Editorial: Frontiers and diversification of hydroinformatics for new challenges

Climate change, rapid urbanization, water pollution and data explosion provide new challenges and opportunities to water-oriented researchers, which brings hydroinformaticians from all over the world together in Tianjin to discuss countermeasures.

This special issue is dedicated to the publication of selected papers from the 7th International Conference on Hydroinformatics (HIC 2010) held at the Tianjin Binhai New Area, 7–11 September 2010. The event was organized jointly by Tianjin University and Research Center for Eco-Environmental Sciences. There was an open call for papers after the conference, and each submission was requested to contain at least 40% new content and to be rewritten to the journal's high standards. The papers were also peer-reviewed through the normal submission system of the *Journal of Hydroinformatics*. In total, 29 submissions were received, but only 10 were accepted for publication. The selected papers cover a good perspective of the frontiers and diversity of the hydroinformatics discipline.

It will always be the case that the core of hydroinformatics is numerical modeling. Zhang *et al.* (2013) and Djordjevic (2013) presented their interesting work on three-dimensional modeling of hydrodynamics at confluences and water quality in a reservoir, respectively. These two studies demonstrated the power of computation and the art of numerical modeling. However, data-driven and machine-learning have no doubt proved an important alternative approach, and have become a promising branch of hydroinformatics. Dastorani *et al.* (2013) showed the capability of machine learning in river instantaneous peak flow estimation, whilst Xiang *et al.* (2013) proposed a hybrid soft computing approach in modeling of Chlorophyll-*a* concentrations in coastal waters.

The integration of advanced information technology significantly enhances the capability of hydroinformatics in practical applications. Yang *et al.* (2013) integrated a watershed model and online monitoring infrastructure to develop a river system modeling platform for the Murray-Darling Basin in Australia. Shrestha *et al.* (2013) explored the applicability of weather radar in stream flow simulation. More striking progress is the application of the Google Android mobile phone to water quality information management from Jonoski *et al.* (2013), which brings the possibility of water management to our daily lives.

Urbanization and water pollution bring more challenges and opportunities to hydroinformatics. Vojinovic *et al.* (2013) and Xiang *et al.* (2013) demonstrate the potential of hydroinformatics techniques in solving urban water and hydro-environmental issues.

Last but not least, the encapsulation of social-economic techniques and knowledge engineering is essential to the development and application of hydroinformatics, as pointed out by Michael Abbott. Liu *et al.* (2013) further emphasizes this aspect in his paper on an ontology-based knowledge management framework for a distributed water information system.

The exchange and communication of the state-of-the-art hydroinformatics in Tianjin stimulated the development of the subject in China, as commented on by Abbott & Vojinovic (2013) in 'Towards a hydroinformatics for China'.

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REFERENCES

Abbott, M. B. & Vojinovic, Z. 2013 Towards a hydroinformatics for China. *J. Hydroinform.* **15** (4), 1189–1202.

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Dastorani, M. T., Koochi, J. S., Darani, H. S., Talebi, A. & Rahimian, M. H. 2013 River instantaneous peak flow estimation using daily flow data and machine learning based models. *J. Hydroinform.* **15** (4), 1089–1098.

Djordjevic, D. 2013 Numerical study of 3D flow at right-angled confluences with and without upstream planform curvature. *J. Hydroinform.* **15** (4), 1073–1088.

Jonoski, A., Almoradie, A., Khan, K., Popescu, I. & van Andel, S. J. 2013 Google android mobile phone applications for water quality information management. *J. Hydroinform.* **15** (4), 1137–1149.

Liu, Q., Bai, Q., Kloppers, C., Fitch, P., Bai, Q., Taylor, K., Fox, P., Zednik, P., Ding, L., Terhorst, A. & McGuinness, D. 2013 An ontology-based knowledge management framework for a distributed water information system. *J. Hydroinform.* **15** (4), 1169–1188.

Shrestha, N., Goormans, T. & Willems, P. 2013 Evaluating the accuracy of C and X band weather radars and their application for stream flow simulation. *J. Hydroinform.* **15** (4), 1121–1136.

Vojinovic, Z., Seyoum, S., Salum, M. H., Price, R. K., Fikri, A. K. & Abebe, Y. 2013 Modelling floods in urban areas and representation of buildings with a method based on adjusted conveyance and storage characteristics. *J. Hydroinform.* **15** (4), 1150–1168.

Xiang, X., Xu, X. & Tao, J. 2013 Modelling Chlorophyll-*a* in Bohai Bay based on hybrid soft computing approach. *J. Hydroinform.* **15** (4), 1099–1108.

Yang, A., Podger, G., Seaton, S. & Power, R. 2013 A river system modelling platform for murray-darling basin, Australia. *J. Hydroinform.* **15** (4), 1109–1120.

Zhang, C., Gao, X., Wang, L. & Chen, Y. 2013 Analysis of agricultural pollution by flood flow impact on water quality in a reservoir using a three-dimensional water quality modeling. *J. Hydroinform.* **15** (4), 1061–1072.