Submesoscale dynamics of dissolved organic matter across the Northern Mediterranean Current revealed from a new glider-mounted optical sensor.

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Traditional measurements of dissolved organic matter (DOM) in natural environment implies the collection of water samples that need to be further analyzed in the laboratory. The workload associated with this task generally prevent the temporal and spatial resolutions to be sufficient to address DOM submesoscale dynamics. However, new techniques involving portable or submersible fluorometers have been employed in recent years to acquire real time and high frequency measurements of target DOM fluorophores in seawater. Data presented here are from one of these new generation sensors, the MiniFluo-UV, which is now fully operational on the European-built glider SeaExplorer. The two optical pathways used in the MiniFluo-UV target measurements of tryptophan-like (TRY-) and phenanthrenes-like (PHE-) compounds in natural environment that are interpreted using other standard physical and biogeochemical measurements on gliders such as temperature, salinity, Chlorophyll-a (Chl-a), turbidity, etc.

Data presented here were obtained in the Northwestern Mediterranean Sea between 28 October and 10 November 2015 as part of the OSCAHR (Observing Submesoscale Coupling At High Resolution) campaign. They consist of two transects across the frontal zone created by the permanent Northern Mediterranean Current. Results show that the new sensor is able to highlight new features of DOM dynamics. For example, near-shore low-salinity waters are associated with high turbidity, colored dissolved organic matter (CDOM) and high PHE-like concentrations (fluorescent DOM) suggesting anthropogenic influence, while offshore waters are associated with high Chl-a and high TRY-like concentrations marking higher biological production of DOM. Such distinction would be more difficult to assess without the MiniFluo-UV measurements, specially when looking only at Chl-a measurements. Specific improvements resulting from the use this new sensor for DOM characterization will be presented, together with preliminary results of submesoscale DOM dynamics in the NW Mediterranean Sea within OSCAHR campaign context.

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