Evaluation of the operational implementation of LAPS into the POSEIDON weather forecasting system

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The Hellenic Centre for Marine Research (HCMR) developed the POSEIDON system to provide advanced measurements and forecasts for the marine environmental conditions of the Greek Seas. The POSEIDON weather forecasting system is the key element that issues timely and high-resolution ($1/20° \times 1/20°$) weather forecasts on the basis of an advanced version of the non-hydrostatic atmospheric Eta/NCEP model. This study investigates whether an advanced and systematic data assimilation system can improve the operational weather forecasts. In particular, the Local Analysis and Prediction System (LAPS) which is a complete, three-dimensional meteorological data assimilation system has been implemented at the HCMR to produce high resolution analysis fields on a 15-km grid covering Europe and the Mediterranean region. Furthermore, LAPS has been configured to provide initial conditions to the mesoscale forecast model of the POSEIDON system. Since late November 2007 the POSEIDON weather forecasting system has been run twice daily at HCMR. The two operational configurations, one with the LAPS based initialization and the other with the standard NCEP's Global Forecast System (GFS) initialization, are assessed using as reference fields 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. The long-term verification of the two set of forecasts has been also based on the terrain characteristics by grouping the validation stations according to the characteristics of the surrounding terrain: i.e. flat terrain, mountainous and coastal. The seasonal variability of the forecast skill has been also investigated.