

GloFAS foreseen evolutions

Calum Baugh, ECMWF



Foreseen Developments



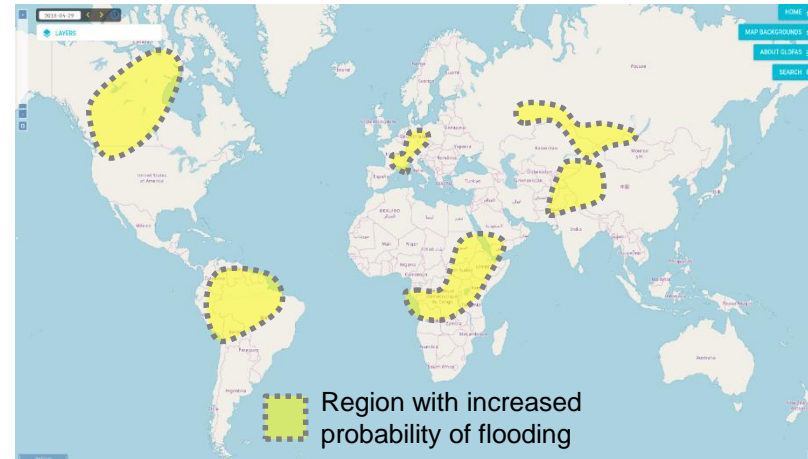
- ✓ Weekly bulletin
- ✓ Global flash flood
- ✓ Rapid risk assessment layers
- ✓ MARS archival of GloFAS forecast / Web services for data provision
- ✓ Real time hydrological data collection (potential for hydrological data assimilation)
- ✓ Hydrological verification suite development / Revising the use of observations (for verification/calibration)
- ✓ Exploring upgrade in Lisflood and system configuration



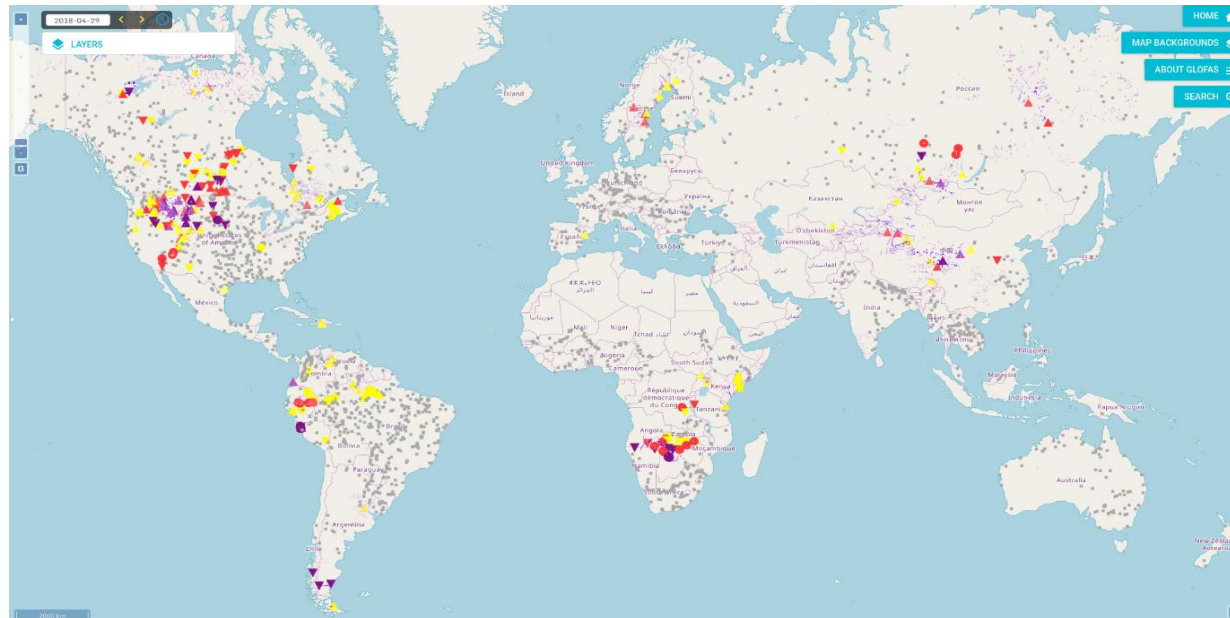
Weekly Bulletin



- Summarise the forecasted flood situation across the globe over the next 10, 20, 30 days
 - Number of flood points over return period thresholds?
 - Or the trends of these points?
 - You decide in the next exercise!



- 34** 20-year flood
- 45** 5-year flood
- 67** 2-year flood
- 2054** No flood forecasted

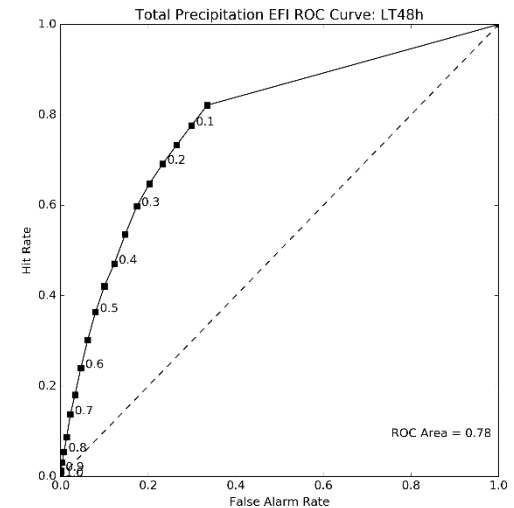
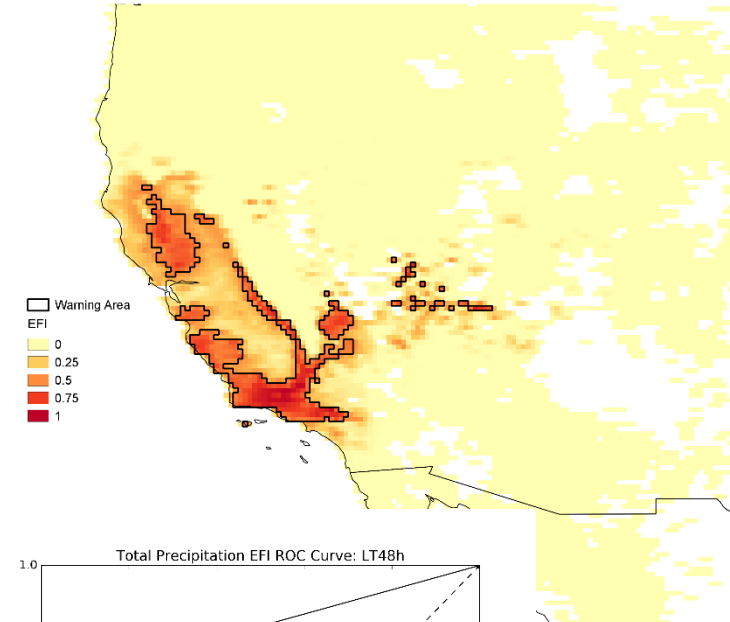
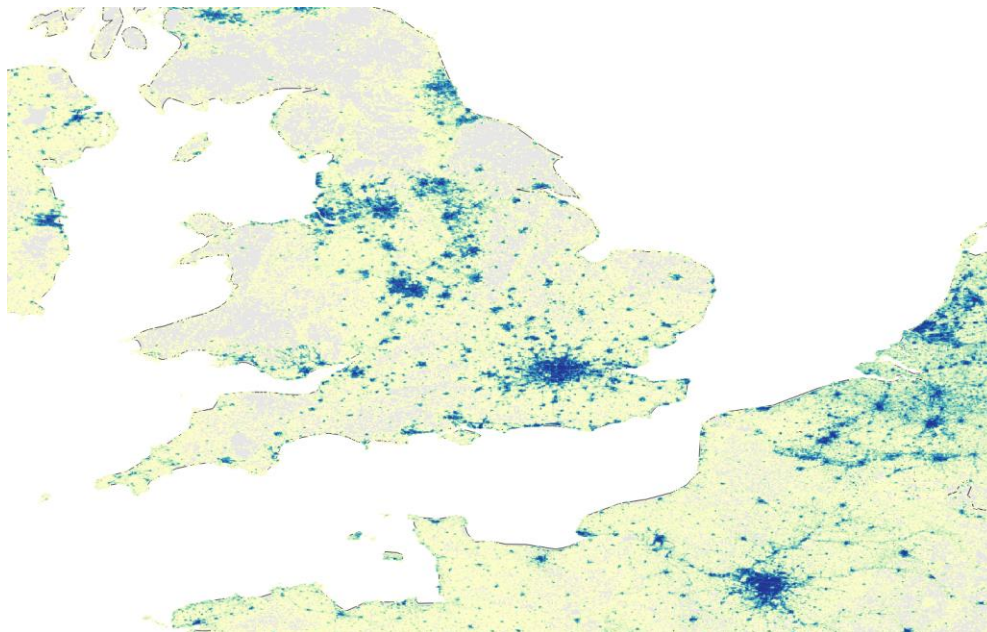




'Flash Flood' Layer



- Using 24 hr total precipitation EFI from ECMWF NWP
- Combined with populated fraction to focus on most exposed locations
 - Pluvial risk?





Rapid Risk Mapping

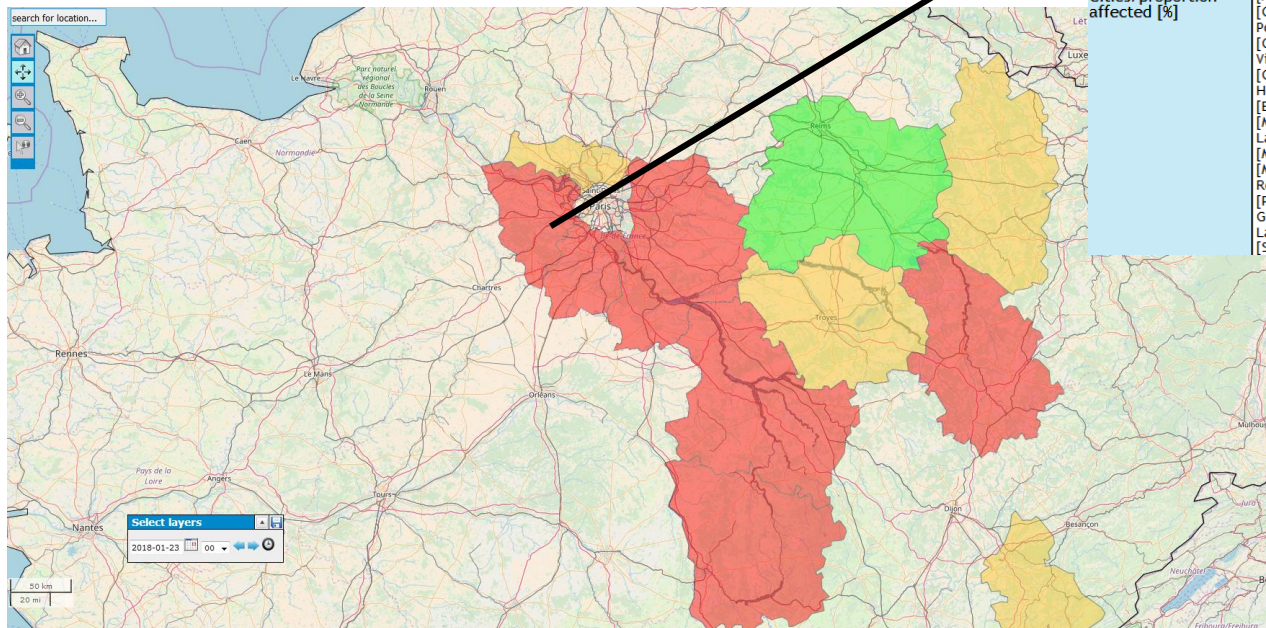


- Expand EFAS methodology globally
- Discretised by 2nd level administration units
- Within each unit will summarise:
 - Total population within flood footprint
 - Infrastructure affected e.g. km of roads (from OpenStreetMap)

	Low impact <1K	Medium impact 1K-10k	High impact > 10K
High likelihood			
Medium likelihood			✓
Low likelihood			

Rapid Impact Assessment for Yvelines region

	PROTECTED	UNPROTECTED
Estimated peak time	6	6
Estimated mean return period [yr]	159	79
Estimated protection levels [yr]	169	169
Population affected [Nr. of people]	55,600	119,500
Total roads affected [km]	0	0
Artificial surfaces [ha]	2,278	5,188
Agricultural surfaces [ha]	168	2,382
Forest and seminatural [ha]	2,006	5,638
Potential monetary damage [M Euro]	2	1,051
Cities/proportion affected [%]	[Acheres/27.92%] [Carrieres-sous-Poissy/12.57%] [Chanteloup-les-Vignes/1.48%] [Confians-Sainte-Honorine/21.39%] [Eragny/2.53%] [Maisons-Laffitte/6.79%] [Maurecourt/25.69%] [Mesnil-le-Roi/4.96%] [Pecq/7.77%] [Saint-Germain-en-Laye/1.59%] [Sartrouville/10	[Bezons/13.37%] [Carrieres-sous-Poissy/12.57%] [Carrieres-sur-Seine/16.25%] [Chanteloup-les-Vignes/1.48%] [Chatou/13.99%] [Confians-Sainte-Honorine/21.39%] [Croissy-sur-Seine/36.3%] [Eragny/3.19%] [Evrecquemont/15.12%] [Freneuse/4.26%] [

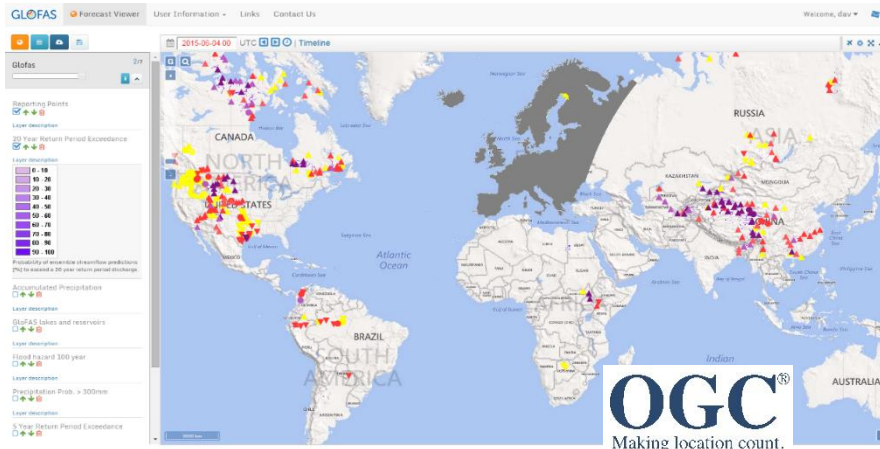




MARS Archiving / WMS



- Retrieve past forecasts using simple MARS retrieval scripts
- Users can display GloFAS products on their own systems
- See Fredrik's talk later



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mars - INFO - 20170918.071028 - Processing request 1

RETRIEVE,
CLASS      = OD,
TYPE       = CF,
STREAM     = ENFO,
EXPVER     = 0001,
REPRES     = SH,
LEVTYPE    = SFC,
PARAM      = 167,128/182,128/228,128,
DATE       = 20170918,
TIME       = 0000,
STEP       = 0/6/12/18/24/30/36/42/48/54/60/66/72/78/84/90/96/102/,
DOMAIN     = G,
TARGET     = "/gpfs/lxop/efas/emos/efas/meteo/forecasted/201709180
RESOL      = AUTO,
GRID       = 0640

mars - INFO - 20170918.071028 - Requesting 183 fields
44616 FDB; INFO: DB#_ Fields DataBase 4,8,4

mars - INFO - 20170918.071052 - 183 fields retrieved from 'cca fdb'
mars - INFO - 20170918.071052 - Request time: wall: 24 sec cpu: 1
mars - INFO - 20170918.071052 - Transfer from ccafdb: 580,39 Mbyte
mars - INFO - 20170918.071052 - Visiting cca fdb: wall: 24 sec
mars - INFO - 20170918.071052 - Writing to target file: 580,41 Mby

mars - INFO - 20170918.071052 - Processing request 2

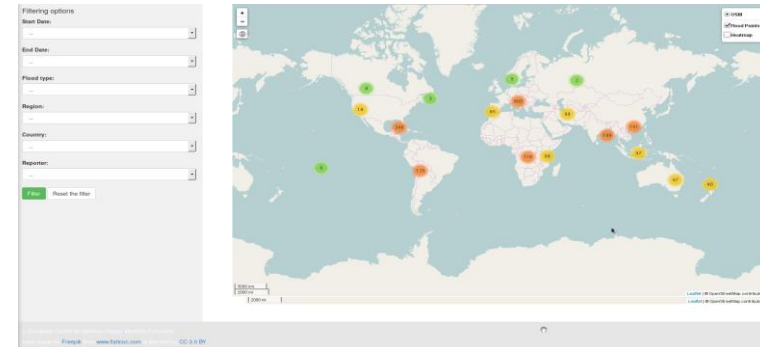
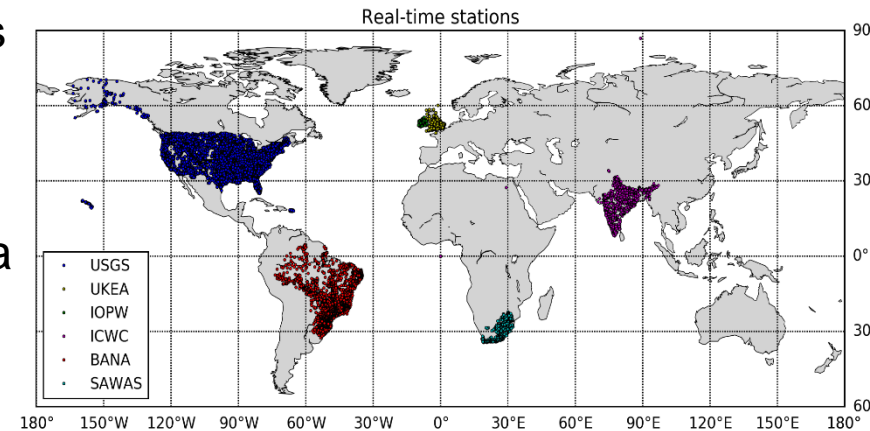
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NRT Hydro' Data



- Collecting hydrological observations in near-real time from hydromet' service websites
 - For verification purposes
 - Also event identification?
- Data from USA, Brazil, South Africa, India UK, Ireland
- Flood event observations from media reports
 - Collected by FloodList.com
 - Pluvial event verification
 - Delivered via WMS to users

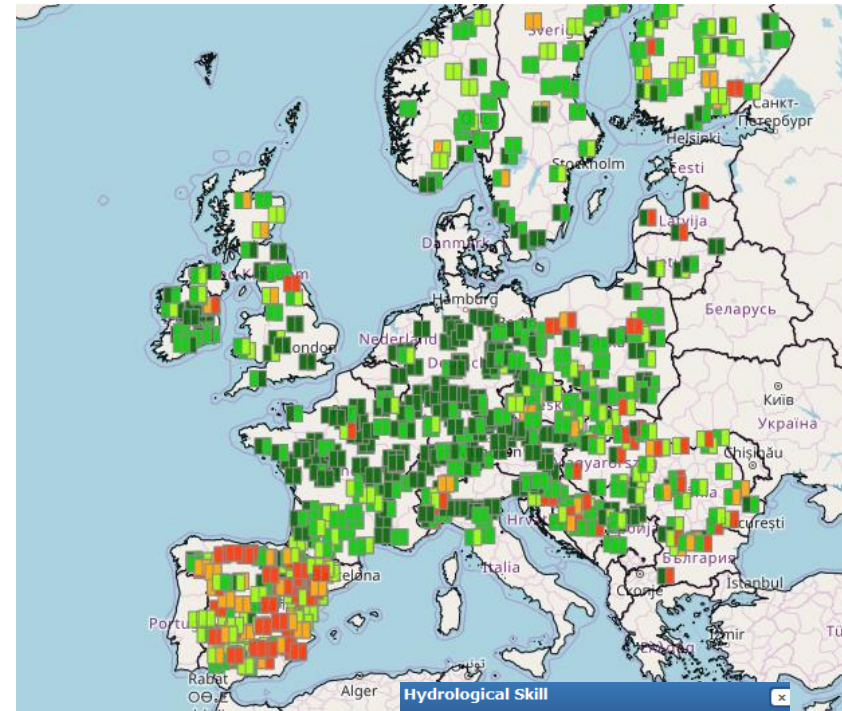




Hydrological Verification



- New layer on GloFAS website showing skill at gauging station locations
- Regularly updated using near real time observations gleaned via new tool
- Can we explore skill by?:
 - Season
 - Basin size/characteristics
 - Flood type (monsoon vs cloudburst driven)



Hydrological Skill

Legend

- > 0.75
- > 0.5-0.75
- > 0.2-0.5
- > 0-0.2
- < 0

Description

The hydrological skill of LISFLOOD expressed through the modified Kling-Gupta Efficiency for the calibration (left) and validation (right) period at gauging stations, which were used to calibrate LISFLOOD. For more information regarding the Kling-Gupta Efficiency the reader is referred to [Gupta et al. \(2009\)](#).



LISFLOOD Configuration



- Global application of entire LISFLOOD hydrological model
- Create calibration suite to test model
- Different model configurations regarding initialization
 - ERA-Interim
 - ERA-5
 - Reforecasts
- Calculation of warning levels
 - Lead time dependency

