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Significance and implementation of SMART Monitoring Tools

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The term “SMART Monitoring” is often used in digital projects to survey and analyze data flows in near- or realtime. The term is also adopted in the project Digital Earth (DE) which was jointly launched in 2018 by the eight Helmholtz centers of the research field Earth and Environment (E&E) within the framework of the German Ministry of Education and Research (BMBF). Within DE, the “SMART monitoring” sub-project aims at developing workflows and processes to make scientific parameters and the related datasets SMART, which means **s**pecific, **m**easurable, **a**ccepted, **r**elevant, and **t**rackable (SMART).

“SMART Monitoring” in DE comprises a combination of hard- and software tools to enhance the traditional sequential monitoring approach - where data are step-by-step analyzed and processed from the sensor towards a repository - into an integrated analysis approach where information on the measured value together with the status of each sensor and possible auxiliary relevant sensor data in a sensor network are available and used in real-time to enhance the sensor output concerning data accuracy, precision, and data availability. Thus, SMART Monitoring could be defined as a computer-enhanced monitoring network with automatic data flow control from individual sensors in a sensor network to databases enhanced by automated (machine learning) and near real-time interactive data analyses/exploration using the full potential of all available sensors within the network. Besides, “SMART monitoring” aims to help for a better adjustment of sensor settings and monitoring strategies in time and space in iterative feedback.

This poster presentation will show general concepts, workflows, and possible visualization tools based on examples that support the SMART Monitoring idea.