Geophysical Research Abstracts
Vol. 15, EGU2013-12373, 2013
EGU General Assembly 2013

Global flood risks under changing climate and socioeconomic conditions

Frederiek Sperna Weiland (1), Philip Ward (2,3), Arno Bouwman (4), Willem Ligtvoet (4), Rens van Beek (5), and Hessel Winsemius (1)

(1) Deltares, Netherlands (frederiek.sperna@deltares.nl), (2) Institute for Environmental Studies, VU University Amsterdam, The Netherlands, (3) Amsterdam Global Change Institute, VU University Amsterdam, The Netherlands, (4) PBL, The Netherlands Environmental Assessment Agency, The Netherlands, (5) Department of Physical Geography, Faculty of Geosciences, Utrecht University, Utrecht, The Netherlands

Worldwide major flood events result in both economic losses and large numbers of casualties. Recent global scale studies indicate that in many regions of the world discharge extremes are likely to increase under changing climate conditions. However, few studies have so far examined how these changes in climate conditions may affect flood risk (defined here as the probability of a flood multiplied by the consequences). In the current study we investigate the impacts of changing climate and socioeconomic conditions on flood extents and depths, and also assess the potential impacts on flood risk. The study is conducted on a global scale, thereby indicating in which regions of the world flood risk is likely to change most.

To assess global food risk under changing conditions, we combined socio-economic data from the Integrated Model to Assess the Global Environment (IMAGE) framework of the Netherlands Environmental Assessment Agency (PBL) with high resolution maps of inundation depth (1 km). To this end, projections from a number of GCMs were bias-corrected and used to force the global hydrological model PCR-GLOBWB which simulates (amongst other variables) global maps with daily flood volumes on a 0.5 degree resolution. These time series were used to derive flood volume maps for multiple return periods, which were downscaled to inundation depth maps at 1 km resolution using a 1 km resolution DEM. Finally, these high resolution flood maps were combined with spatial datasets on future GDP and population density from the IMAGE model.

Results are presented on both the global scale and at the country level. We believe that the obtained flood extend and flood risk maps can assist development agencies in planning climate adaptation investments that aim to reduce flood risks.