



Global Flood Awareness System

GloFAS

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with the help of the whole EFAS/GloFAS team

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What is GloFAS?



- Global-scale ensemble-based flood forecasting system for medium and large river basins
- A collaboration product between JRC and ECMWF
- Pre-operational since 2011 / **Operational since April 2018 !**

Forecast frequency:
Updated daily

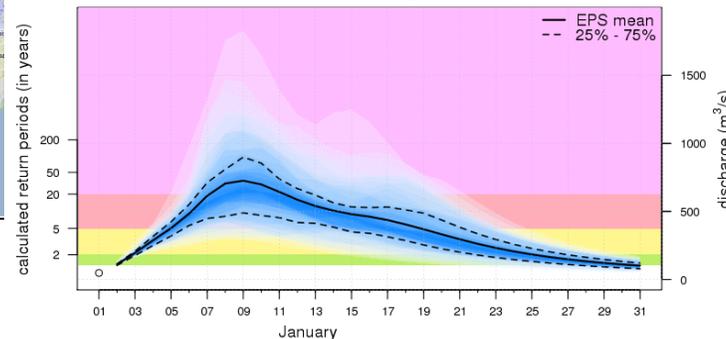
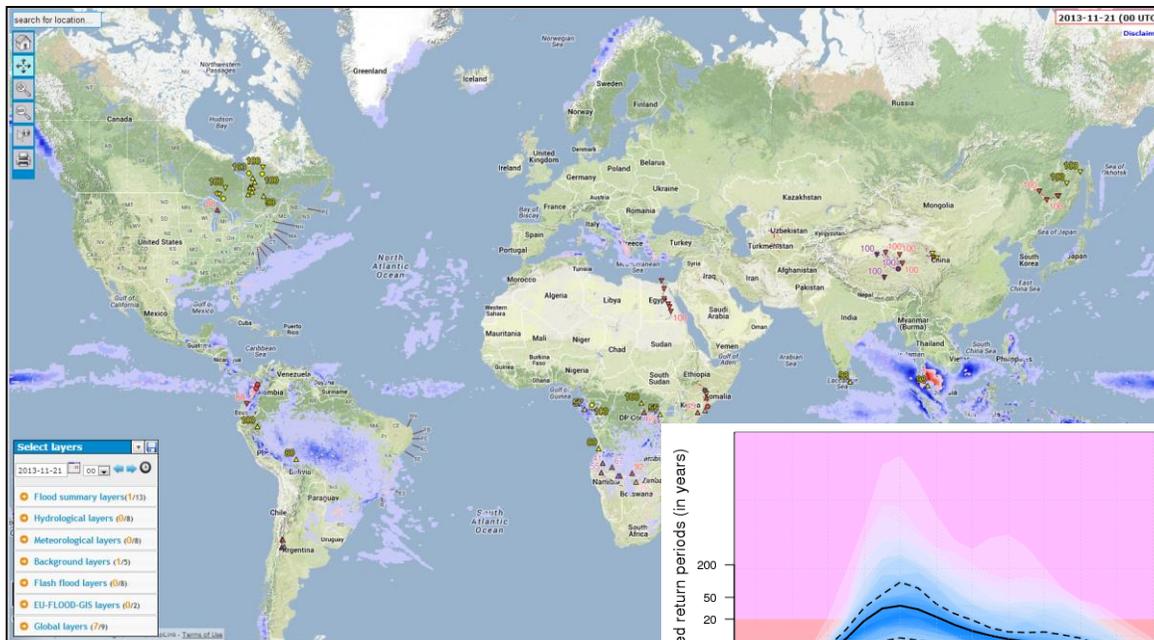
Forecast lead time:
Up to 30 days

Forecast variable:
River Flow

Forecast type:
Probabilistic

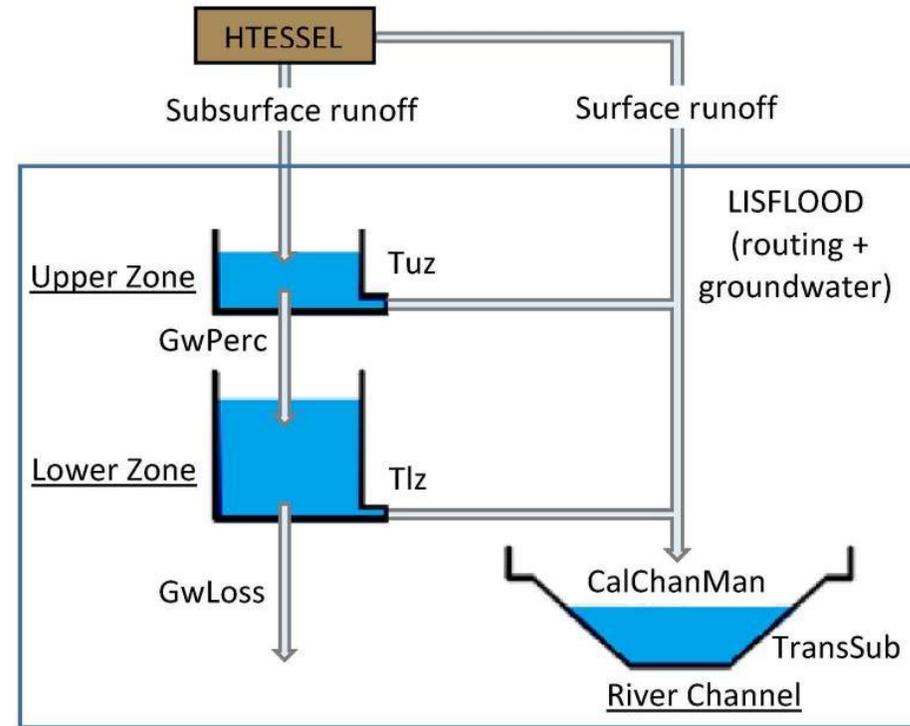
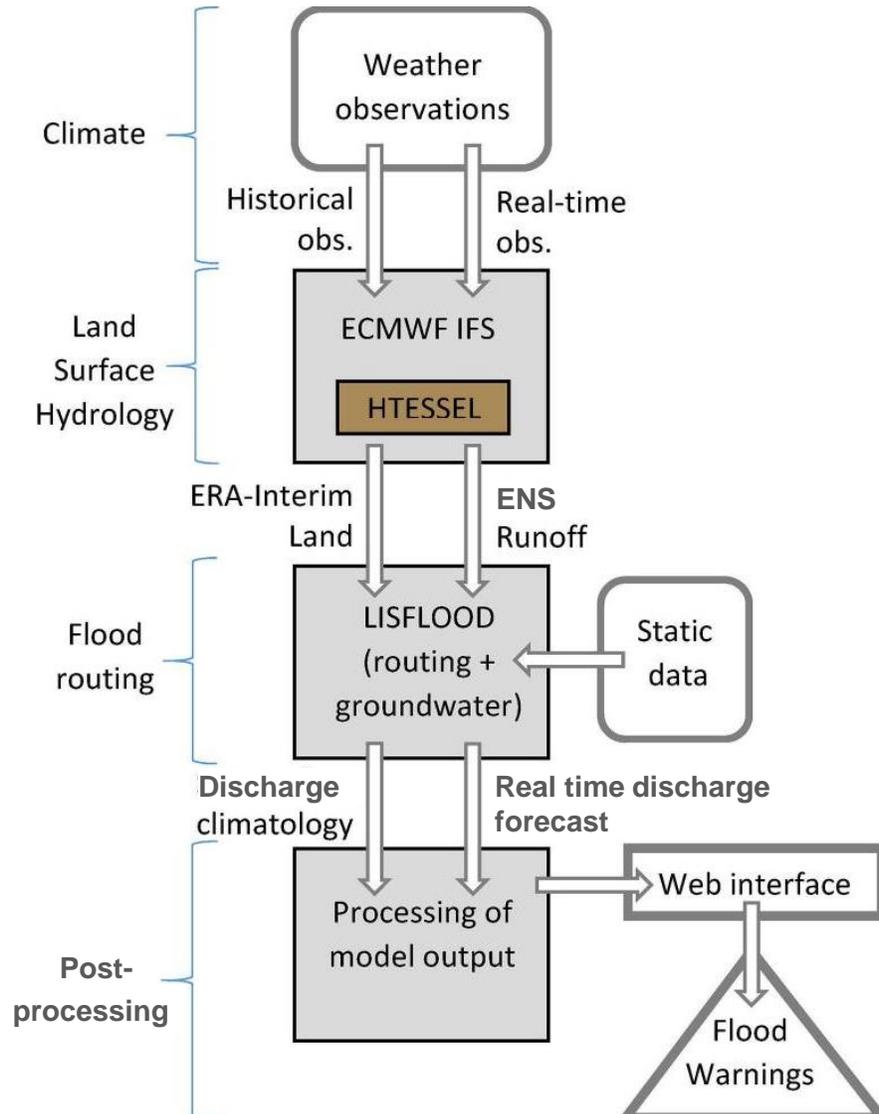
Forecast resolution:
Daily and 0.1 degree

Modelling system:
ENS + HTESEL + Lisflood



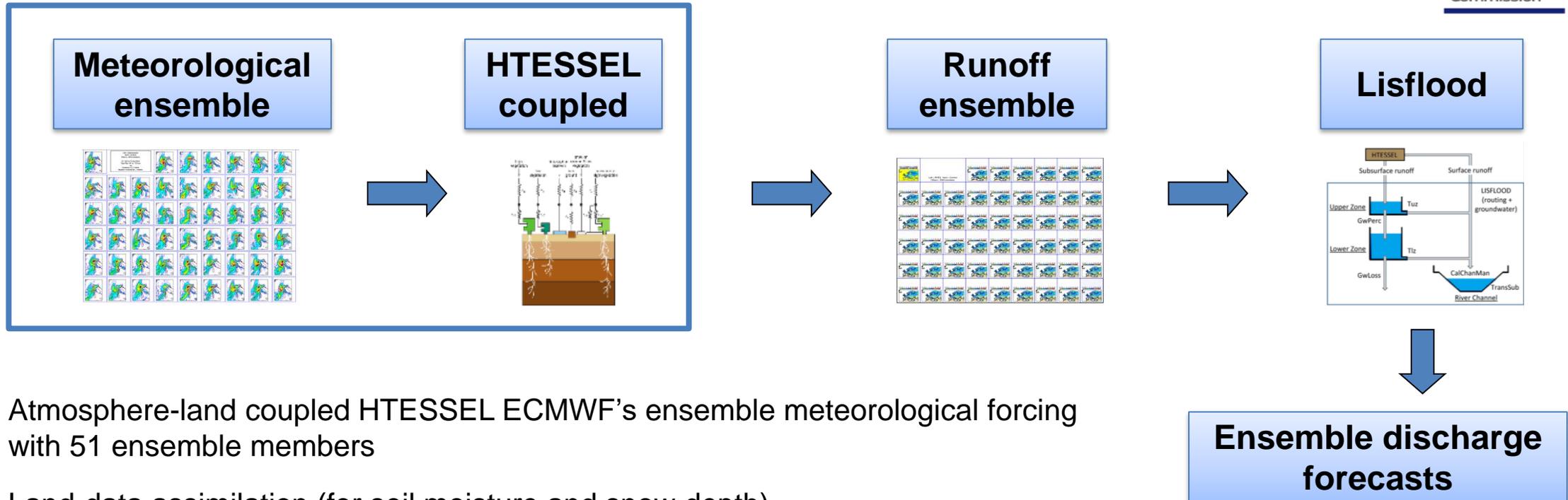


GloFAS modelling chain

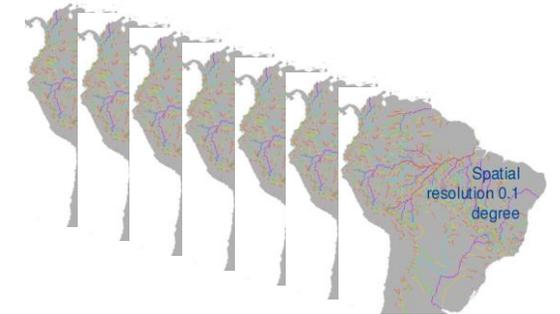




Real time ENS discharge



- Atmosphere-land coupled HTESSEL ECMWF's ensemble meteorological forcing with 51 ensemble members
- Land-data assimilation (for soil moisture and snow depth)
- Meteorological forcing in 0-15 days: Taken from daily medium-range ensembles at ~18km resolution
- Meteorological forcing in 15-30 days: Taken from monthly forecasts produced only on Mondays and Thursdays at ~36km resolution



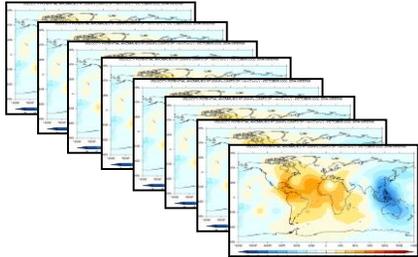
The monthly extension has been active in GloFAS since 23 April 2018 !



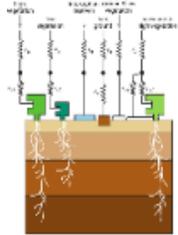
Discharge climatology – Severity thresholds



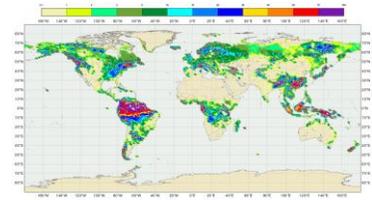
Era Interim reanalysis



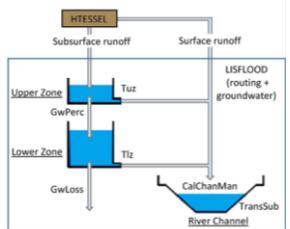
HTESSEL uncoupled



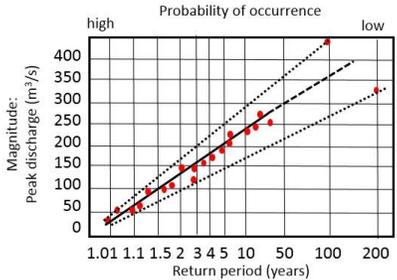
Runoff reanalysis



Lisflood

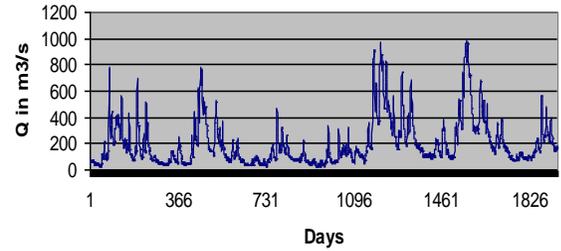


Discharge thresholds



2-year
5-year
20-year

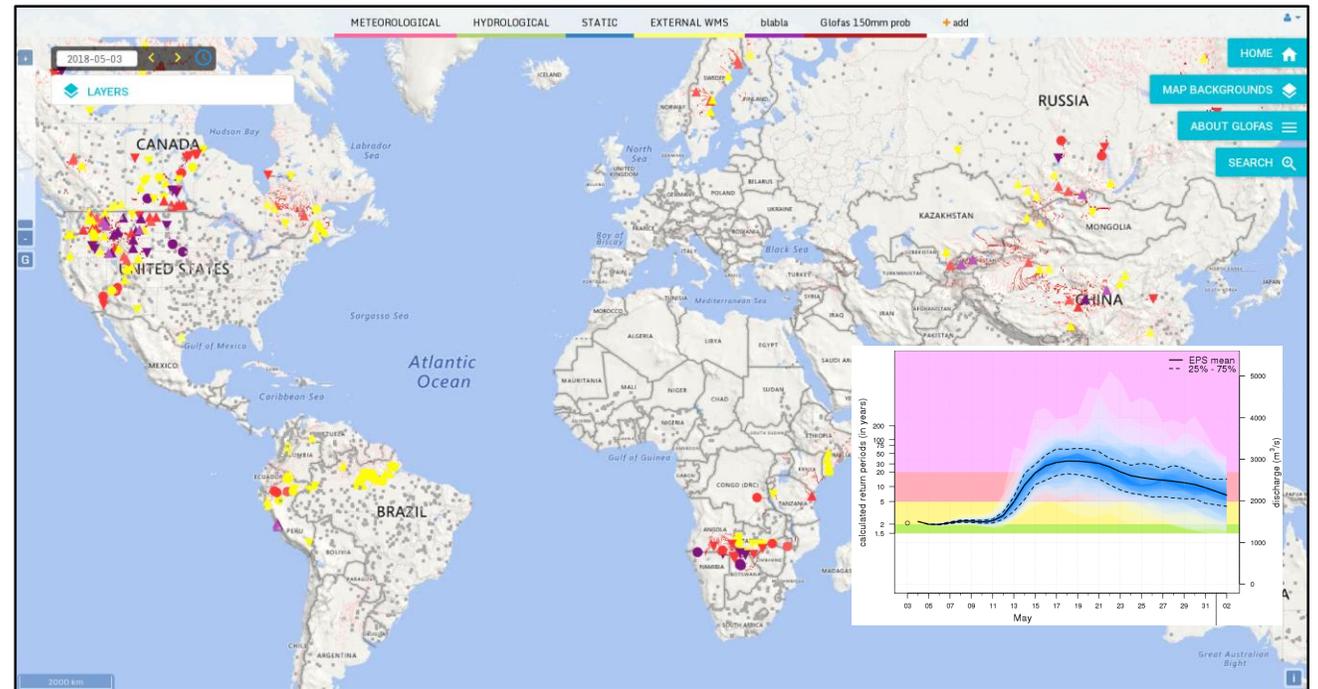
Discharge reanalysis



- Uncoupled HTESSEL (with latest hydrological scheme) at ~80km resolution
- ECMWF's ERA-Interim meteorological input
- With GPCP precipitation bias correction but no land data assimilation
- Different return period thresholds (to compare the real time forecasts)



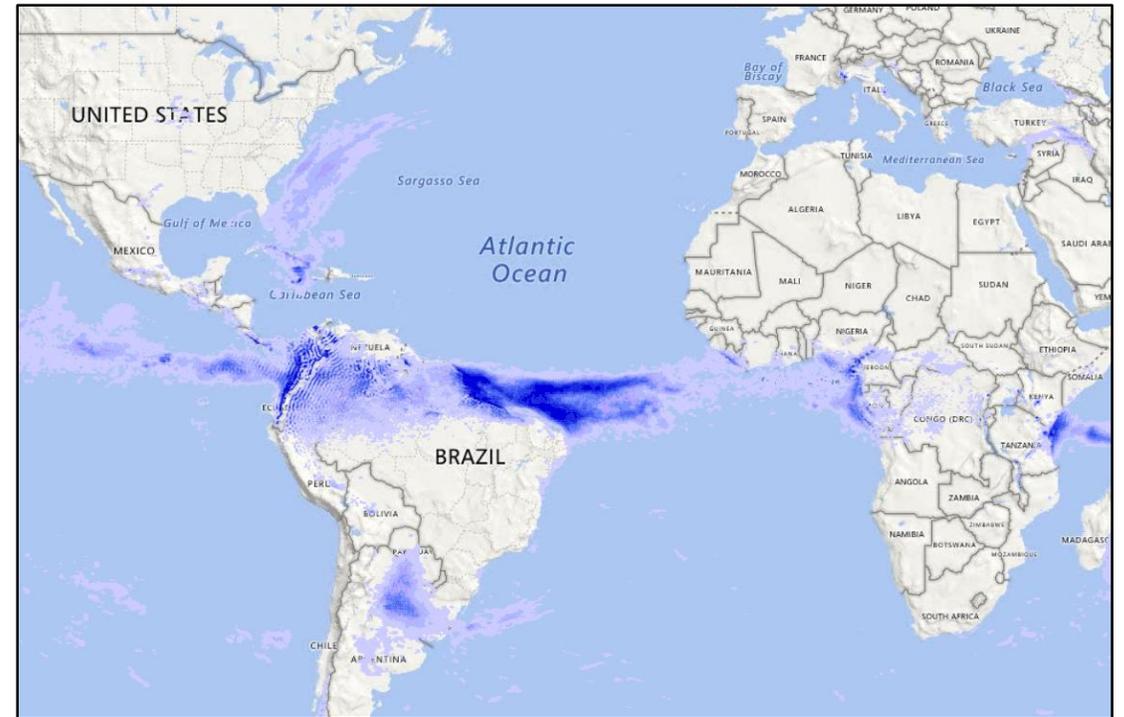
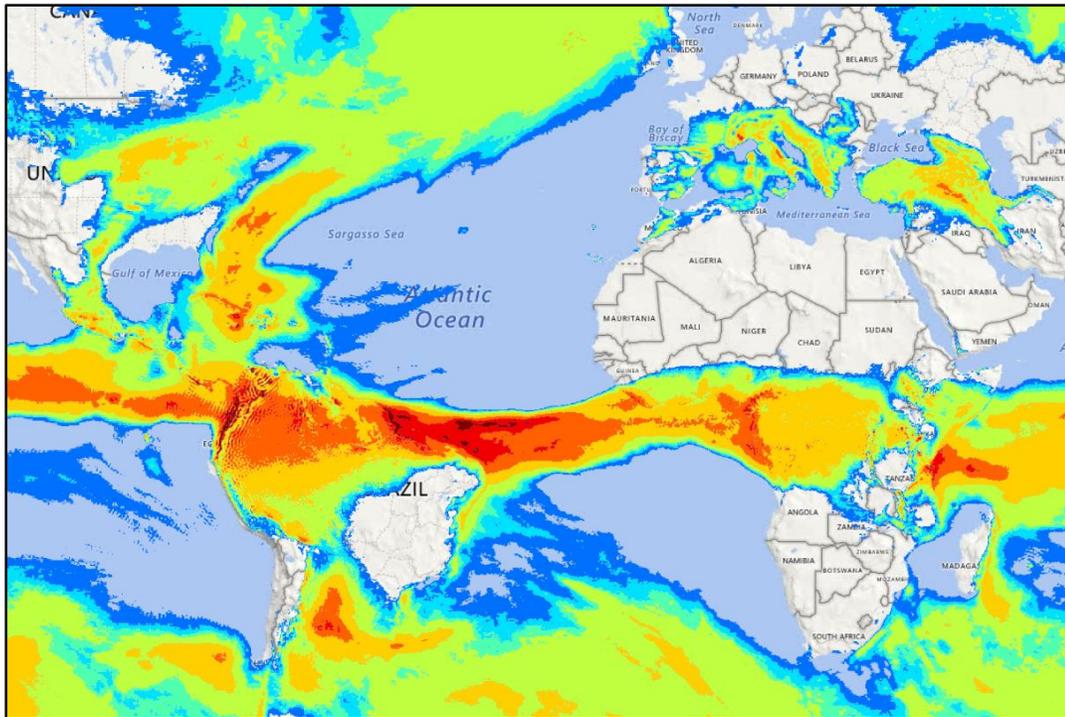
- Forecast updates every day
- Hotspot maps, flood probability maps, flood threshold exceedance, persistence plots
- Produces forecast at >2000 reporting points worldwide everyday
- Hydrologically relevant meteorological information
- Almost 8 years of forecast available with 1 click!
- Cross-browser and multi-devices
- Possibility to include external OGC:WMS
- Regular updates with new features added
- GloFAS YouTube videos





Meteorological layers

- 10-day precipitation total (median)
- Probability of 10-day precipitation for >50mm, >150mm and >300mm

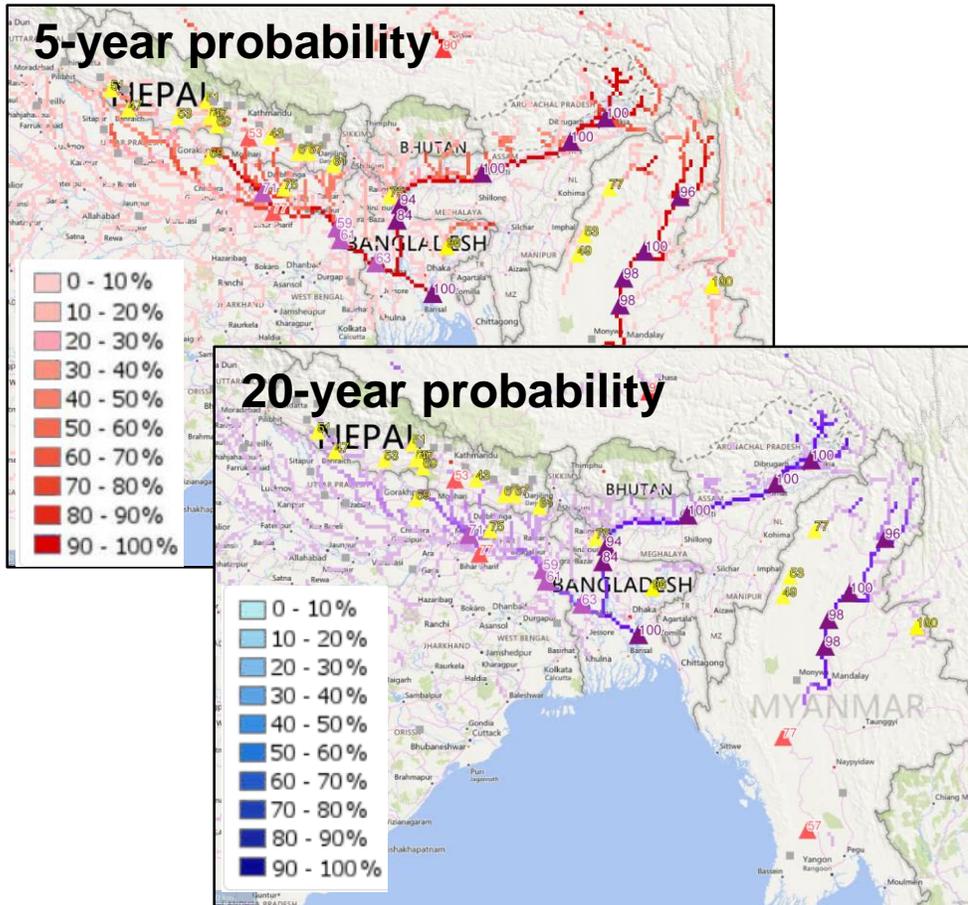




Forecast products 2 – GloFAS 30-day

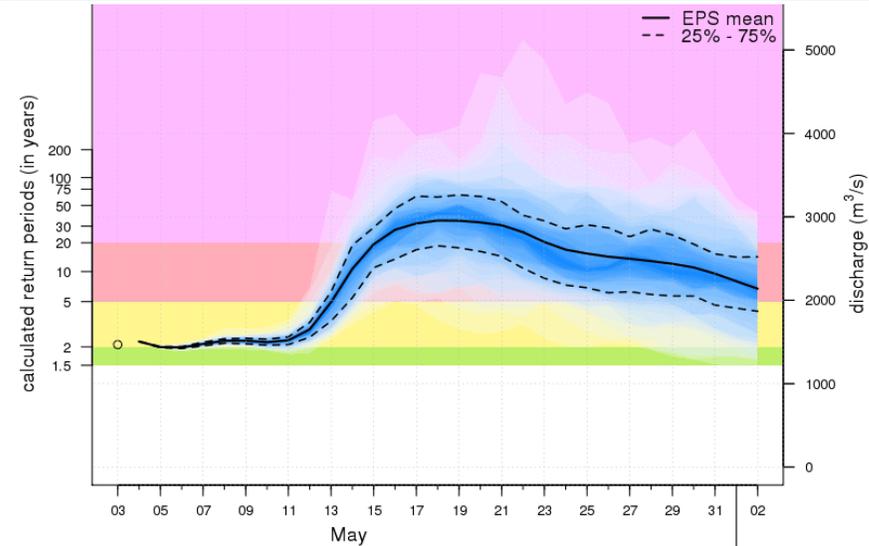


- 5- and 20-year return period exceedance probability maps (maximum of the daily probabilities 1-30 days)
- Reporting points (static and dynamic) with hydrograph and persistence tables (2-, 5- and 20-year)



Country	Basin	Station	Lon	Lat	Upstream area (LDD)	Upstream area (Provider)
0	Dynamic Point	0	71.35	40.85	93,800	0

Forecast Date	Point No.	max. EPS > threshold [%]	Alert level	Probability tendency	Peak forecasted in
2018-05-03 00:00	2211	100/100/74	3	↗	> 10 days



Color coded
 <2-year
 >2-year
 >5-year
 >20-year

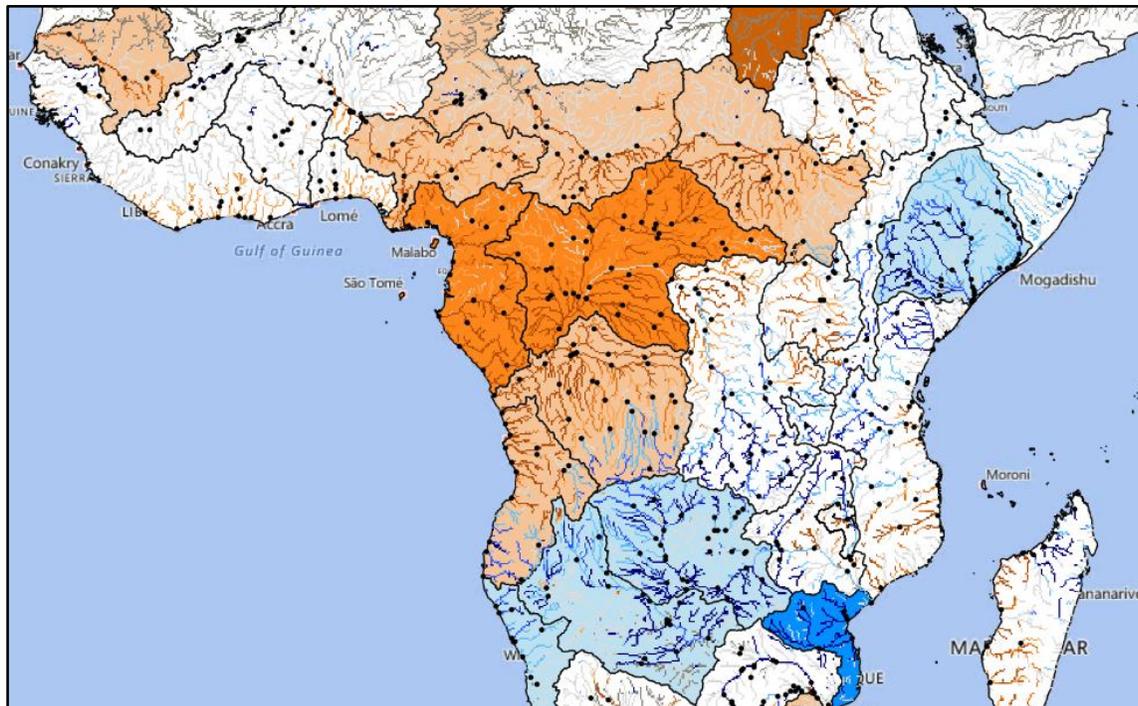
Forecast Day	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
29/04/2018													8	12	16	16	29	31	33	35	29	29	25	25	33	31	25	22	16	12	
30/04/2018												4	6	16	24	33	31	33	22	22	25	27	25	24	29	29	24	14	16	18	12
01/05/2018												2	6	16	24	25	14	16	25	33	33	31	39	33	29	31	31	29	31	27	22
02/05/2018														4	10	10	24	35	49	59	45	41	45	41	33	33	35	27	27	20	
03/05/2018														2	24	43	59	65	75	71	73	61	57	41	39	33	33	29	33	35	24



Forecast products 3 – GloFAS Seasonal

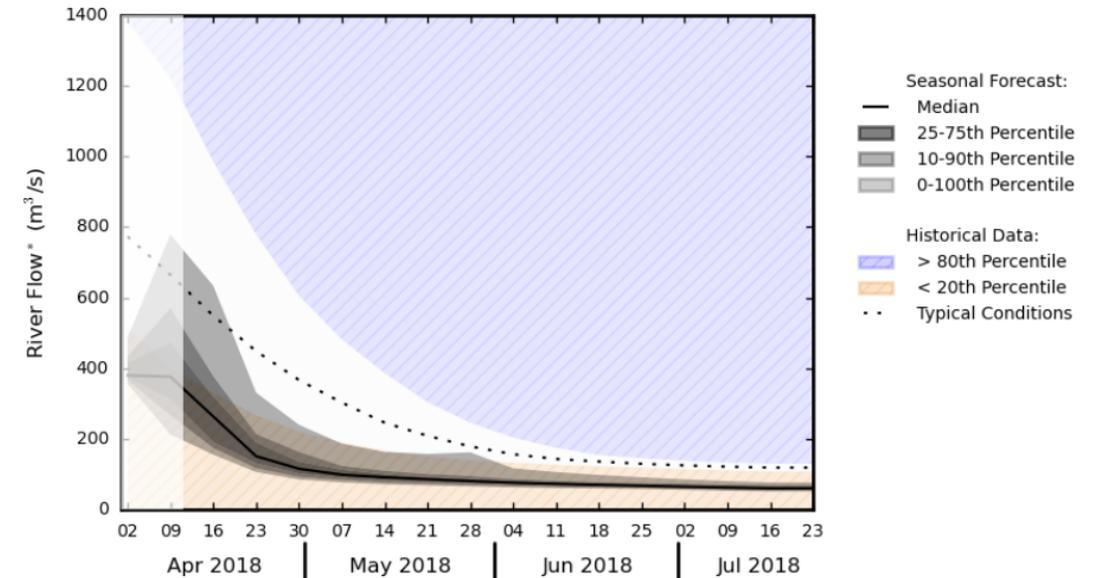


- Based on ECMWF Seas5 seasonal forecasts
- Weekly averaged river flow, 4-month lead time, updated once a month (on the 10th)
- Maximum probability of high (>P80) or low (<P20) flow
- Basin overview (basin average probabilities)
- Reporting points (static and dynamic)



Country	Basin	Station	Lon	Lat	Upstream area (LDD)	Upstream area (Provider)
'Brazil'	'Tocantins'	'Porto Uruacu'	-49.05	-14.55	34,200	34,300

Hydrograph



* River flow is a weekly average, displayed at start of week (dates shown)

Forecast Day	01	08	15	22	29	05	12	19	26	02	09	16	23	30	07	14	21	28	04	11	18	25	02	
2018-01-01	18	25	82	73	71	67	76	75	75	67	63	75	65	67	75	75								
2018-02-01					4	35	67	57	59	61	49	51	51	43	55	53	49	53	53	55				
2018-03-01									96	24	22	35	43	31	35	27	33	41	41	45	47	57	65	69
2018-04-01													100	65	82	92	98	100	100	98	98	100	100	100

Probability of exceeding high flow threshold.

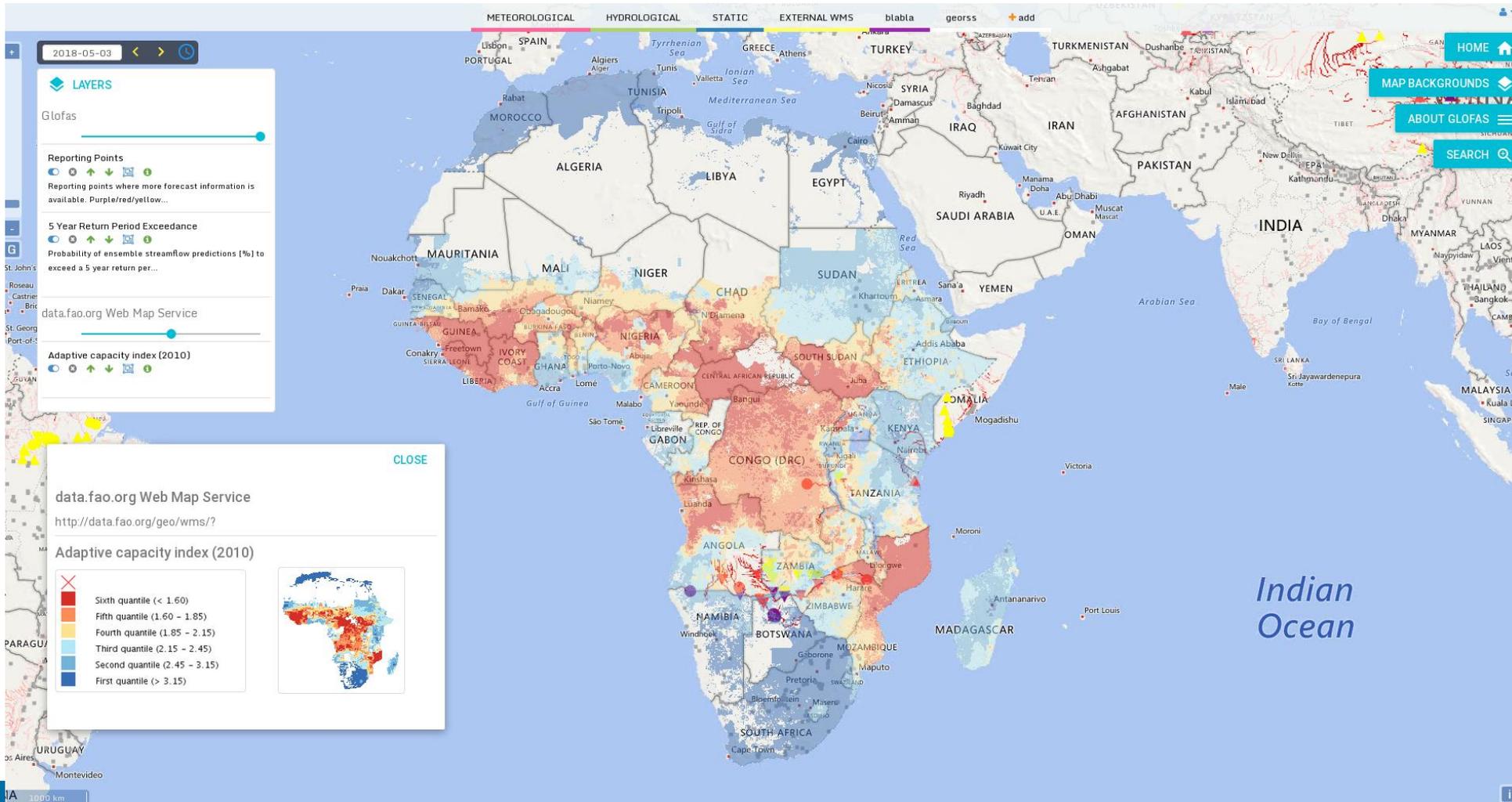
Forecast Day	01	08	15	22	29	05	12	19	26	02	09	16	23	30	07	14	21	28	04	11	18	25	02	09
2018-01-01				2	2				2	2	2	2		2		2								
2018-02-01						37							2	4	4	6	4	4	6	6				
2018-03-01										4	2	4	4	8	6	12	8	8	10	10	10	8	6	
2018-04-01																								



OGC:WMS layers in GloFAS



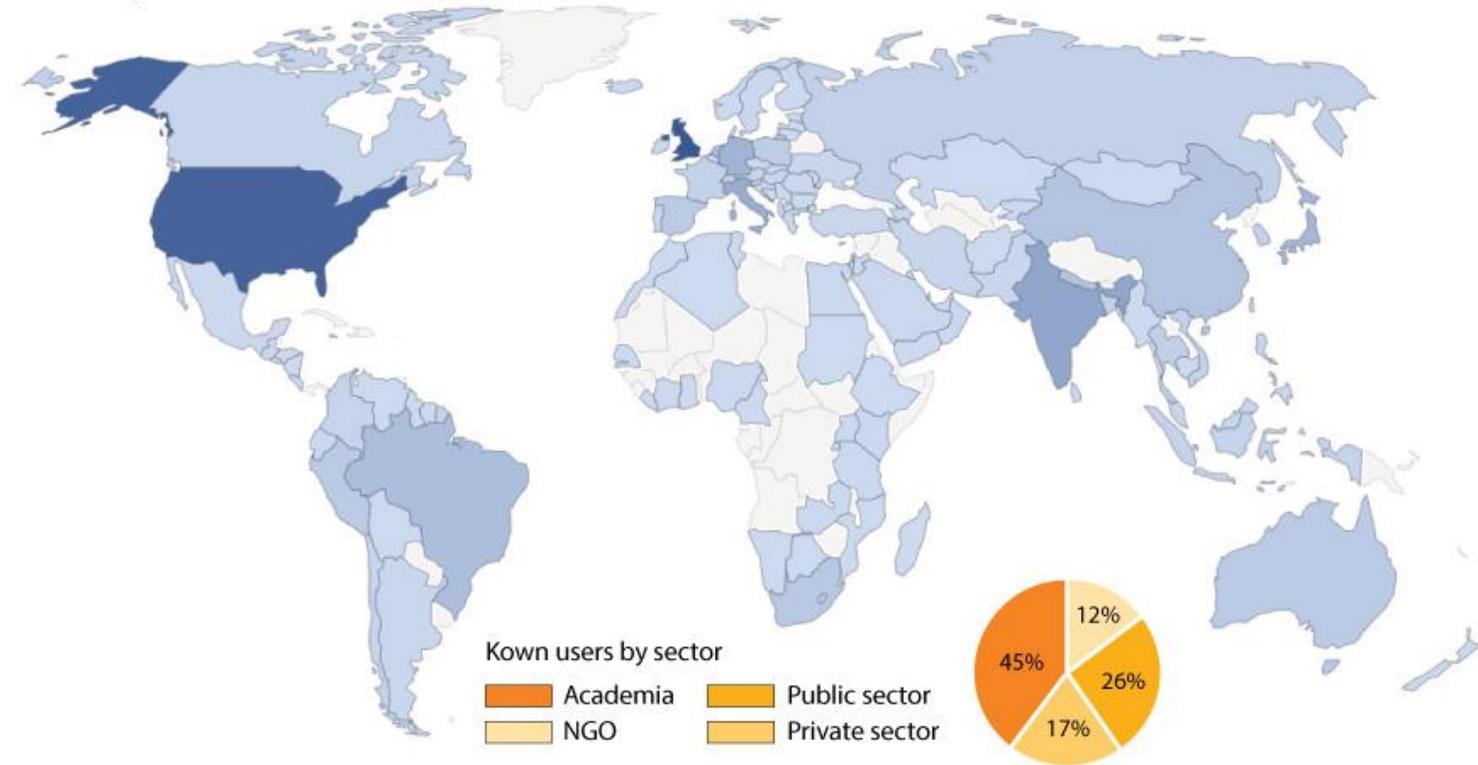
- The GloFAS web allows the inclusion and combination of OGC:WMS services





- Over 1600 registered users (Nov 2017)
- Several partners e.g. University of Reading (UK) and the Red Cross
- Forecasts can be analysed through the web (with registration)
- Data access is currently possible through ftp
- Collaboration with users, local centers/partners is essential

Visitor map – 9.5k visits



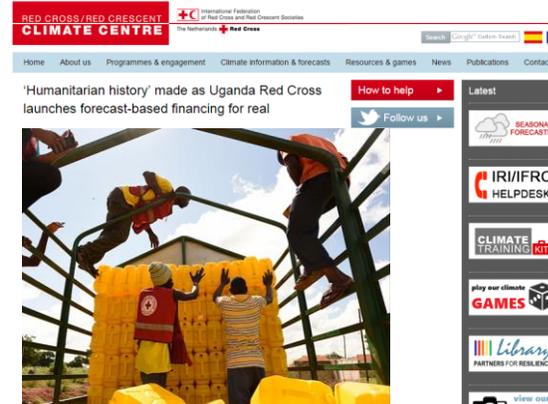
* Figure correct as of 13th Jul 2016



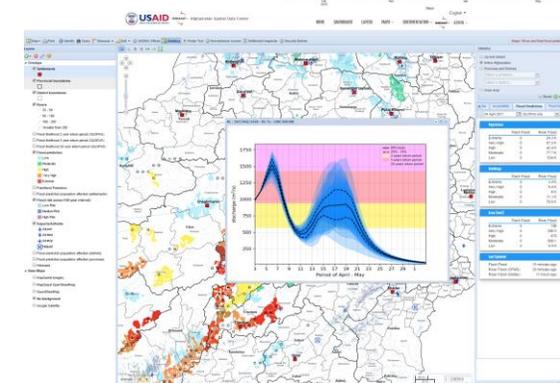
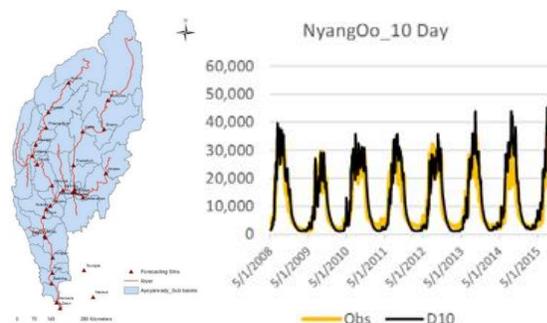
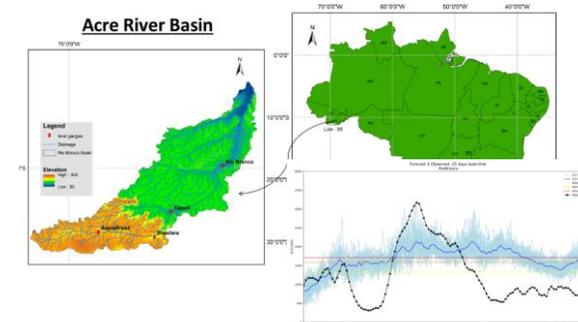
Collaborations and capacity building with GloFAS



- ‘Forecast-based Financing’ Red Cross Projects
 - Peru: GloFAS forecasts are used as a trigger for early action (El Niño)
 - Uganda: First FbF humanitarian action in Nov. 2015. GloFAS is used to trigger alerts
- Dept. of Hydrology and Meteorology in Nepal
 - GloFAS is used for early warnings
- RIMES (in South Asia)
 - RIMES evaluated GloFAS performance at various locations in South Asia
 - Regional training in Thailand 2016 to enhance capacity for flood forecasting also using GloFAS
- CEMADEN in the South Western Amazon Basin
 - Evaluate GloFAS as a flood alert system in Acre region
- iMMAP – Afghanistan Spatial Data Centre
 - GloFAS is one of the products used



Mr. Binod Parajuli (DHM, Nepal) discusses how GloFAS was successfully used to forecasting in Nepal





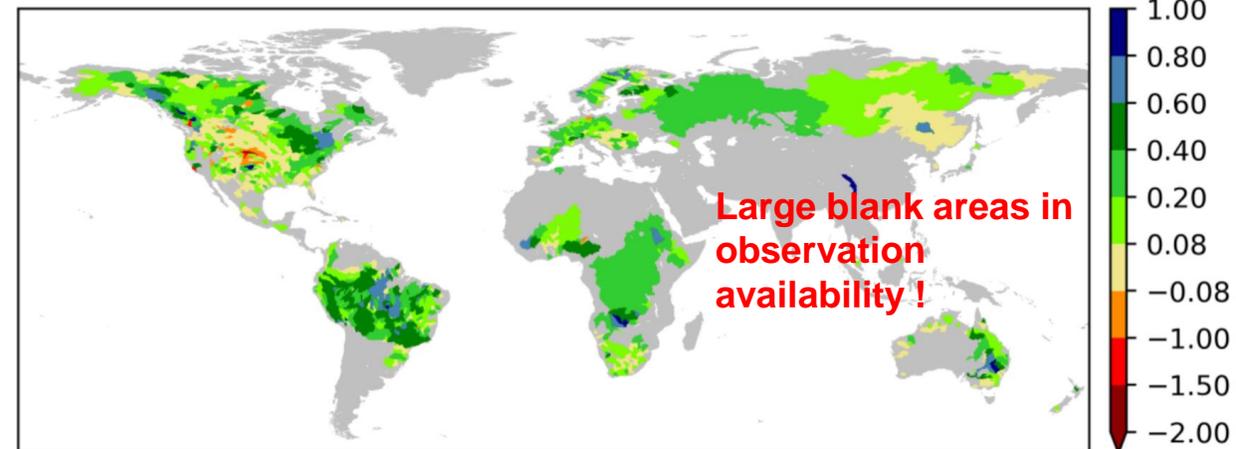
Why collaborate with GloFAS?



- Increase the usability and local relevance of GloFAS forecast
- Get archive and real time GloFAS forecasts (netCDF) currently through ftp
 - ✓ Archive data for research, skill analysis with local observations (2008 – 2018)
 - ✓ Real time forecasts to support applications
 - ✓ Forecasts for points or as 2D grids
- Evaluate the model for your needs/area with the locally available observations
- Give us your feedback about model performance
- Request extra reporting points (web)
- Feed your own applications with GloFAS data
- Help the model calibration by providing your local observations
 - ✓ This will significantly increase the forecast skill

More on how to request data tomorrow morning !

Improvements (KGE) in the calibration period



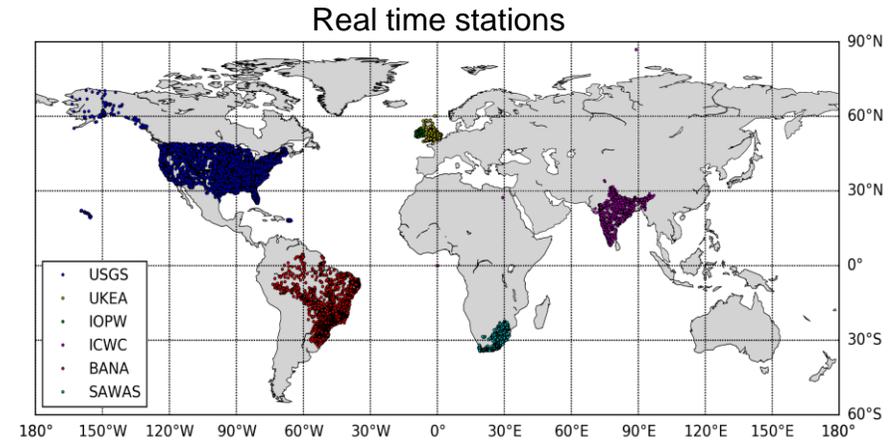
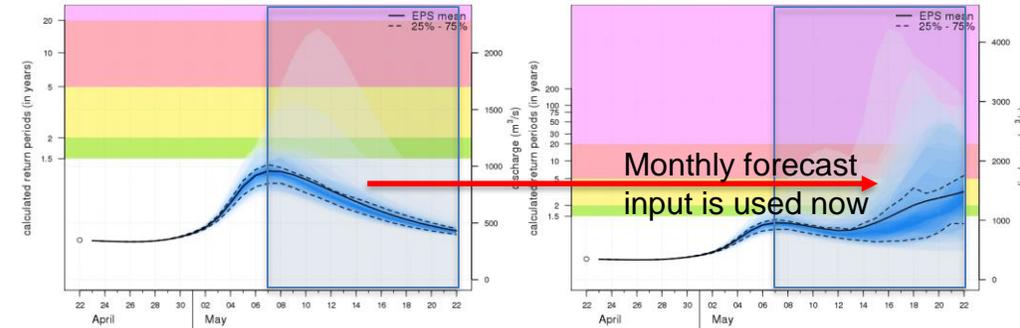
Local knowledge and data is essential!



GloFAS going forward



- GloFAS is 24/7 with 30-day NWP inputs since 23rd of April
- Next GloFAS upgrade (summer 2018)
 - ✓ New Lisflood model calibration
 - ✓ Climatology based on 20-year re-forecasts
 - ✓ GloFAS hindcasts (for April 2008 – June 2018)
- Ongoing and planned developments
 - ✓ Global flash flood and rapid risk assessment layers
 - ✓ Update of products (also users request)
 - ✓ GloFAS weekly summary (global summary of the forecasts)
 - ✓ MARS archival of GloFAS forecast / Web services for data provision
 - ✓ Real time hydrological data collection (potential for hydrological data assimilation)
 - ✓ Hydrological verification suite development / Revising the use of observations (for verification/calibration)
 - ✓ Exploring upgrade in Lisflood configuration
 - ✓ Further optimization of the system configuration





More on GloFAS



European Commission

- GloFAS website with forecasts and various news
<http://www.globalfloods.eu>
- GloFAS Webinars:
<https://www.youtube.com/channel/UCV76vM-bU2cksErBz8D1vRw>
- Twitter @globalfloods_eu

GloFAS system update: 24/7 service and extension to 30-day forecasts
April 24, 2018, 8:59 a.m.

Workshop: Hydrological Services for Business the 8-9 May 2018 in Reading (UK)
Feb. 20, 2018, 10:43 a.m.

New Seasonal River Flow Outlook Available in GloFAS
Nov. 10, 2017, 11:19 a.m.

South Asia floods put new GloFAS river discharge forecasts to the test
Sept. 5, 2017, 2:23 p.m.

GloFAS system update: 24/7 service and extension to 30-day forecasts
Operational implementation:
GloFAS has been producing forecasts for the Copernicus Emergency Management service - Early Warning System since 2011 in a semi operational fashion without any time critical support. From the 23rd of April the system is running in the ...
By Zsoter Ervin - April 24, 2018, 8:59 a.m. [read more](#)



Twitter [View @globalfloods_eu on Twitter](#)

Tweets by @globalfloods_eu

globalfloods @globalfloods_eu
Farmers, communities continue to tally damage from floods - Western Producer (subscription): Western Producer... [news.google.com/news/url?sa=t&...](#)

globalfloods @globalfloods_eu
Tasmania's weekend weather: floods, snow, wind - Tasmania Examiner: ABC Online Tasmania's... [news.google.com/news/url?sa=t&...](#)

Embed [View on Twitter](#)



Prototype for social media analysis for flood events

This example shows an aggregated 24 hours filtered flood signal from Twitter for 24th of July 2013 in form of a heat map (read color=high signal). It is considered as a valid signal Twitter messages containing top 25 bigrams extracted from Twitter streaming over the last 10 days prior to the day of 24 hourly analysis.

• Hover the map and zoom in with mouse wheel!

Up next

- Tutorial on GloFAS update 2 December 2015 (4:43)
- How to use the GloFAS forecast viewer (1:30)
- GloFAS webinar from 16 September 2015 (1:11)
- Introduction to WMS and the Wipys Warehouse Management System for Exact WipysChannel (7:56)
- The Basic Concepts of GloFAS (1:16)
- Achieve Warehouse Management for SAP Business One (20:28)
- How to Get Around Lack of External Mic (1:38)

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Thank You!