

Plankton biodiversity Through Remote sensing and omics in the MEDiterranean Sea: The PETRI-MED project

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Abstract

Monitoring microbial plankton abundance and diversity provides valid indications for assessing the health of the marine pelagic habitat. Photosynthetic plankton is responsible for almost 50% of the primary production of the planet, being fundamental for the functioning of marine food webs and biogeochemical processes in marine ecosystems. Ubiquitous highly-diverse heterotrophic microbes are essential to metabolise the diverse compounds that constitute the dissolved and particulate organic matter pools, participate in the biological carbon sequestration and contribute to the biogeochemical cycles. However, the effective assessment of microbial plankton diversity is suffering from lacking observations at high spatial and temporal coverages that are not achievable by in situ sampling. The PETRI-MED project, funded through the *European Biodiversity Partnership BIODIVERSA+*, aims to develop novel strategies to synoptically assess status and trends of plankton biodiversity in coastal and open waters of the Mediterranean Sea. This is achieved following a multidisciplinary approach capitalizing on the large potential offered by the past and ongoing satellite missions (e.g., Copernicus Sentinel-3), complemented with field measurements of OMICS-based taxonomy, biogeochemical models and emerging Artificial Intelligence technologies. PETRI-MED is thus going to: 1) develop a novel observation system to assess marine plankton biodiversity status and trends, and ecological connectivity among areas, that deals with specific user needs identified within the project and European policy indications; 2) enhance our fundamental understanding and predictive capabilities on plankton biodiversity controls and sensitivity to natural and environmental stressors; 3) contribute towards science-based solutions in support of decision making for sustainable marine ecosystem management strategies.