A dam information and monitoring system rooted in the sensor web

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River dams are critical infrastructure. As part of a risk landscape that is constantly changing due to climatic changes and human impacts, dam systems require continuous monitoring with various observations. Potential damages associated with dams usually stem from the failure of the structure due to overtopping, seepage water flow, and deformation. A critical dam failure may claim lives and cause massive material damage. To further minimize the residual risk, measures from different sources must be combined and analysed to extract maximum information.
Within the research project TaMIS a novel integrated dam monitoring system has been developed utilising an existing Sensor-Web infrastructure. Sensor types used in the system comprise differential GPS, monitoring the dam structure deformation, weather and gauge sensors to watch hydrological behaviour and seepage sensors. A bunch of analysis tools including statistical methods as well as a complex runoff model are integrated using standardised Web Processing Services (OGC WPS) for a better understanding of processes at the dam building. The TaMIS control centre, a browser-based Web application, allows an integrated view on the different sensor sources and also enables the dam manager to execute different analysis and prediction facilities on-the fly. The approach is considered as best practice for similar scenarios when a flexible Web-based visualisation and (geo-)processing of observation data is needed. The tools developed in the TaMIS project are all published as open source software and can be reused in other systems.