Geophysical Research Abstracts
Vol. 15, EGU2013-8216, 2013
EGU General Assembly 2013

Deriving global flood hazard maps of fluvial floods through a physical model cascade

Florian Pappenberger (1,2), Emanuel Dutra (1), Fredrik Wetterhall (1), and Hannah L. Cloke (3)

(1) European Centre for Medium Range Weather Forecasts, Reading, United Kingdom (florian.pappenberger@ecmwf.int, +44-(0)118-9869450), (2) Hydrology and Water Resources, Hohai University, Nanjing, China, (3) Department of Geography & Environmental Science and Department of Meteorology, University of Reading, UK

Global flood hazard maps can be used in the assessment of flood risk in a number of different applications, including (re)insurance and large scale flood preparedness. Such global hazard maps can be generated using large scale physically based models of rainfall-runoff and river routing, when used in conjunction with a number of post-processing methods. In this study, the European Centre for Medium Range Weather Forecasts (ECMWF) land surface model is coupled to ERA-Interim reanalysis meteorological forcing data, and resultant runoff is passed to a river routing algorithm which simulates floodplains and flood flow across the global land area. The global hazard map is based on a 30 yr (1979–2010) simulation period. A Gumbel distribution is fitted to the annual maxima flows to derive a number of flood return periods. The return periods are calculated initially for a 25 $\times$ 25 km grid, which is then reprojected onto a 1 $\times$ 1 km grid to derive maps of higher resolution and estimate flooded fractional area for the individual 25 $\times$ 25 km cells. Several global and regional maps of flood return periods ranging from 2 to 500 yr are presented. The results compare reasonably to a benchmark data set of global flood hazard. The developed methodology can be applied to other datasets on a global or regional scale.