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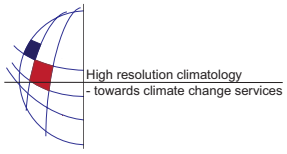

Mesoscale analysis of minimum, mean and maximum temperatures in Calabria, southern Italy

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Increased computing power coupled with greater access to real-time asynoptic data is paving the way toward a generation of high-resolution (i.e. on the order of 10 km or less) operational mesoscale analyses and forecast systems.
Data analysis is a potentially cost-effective means for incorporating and displaying vast amounts of data and can be used in various capacities including the evaluation of observing strategies such as the representative siting of surface stations, the investigation of sampling issues, gauging the value of an observing system, nowcasting, model initialization, and better defining local climatic features.
At CRATI/ISAC-CNR (www.crati.it), asynoptic measurements of minimum, mean and maximum temperature are available for Calabria, southern Italy, since 2008. Moreover, high horizontal resolution (2.5 km) temperature forecasts are issued daily for the same region for the following four days.
The first-day temperature forecast and measurements from 82 thermometers are combined to give gridded analysis of minimum, mean and maximum temperatures at 2.5 km horizontal-resolution. The analysis is based on Optimal Interpolation (OI).
In this work we show the methodology and the data analysis for case studies. The added value of measurement to first day forecast is apparent because several fine scale structures of the analysed field are not present in the forecasted field. Analysis precision ranges from 0.5 to 2.5 °C for minimum and mean temperature while is it lower for maximum temperature (from 0.5 to 4.5 °C). The stations representative error is usually less than 2 °C (95% of stations for mean and maximum temperature, 90% for minimum temperature).
Analyses are also used to evaluate the forecast performance. Results show that maximum temperature has the largest error, while minimum and mean temperature errors are similar. The errors for mean, minimum and maximum temperatures vary from 2.1, 2.2, and 2.9 °C, respectively, for the first forecast day, to 2.3, 2.3, and 3.2 °C for the fourth forecast day.
Results for anomaly correlation show that the model is able to represent the day-to-day variations in synoptic and mesoscale features and show that the model performance at four days is still better than two-day persistence forecast.