



## **Flood hazard mapping using open source hydrological tools**

Daniel Tollenaar (1), Lex Wensveen (2), Hessel Winsemius (1), Jaap Schellekens (1,2)

(1) Deltares, Delft, The Netherlands, (2) VU University, Faculty of earth and life sciences, Amsterdam, The Netherlands

Commonly, flood hazard maps are produced by building detailed hydrological and hydraulic models. These models are forced and parameterized by locally available, high resolution and preferably high quality data. The models use a high spatio-temporal resolution, resulting in large computational effort. Also, many hydraulic packages that solve 1D (canal) and 2D (overland) shallow water equations, are not freeware nor open source.

In this contribution, we evaluate whether simplified open source data and models can be used for a rapid flood hazard assessment and to highlight areas where more detail may be required. The validity of this approach is tested by using four combinations of open-source tools: (1) a global hydrological model (PCR-GLOBWB, Van Beek and Bierkens, 2009) with a static inundation routine (GLOFRIS, Winsemius et al. 2013); (2) a global hydrological model with a dynamic inundation model (Subgrid, Stelling, 2012); (3) a local hydrological model (WFLOW) with a static inundation routine; (4) and a local hydrological model with a dynamic inundation model. The applicability of tools is assessed on (1) accuracy to reproduce the phenomenon, (2) time for model setup and (3) computational time. The performance is tested in a case study in the Rio Mamoré, one of the tributaries of the Amazone River (230,000 km<sup>2</sup>).

### **References:**

Stelling, G.S.: Quadtree flood simulations with sub-grid digital elevation models, Proceedings of the ICE - Water Management, Volume 165, Issue 10, 01 November 2012, pages 567–580

Winsemius, H. C., Van Beek, L. P. H., Jongman, B., Ward, P. J., and Bouwman, A.: A framework for global river flood risk assessments, Hydrol. Earth Syst. Sci. Discuss., 9, 9611–9659, doi:10.5194/hessd-9-9611-2012, 2012

Van Beek, L. P. H. and Bierkens, M. F. P.: The global hydrological model PCR-GLOBWB: conceptualization, parameterization and verification, Dept. of Physical Geography, Utrecht University, Utrecht, available at: <http://vanbeek.geo.uu.nl/supinfo/vanbeekbierkens2009.pdf> (last access: 14 Jan 2014), 2009.