CF Challenge Fund

Dartmouth Flood Observatory

Web map services to improve
real-time flood data in Africa

Globally, Africa has the second highest number of disaster victims year over year. Whereas other continents show a steady decline, disaster victims in Africa are on the rise. These increases can be attributed almost exclusively to floods and droughts. In early 2015, for example, Malawi was hit by severe floods of the Shire River, affecting more than a million people. In Mozambique, flooding the same year affected 160,000 people and killed 158. An estimated 65,000 hectares of crops were destroyed, placing more than 65,000 families at risk of food and income insecurity. Madagascar also received heavy rains in 2015; 25 people died, 4,800 houses were destroyed and 35,000 people were forced from their homes to seek refuge in higher areas.

With proper planning and mitigation measurements, the number of people affected by these disasters could have been reduced. However, important flood information is often missing or incomplete in many regions of Africa that experience frequent heavy rainfall events, even while Earth Observation satellites are providing useful information. To help address this shortfall, the Dartmouth Flood Observatory (DFO) set out to create a set of digital products to provide decision-makers and local planners with accurate quantitative maps of long-term flood risks. LINK TO PORTAL

HIGHLIGHTS

An Africa flood Web Map Service was created, providing free, easily accessible historical and current flood information.
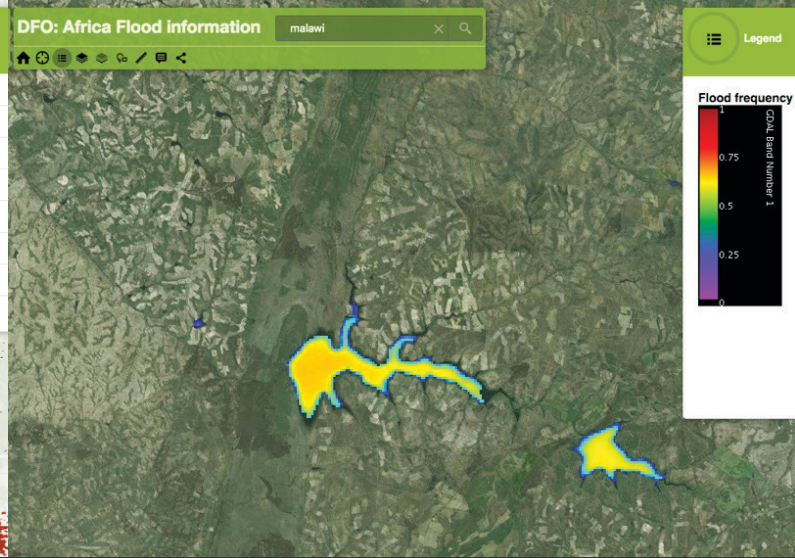
Feedback from project partners made the DFO adjust standard flood products to become more useful in daily operations.

The historical flood information provided in these tools enables users to comparatively assess current flood severity.
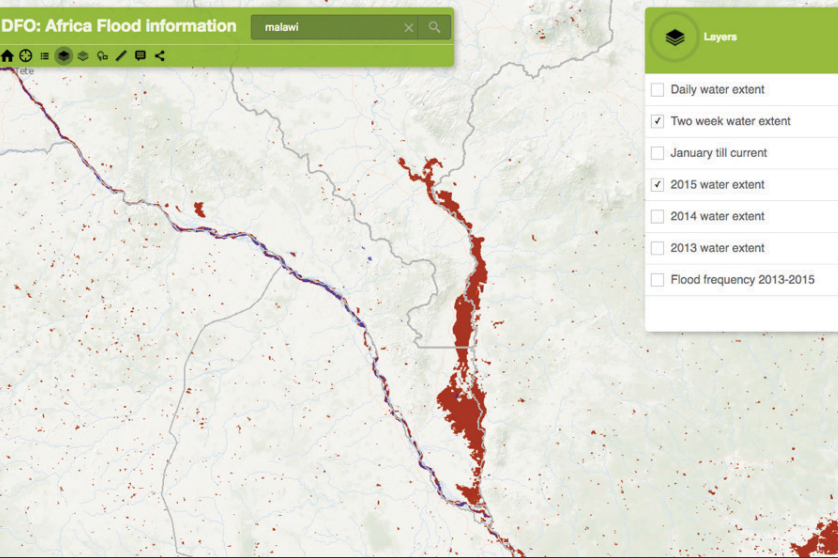
Data for flooding of the Shire River in Malawi, 2015

Flood frequency model in Zimbabwe

APPROACH

The DFO measures, at daily intervals, surface water extent by utilizing sensors aboard satellites launched by NASA and the European and Japanese space agencies. This technique of measuring flood extents has been successfully implemented over 15 years, but accessing this data by end users can be cumbersome. Significant progress of geospatial software now makes it possible to access and visualize geospatial data through traditional web browsers. For this project, the DFO utilized these tools by implementing web map services through which datasets are easily accessible to decision-makers and local planners.

Several organizations active in Africa have shown strong interest: the Regional Centre for Mapping of Resources for Development (RCMRD), Southern African Development Community (SADC) Disaster Risk Reduction Centre, the World Food Program (WFP), Peace Parks Foundation (PPF), and the World Wildlife Fund (WWF). These organizations and others can now access Africa related flood data through a web browser, or ingest data in local GIS systems.

In phase I, the firm developed web map service and geospatial portal that visualizes high-resolution flood maps for the Africa region with data derived from NASA satellites.

Through phase II funding, DFO will extend the water extent coverage to all continents in the world. The team will move the portal from the proprietary ArcGIS server to the open source Tethys platform, and enhance the functionality.

"The Africa project is extremely useful for our daily routines in the event of floods in Africa, therefore would be a great asset in case extended to the entire world."

– The World Food Program

NEXT STEPS

Worldwide floods are impacting half a billion of people every year. The DFO would like to utilize the implemented flood data handling and visualization tools developed for the Africa project and scale this up to global coverage. Subsequently, the DFO aims to utilize the existing network of SERVIR-hubs to advertise and help distribute the flood disaster data products. Additional flood related satellite data will also be made available, and the DFO will use the existing flood portal to provide model-simulated flood information that not only provides flood extent information, but also the expected flood height of an event.

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