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Operational water management of Rijnland water system and pilot of ensemble forecasting system for flood control

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The Rijnland water system is situated in the western part of the Netherlands, and is a low-lying area of which 90% is below sea-level. The area covers 1,100 square kilometres, where 1.3 million people live, work, travel and enjoy leisure.

The District Water Control Board of Rijnland is responsible for flood defence, water quantity and quality management. This includes design and maintenance of flood defence structures, control of regulating structures for an adequate water level management, and waste water treatment.

For water quantity management Rijnland uses, besides an online monitoring network for collecting water level and precipitation data, a real time control decision support system. This decision support system consists of deterministic hydro-meteorological forecasts with a 24-hr forecast horizon, coupled with a control module that provides optimal operation schedules for the storage basin pumping stations. The uncertainty of the rainfall forecast is not forwarded in the hydrological prediction.

At this moment 65% of the pumping capacity of the storage basin pumping stations can be automatically controlled by the decision control system. Within 5 years, after renovation of two other pumping stations, the total capacity of 200 m3/s will be automatically controlled.

In critical conditions there is a need of both a longer forecast horizon and a probabilistic forecast. Therefore ensemble precipitation forecasts of the ECMWF are already consulted off-line during dry-spells, and Rijnland is running a pilot operational system providing 10-day water level ensemble forecasts.

The use of EPS during dry-spells and the findings of the pilot will be presented. Challenges and next steps towards on-line implementation of ensemble forecasts for risk-based operational management of the Rijnland water system will be discussed.

An important element in that discussion is the question: will policy and decision makers, operator and citizens adapt this Anticipatory Water management, including temporary lower storage basin levels and a reduction in extra investments for infrastructural measures.