The importance of river hydrodynamics modeling for large scale flood forecasting

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References

Araújo, A. N.; Breda, A. ; Freitas, C. ; Leite, E. A. ; Gonçalves, José Eduardo ; Calvetti, L. ; Almeida, M. I. ; Silveira, R. B. . Hydrological and Meteorological Forecast Combined Systems for Flood Alerts and Reservoir Management: The Iguaçu River Basin Case. In: 6th International Conference on Flood Management, 2014, São Paulo/SP. 6th International Conference on Flood Management - ICFM6, 2014.

Bates, P., Horritt, M., Fewtrell, T. (2010). A simple inertial formulation of the shallow water equations for efficient two-dimensional flood inundation modelling. Journal of Hydrology 387, 33-45.

Bravo, J. M. ; Allasia, D. ; Paz, A. R. ; Collischonn, W. ; Tucci, C. E. M. . Coupled Hydrologic-Hydraulic Modeling of the Upper Paraguay River Basin. Journal of Hydrologic Engineering, v. 17, p. 635, 2012.

Fleischmann, A.; Paiva, R.; Collischonn, W.; Sorribas, M.; Pontes, P. On river-floodplain interaction and hydrograph skewness. Water Resources Research 2016, doi 10.1002/2016WR019233.

Paiva, R. C. D.; Collischonn, W.; Bonnet, M. P.; De Gonçalves, L. G. G. . On the sources of hydrological prediction uncertainty in the Amazon. Hydrology and Earth System Sciences, v. 16, p. 3127-3137, 2012.

Paiva, R. C. D.; Buarque, D. C. ; Collischonn, W. ; Bonnet, M.-P. ; Frappart, F.; Calmant, S.; Bulhões Mendes, C. A.. Large-scale hydrologic and hydrodynamic modeling of the Amazon River basin. Water Resources Research, v. 49, p. 1226-1243, 2013a.

Paiva, R. C. D. ; Paiva, R. C. D. ; Collischonn, W. ; Bonnet, M.-P. ; De Gonçalves, L. G. G. ; Calmant, S. ; Getirana, A. ; Santos Da Silva, J. . Assimilating in situ and radar altimetry data into a large-scale hydrologic-hydrodynamic model for streamflow forecast in the Amazon. Hydrology and Earth System Sciences Discussions (Online), v. 10, p. 2879-2925, 2013b.

Paz, Adriano Rolim da ; Collischonn, Walter ; Tucci, Carlos E. M. ; Padovani, Carlos R. . Large-scale modelling of channel flow and floodplain inundation dynamics and its application to the Pantanal (Brazil). Hydrological Processes (Print), v. 25, p. 1498-1516, 2011.

Paz, A.R., Collischonn, W., Bravo, J.M., Bates, P.D., Baugh, C. 2014 The influence of vertical water balance on modelling Pantanal (Brazil) spatio-temporal inundation dynamics. Hydrological Processes 28 (10), pp. 3539-3553.

Pontes, P. R. M. ; Fan, F. M. ; Collischonn, W. ; Lisboa, A. M. V. ; Gomes, G. ; Buarque, D. C. ; Tucci, C. E. M. . A importância da hidrodinâmica fluvial para previsão de vazão. In: XXI Simpósio

Brasileiro de Recursos Hídricos, 2015, Brasília-DF. Anais do XXI Simpósio Brasileiro de Recursos Hídricos. Porto Alegre - RS: ABRH, 2015. p. PAP020022.

Pontes, P.R.M.; Collischonn, W.; Fan, F.M.; Paiva, R.C.D.; Buarque, D.C. Modelagem hidrológica e hidráulica de grande escala com propagação inercial de vazões. Revista Brasileira de Recursos Hídricos, vol. 20, n. 4. 2015a.

Pontes, P. R. M. ; Collischonn, W. ; Fan, F. M. ; Paiva, R. C. D. ; Buarque, D. C. . Hydrologic And Hydraulic Large-Scale Modeling With Inertial Flow Routing. In: Vieira da Silva, Tucci and Scott. (Org.). Water and Climate modeling in large basins 3. 3ed.Porto Alegre: Brazilian Water Resources Association, 2015b, v. 3, p. 45-80.

Pontes, P.; Fan. F.. Fleischmann, A.; Paiva, R.; Buarque, D.; Siqueira, V.; Jardim, P.; Collischonn , W. MGB-IPH model for hydrologic and hydraulic simulation of large floodplain river systems coupled with open source GIS. Submitted manuscript, 2016.

Todini, E. A mass conservative and water storage consistent variable parameter Muskingum-Cunge approach, Hydrol. Earth Syst. Sci., 11, 1645‑1659, doi:10.5194/hess-11-1645, 2007.