



Atmospheric fluxes of organic matter to the Mediterranean Sea: contribution to the elemental C: N: P ratios of surface dissolved organic matter

Kahina Djaoudi, Aude Barani, Sandra Hélias-Nunige, France Van Wambeke, and Elvira Pulido-Villena
MIO,OT-Med, Aix-Marseille University, Marseille, France (kahina.djaoudi@mio.osupytheas.fr)

It has become increasingly apparent that atmospheric transport plays an important role in the supply of macro- and micro-nutrients to the surface ocean. This atmospheric input is especially important in oligotrophic regions where the vertical supply from the subsurface is low particularly during the stratification period. Compared to its inorganic counterpart, the organic fraction of atmospheric deposition and its impact on surface ocean biogeochemistry has been poorly explored.

In the ocean, carbon export to depth (and therefore, its long term storage with presumed consequences on climate) occurs both through particle sedimentation and through the transfer of dissolved organic matter (DOM) via diffusion or convection. DOM export from the surface ocean represents up to 50% of total organic carbon flux to the deep ocean in oligotrophic regions such as the Mediterranean Sea. The efficiency of this C export pathway depends, among others, on the elemental C: N: P ratios of surface DOM which might be affected by the relative contribution of microbial processes and allochthonous sources.

This work reports a one-year time-series (April 2015-April 2016) of simultaneous measurements of (1) total (dry + wet) atmospheric fluxes of organic carbon, organic nitrogen, and organic phosphorus and (2) concentration of dissolved organic carbon, dissolved organic nitrogen, and dissolved organic phosphate at the surface layer (0-200 m) in the NW Mediterranean Sea. Atmospheric and oceanic surveys were conducted at the Frioul and ANTARES sites, respectively, operated by the long-term observation network MOOSE (Mediterranean Oceanic Observation System for the Environment).