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“MétéEau des nappes”: a decision making tool to characterize in almost real-time groundwater quantitative state.



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ABSTRACT

In a climate change context, the availability of real time and forecast piezometric data is essential information for decision makers. Indeed, associated with threshold values (groundwater levels corresponding to different alert discharges values) those data can indicate if a crisis situation is expected, either drought or flooding episodes.

To meet societal expectations, BRGM (French geological survey) currently works on improving its national piezometric data network. Raw data from sensors are exposed in interoperable formats and services in accordance with international open standards for sensorWeb interoperability and European rules (INSPIRE directive guidance on the use of Observations & Measurements and OGC SWE - Sensor Web Enablement Framework).

The objective of the “MétéEau des Nappes” project is to deploy an interoperable communication tool unable to cross data from different networks (meteorology, river flow, piezometric) in order to characterize in almost real-time groundwater quantitative state. A prototype of this tool was deployed on a few selected French regions with different hydrogeological characteristics and various issues (drought or flooding).

Preliminary steps were to define case studies (watersheds) to select the representative piezometers and the corresponding measured stations and, eventually to calibrate models that provide piezometric level forecasts. At the present stage, the tool shows maps giving the location of measured stations and charts drawing the real time evolution of data compared to thresholds and model predictions. It also provides the model predictions as a Sensor Observation Service in addition to the raw data flows.

BRGM also contributes to the achievement of the national hydrological situation report (monthly evolution of water resource) on behalf of the French ministry of Environment. Then the final step of the project is to integrate into the tool a map showing specified indicators of the groundwater state and trends.

Perspectives of the project are the implementation of data assimilation and automatic forecasting processes into the models.

Among the French stakeholders interested in the tool, we can indicate: Water agencies, decentralized services of ministries, Regions and Departments, Association of Municipalities, Industrial water producers...