Water Management
Volume 166 Issue WM6

Editorial
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ice | proceedings

Proceedings of the Institution of Civil Engineers
Water Management 166 June 2013 Issue WM6
Pages 301–302 http://dx.doi.org/10.1680/wama.2013.166.6.301

Editorial

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This issue of *Water Management* includes interesting papers that address several issues relating to water management in a catchment. For example, in what way do aquatic plants such as water hyacinths alter the regime of flow in an open channel? Is there a simple way to calculate the sequent depth of a hydraulic jump in an open channel that expands gradually in the direction of flow? What is the best way to calibrate a flood routing model?

The Gini coefficient is an established statistical measure of inequality that is commonly used by economists to describe distributions of income and/or wealth. In recent years, the Gini coefficient and the associated Lorenz curve have been used to quantify inequality in many fields (Ekkawatpanit *et al.*, 2013). Ekkawatpanit *et al.* (2013) propose a Gini coefficient to assess inequality in the spatial distribution of water resources in the Mae Chaem river basin in Thailand and a separate Gini coefficient for inequality in the availability of water with respect to the distribution of the population. The authors then use the Gini coefficient to discuss the availability of water with respect to the seasons, long-term changes and differences between the Mae Chaem river basin and Thailand as a whole.

To estimate water resources, Ekkawatpanit *et al.* (2013) calculated stream flows using flow routing based on a Muskingum-Cunge model calibrated by trial and error. By contrast, Orouji *et al.* (2013) describe the application of two meta-heuristic algorithms; namely simulated annealing (SA) and the shuffled frog leaping algorithm (SFLA) to calibrate the parameters of the non-linear Muskingum flood routing model. The authors compare SA and SFLA to other approaches that have been used elsewhere (see Karahan *et al.*, 2013). Applying SA and SFLA to a benchmark problem and a major river system in the southwest of Iran, the authors use several measures to show that SFLA gives the best results and that both SA and SFLA can find (near) optimal values of the parameters of the non-linear Muskingum flood routing model quickly and reliably.

The paper by Ghiami *et al.* (2013) is also about flood management and explains the use of the fast Fourier transform to derive the instantaneous unit hydrograph for a catchment that may be used to predict the direct runoff hydrograph of storms for purposes such as flood forecasting. The authors propose the use of a class of wavelets known as Daubechies wavelets to remove errors and high-frequency oscillations (for example noise), from the resulting instantaneous unit hydrograph. The noise arises from measurement errors and the linear relationship between rainfall and runoff that is implicit in the theory of the unit hydrograph but, strictly, is not accurate (Ghiami *et al.*, 2013). The results demonstrate the effectiveness and benefits of the wavelet theory approach in a catchment of 449 hectares for 15 storm events and four gauging stations.

The paper by Montakhab *et al.* (2013) features an interesting application of digital image processing to estimate the density of vegetation in a laboratory experiment to study the effects of vegetation (e.g. emergent plants) in open channel flow – an important aspect of catchment and flood management. Various techniques for measuring the density – or conversely the sparseness – of the vegetation are described and discussed along with the relationship between the vegetation porosity or sparseness and Manning's roughness coefficient. The authors show that the best results are obtained if the actual volume of the vegetation is used to measure the vegetation porosity and that the resistance to the flow depends strongly on the vegetation porosity.

Scour at the pier foundations of bridges is a common cause of bridge failure (see Hamill, 1999) and major scouring often occurs during floods when the flow is unsteady. The paper by Salamatian *et al.* (2013) discusses the merits of Bayesian networks and explains how they can be used to estimate the probability of bridge failure due to scour.

This issue includes an interesting discussion (Zhang *et al.*, 2013) on the computation of the sequent depths of hydraulic jumps in gradually expanding open channels (Zhang *et al.*, 2012). Zhang *et al.* (2012) proposed a new formula for the sequent depth ratio that has no empirical coefficients and is easy to use. In the discussion in this issue, the theory used in the original derivation is extended to obtain a single formula that works for both prismatic and expanding trapezoidal channels.

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