Testing the performance of a spatial consistency test for data quality control

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The availability of information about the quality of meteorological observations is of fundamental importance both for meteorological network management and for data analysis.

In this work the performance of a Spatial Consistency Test (SCT) as a component of an overall automated data quality control procedure is discussed. The SCT, that gives the probability of a Gross measurement Error (GE) affecting temperature observations, is based on a model-independent Optimal Interpolation scheme that is able to produce reliable analysis fields in presence of complex orography (southern part of the alpine region).

The SCT is specific for each observation as it depends on the local data density: isolated stations undergo a less restrictive test with respect to stations located in densely observed areas.

The possible occurrence of large representativity errors that cannot be distinguished from GEs by the SCT alone requires cross-checking with other tests integrated in the external quality control system.

In this work performance statistics on the overall behavior of of the SCT are presented. Moreover, in order to better understand the characteristics of representativity errors in mesoscale networks and to investigate the possibility of identifying them with an SCT, we also present some relevant case studies, in which the test's performance is discussed in detail.