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A relational database for automatic weather station data

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Archiving measuring data requires accessibility, security and simplicity. When many users are working with the same data sets, these requirements may be violated due to separation of data and meta data, redundancy (same or different versions of data in several locations) and/or different file formats of raw data files. Such a suboptimal data archiving system might not be comprehensible by a new and even an old user.

When deploying a relational database, many of the above problems can be addressed: (1) Data, meta data and documentation of data format are stored in a central place, (2) all users are working with the same data set, which is the one with the highest quality level, (3) data format, units and date conventions, and thus program code for importing is identical for all data, (4) linkage of all types of information makes it easy for old and new users to manipulate and interpret data. By using a common SQL database the development effort can be kept at a low level.

For maximum usability a simple database design with three tables was created: (a) station site details and meta data, (b) measuring data and quality flags, (c) attached files (site photos, logger programs, etc.). Web tools are provided for maintaining and looking up meta data. For inserting, selecting and updating data values example Matlab code is provided, which can be extended by users or ported to other languages.