

UNIVERSITY: Lille , Faculty of Sciences and Technologies

Scientific field : Marine biology and biogeochemistry

Title of the thesis:

Supervisor(s): Pr. L. Denis (HDR, 75%), Dr. F. Gevaert (25%)

Laboratory: UMR CNRS 8187 LOG – Laboratoire d’Océanologie et de Géosciences

Related research project (international/national/regional): CPER MARCO, Project EC2CO Interface-2M

Expected/obtained funding: Région Hauts de France (priority)

ABSTRACT

This PhD work to better understanding the processes of microphytobenthic production in the soft estuarine intertidal sediments, which constitute areas of prime importance for the feeding activity of juvenile fishes. More accurately, this research project aims at identifying, quantifying and prioritizing the main environmental drivers of microphytobenthic primary production and carbon mineralization (light, temperature, salinity, interstitial water content...).

This work will mainly be performed by using an autonomous *in situ* miniprofiler allowing the acquisition of several simultaneous and successive oxygen microprofiles in the surficial sediments. Additionally, CO₂ fluxes at the sediment/air or sediment/water interface will allow estimating the variability of respiratory quotients at the different temporal scales of interest. This approach will be coupled to a diving-Pam to quantify the photosynthetic efficiency of microalgae. Moreover, a 2D system recording CO₂ concentrations will allow verifying (or not) the correspondence at small-scale between CO₂ uptake and Oxygen release during the production period, of CO₂ release vs oxygen uptake during the mineralization phase (at dark).

Several types of soft sediments will be studied, in estuaries presenting various intensities of microphytobenthic production (Canche, Authie, Somme, Seine estuaries), diverse rhythms of alternation between immersion and emersion periods (subtidal to supratidal sediments) and hydrodynamic forcing (various tidal amplitudes). This coupled approach, considering both the processes of carbon and oxygen exchanges during emersion and immersion, is very innovative and will allow calculating more accurate carbon budgets at the scale of the tidal cycle.

Planned recruitment date : October 2020

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Additional remarks/comments :

