Quality control of 10-min air temperature data at RMI

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In the 90's, the Royal Meteorological Institute (RMI) of Belgium started to replace its conventional "manual" meteorological network by automated weather stations (AWS). The meteorological measurement network is now fully automated. RMI counts 18 AWS that made automated observations centrally available at our head quarter in Uccle, Brussels to internal as well as external users. Due to the large increase in the data amount associated with the automation, quality assurance (QA) procedures are being automated. However, human operators continue to play an essential role in the data validation processes.

This contribution describes our newly developed semi-automatic quality control (QC) of 10-min air temperature data. First, a basic automatic QC is performed once the data are received in the central system in Uccle to ensure that gross errors are trapped before being further transmitted in our database. After an existence test, a module checks for physical limits, flags the data violating these limits and delivers alarms. Second, each night, automated QA procedures check the previous day data for more subtle errors. Data are checked for temporal consistency, climatological consistency, vertical consistency, spatial consistency, and plausibility using adjusted limits to reflect the AWS sites conditions more precisely than done in the previous range of tests applied on a near-real time basis. At the end of the checks, a decision algorithm attributes a flag to each particular data. Third, each day the QC staff analyzes the preceding day observations in the light of the quality flags assigned by the automated procedures during the night. It is the human decision whether or not a value is accepted. Where errors are found corrections are supplied and were values are missing estimates are made. Operators are supported in this task by automated data correction/estimation procedures.