CALIBRATION OF IN SITU FLUORESCENCE PROFILES USING A NEURAL NETWORK: A FIRST STEP IN THE DEVELOPMENT OF A 3D GLOBAL CLIMATOLOGY OF PHYTOPLANKTON COMMUNITIES

Raphaëlle Sauzède*[1], Hervé Claustre[1], Cédric Jamet[2], Heloise Lavigne[1], and Julia Uitz[1]

[1]Laboratoire d'océanographie de Villefranche (LOV) – CNRS : UMR7093, Université Pierre et Marie Curie (UPMC) - Paris VI – Quai de la Darse, BP08, 06230 VILLEFRANCHE SUR MER Cedex, France
[2]Laboratoire d'Océanologie et de Géosciences (LOG) – CNRS : UMR8187 – 28 av Foch 62930 Wimereux, France

Abstract

In vivo chlorophyll-a fluorescence, a proxy of chlorophyll-a concentration ([Chl]), is one of the most frequently measured biological property in the ocean. Thousands of profiles are available from historical databases and the integration of fluorescence sensors to autonomous platforms led to an increase of fluorescence profiles acquisition. All these data (past and future) could be exploited within a single reference database which would represent an invaluable source of information. However, a concurrent exploitation of these data is currently impossible because of heterogeneous data sources (in particular with respect to fluorescence calibration). We therefore developed a neural network for converting fluorescence into [Chl] profiles based on the shape of the fluorescence profiles. In addition to total [Chl], this method also allows retrieving [Chl] associated to three phytoplankton size classes (microplankton, nanoplankton and picoplankton). Our final goal was to assemble a global database of fluorescence profiles calibrated into [Chl] specific to the three phytoplankton classes. The resulting database can be considered as an initial phase in view of producing 3D climatology of the vertical distribution of phytoplankton communities for the global ocean.

Keywords: fluorescence, neural network, chorophyll a, phytoplankton communities

*Speaker