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Editorial
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Editorial

Manuela Escarameia MSc, EurIng, FICE
Principal Engineer, HR Wallingford, Oxfordshire, UK

It is my pleasure to welcome you to the April issue of *Water Management* and to invite you to explore and enjoy a very interesting mix of papers spanning a range of topics. The papers in this issue cover hydraulic structures such as subsurface dam weirs, side weirs and culverts, as in Kabiri-Samani and Shams (2014), Seyedian *et al.* (2014) and Blanc *et al.* (2014), respectively; rainfall-runoff modelling and flood risk potential, as in Baymani-Nezhad and Han (2014) and also Blanc *et al.* (2014); and stream flow structure and water quality, as in Afzalimehr *et al.* (2014) and Ghoveisi *et al.* (2014). Experimental techniques have been extensively used by the authors (four out of the six papers are laboratory studies), which confirms the relevance of acquiring new data in today's research. Modern numerical techniques are also reported as a means of improving accuracy in estimates (Seyedian *et al.*, 2014) or for parameter optimisation (Baymani-Nezhad and Han, 2014).

The first paper deals with the important issue of groundwater sources. Subsurface dams are built to store groundwater in aquifers; these dams are a useful means of counteracting water deficiency during dry seasons but weirs are needed to discharge excess groundwater and control the level behind. Kabiri-Samani and Shams (2014) investigate submerged weirs as components of subsurface dams. Both physical modelling and numerical methods were employed to recommend a threshold value for subsurface weir submergence and determine a discharge equation, with associated limits of application and values of uncertainty. This equation was developed with practical applications in mind and is particularly relevant for arid and semi-arid countries.

Management of water resources, flood forecasting and environmental protection depend on reliable rainfall-runoff models that estimate stream hydrographs. Baymani-Nezhad and Han (2014) introduce the various categories of model available, including the IHACRES model, which has been in use for over two decades. The paper explores parameter optimisation schemes in terms of accuracy and computational time. For the three different catchments investigated, the authors conclude that certain methods can produce improved results in relation to the scheme embedded in IHACRES.

Afzalimehr *et al.* (2014) report on experimental research looking at the combined effect of the concentration of cobble-size particles and vegetated banks on the mean flow and the turbulence structure of stream flows. The cobble concentration, defined as the number of cobbles per square metre of stream bed, usually changes along a reach of mountainous rivers but most studies have so far used close-packed arrangements. Through detailed measurements, the authors confirmed that cobble concentration and distance from vegetated banks affect the turbulence intensity distributions. The paper gives further insight into the structure of these flows and informs numerical modellers how to incorporate better the effects of high bed roughness in their models.

Culverts are common features of the drainage infrastructure but can potentially increase the risk of flooding if badly designed or maintained. Screens are installed in culverts to address the dual requirement of preventing debris ingress, which can cause blockages, and unauthorised access. However, accumulation of debris at screens can also increase flood risk. Blanc *et al.* (2014) describe a comprehensive experimental study on how blockage is influenced by the screen geometry and positioning of the screen. Debris length, screen bar spacing, screen angle and positioning were shown to significantly affect blockage potential and an empirical relationship was developed. The authors suggest that the methodology presented provides a good basis for developing a predictive method for screen design and for increased understanding of cumulative debris build-up.

The paper by Seyedian *et al.* (2014) suggests an Anfis (adaptive neuro-fuzzy inference system) model for the estimation of side weir discharge coefficients. Side weirs are installed along the side of main channels (or reservoirs) as part of irrigation, land drainage or sewage systems, or for example in canals, as control structures. Given the relative position of side weirs, their coefficient of discharge is influenced by a number of parameters, making its prediction rather complex. The authors report on various approaches that have been used, from analytical to laboratory-based and artificial intelligence techniques. The research involved neuro-fuzzy systems to determine the discharge coefficient of rectangular side weirs, using experimental data for training and verification of the method. A comparison with regression models showed that Anfis provided closer values to the actual data, particularly when considering the channel slope as a parameter in the analysis.

The final paper addresses water pollution. Most metals, as well as organic and inorganic pollutants, can attach to river sediments (in a process called adsorption) and the detachment of these materials can play a significant role in water quality. Ghoveisi *et al.* (2014) describe an experimental study using cadmium as a heavy metallic element in the flow and granular sediment transported as bed load and as suspended load. A flume previously designed to reproduce natural river conditions was used in this study and results are compared with those obtained using a traditional reactor-type experimental facility. The authors provide useful conclusions regarding the effects of flow velocity, sediment concentration and type of sediment movement on cadmium adsorption.

I hope the above brief introductions will have enticed you to read the full papers and that they will prove useful in your engineering or research activities – enjoy the read!

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