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Going beyond FAIR to increase data reliability

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The FAIR principle is on its way to becoming a conventional standard for all kinds of data. However, it is often forgotten that this principle does not consider data quality or data reliability issues. If the data quality is not sufficiently described, a wrong interpretation and use of these data in a common interpretation can lead to false scientific conclusions. Hence, the statement about data reliability is an essential component for secondary data processing and joint interpretation efforts. Information on data reliability, uncertainty, quality as well as information on the used devices are essential and needs to be introduced or even implemented in the workflow from the sensor to a database if data is to be considered in a broader context.

In the past, many publications have shown that the same devices at the same location do not necessarily provide the same measurement data. Likewise, statistical quantities and confidence intervals are rarely given in publications in order to assess the reliability of the data. Many secondary users of measurement data assume that calibration data and the measurement of other auxiliary variables are sufficient to estimate the data reliability. However, even if some devices require on-site field calibration, that does not mean that the data are comparable. Heat, cold, internal processes on electronic components can lead to differences in measurement data recorded with devices of the same type at the same location, especially with the increasingly complex devices themselves.

The data reliability can be increased by implementing data uncertainty issues within the FAIR principle. The poster presentation will show the importance of comparative measurements, the information needs for the application of proxy-transfer functions, and suitable uncertainty analysis for databases.