

Ensemble forecasting for anticipatory humanitarian action

GLOBAL FLOOD FORECASTING for anticipatory humanitarian action

Liz Stephens (Red Cross & Red Crescent Climate Centre, University of Reading)



Florian Pappenberger

(thanks to Karen, Rebecca, Hannah, Ervin, Calum, Christel, Peter S. etc etc etc)



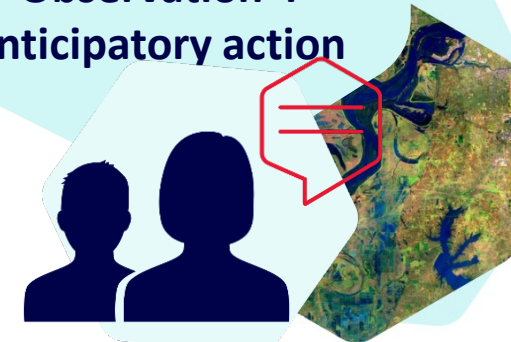


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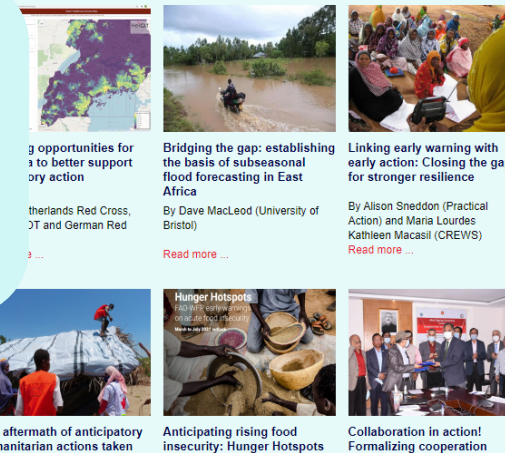
Collate learning resources
e.g. early action database, global project map

Join working groups
e.g. Earth Observation 4 anticipatory action



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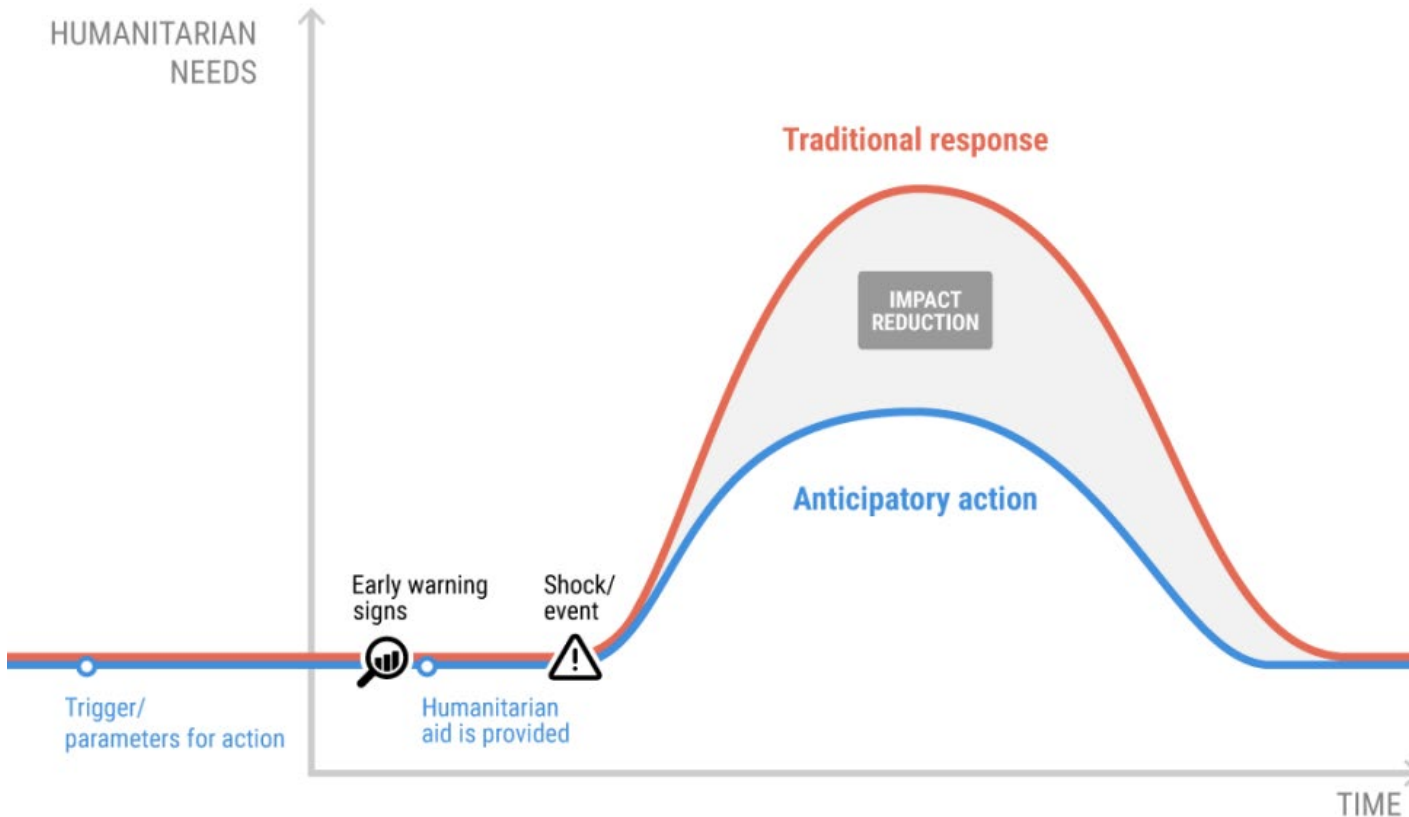


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What is Anticipatory Action

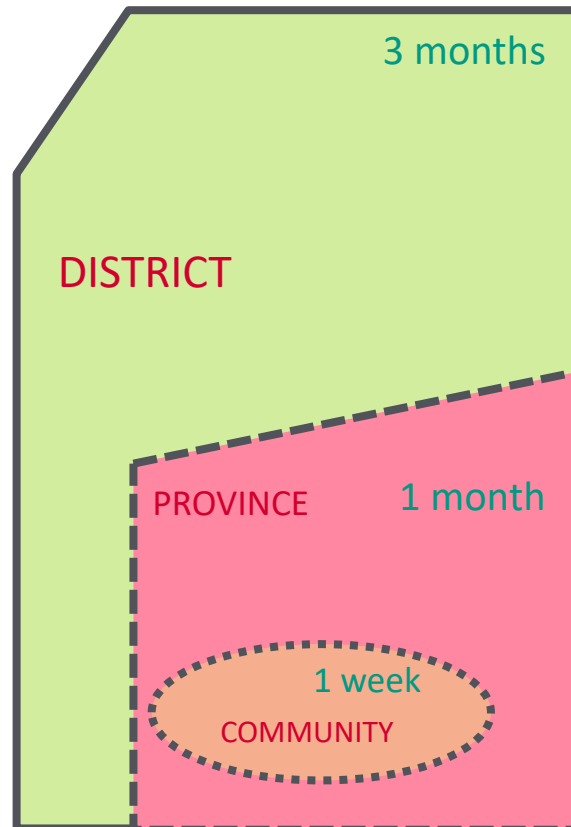
Anticipatory action enables humanitarian organizations to get ahead of a shock and mitigate its impact. Predictive analytics can help anticipate humanitarian needs arising from different shocks



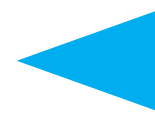
Change #1 How forecasts are used



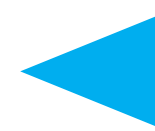
Shift towards triggering humanitarian action at the shorter lead times. More robust and informed use of forecasts that better matches appropriate actions with the limit of forecast predictability – finding the ‘**window of opportunity**’



Preparedness
and Readiness



Prepositioning



Distribution




Change #2 Systematic Funding



Forecast based Action (FbA) by the DREF



Forecast based Action by the DREF is an IFRC funding mechanism specifically designed to fund Early Action Protocols (EAP) developed by National Societies. The Forecast based Action by the DREF is managed by the IFRC Secretariat as a central fund.

A key element of the FbA by DREF, is the guaranteed allocation of funds for early action, once a National Society has an EAP that has been approved by the validation committee. Financial allocations will be done automatically by the FbA by DREF according to a pre-agreed forecast trigger, that indicates the potential for severe negative impacts on the most vulnerable population.



Any National Society can develop an Early Action Protocol and apply to the FbA by the DREF – in some cases with support from Partner National Societies.

 International Federation of Red Cross and Red Crescent Societies 

START NETWORK  

START FUND

CRISIS ANTICIPATION

The Start Fund Anticipation enables NGOs to prepare when they see a crisis coming and respond early to mitigate the predicted impacts. It is the first NGO funding mechanism to be available for anticipatory interventions.

- Pre-defined plans
- Evidence-led use of forecasts

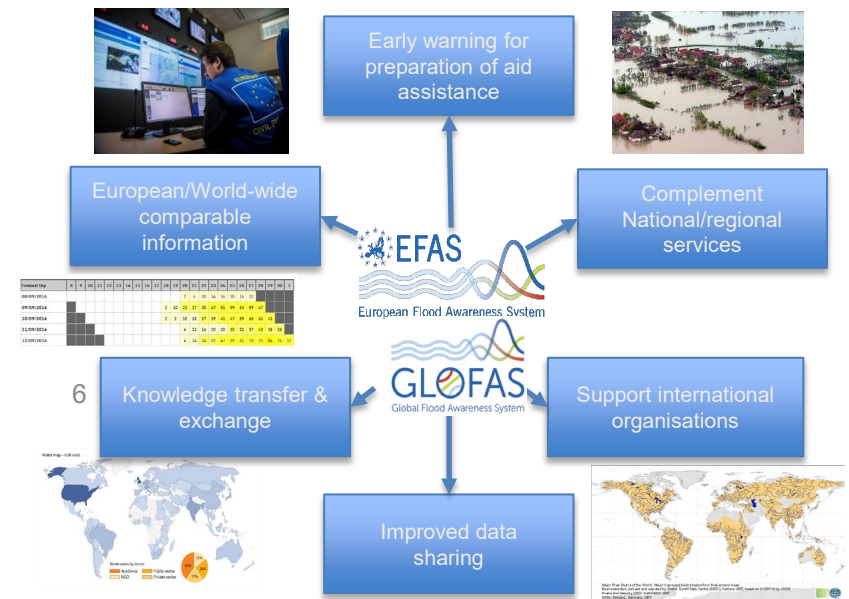
- Decision by committee
- Faster process

Global Flood Awareness System (GloFAS)

- GloFAS is part of the Copernicus Emergency Management Service (CEMS) Early Warning & Monitoring
- ECMWF is the **CEMS Hydrological Computational Centre** operating EFAS (Europe) and GloFAS (global)

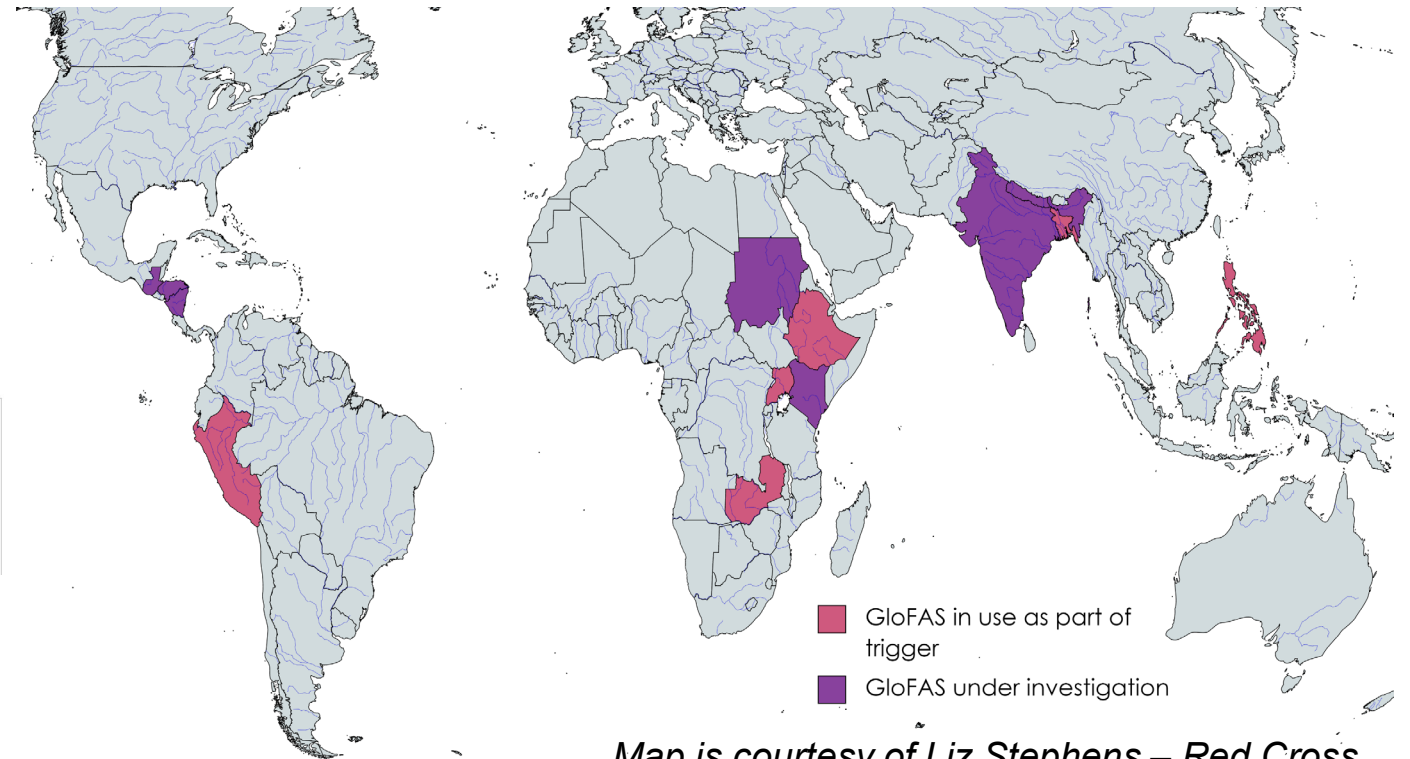
What is GloFAS?

- GloFAS couples NWP and hydrological modelling to produce **global flood forecasts**
- **Complementary** information to National Hydrological and Meteorological Services (NHMS)
- **Freely available** across the world
- **Riverine** flood forecasting, only for **large catchments** (>2000km²)



GloFAS in action

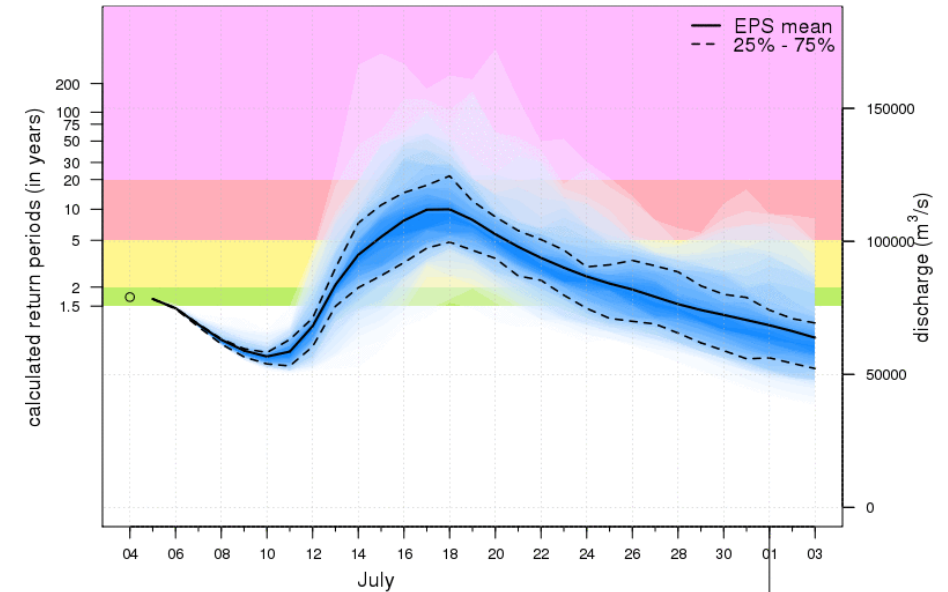
- **GloFAS** has been **supporting** many **international organisations** with forecast information and data for over many years now
- As the 'go-to' global flood information service
- **GloFAS** is one of the important contributors to the **anticipatory humanitarian action** in multiple projects worldwide



Map is courtesy of Liz Stephens – Red Cross

Global model: longer lead times

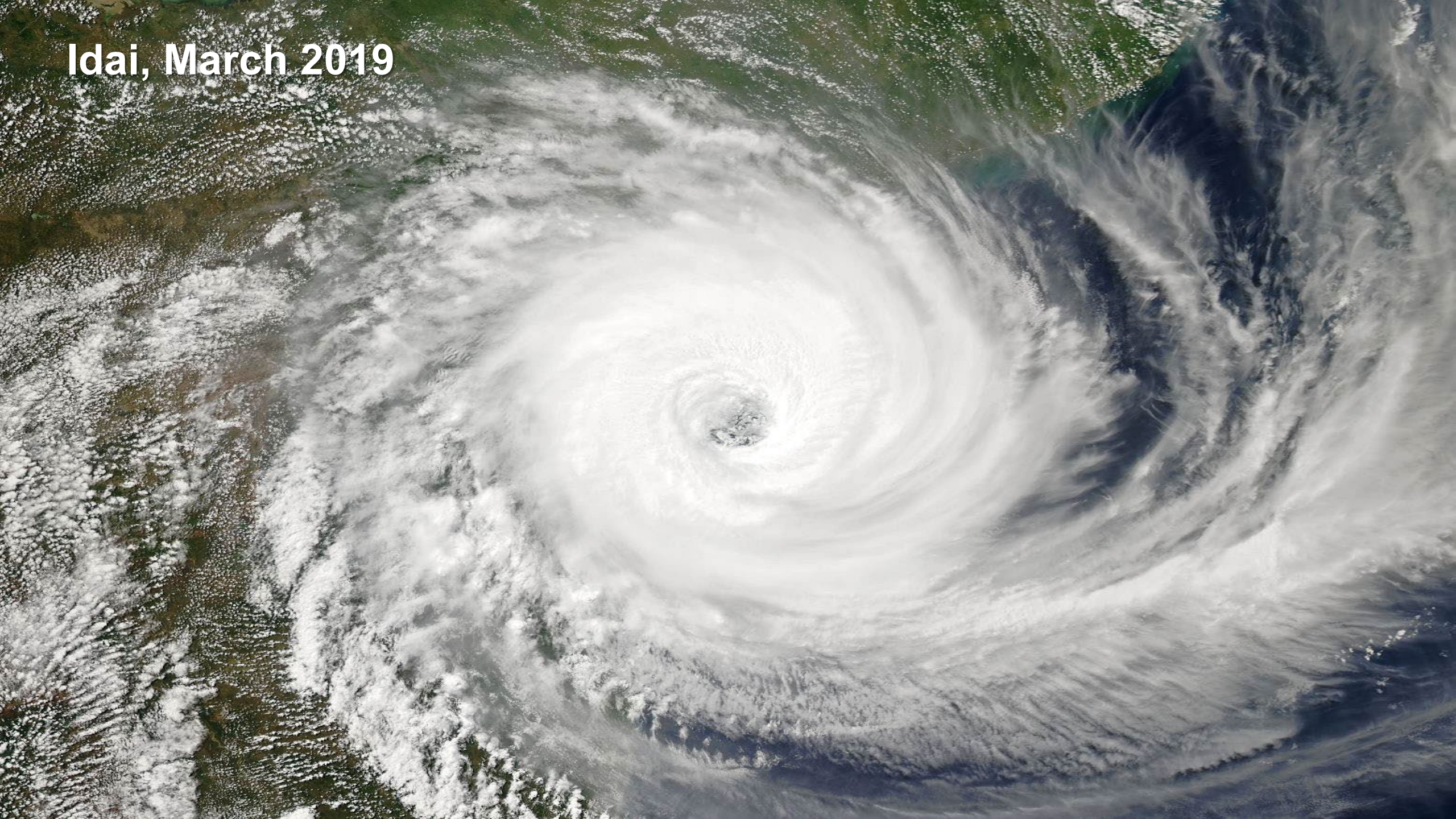
- Case Study: Brahmaputra in Bangladesh
- Collaborating with the Bangladesh Flood Forecasting and Warning Centre to develop extended-range forecasting capacity on the Brahmaputra River
- Two-step process, GloFAS as pre-activation at longer lead times (15 days), FFWC forecasts at short lead times (3 days)
- 2020:
 - July 4th forecast: \$5.2million funds by UNCERF & CHF 234,803 released by IFRC's FbA by DREF, preparations made
 - July 10th: distribution of cash, livestock feed, storage drums, and hygiene, dignity and health kits. >200,000 people reached



Mozambique

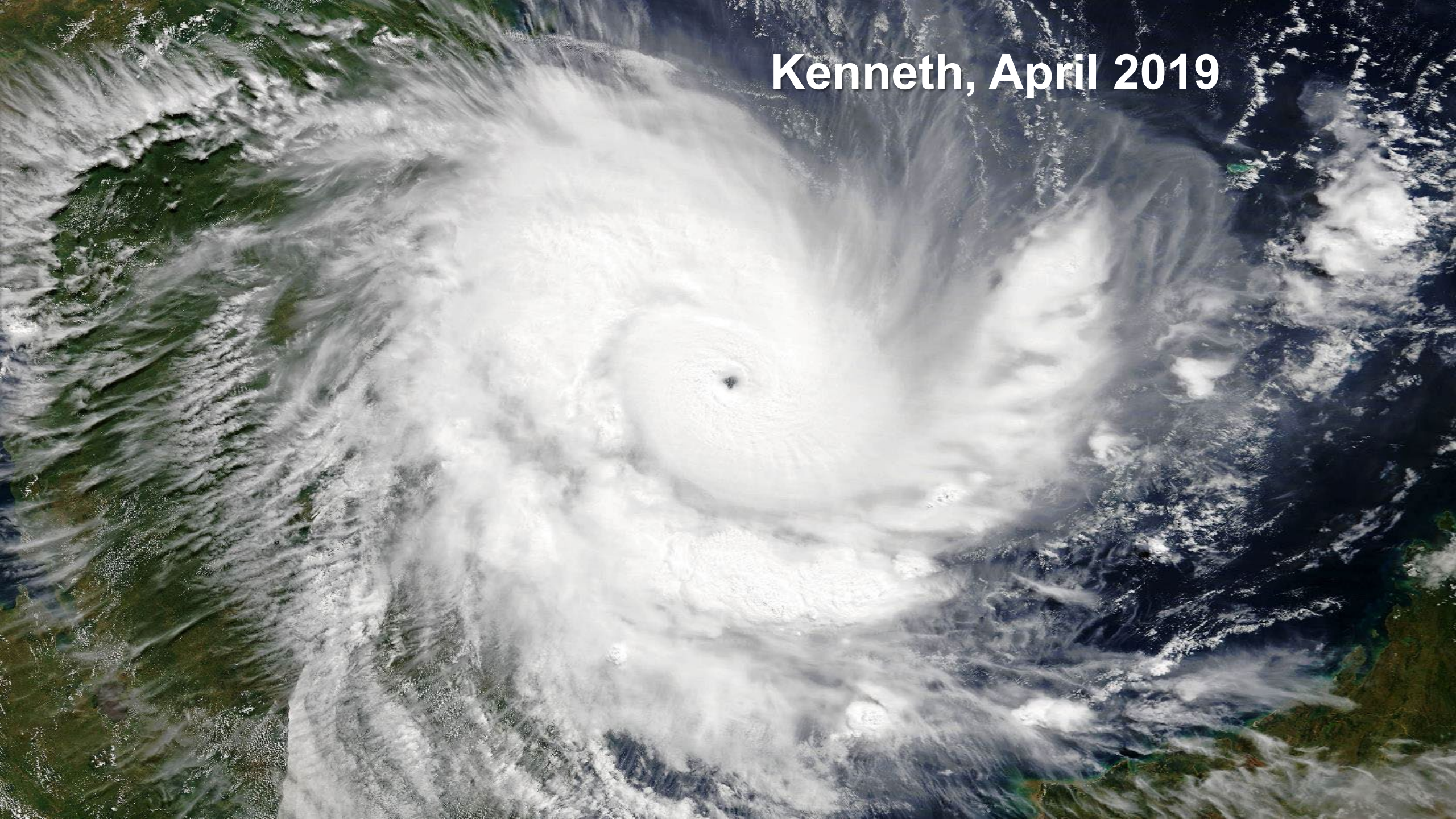


Idai, March 2019





Kenneth, April 2019









International Journal of Disaster Risk Reduction 50 (2020) 101811



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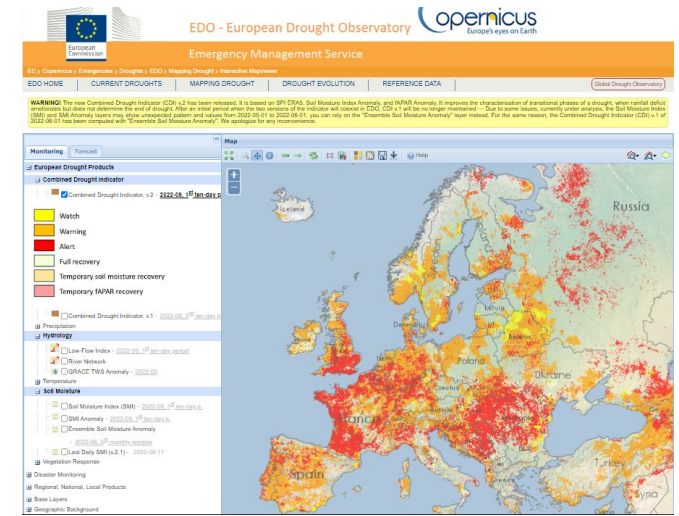
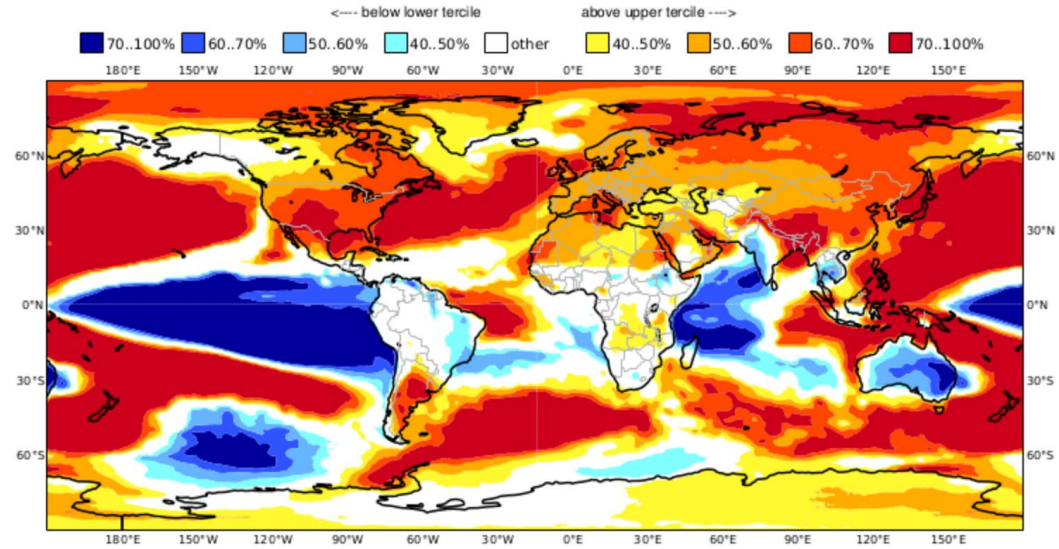
journal homepage: <http://www.elsevier.com/locate/ijdr>



Emergency flood bulletins for Cyclones Idai and Kenneth: A critical evaluation of the use of global flood forecasts for international humanitarian preparedness and response

Anticipatory Action – what else??

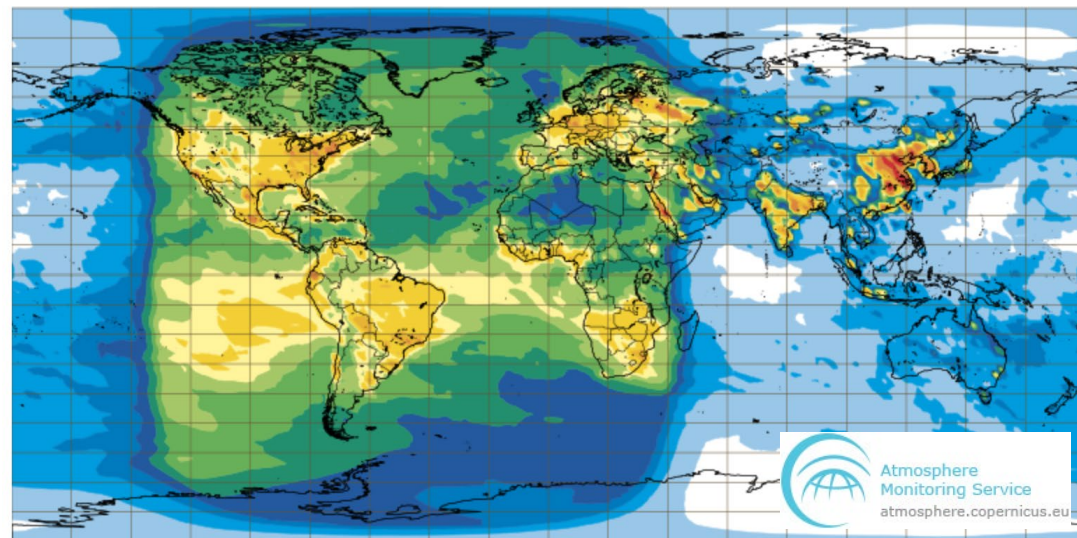
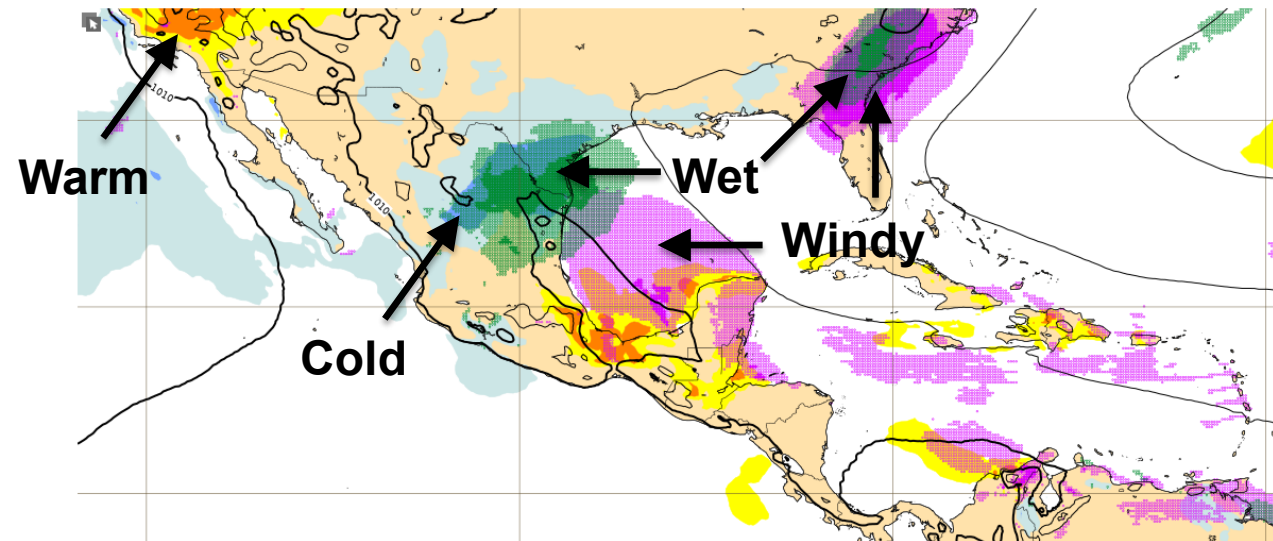
C3S multi-system seasonal forecast ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA/ECCC
 Prob(most likely category of 2m temperature)
 Nominal forecast start: 01/09/22
 Unweighted mean



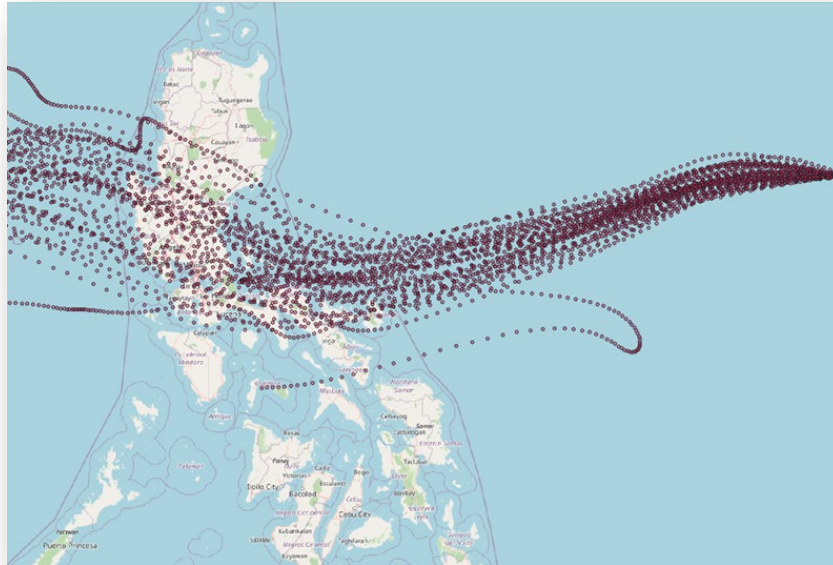
Multi-parameter EFI (24-h up to valid time)

Base time: Tue 06 Jul 2021 00 UTC Area: Central America

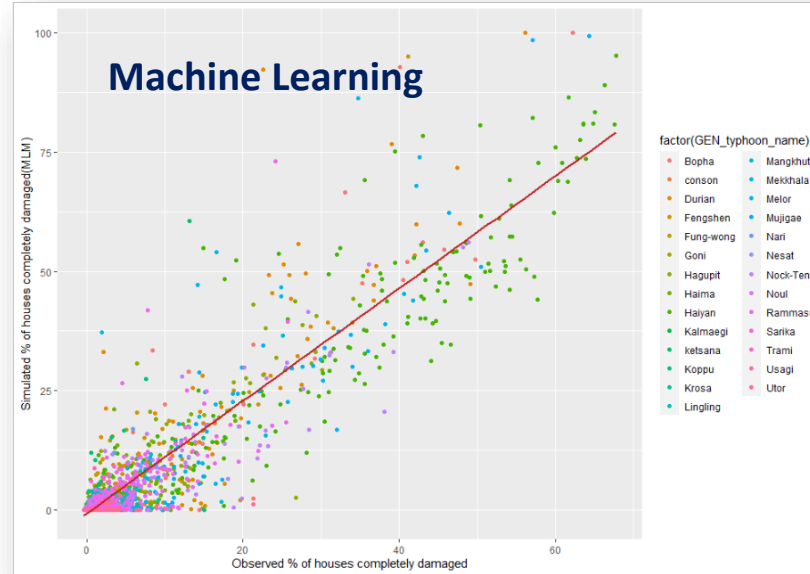
2m temperature extreme forecast index / 10m wind gust extreme forecast index / Total precipitation extreme forecast index / Ensemble mean for mean sea level pressure
 Tuesday 6 Jul, 00 UTC T+72 Valid: Friday 9 Jul, 00 UTC



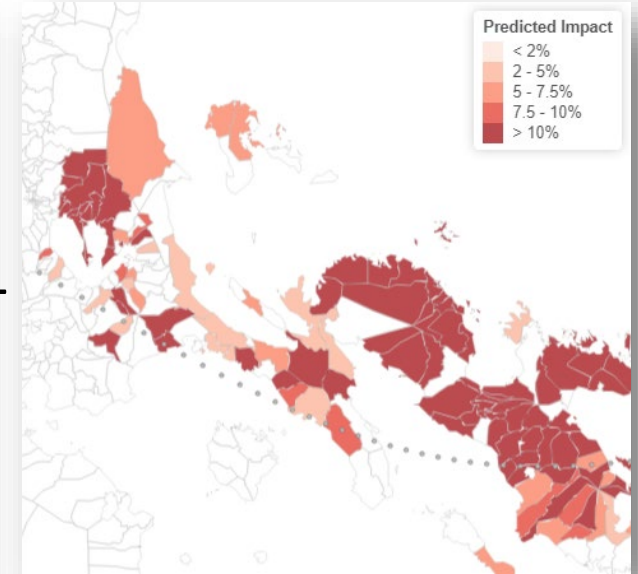
Impact-based forecasting – what else?



+



+



Model

+

ML

+

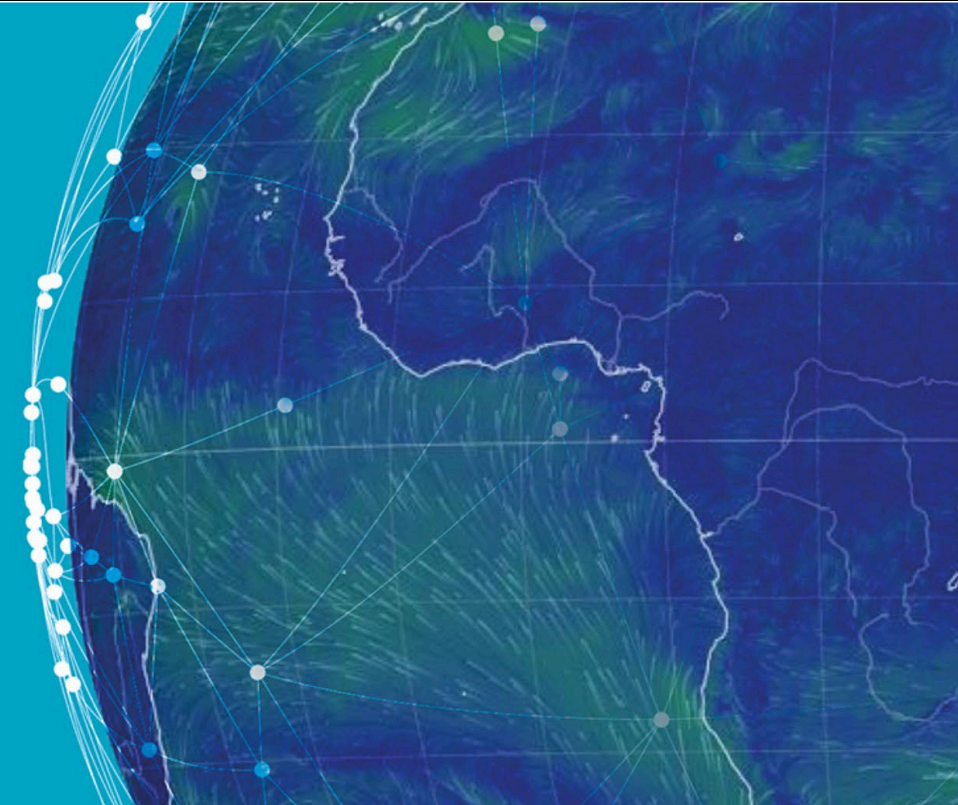
Impact

Better Anticipatory Action

MOOC Machine Learning in Weather & Climate

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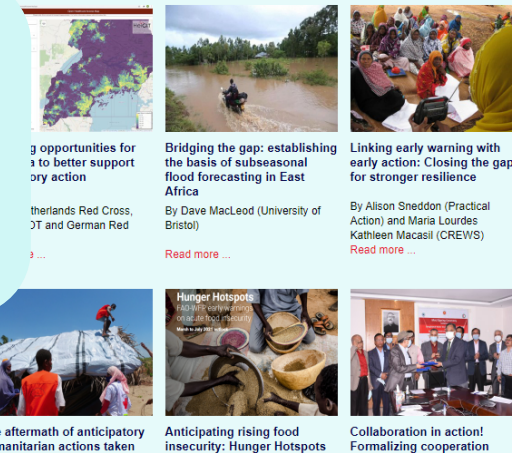


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- g opportunities for a to better support ory action**
By Netherlands Red Cross, DT and German Red
- Bridging the gap: establishing the basis of subseasonal flood forecasting in East Africa**
By Dave MacLeod (University of Bristol)
- Linking early warning with early action: Closing the gaps for stronger resilience**
By Alison Sneddon (Practical Action) and Maria Lourdes Kathleen Macasil (CREWS)
- The aftermath of anticipatory humanitarian actions taken**
- Hunger Hotspots: Anticipating rising food insecurity: Hunger Hotspots**
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