Geophysical Research Abstracts
Vol. 15, EGU2013-13730, 2013
EGU General Assembly 2013

Toward new observations and models for a better quantification of carbon sequestration by global models

stemmann lars, Guidi Lionel, Berline Léo, Lombard Fabien, and Picheral Marc

UPMC Université Paris 06, UMR7093, Laboratoire d'Océanographie de Villefranche, 06230, Villefranche-sur-Mer, France, stemmann@obs-vlfr.fr

The oceans play a critical role in the carbon cycle and climate. It is therefore a major objective of the oceanographic community to better understand the functioning of these cycles as a mean to improve the predictive capacity of global models. Based on global modeling, the biological carbon pump could contribute significantly to climate variability. However, the uncertainties in our understanding of the biological pump's functioning in today's oceans remain important. For example, recent reviews about the export of biogenic particles to the deep ocean showed that there is no consensus on the mechanisms controlling its spatial and temporal variability. Our knowledge of export mechanisms remains approximate partly because lack of data in the mesopelagic layer at appropriate time and space scales and taxonomic or size resolutions. Recent technological developments allow, now, in situ measurement of biogeochemical properties of the ocean at high resolution (oxygen, fluorescence, nitrate). Imaging systems will also soon provide plankton and particle size distributions (PSD) in a way such that synoptic surveys will be possible. In this presentation, we will first show an existing global PSD in the upper kilometer of all oceans obtained using the Underwater Vision Profiler. Second, we will present a review of current knowledge gained by combining PSDs and biogeochemical models of vertical particle flux. Finally, we will then propose a new framework to couple in situ PSDs observations with models to better understand and constrain particle flux in the ocean. Ultimately, these advances will allow better quantification of the uncertainty of the biological pump in biogeochemical climate models.