

5th symposium on the hydrological modelling of the Meuse basin on 13 September 2018 in Liège

Bernhard Becker (Deltares), September 2018

In 2013, the first edition of the symposium series on the hydrological modelling of the Meuse basin took place, and on September 13th, 2018, for the 5th time, 30 participants from Belgium, France, the Netherlands and Germany came together to share and exchange knowledge on hydrological modelling and water-related processes (in the widest sense) in the Meuse catchment on a scientific basis. The symposium covered a range of topics. Beside hydrological modelling, there were sessions dedicated for stakeholders and policy analysis; sediment, water quality and environment and climate change. Presentations highlighted the need for fast conceptual models of hydraulic systems, drought management, analysis of and adaption to climate change impacts and the balance of hydropower production and environment. While scientists met in Liège, policy makers were gathering on the same day in Charleville-Mézières on the occasion of the 20th anniversary of the international Meuse commission.

Hubert Savenije from TU Delft chaired the first session of the conference. Savenije is one of the initiators of the intercomparison study of hydrological models that has been a recurring topic since the first edition of the symposium series. Lieke Melsen (Wageningen UR) and Laurène Bouaziz (TU Delft and Deltares) presented the current status of work and first results. After having published about the intercomparison study in 2017 (de Boer-Euser et al., *Hydrol. Earth Syst. Sci.*, 21, 423-440, 2017), now the study continues with the following research questions: 1. compare internal states and fluxes of the models, 2. run the models with national climate scenarios and 3. have people run each other's model to investigate the impact of experience with a certain model on the model results.

The session had two more presentations: Maud Grandry (Université de Liège) presented her analysis of trends in the magnitude, frequency and seasonality of high flows. Trends were found only at some sites, while most of the sites don't show any trends. For those sites that show a trend, urbanisation and water transfers via sewerage networks are possible explanations for the trend. Luc Willems (Université de Liège) presented about the polyphased karst system in cretaceous chalk of the Belgian-Dutch border. Here, an underground quarry gives an exceptional access to the rock geology and karst features. With a lot of impressive photographs Willems took the audience to a virtual tour through the karst system and explained possible mechanisms for the genesis of the karst system. From a hydrologic point of view, the most interesting was probably that these karst features form preferential pathways for water and even provide a hydraulic connection between the river Meuse and her tributary Geer.

Jiri Nossent from Flanders Hydraulic Research chaired the second morning session about stakeholders and policy analysis. Lila Collet (IRSTEA) explained how probabilistic maps help to translate research knowledge of climate change uncertainty such that this information can be understood by decision makers and used within the decision process.

Bernhard Becker (Deltares) presented his inventory of developments in neighbouring countries can have an impact on the river discharge in the Dutch part of the Meuse. The expected increase of cargo ship navigation on inland waterways was considered as one of the most important future developments that should be taken into account in the strategic water resources planning.

Siebolt Folkertsma shared the experiences the Dutch water authorities made during the drought period in the current year 2018. Although the lowest river discharge in the Meuse in 2018 was not unusually low compared to 2017, the duration of the low flow period was extraordinarily long, and the low flow period started much earlier than in 2017. However, experience from 2017 could be used for the water management in 2018. The drought period is still going on (September 2018), and besides hindering of ship navigation, a severe impact on aquatic life is expected from the drought.

After the lunch break, which has also been used for interesting discussions among the participants, the programme continued with talks on sediment, water quality and environment (session chair: Bernhard Becker). Jiri Nossent presented a conceptual modelling tool for water quality and sediment transport and pointed out how conceptual modelling can be complementary to the classical detailed modelling for specific applications. Stefano de Simone (Kisters AG) and Julia Rauw (FH Aachen) showed results from a pilot study on the operation of hydropower plant Linne. With the help of optimization techniques, the turbines and the weir can be operated in such a way that the economic output from hydropower increases, while at the same time all obligations for protection of downstream migrating fish are maintained as well as the permitted water level range upstream of the weir Linne is maintained. As last speaker in this session Sébastien Epicum (Université de Liège) showed preliminary results from the Life 4 Fish project that aims a safer downstream passage for fish at six hydropower plants in the Meuse by applying physical modelling, numerical modelling and field analysis.

Guillaume Thirel (IRSTEA) chaired the last session of the day about climate change and hydraulics. Here Patrick Willems (KU Leuven) presented applications for conceptual modelling of water systems, which has some advantages in terms of performance and flexibility compared to detailed hydraulic modelling and can therefore be a complimentary approach e. g. for forecasting systems and real-time control studies. Ryan Teuling (Wageningen UR) presented his research on the impact of climate change, re-/afforestation, and urbanisation on evapotranspiration and streamflow in Europe. The session closed with another talk by Patrick Willems about spatial climate scenarios for Flanders – this talk coincided with the occasion of the launch of the Flanders Climate Webportal today. For Flanders the climate change is already visible in the data: the average temperature has increased with respect to the period between 1850 – 1800, and more days with temperature above 30°C have been registered.

Organizers Benjamin Dewals and Bernhard Becker thanked the speaker and the audience for the interesting talks and the lively discussions. Ideas for topics for the 6th edition of the symposium in 2019 are very welcome!

Presentations can be downloaded from the conference website:

<https://publicwiki.deltares.nl/display/HydrologyMeuse/5th+symposium+on+the+hydrological+modelling+of+the+Meuse+basin>