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Development of an information system for the ad hoc assessment of hydro-meteorological extreme events

Stefan Wiemann
Technische Universität Dresden, Chair of Geoinformatics, Dresden, Germany (stefan.wiemann@tu-dresden.de)

Numerous studies have addressed the assessment and prediction of flash flood events during the past decade. However, there are still a number of research challenges to be solved among and across different research disciplines. In this study, we particularly focus on capabilities for ad hoc data retrieval and processing of environmental data relevant to flash flood analysis and forecasting in an online information system. Currently, the following data sources are included:

- Ground radar imagery provided by Germany's National Meteorological Service (DWD) through its open data platform. The data is transformed to an array data structure to enhance spatiotemporal filtering. It uses two approaches: the NetCDF file format and the SciDB database.

- Stationary hydro-meteorological measurements, including precipitation, river discharge and temperature. The data is provided by OpenSensorWeb (www.opensensorweb.de) acting as a proxy to a number of open sensor measurement networks.

For data processing, the OpenCPU platform (www.opencpu.org) is used to expose R functionality for data retrieval, analysis and modelling to the web. A number of predefined functions is accessible through a web client in order to derive information from the input data sources. Examples are the rainfall distribution within a chosen space-time cube and the predicted water discharge at a selected measurement station.

The goal of the information system is to provide means to derive highly customizable information in an ad hoc manner. Additional data inputs and functionality for data analysis and modelling will be added in the near future.

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