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The impact of a 3D data assimilation system on operational weather forecasts across the Mediterranean basin

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The Hellenic Centre for Marine Research has configured an operational analysis and forecast system for issuing timely and high-resolution ($1/20^{\circ} \times 1/20^{\circ}$) weather forecasts (named POSEIDON) over Europe and Mediterranean region on the basis the non-hydrostatic NCEP/Eta model. An advanced and systematic data assimilation system, the Local Analysis and Prediction System (LAPS), is applied to ingest real-time observations and to produce fine-scale analysis ($1/6^{\circ} \times 1/6^{\circ}$). The main aspect of the LAPS/POSEIDON operational system is the initial forcing of the high-resolution model runs with comparable high-resolution analysis fields from LAPS. The system has been operational since December 2007 where for each operational cycle the model is run twice; once using LAPS for the initial conditions, and the second using the NCEP's Global Forecast System (GFS) analysis fields ($1/2^{\circ} \times 1/2^{\circ}$).

In this study, the impact of the LAPS initialization on the model forecast of surface parameters is presented based on the $1^1/_2$ years of model outputs. The assessment was performed using as reference surface data from conventional weather observing stations across Europe. On the basis of traditional objective verification techniques (like bias, RMSE, threat scores) preliminary results show that LAPS based initialization versus the standard initialization leads to a considerable improvement in the early portion of the model integration with a slight degradation as the forecast length increases.