



Emergency Management

CEMS Week – EFAS Annual Meeting 2021

Using Partner Feedback and Data for Flash Flood Verification

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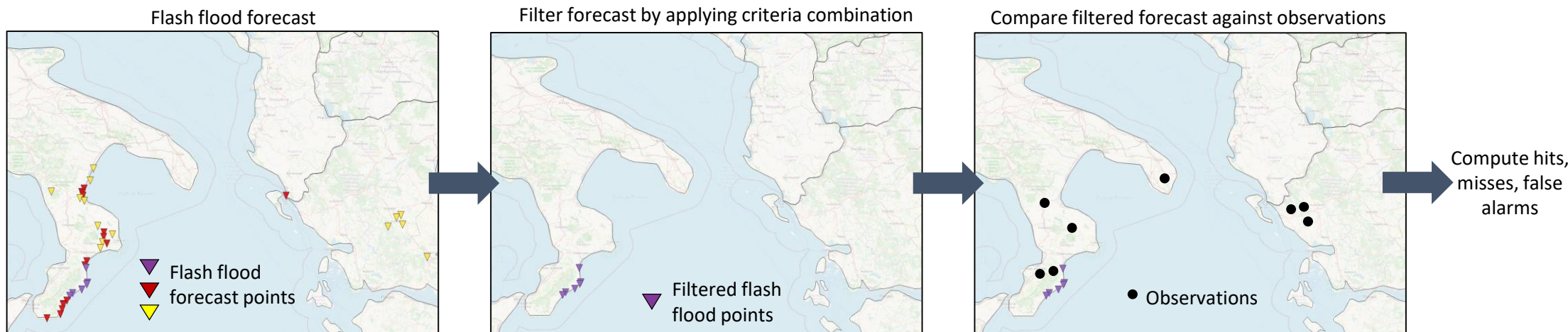
1. Principles of flash flood verification
2. Flash flood notification feedback
 - Current feedback received so far
 - What we can do with the feedback
3. Additional data from HYDRO DB for flash flood verification
 - Deriving flash flood observations



Principles of Flash Flood Verification

Aim: Identify the optimal criteria for issuing flash flood notifications

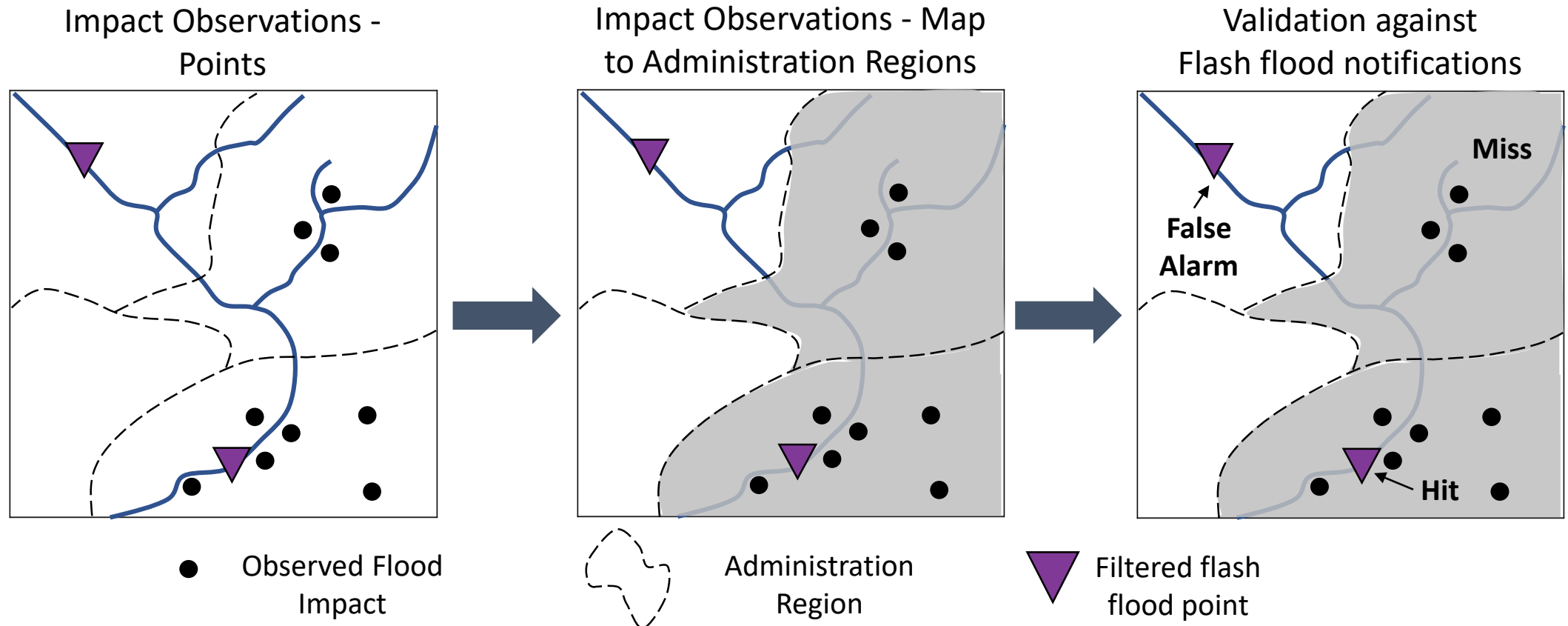
- Criteria for issuing flash flood notifications:
 - Exceedance probability of 2, 5 or 20 year return period thresholds (0-100%)
 - Lead time (0-120 hours)
- 1. Produce flash flood forecasts over a 1 year period
- 2. For each lead time of each forecast:
 3. Apply different criteria combinations for generating flash flood notifications
 4. Compare against observations – compute hits, misses, false alarms
- 5. Compute skill score for each criteria combination
- 6. Identify criteria combination which give optimum skill score





Principles of Flash Flood Verification

- Flash flood forecasts are compared against observations at the administration region level
 - In EFAS web map viewer see *Static > Administrative regions* layer
 - Consistent with the unit at which flash flood notifications are issued
- Both filtered flash flood points and observations are assigned to their nearest administration region





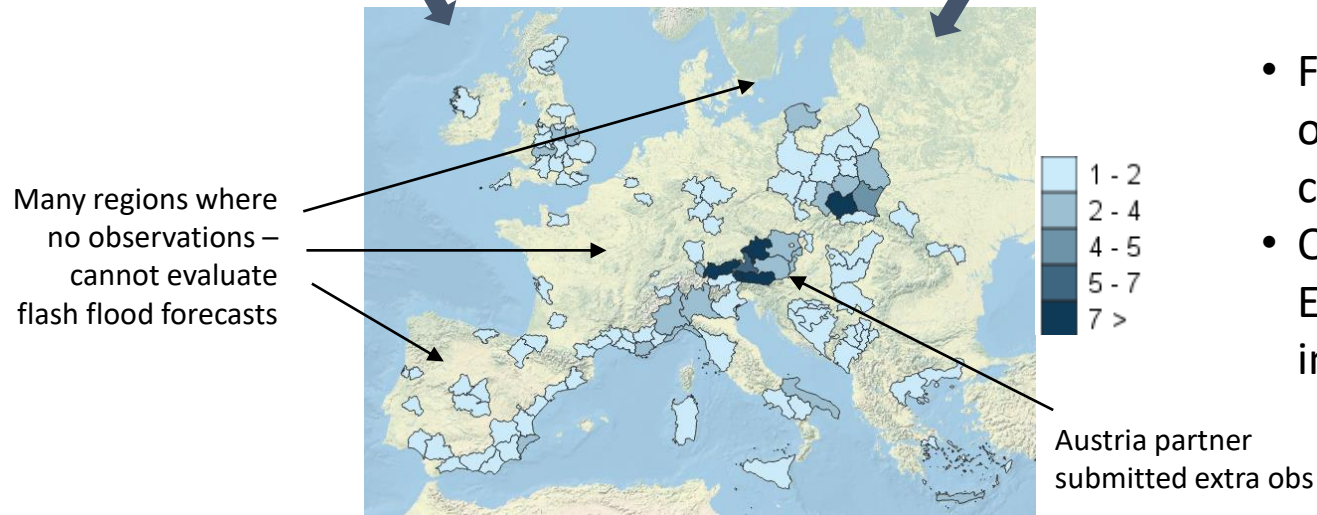
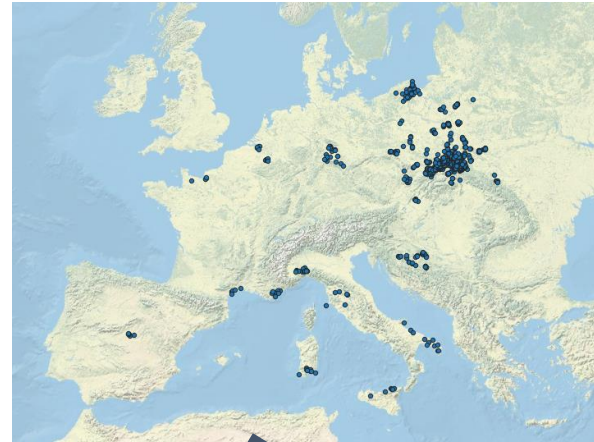
Use of Flash Flood Observations

- Observations of flash flood impacts
- From media (FloodList.com) or volunteer observers (www.eswd.eu)
 - Also from EFAS partners

FloodList.com observations



ESWD observations



- FloodList and ESWD observations don't give coverage in all areas
- Observations submitted by EFAS partners are really important to fill the gaps



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EFAS Flash Flood Notification Feedback

- At the bottom of each flash flood notification email is a link to leave feedback
- Yes/No feedback – option to add a description

LEAVE A FEEDBACK FOR THIS NOTIFICATION

[Leave the Feedback!](#)

(you need to be logged in on the EFAS website)



Copernicus Emergency Management System
Flood monitoring and forecasting

Home Training Wiki Viewer Dashboard

Overview

User Info	Event Info
Name:	Date: 20/10/2021 - 10:48
Organization: ECMWF_EFAS	Country: SWEDEN
Country: United Kingdom	Region:
	Basin: Helge
	River: Helge a

Was a flood observed in or around the area? * Yes/No feedback →

* = mandatory field

Drop some lines:

Write something... Write optional feedback here...

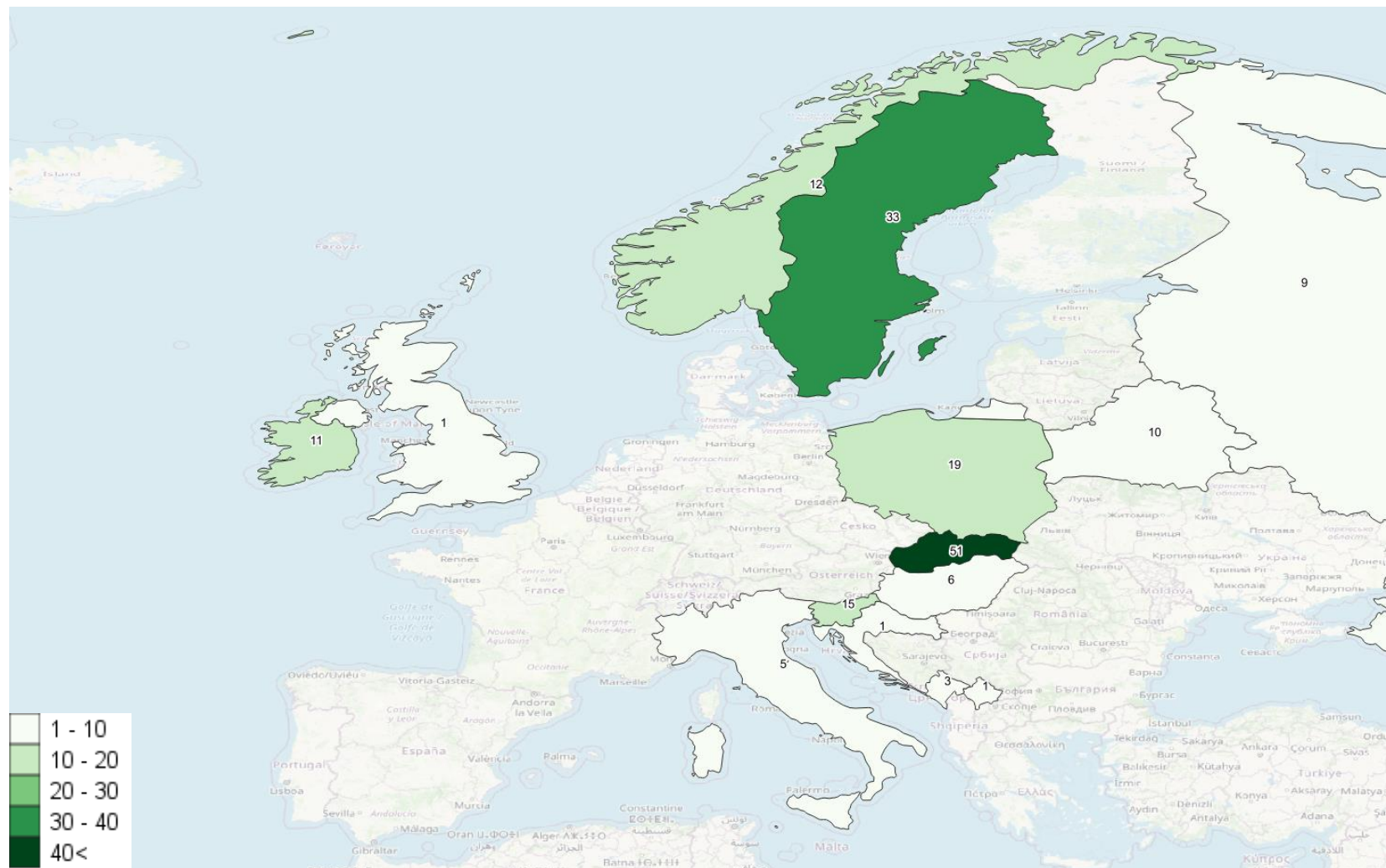
Send Feedback! Cancel



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Flash Flood Feedback Received to Date

- 174 feedbacks received to date for 2020 and 2021



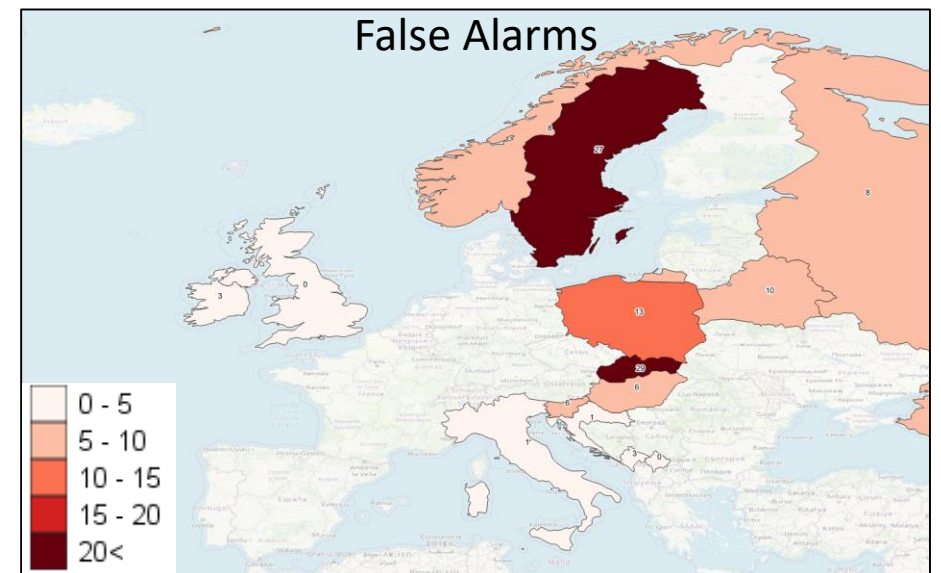
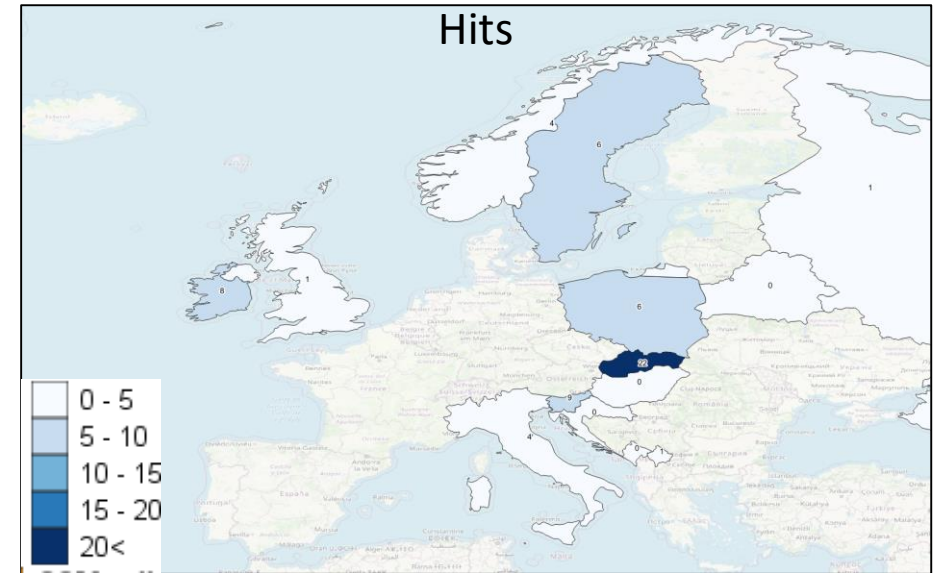
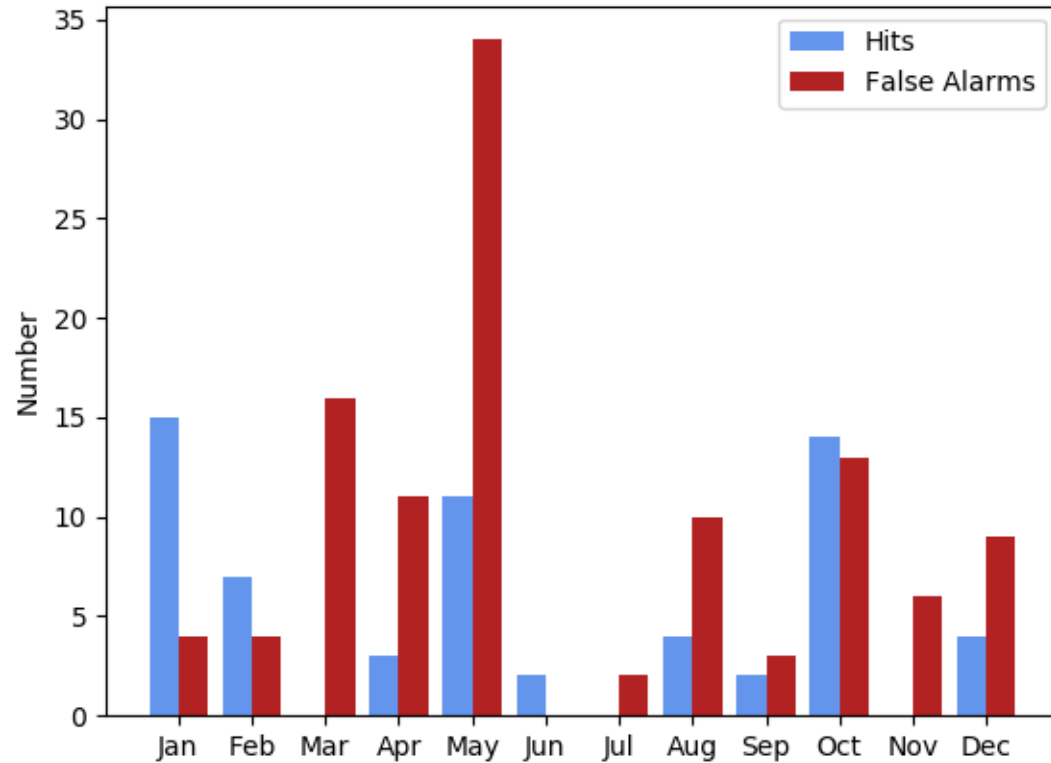


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Flash Flood Feedback Received to Date

- Feedback gives indication of performance of current flash flood notifications
- Allows assessment of hits versus false alarms

Flash Flood Notifications: Hits and False Alarms





Flash Flood Feedback: Use in Verification

- Feedback can be used to identify additional flash flood observations:
- Take the 'yes' events
 - Find coordinates and dates of the corresponding forecast points – translate to observations
- This can be done for the verification of the flash flood forecasts for the next EFAS upgrade

However:

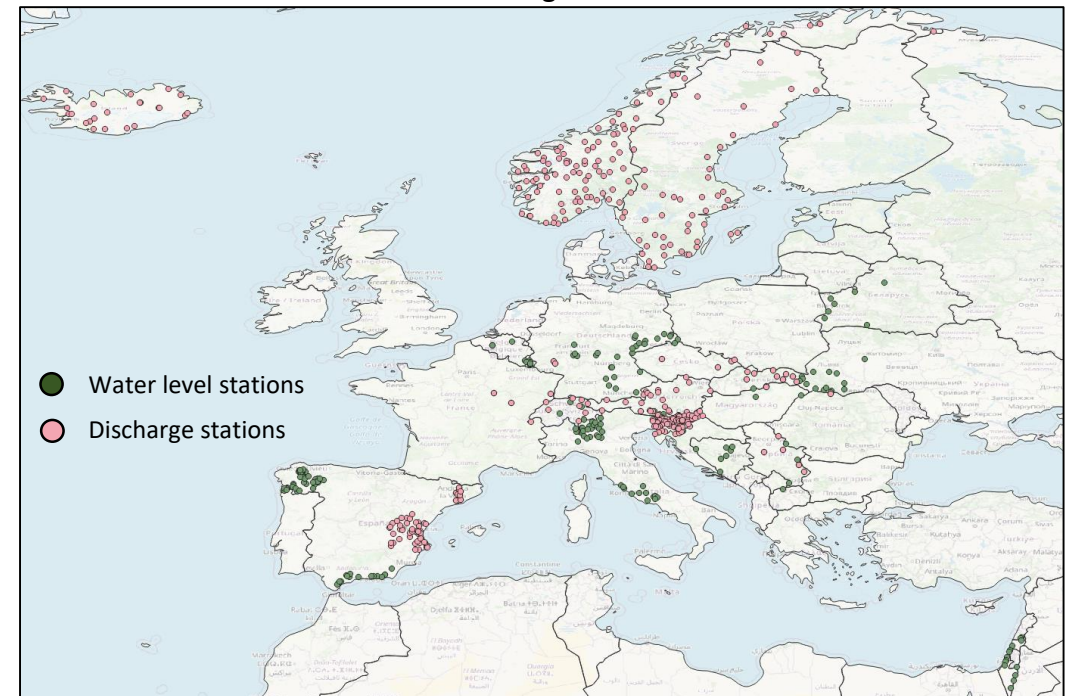
- Don't know about missed events
- Any additional observations about flash floods are highly welcome



Deriving Flash Flood Observations from Hydro Database

- Flash flood observations can be derived from the discharge/water level observations in the EFAS Hydro database
- Some stations have associated warning level thresholds
- Derive flash floods from discharge or water level stations with following criteria:
 - 1 or 6 hourly observations
 - Catchment area ≤ 2000 km²
 - Warning level 1 threshold data available
- Between Oct 2020 – Jan 2021: 240 water level stations, 372 discharge stations met above criteria

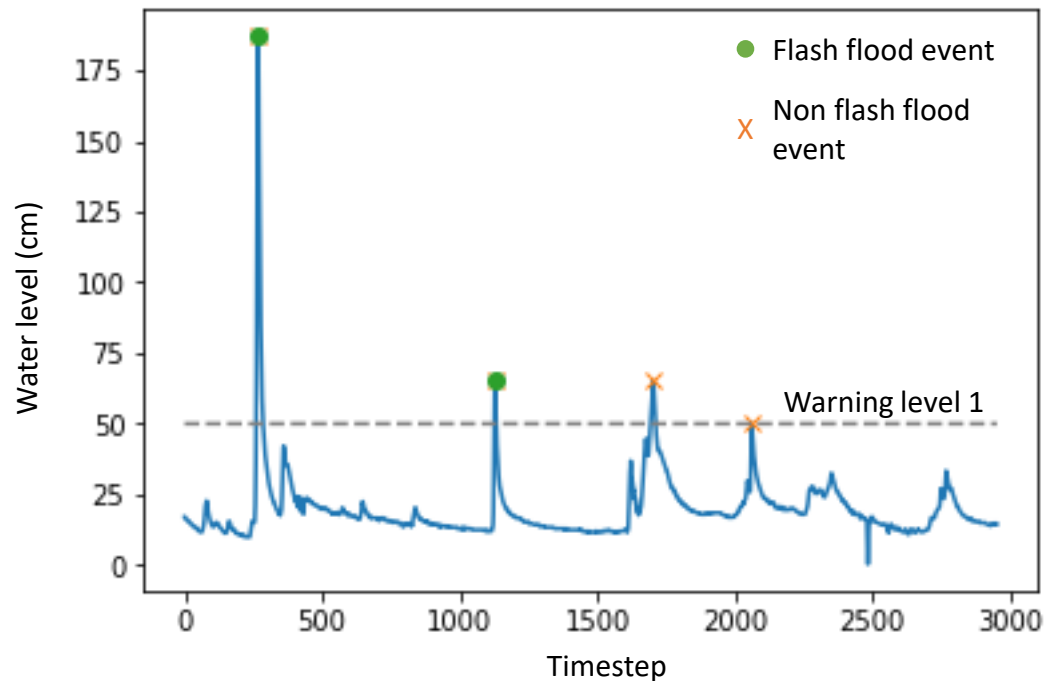
Stations with Warning Level 1 Threshold





Deriving Flash Flood Observations from Hydro Database

- To derive flash flood from a time series:
 - Must exceed the warning level 1 threshold
 - Peak prominence is greater than warning threshold minus baseflow
 - Peak duration <5 hours
 - No other peaks with 36 hour period
- 29 observations between Oct 2020 – Jan 2021



Flash flood observations 1st Oct 2020 – 31st Jan 2021





Conclusions

- Observations derived from partner information is vital for the verification of the flash flood forecasts
 - Helps to extend verification to as much of the domain as possible
- Flash flood feedback allows the evaluation of the current forecast system
- Feedback also allows us to derive new observations for future verification efforts
- Still need additional information to identify missed events
- Water level/discharge observations in Hydro DB very useful to derive flash flood observations
 - 1 to 6 hourly time series are most helpful
 - Need corresponding warning level threshold information

Any questions?: calum.baugh@ecmwf.int