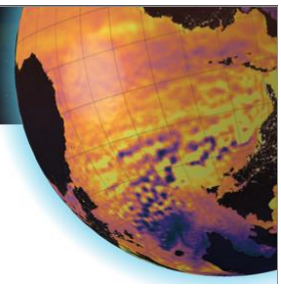

Glider observations in the Western Mediterranean Sea: their assimilation and impact assessment using four analysis and forecasting systems

Underwater gliders are very important and valuable ocean observing platforms able to provide high-spatial-resolution temperature and salinity measurements over specific sections. Several transects are monitored regularly in the Mediterranean Sea through endurance line programs sometimes providing quasi-continuous monitoring capabilities. While the impact of glider observations once assimilated into numerical models was demonstrated in several studies, the corporation of glider data in operational forecasting systems implemented in the Mediterranean Sea is still only partial. In the framework of the EuroSea European project, coordinated glider data assimilation experiments were performed in parallel in several operational Mediterranean forecasting systems, with the objective to contribute to bridge this gap. Glider temperature and salinity data were assimilated in the Copernicus Marine Service Mediterranean and Atlantic-Iberian Biscay Irish (IBI) systems, as well as in SOCIB Western Mediterranean Operational System. Observing Systems Experiments (OSEs) were conducted over the year 2017 to evaluate the impact of these data on the different models. OSEs help quantify the model error reduction and identify the improvements in terms of water mass transports and representation of specific mesoscale structures. Overall, the different systems are able to properly ingest the glider measurements and improve the local description of temperature, salinity and the resulting density fields. The model intercomparison also allows us to identify relative strengths and weaknesses of the different forecasting systems. Finally, these simulations were also used to evaluate the impact of the glider physical measurements on the biogeochemical parameters represented by the Copernicus Marine Service. Mediterranean Sea biogeochemistry forecast model forced by these different hydrodynamic simulations. Finally, this collaboration has been instrumental for a data assimilation task team under OceanGlider programme.

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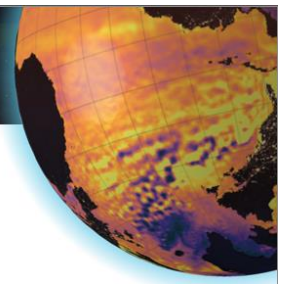

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