Geophysical Research Abstracts, Vol. 9, 08891, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08891

Probabilistic quality control of daily precipitation data

A. Cancelliere, G. Sciuto, B. Bonaccorso, G. Rossi

Dipartimento di Ingegneria Civile e Ambientale, Università di Catania, Viale A. Doria 6, 95125, Catania, Italy (acance@dica.unict.it)

Meteorological data acquired by a monitoring network can be potentially affected by several errors, that can compromise their applicability in describing hydrological phenomena. Indeed, the necessary time for a traditional data control, based on a manual inspection, is not compatible with the requirements of processing and making available, in a short amount of time, the information collected about the evolution of the examined phenomenon. So, it is essential to develop automatic data control methods in order to carry out a fast preliminary screening of the acquired data and to identify possible anomalies in the data. Such potential anomalies can be subjected to further manual tests by the operator, who can classify the data quality on the basis of his experience. Thus, the automatic control procedure enables to make a selection among the several acquired data and to highlight only the ones which can be affected by potential errors, reducing significantly the time for the verification of the data.

An automatic control procedure of daily precipitation data is presented, based on the comparison, in probabilistic terms, of the observed daily value with the corresponding value estimated by means of two neural networks that make use of contemporaneous observations at reference stations, applied sequentially. In particular, the first network enables to assess whether a null observation should indeed be considered non-null, thus indicating a potential malfunctioning of the pluviometer. The second network is applied to non-null data, providing confidence intervals that should contain the observation with pre-fixed probability. Observations that fall outside of such confidence intervals are flagged as potentially affected by errors and therefore subject to manual control.

The proposed procedure has been applied as an example to daily precipitations observed from 1950 to 2004 in some Sicilian precipitation stations, belonging to the real time monitoring network of the Sicilian Regional Hydrographic Office. Such ap-

plication indicates that about 85% of the observations are classified as correct by the procedure, leaving only 15% of data for manual control. Also the reliability of the procedure in detecting erroneous data has been assessed by adding known errors to the available historical series and by computing the probabilities to incorrectly classify the quality of the data. Results indicate that the procedure enables to reduce substantially the number of data to be processed manually, while maintaining a fairly good accuracy in detecting correct and non-correct data.