



Hydrological modelling of low-lying catchments in deltas using multiple data sources and SIMGRO modelling system

Isnaeni Hartanto, Schalk Jan van Andel, and Dimitri Solomatine
UNESCO-IHE Institute for Water Education, Delft, Netherlands (i.hartanto@unesco-ihe.org)

Low-lying land-reclamation areas are common in deltas such as the Netherlands. With characteristics such as many ditches and canals, shallow ground water levels, and highly controlled surface water levels with pumps and weirs, these areas provide particular challenges to hydrological modelling. SIMGRO is one of the hydrological modelling systems that has the capabilities to model such areas. SIMGRO is used in this research to model the water system of Rijnland to study the effect of using multiple data sources in hydrology modelling.

Hydrological data in the area are abundant, hence the model can be used with various combinations of input data and generate multi-model output.

With the advance of data collection methods, more data sources have become available throughout the years. The types of data include in-situ measurements, remote sensing and earth observation (e.g. radar, satellite-based sensors), and meteorological numerical model analysis and forecasts. With such many data sources, a hydrological model can be built and fed with multiple data sources to model hydrological processes in a system. The hydrological model output itself also is a source of data, which can be compared to other sources of hydrological data.

In the experiments with the SIMGRO model of Rijnland, multiple sources of data are available for land use, precipitation, and soil type. The output of the model can be compared with alternative data sources for surface water level, ground water level, actual evaporation, and soil moisture. The land use data comes from local authorities, SPOT, MERIS, and Landsat 5. Meteorological data comes from in-situ gauges, weather forecasts, and radar.

Comparison results are presented and analysed. Challenges in assessing the performance of each data source are being discussed.