbon sequestration in intertidal areas. However, there is no general method to routinely assess intertidal benthic primary production at the macro scale.

Several 1D-models have been developed to calculate microphytobenthic primary production in intertidal areas, but none of these models are adapted to be used on larger spatial scales, e.g. in combination with satellite remote sensing. In this study, we adapted the 1D sediment-optical model from Forster et al. (2006) to a 2D-model, using information on microphytobenthic biomass and silt content retrieved from Landsat 8. Photosynthetic parameters were measured on several locations in the Eastern and Western Scheldt with a PAM fluorometer. The photosynthetic capacity (maximum photosynthetic rate) could be linked to ambient temperature. The method is validated on nine intertidal flats in the Eastern and Western Scheldt in the Netherlands.

The model provides a means to obtain information on steady state microphytobenthic primary production rates of an entire estuary with relatively little effort and may be applied to other estuaries, although calibration at the estuary of interest is needed. Furthermore, using multiple images temporal variability in microphytobenthic production may be assessed.



*Figure 3 Average intertidal microphytobenthic production rates in the Eastern and Western Scheldt in March 2015.*