



Forecast-based Integrated Flood Detection System for Emergency Response and Disaster Risk Reduction (Flood-FINDER)

Mauro Arcorace (1), Francesco Silvestro (2), Roberto Rudari (2), Giorgio Boni (2,3), Luca Dell’Oro (1), and Einar Bjorgo (1)

(1) UNITAR-UNOSAT, Geneva, Switzerland, (2) CIMA Research Foundation, Savona, Italy, (3) DIBRIS, University of Genoa, Genoa, Italy

Most flood prone areas in the globe are mainly located in developing countries where making communities more flood resilient is a priority. Despite different flood forecasting initiatives are now available from academia and research centers, what is often missing is the connection between the timely hazard detection and the community response to warnings. In order to bridge the gap between science and decision makers, UN agencies play a key role on the dissemination of information in the field and on capacity-building to local governments. In this context, having a reliable global early warning system in the UN would concretely improve existing in house capacities for Humanitarian Response and the Disaster Risk Reduction.

For those reasons, UNITAR-UNOSAT has developed together with USGS and CIMA Foundation a Global Flood EWS called “Flood-FINDER”. The Flood-FINDER system is a modelling chain which includes meteorological, hydrological and hydraulic models that are accurately linked to enable the production of warnings and forecast inundation scenarios up to three weeks in advance. The system is forced with global satellite derived precipitation products and Numerical Weather Prediction outputs. The modelling chain is based on the “Continuum” hydrological model and risk assessments produced for GAR2015. In combination with existing hydraulically reconditioned SRTM data and 1D hydraulic models, flood scenarios are derived at multiple scales and resolutions. Climate and flood data are shared through a Web GIS integrated platform. First validation of the modelling chain has been conducted through a flood hindcasting test case, over the Chao Phraya river basin in Thailand, using multi temporal satellite-based analysis derived for the exceptional flood event of 2011.

In terms of humanitarian relief operations, the EO-based services of flood mapping in rush mode generally suffer from delays caused by the time required for their activation, programming, acquisitions and image processing. Flood-FINDER aims to pre-empt this process and to provide preliminary analyses where no field data is available. In the early 2015, the Flood-FINDER’s forecast along the Shire River has been used to guide the rapid mapping activities in Southern Malawi and Northern Mozambique. It proved efficient support providing timely information about the evolution of the flood event over an area lacking of field data. Regarding in-country capacity building, Flood-FINDER allowed UNOSAT to set up in middle 2015 a flood early warning system in Chad along the Chari River basin with the collaboration of Chadian Ministry of hydraulics and livestock. Weekly flood bulletins have been shared with local authorities and UN agencies over the entire rainy season. Finally, an experimental version of the global web alerting platform has been recently developed for supporting the El Nino flood preparedness in the Horn of Africa.

Flood-FINDER’s mission is to support decision makers throughout all the disaster management cycle with flood alerts, modelled scenarios, EO-based impact assessments and with direct support at country level to implement disaster mitigation strategies. The aim for the future is to seek funding for having the global system fully operational using CERN’s supercomputing facilities and to establish new in-country projects with local authorities.