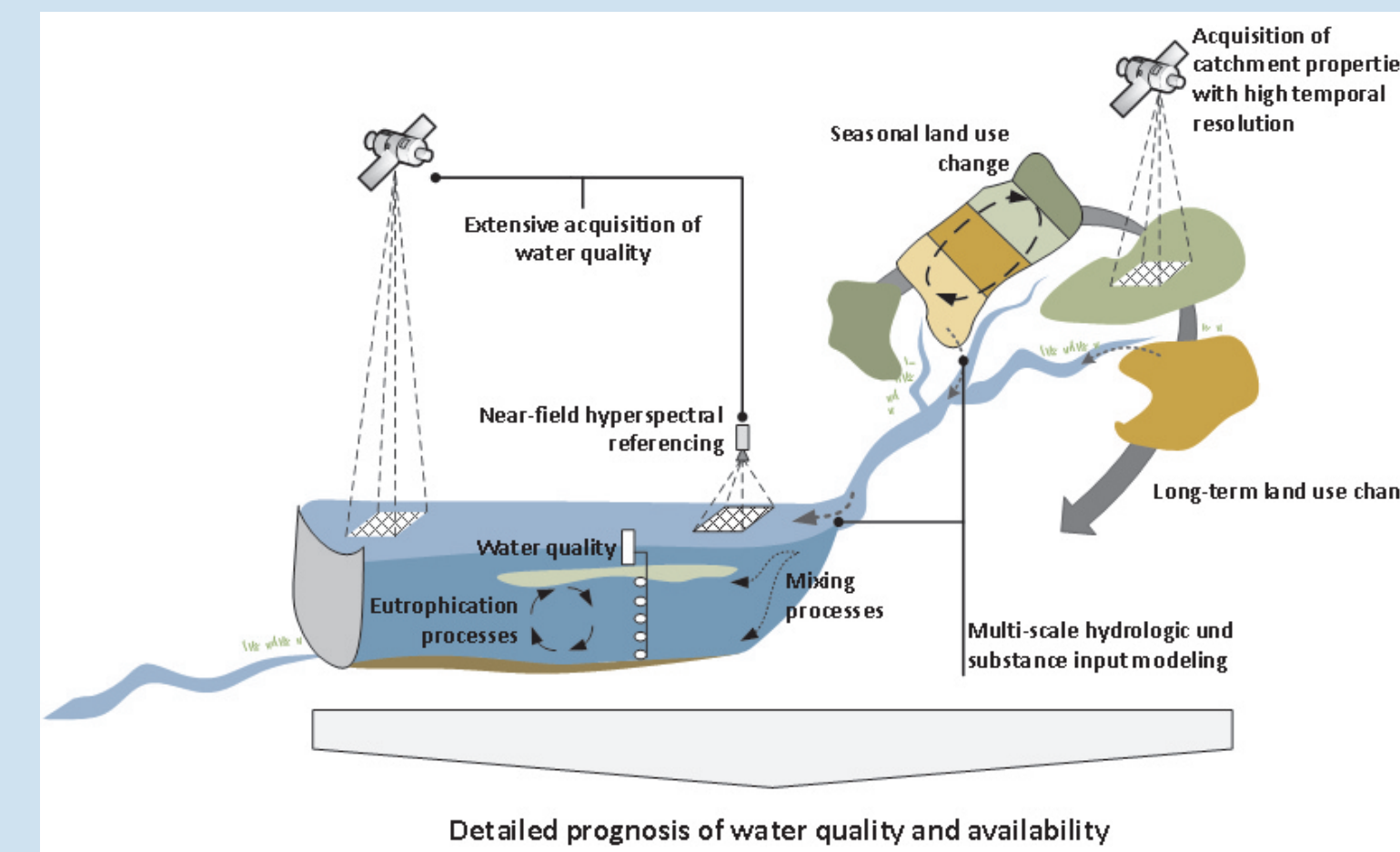


Managing Earth Observation datasets as multidimensional arrays using SciDB and open standards

Benedikt Gräler, Eike Hinderk Jürrens, Maurin Radtke and Simon Jirka
52°North Initiative for Geospatial Open Source Software GmbH, Münster, Germany

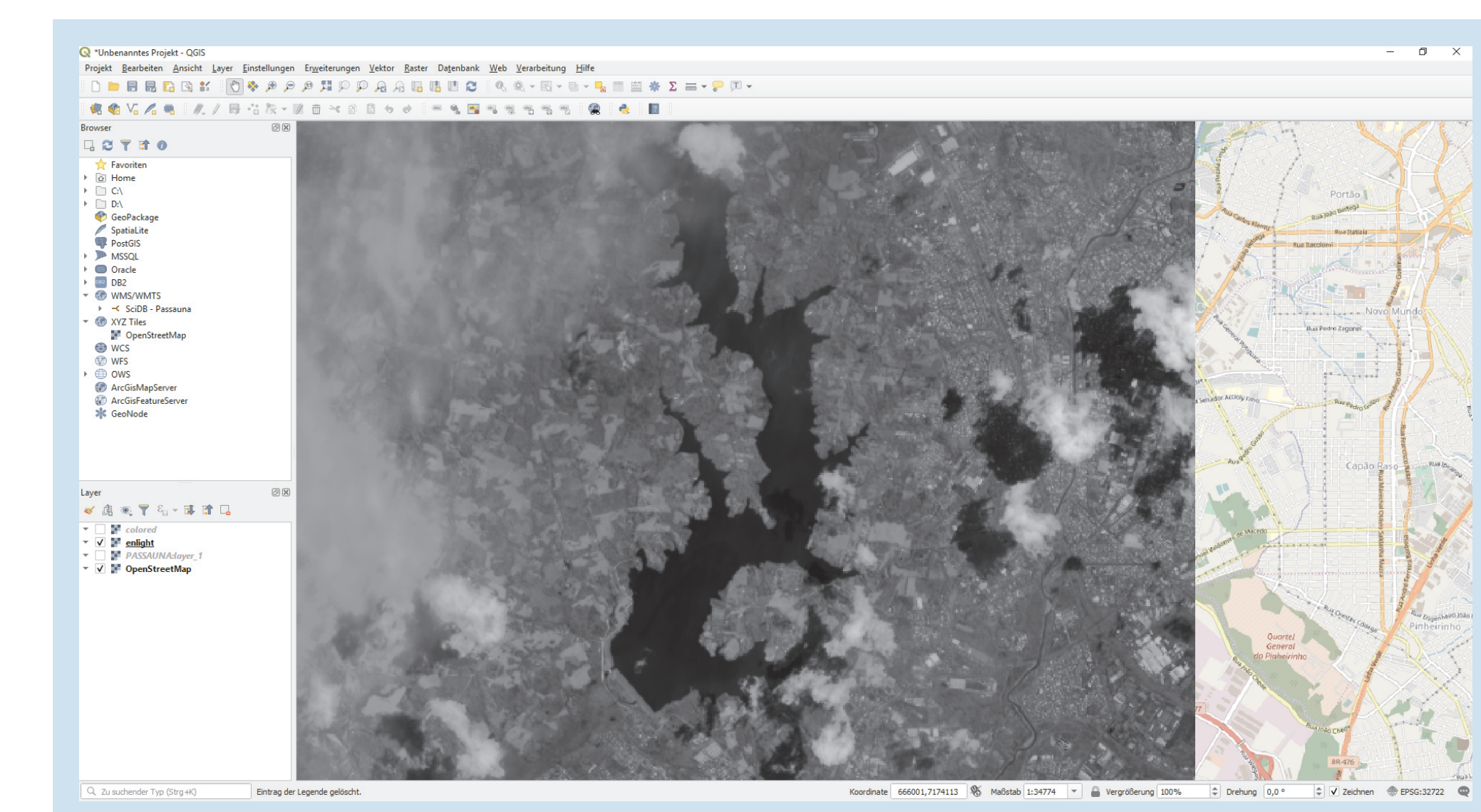
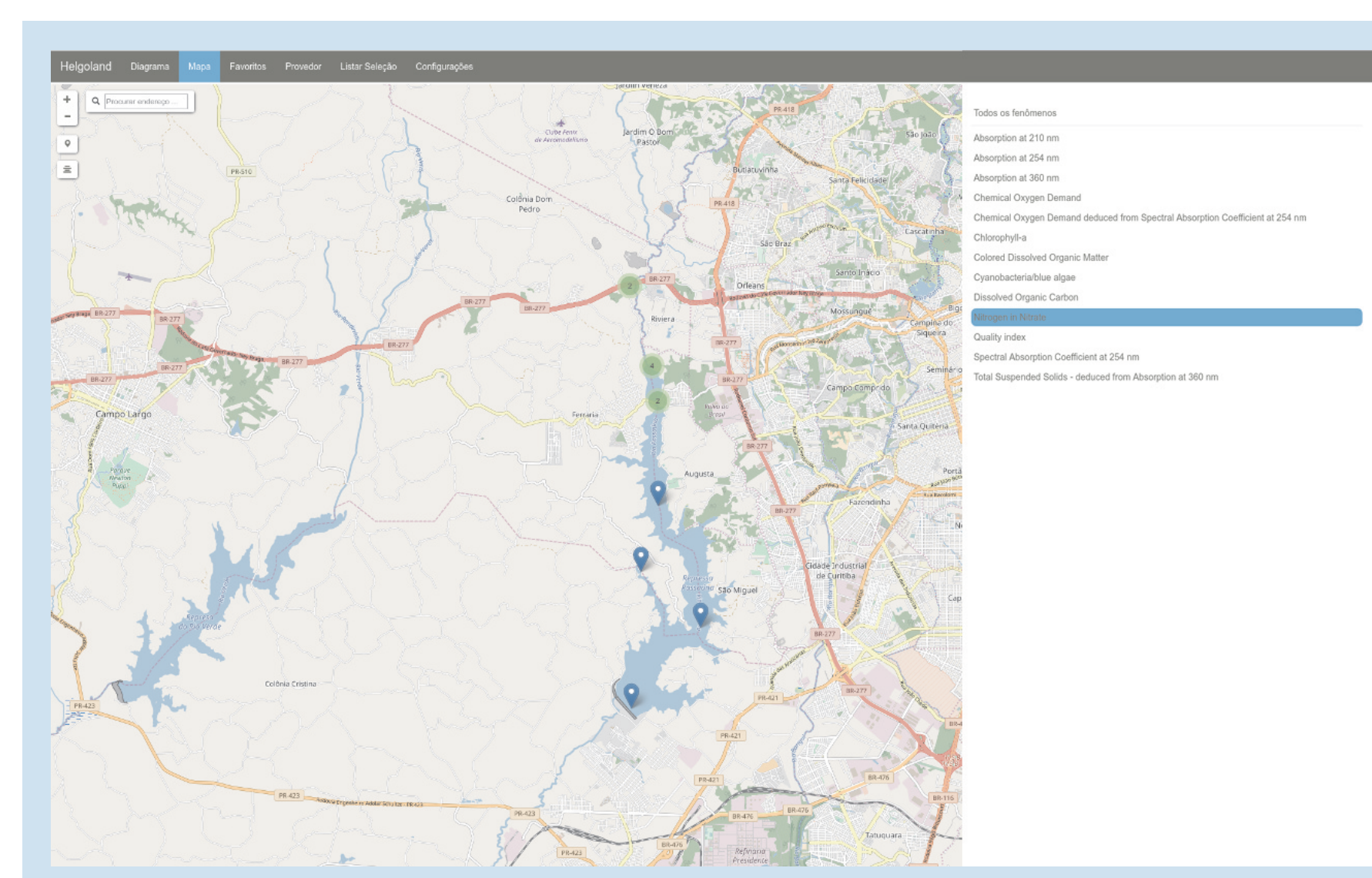
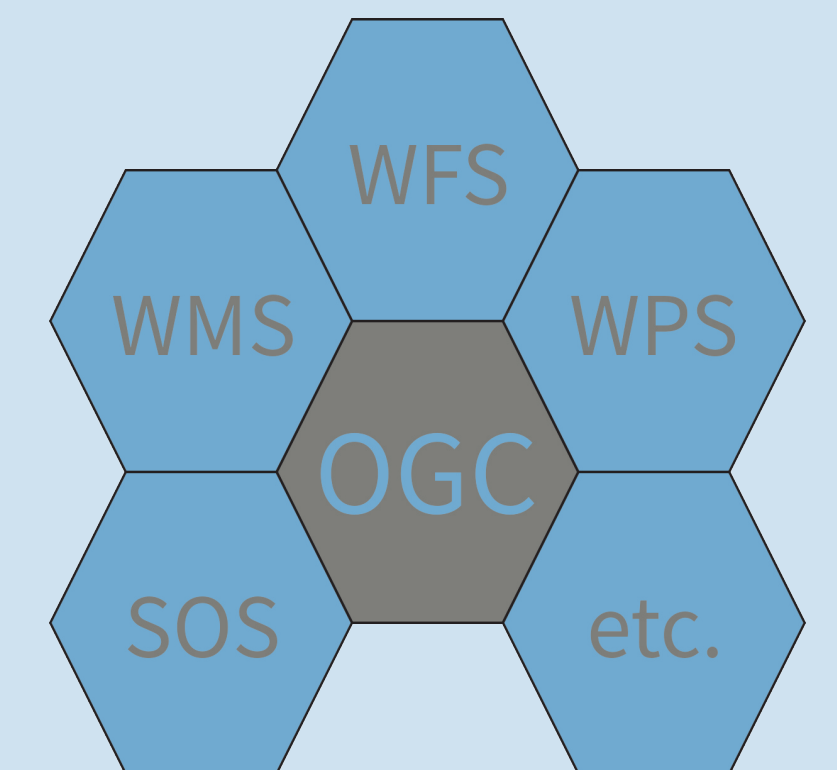
Multidisciplinary data acquisition as the key for a globally applicable water resource management (MuDak-WRM)

- Simplification of highly parameterized water reservoir models
- Reduction of data requirements
- Approximation of in-situ data through remote sensing data
- Globally applicable model to assess trends in water quality



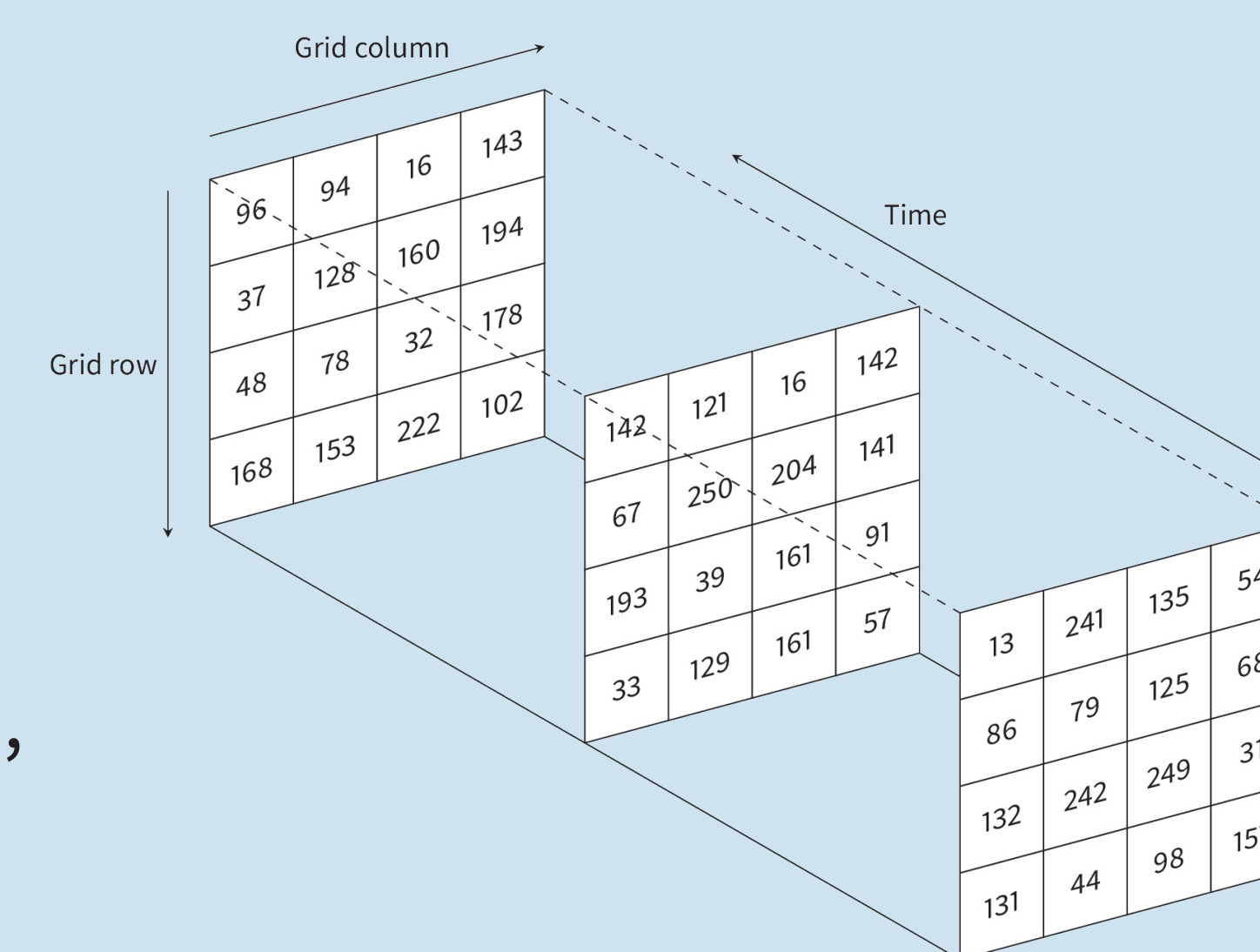
Open Geospatial Consortium (OGC) standards

- Open and freely accessible standards to handle geo information
- FOSS implementations
- Web Feature Service (WFS) provides access to feature data
- Web Mapping Service (WMS) provides ready to use map layers
- Web Coverage Service (WCS) provides access to raster data
- Web Processing Service (WPS) defines processing capabilities
- Sensor Observation Service (SOS) provides access to time series observation data
- Many more, see: ogc.org



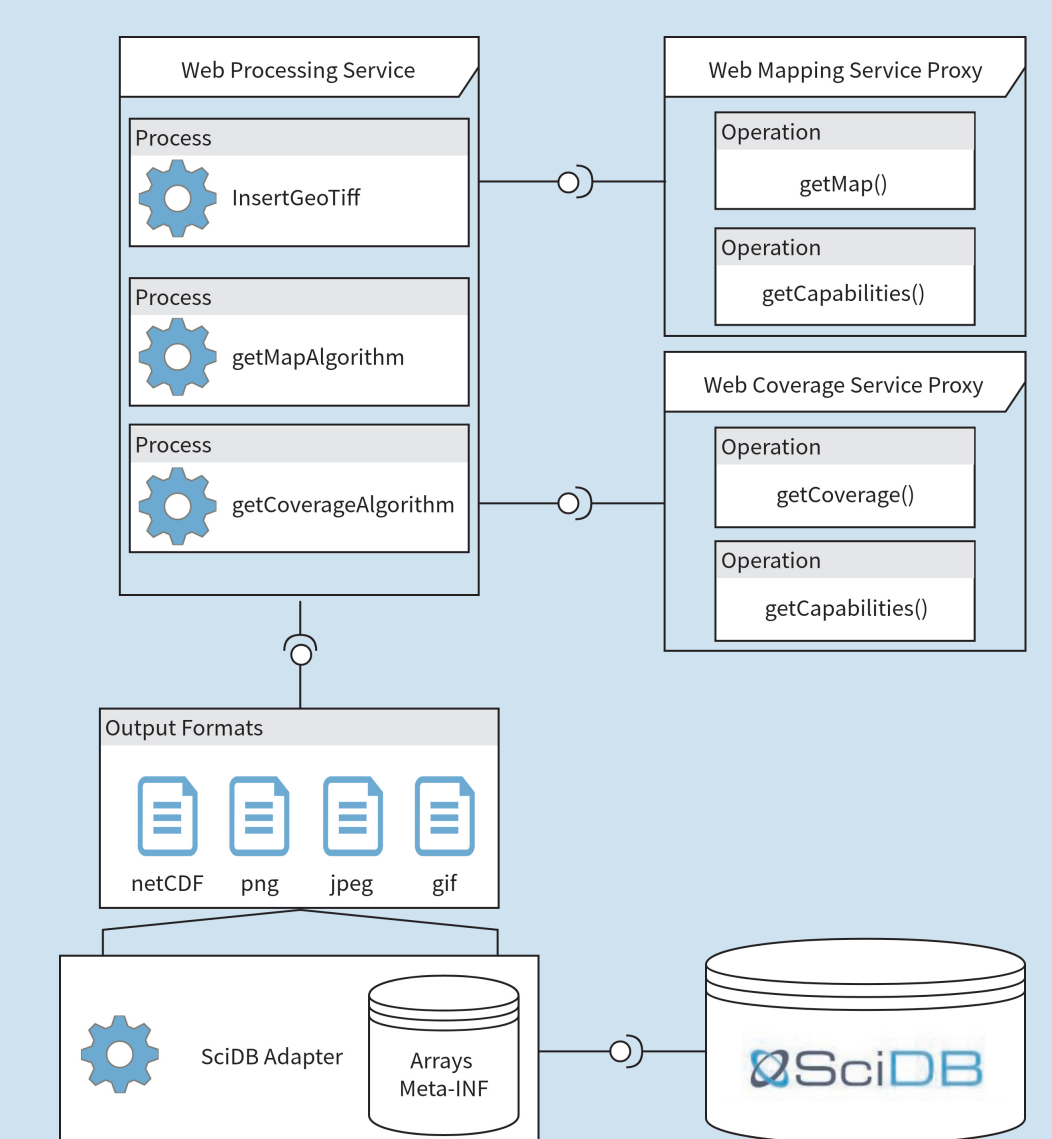
Array data bases

- Remote sensing imagery is delivered as a (multi spectral) raster time series
- Each layer constitutes a matrix (2D-array), several bands aggregate to a 3D-array and a time series builds a 4D-array (e.g.: $X \times Y \times B \times T$)
- As the order and relation of pixels are inherent in the data, no indices and relations need to be explicitly stored
- Meta-data needs to be stored in an additional format



WMS and WCS as WPS processes accessing raster time series

- Process for data retrieval taking spatial and temporal bounding boxes and a phenomenon identifier as input
- Process for data access and styling for direct use as map layer
- To maintain the WMS and WCS definitions, a simple wrapper Service translates the standardized WMS/WCS queries into WPS requests
- Only a single service needs to access the underlying data base (SciDB): fewer implementations, easier maintenance, easily extendible
- GitHub Repository: github.com/52North/wps-sciadb-integration



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