

4th symposium on the hydrological modelling of the Meuse basin on 13 October 2017 in Liège

Bernhard Becker (Deltares), October 2016

For the 4th time, about 40 hydrologists and water managers from Belgium, France, the Netherlands and Germany followed the invitation to the international “symposium on the hydrological modelling of the Meuse basin” in Liège and discussed latest developments and research on the hydrological modelling of the Meuse basin.

In the introductory talk, Jos Brils (Deltares) and Benjamin Dewals (Université de Liège) suggested the idea to found a Rhine-Meuse supersite within DANUBIUS-RI. DANUBIUS-RI will be the research infrastructure for interdisciplinary studies in river-sea-systems, i. e. facilities, resources or services of a unique nature identified by European research communities to conduct top-level research activities in all fields.

“Models are no value-free objective tools, but social constructs” was the take home message of Lieke Melsen’s talk. With literature and own research she pointed out that modellers take decisions that influence the model results, and that commissioners and stakeholders can scope these decisions. This can lead to a bias in model results, which again has an impact on management decisions. The two other talks within the first hydrological modelling session (chair: Guillaume Thirel from irstea) were about satellite and radar data: Jaap Schellekens (VanderSat/Deltares) and Laurène Bouaziz (TU Delft) explained how satellite moisture maps can be used for hydrological modelling and showed results for a tributary of the Meuse. Edouard Goudenhoofd (Institut royal météorologique de Belgique) presented new radar products that can improve hydro-meteorological observations, forecasts and warnings

In the second morning session about hydrological modelling Niels van den Brink (TU Twente) presented a comparison of three models, all covering the whole Meuse basin upstream Borgharen. Guillaume Thirel (irstea) presented his analysis of methods for the naturalization of streamflows. A naturalized streamflow is a flow time series that could have been observed without any human influence and can be used to obtain reliable drought indicators.

The comparison of hydrological models has been a recurring topic in all editions of the symposium on the hydrological modelling of the Meuse basin until now, and an international peer-reviewed paper about the results has been published this year (de Boer-Euser et al., *Hydrol. Earth Syst. Sci.*, 21, 423-440, 2017). Jan De Niel (KU Leuven), Laurène Bouaziz (TU Delft) and Lieke Melsen (Wageningen University and Research Centre) coordinate the joint model comparison. The next steps of this model comparison study were discussed in a plenary discussion, moderated by the session chairman Remko Uijlenhoet (Wageningen University and Research Centre).

The first afternoon session was dedicated to water management and developments in the Meuse basin, and chaired by Bernhard Becker (Deltares) and Jiri Nossent (Flanders Hydraulics Research). Recently, two new pump and hydropower installations have been installed in the Albert canal, and Niels van Steenberg (De Vlaamse Waterweg) explained how these installations help to ensure the water supply during low flow periods. Similar installations are planned for other lock complexes, and the new installations produce hydro power during periods of high water supply. Also related to low flow was Christof Homann’s presentation (Wasserverband Eifel-Rur). The water board is currently developing operational rules for management of reservoirs in the Rur river system during low flow. A drought index is a key element of the new operational protocol. Martin Bruwier (Université de Liège) addressed the flood risk in the Walloon region under various urbanization scenarios (business as usual or ban on new developments) and urbanization rates, and showed the impact of urban patterns on flooding.

Patrick Willems (KU Leuven) chaired the second afternoon session about real-time control and hydrological processes. Jorn Baayen (Deltares) explained the concept of model predictive control and explained his approach with the help of a case for a drainage channel network in the Netherlands. For a flood event, the model predictive approach was able to achieve a lower maximum water level, having at the same time lower pump costs than the conventional feedback control. Another model predictive approach was presented by Evert Vermuyten and Vincent Wolfs (both from KU Leuven) for the Demer basin. The operation of weirs, gates and pumps is optimized such that economic damage costs as low as possible, which means a damage reduction due to flooding of up to 30 %. As last speaker of the day Mohamad Rammal (Université de Liège) made the connection back to hydrological modelling by presenting a new method for base flow separation.

Organizers Benjamin Dewals and Bernhard Becker thanked the speaker and the audience for the interesting talks and the lively discussions. Both the idea of the Rhine-Meuse super-site within DANUBIUS-RI and the international model comparison study will create international collaboration; outcomes might be presented in a fifth edition of the symposium of the hydrological modelling of the Meuse basin. Ideas for topics are very welcome!