Verification of a high-resolution forecasting system of surface minimum, mean and maximum temperature in Calabria for summer 2008

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Gridded high horizontal resolution (2.5 km) forecasts of minimum, mean and maximum temperature are evaluated against gridded analyses at the same horizontal resolution for Calabria, southern Italy. Temperature forecasts are issued at CRATI/ISAC-CNR (meteo.crati.it/previsioni.html) since 2005 by the RAMS (Regional Atmospheric Modeling System) model and, starting from June 2008, the horizontal resolution was enhanced to 2.5 km. Forecast skill and accuracy are determined out to four days for the 2008 summer season (from 6 June to 30 September).

Gridded analysis is based on Optimal Interpolation (OI) and uses RAMS first day forecast for minimum, mean and maximum temperatures as background field. Observations from 87 thermometers of the Centro Funzionale – ARPACAL network are used in the analysis system.

Cumulative measure oriented statistics are used to quantify forecast errors out to four days. Results show that maximum temperature has the largest root men square error (RMSE), while minimum and mean temperature errors are similar. The RMSE of minimum, mean, and maximum temperature vary from 1.9, 1.7, and 2.2 ˚C, respectively, for the first-day forecast, to 2.0, 2.0, and 2.6 ˚C for the fourth-day forecast.

The forecast skill is analyzed by comparison with persistence forecast. Anomaly correlation (AC) analysis shows that the model is able to catch the day-to-day variations of synoptic and mesoscale features and that the model performance for the fourth-day forecast is still better than one-day persistence forecast.

Distributions oriented statistics of forecast and analysis and distributions of forecast conditioned to specific values of analyses are also studied to show common forecast tendencies. Results show that forecast underestimates the analysis for the warmest temperatures and overestimates analysis for the lowest temperatures.