



Ocean Monitoring Indicators and Integrated Ecosystem Assessment for the Mediterranean Sea

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The interest in multi-decadal reanalyses of the status of the Mediterranean marine ecosystem is rising constantly, also because of the multiple request or integrated ecosystem assessment (e.g. MSFD). State-of-art reanalyses of the Mediterranean Sea biogeochemistry – being an optimal integration of multi-platforms data and numerical models- constitute an extremely relevant sources of information in evaluating the ecosystem status at basin and sub-basin scales. Here we used the result of a quality checked and high resolution reanalysis to produce sensible environmental indicators useful to characterize the environmental status of the Mediterranean. The reanalysis was qualified by a comparison against several available data sets, in terms of the main surface and sub-surface biogeochemical essential climate variables (chlorophyll, carbon dioxide partial pressure, ocean acidity, nutrients, oxygen). The reanalysis outputs reproduced spatial patterns, seasonal cycle and inter-annual variability of the assessed variables, allowing for a proper description of recent trends and present status of the Mediterranean Sea biogeochemistry. Results provides a suitable basis for the estimation of the so-called Ocean Monitoring Indicators (OMIs) and Essential Biogeochemical Variables (EBVs), and has been used to contribute estimating eutrophication MFSD descriptors, as well as the influence of physical forcing on ecosystem (e.g. mixed layer depth); the basic ecosystem status, functioning and changes (e.g. nutrient concentration, oxygen content, chlorophyll and their variability at monthly/seasonal/annual/decadal scale); the ecosystem health (e.g. anoxia indicators, N/P ratio); the relation of ocean ecosystem with fisheries (e.g. integrated primary production, phyto/zooplankton biomasses) and climate change (e.g. acidification, CO₂ fluxes). Results can also be used to identify reference levels and anomalies for specific OMIs in given periods/regions, so highlighting the occurrence of anomalous events and as a reference term to be used for evaluation of effects of management policies and climate change .