



Flood monitoring for ungauged rivers: the power of combining space-based monitoring and global forecasting models

Beatriz Revilla-Romero, Victor Netgeka, Damien Raynaud, and Jutta Thielen

European Commission, Directorate-General Joint Research Centre Climate Risk Management Unit, Via Enrico Fermi 2749, I-21027 Ispra, Italy, (beatriz.revilla-romero@jrc.ec.europa.eu)

Flood warning systems typically rely on forecasts from national meteorological services and in-situ observations from hydrological gauging stations. This capacity is not equally developed in flood-prone developing countries. Low-cost satellite monitoring systems and global flood forecasting systems can be an alternative source of information for national flood authorities.

The Global Flood Awareness System (GloFAS) has been developed jointly with the European Centre for Medium-Range Weather Forecast (ECMWF) and the Joint Research Centre, and it is running quasi operational now since June 2011. The system couples state-of-the art weather forecasts with a hydrological model driven at a continental scale. The system provides downstream countries with information on upstream river conditions as well as continental and global overviews.

In its test phase, this global forecast system provides probabilities for large transnational river flooding at the global scale up to 30 days in advance. It has shown its real-life potential for the first time during the flood in Southeast Asia in 2011, and more recently during the floods in Australia in March 2012, India (Assam, September-October 2012) and Chad Floods (August-October 2012). The Joint Research Centre is working on further research and development, rigorous testing and adaptations of the system to create an operational tool for decision makers, including national and regional water authorities, water resource managers, hydropower companies, civil protection and first line responders, and international humanitarian aid organizations.

Currently efforts are being made to link GloFAS to the Global Flood Detection System (GFDS). GFDS is a Space-based river gauging and flood monitoring system using passive microwave remote sensing which was developed by a collaboration between the JRC and Dartmouth Flood Observatory. GFDS provides flood alerts based on daily water surface change measurements from space. Alerts are shown on a world map, with detailed reports for individual gauging sites.

A comparison of discharge estimates from the Global Flood Detection System (GFDS) and the Global Flood Awareness System (GloFAS) with observations for representative climatic zones is presented. Both systems have demonstrated strong potential in forecasting and detecting recent catastrophic floods. The usefulness of their combined information on global scale for decision makers at different levels is discussed.

Combining space-based monitoring and global forecasting models is an innovative approach and has significant benefits for international river commissions as well as international aid organisations. This is in line with the objectives of the Hyogo and the Post-2015 Framework that aim at the development of systems which involve trans-boundary collaboration, space-based earth observation, flood forecasting and early warning.