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# Spatial analysis of observations from high resolution automatic meteorological networks.

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Local observational networks of automatic weather stations are characterized, in Northern Italy, by high temporal and spatial resolution, often over complex orography and land-use. Even so, this wealth of meteorological information is only partially exploited in operational centers. In fact, point-wise observations are rarely combined to produce reliable analysis maps, and almost never integrated with other sources of meteorological information, such as model fields or remote sensing measurements.

Mostly for practical reasons, producing objective analysis maps of such observations can be of interest even independently from the availability of model fields. On the other hand it is appropriate to combine observations with model information, if this is available with sufficient resolution. Optimal interpolation, a basic step in many DA methods, can be used in both cases.

An Optimal Interpolation scheme has been implemented with Lombardia's network, accounting for the high observational density and with three-dimensional correlations.

Depending on the analysis variable, local characteristics of the area (as elevation, land-use, slope and aspect) have been included in the correlation functions used to specify covariances. The parameters of these functions have then been optimized through the innovation statistics.

The method is presently applied to temperature and relative humidity observations. The algorithm has been coded to compute the analysis value on on a regular 1.5km grid, the cross-validation analysis on station locations, and diagnostic parameters use-

ful for performance evaluation and data quality control.

Work is under way to extend the interpolation scheme to other variables. The general goal is to progressively integrate the local network measurements with other sources of information (remote sensing, model fields, physical constraints) to produce multivariate analysis fields by means of data assimilation techniques.