



EUROPEAN COMMISSION

DIRECTORATE-GENERAL

Joint Research Centre

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# Review of EFAS progress during 2008

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und FLOODS team

# EFAS

Run and monitored pre-operationally ~ 360 days

- some flooding in Sweden in April 2008
- major flooding in Eastern Europe in July 2008
- localised floods in french rivers, Po, Ebro, Romanian rivers, ...

From January 2008 onwards EFAS warnings are accessed directly by the partners through the EFAS-IS interface. This interface is password protected and only accessible to EFAS partners.

In addition EFAS issues brief alert emails.

## Activated EFAS Alert



[issued on – for - confirmed](#)

- none

## Informal EFAS Alert



[issued on – for - confirmed](#)

Mar	Rivers	Countries	Flooding Confirmed
3	Tisza	RO,HU	not known



Active alert email send to MoU partners



Informal alert email send because catchment area too small, not part of MoU agreement (but partner has signed an MoU for another river)

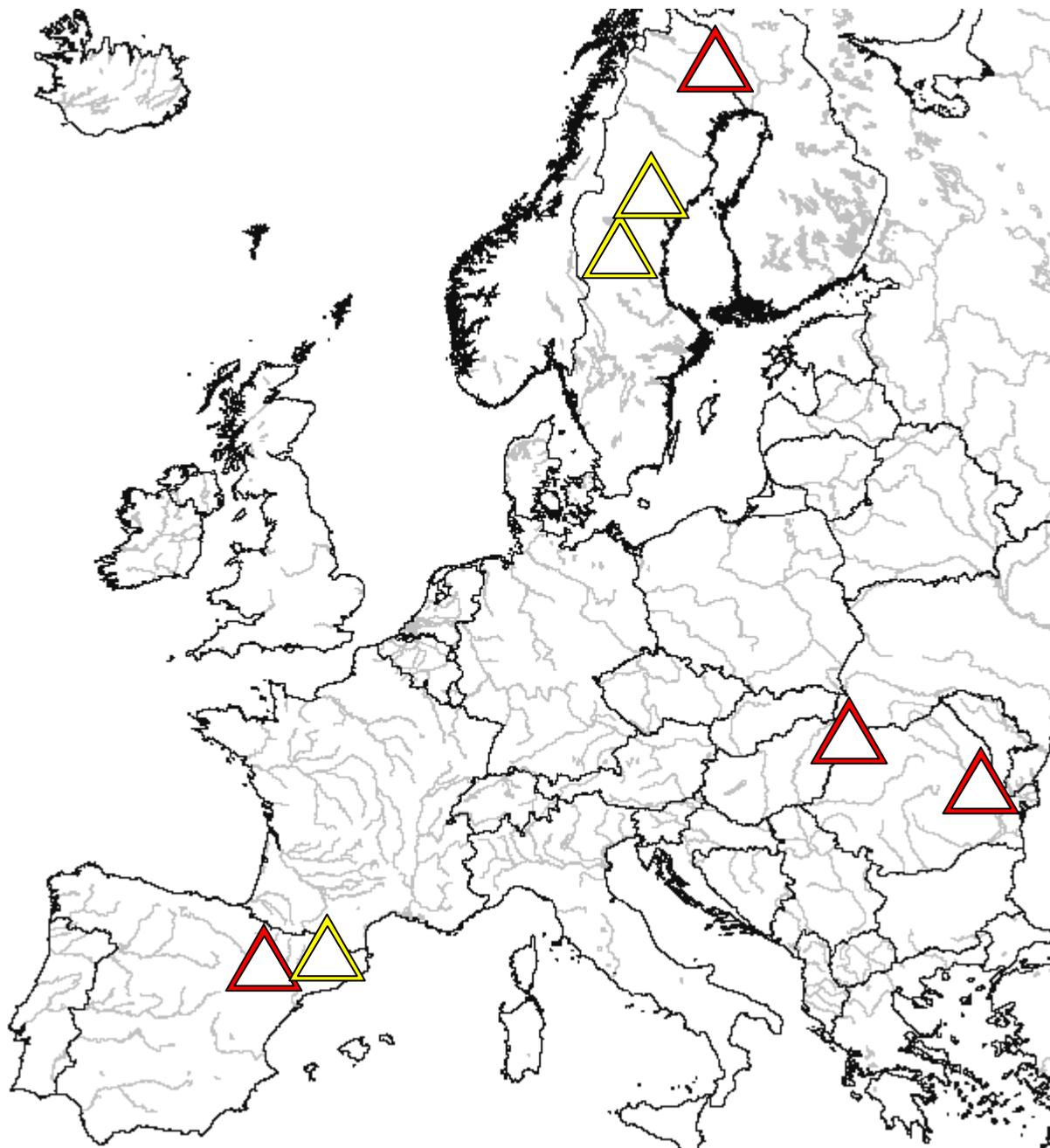
# EFAS FLOOD ALERTS in Mar 2008



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# EFAS FLOOD ALERTS in April 2008



## Activated EFAS Alert

issued on – for - confirmed

April	Rivers	Countries	Flooding Confirmed
07	Ebro	ES	no info
07	Tisza, Prut, Siret	RO, HU, MD	no info
18	Tisza, Somes	RO, HU	yes
28	Kalixaelven	SE	yes



## Informal EFAS Alert

issued on – for - confirmed

April	Rivers	Countries	Flooding Confirmed
24	Ljusån	SE	yes
28	Osterdalälven	SE	yes
30	Cinca (Ebro)	ES	yes



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## Activated EFAS Alert

issued on – for - confirmed

May	Rivers	Countries	Flooding Confirmed
07	Ebro	ES	no
22	Po	IT	yes
30	Loire and other french rivers	FR	yes



## Informal EFAS Alert

issued on – for - confirmed

May	Rivers	Countries	Flooding Confirmed
21	Mures	RO, HU	yes

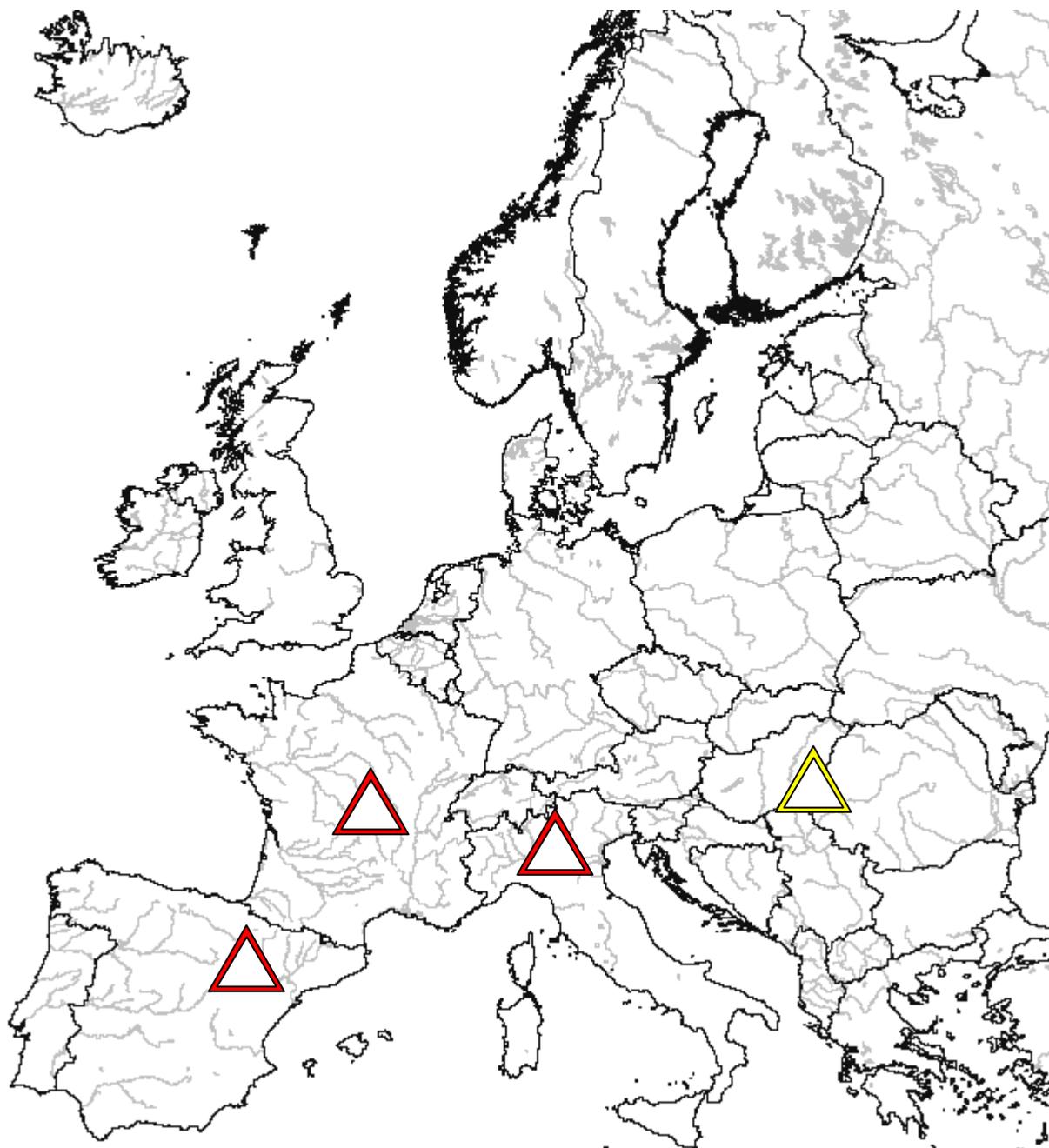


Active alert email send to MoU partners



Informal alert email send because catchment area too small, not part of MoU agreement (but partner has signed an MoU for another river)

# EFAS FLOOD ALERTS in May 2008



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### Activated EFAS Alert

issued on – for - confirmed

June	Rivers	Countries	Flooding Confirmed
09	Ebro	ES	no



### Informal EFAS Alert

issued on – for - confirmed

June	Rivers	Countries	Flooding Confirmed
4	Mur	AT	no



Active alert email send to MoU partners



Informal alert email send because catchment area too small, not part of MoU agreement (but partner has signed an MoU for another river)

# EFAS FLOOD ALERTS in Jun 2008



From January 2008 onwards EFAS warnings are accessed directly by the partners through the EFAS-IS interface. This interface is password protected and only accessible to EFAS partners.

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# EFAS FLOOD ALERTS in Jul 2008



## Activated EFAS Alert

issued on – for - confirmed

July	Rivers	Countries	Flooding Confirmed
20	all rivers in RO	RO	yes
21	Tisza	HU, RO	high levels, flood protection effective
22	Bodrog	SK	yes



## Informal EFAS Alert

issued on – for - confirmed

July	Rivers	Countries	Flooding Confirmed
10	Inn	AT	yes



Active alert email send to MoU partners



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### Activated EFAS Alert

[issued on – for river - confirmed](#)

- none



### Informal EFAS Alert

[issued on – for river - confirmed](#)

Sep	Rivers	Countries	Flooding Confirmed
18	Siret	RO	no



Active alert email send to MoU partners



Informal alert email send because catchment area too small, not part of MoU agreement (but partner has signed an MoU for another river)

# EFAS FLOOD ALERTS in Sep 2008



From January 2008 onwards EFAS warnings are accessed directly by the partners through the EFAS-IS interface. This interface is password protected and only accessible to EFAS partners.

In addition EFAS issues brief alert emails.

# EFAS FLOOD ALERTS in Oct 2008



## Activated EFAS Alert

issued on – for river - confirmed

Oct	Rivers	Countries	Flooding Confirmed
	Danube		
5	trib	RO	yes
29	Loire, Rhone	FR	yes



## Informal EFAS Alert

issued on – for river - confirmed

Oct	Rivers	Countries	Flooding Confirmed
29	Po	IT	high waters



Active alert email send to MoU partners



Informal alert email send because catchment area too small, not part of MoU agreement (but partner has signed an MoU for another river)

From January 2008 onwards EFAS warnings are accessed directly by the partners through the EFAS-IS interface. This interface is password protected and only accessible to EFAS partners.

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# EFAS FLOOD ALERTS in Dec 2008



## Activated EFAS Alert

[issued on – for river - confirmed](#)

- none



## Informal EFAS Alert

[issued on – for river - confirmed](#)

Dec	Rivers	Countries	Flooding Confirmed
	9 Ebro	ES	not known

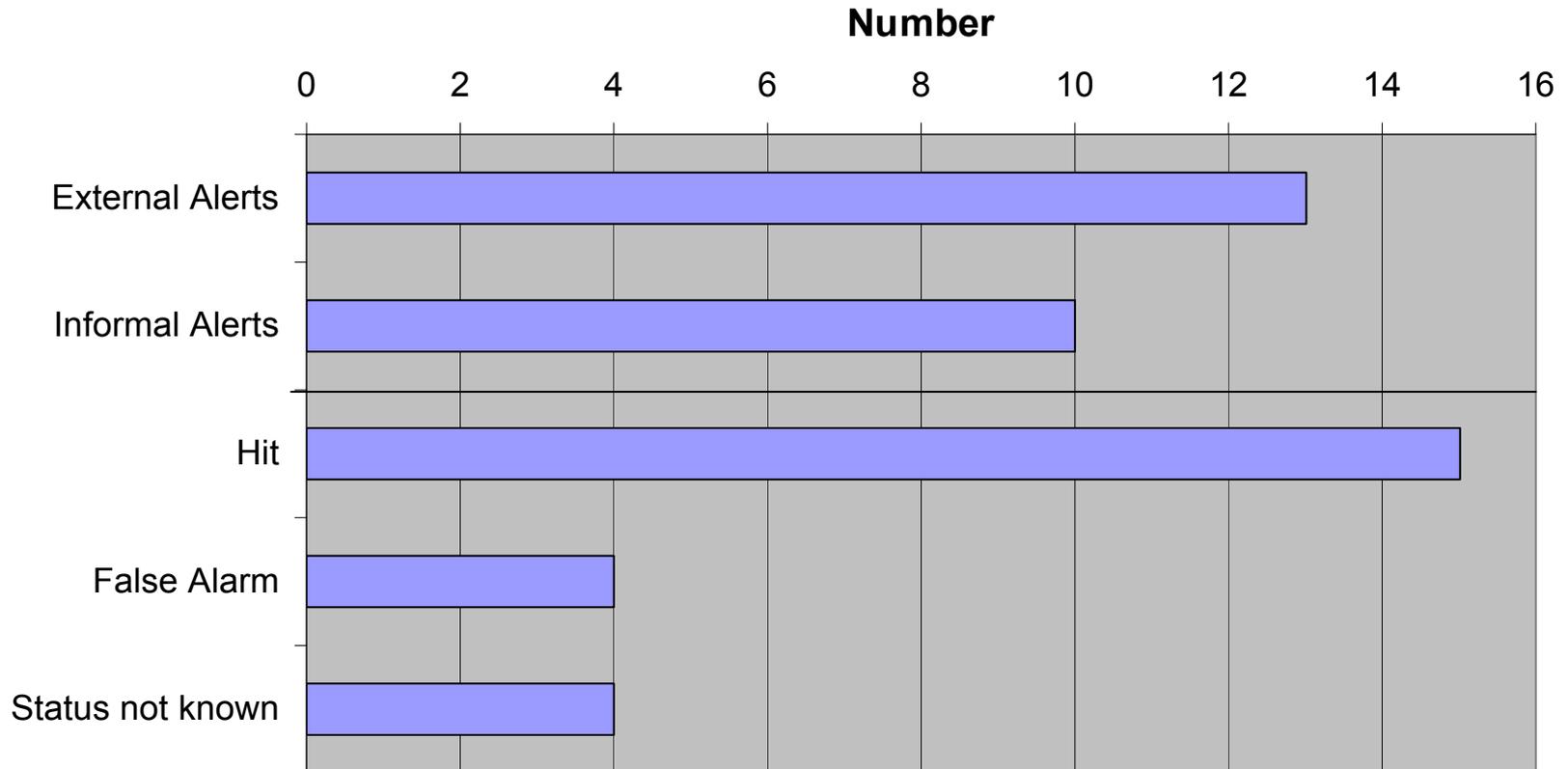


Active alert email send to MoU partners

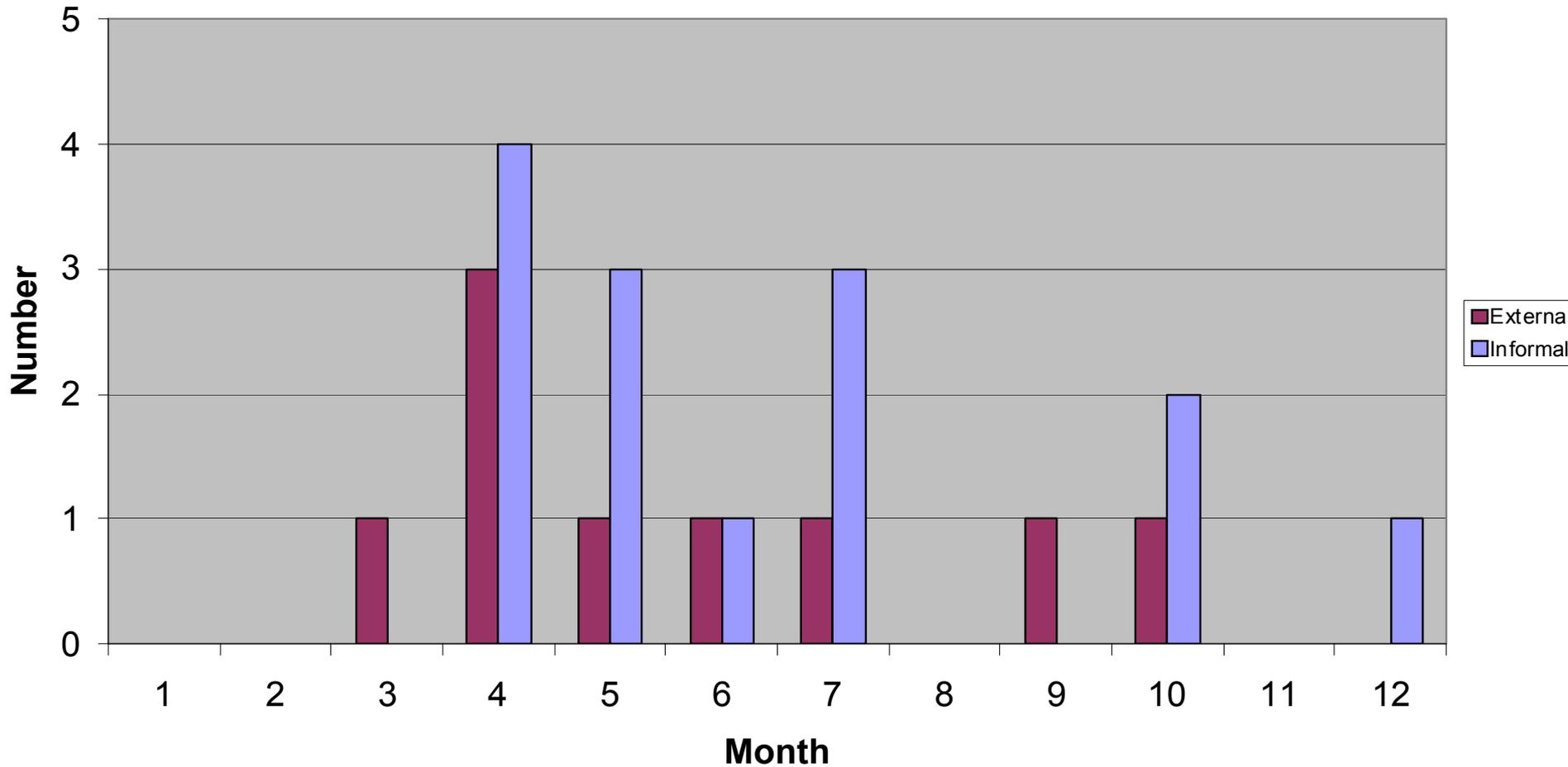


Informal alert email send because catchment area too small, not part of MoU agreement (but partner has signed an MoU for another river)

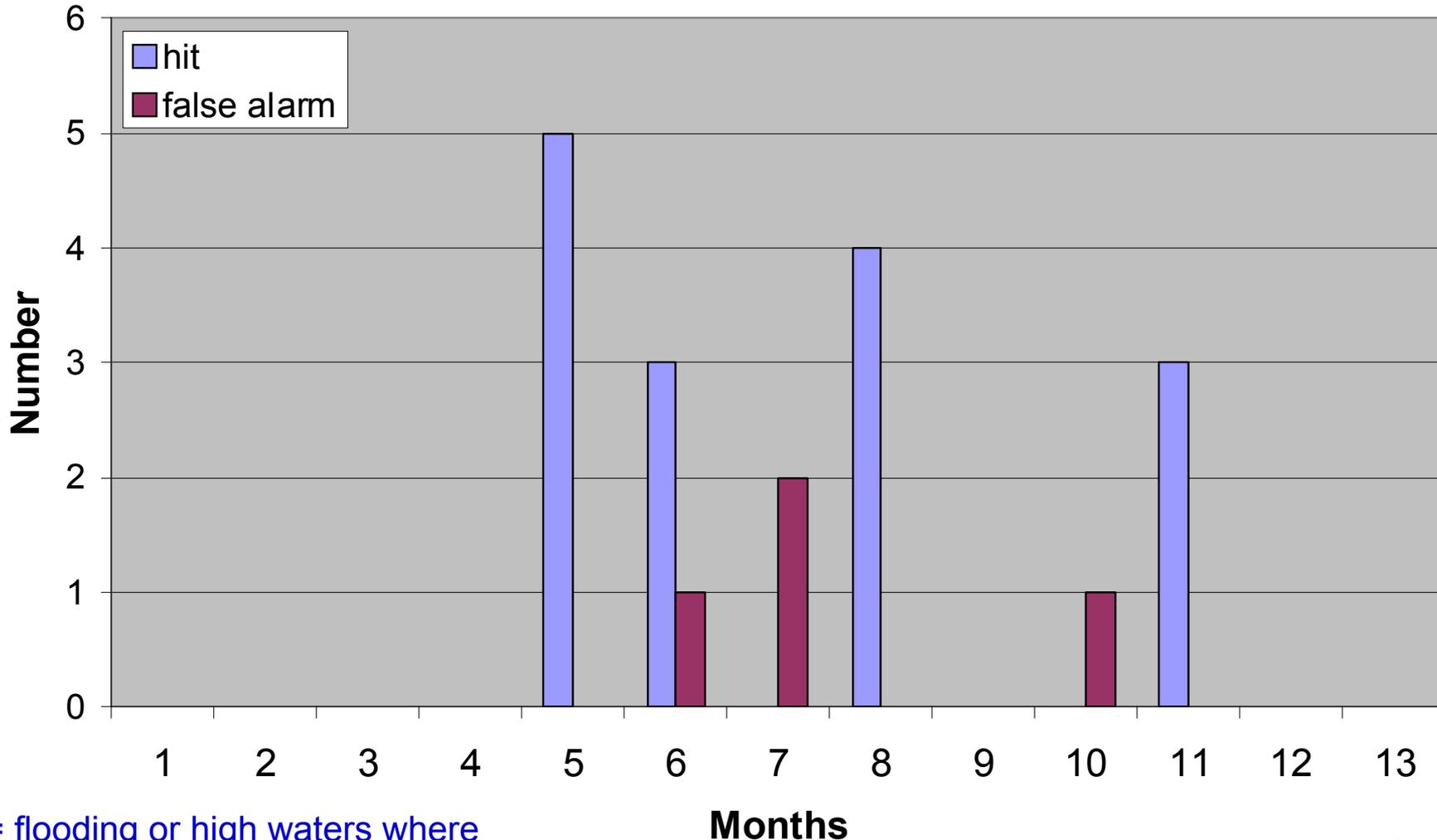
# EFAS statistics 2008



# EFAS 2008 alerts per month



## EFAS 2008 distribution of Hits/False Alarms



Hit= flooding or high waters where protections hold

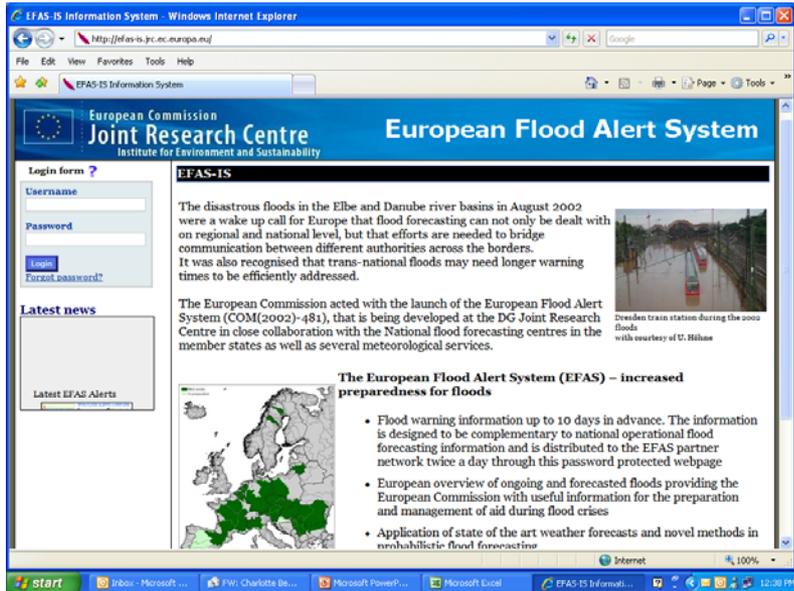
Not known not shown



# EFAS system upgrades during 2008

- 2008 01 Initial conditions are calculated independent from JRC MARS database
- 2008 06 COSMO, VAREPS and MONTHLY forecasts support included in the forecasting scripts
- 2008 08 Started operational COSMO forecast using bash EFAS. Upgrading of EFAS User Interface

# Upgraded user interface



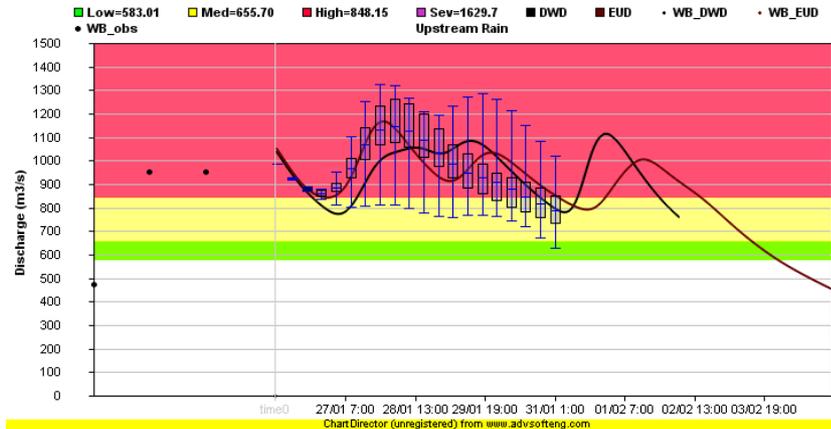
- users can change passwords
- users can update administrative data
- improved legends, content information
- trouble shooting section

## Alert

**EFAS EXTERNAL ALERT  
for the Ebro River Basin  
(ES) from the 24 until  
26/27 January**

- active external alerts highlighted

# COSMO-LEPS



- 16 COSMO-LEPS members
- 6 hourly time steps, 5 days
- part of PREVIEW testing

## COS > HAL

Forecast Day	23	24	25	26	27	28	29	30
2009012312		7	16	16	16			
2009012412		1	16	16	16	16		
2009012512			5	14	16	16	16	
2009012612					15	15	14	11

## COS > SAL

Forecast Day	23	24	25	26	27	28	29	30
2009012312			10	16	16			
2009012412			4	10	16	16		
2009012512					14	14	11	
2009012612					1	1	1	1

- EFAS alerts not based on COSMO during 2008

- research on COSMO only for case studies, no statistical analysis yet performed

# EFAS system upgrades during 2008

2008 10 Switch from bash to python scripts for EFAS

2008 11 New products included: rainfall probabilistic analysis, smups

2008 12 Released version 0.26 of pyEfas which has greatly improved the reliability of our forecasting scripts

**EFAS ran without problems during the full Christmas period!!!**

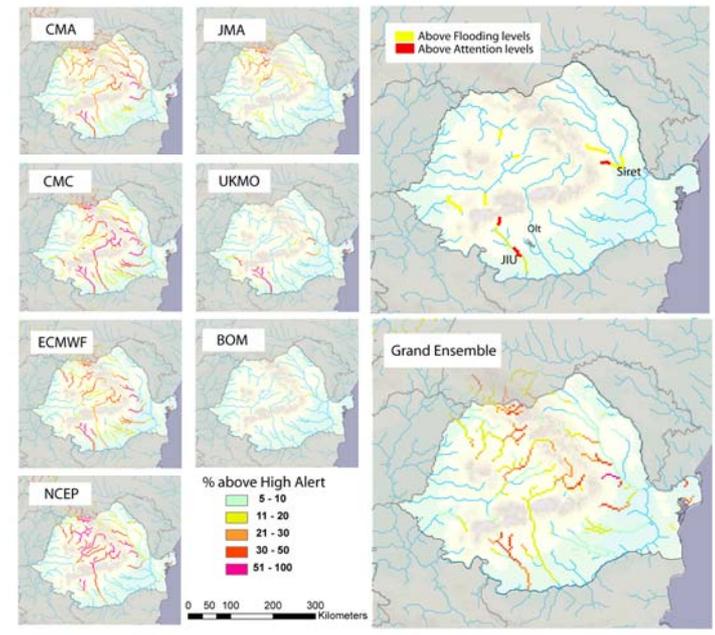
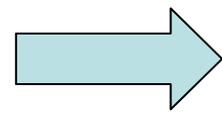
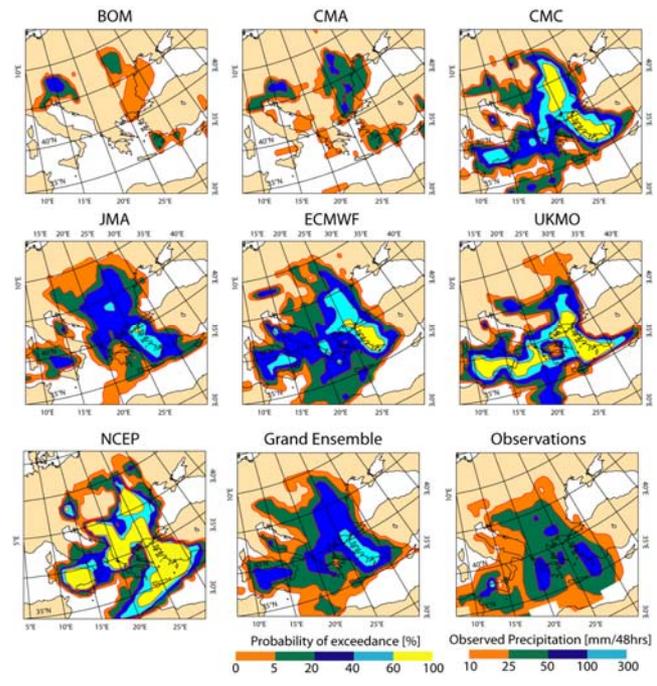
# EFAS research in 2008

Assessing potential benefit of multiple global EPS for flood forecasting

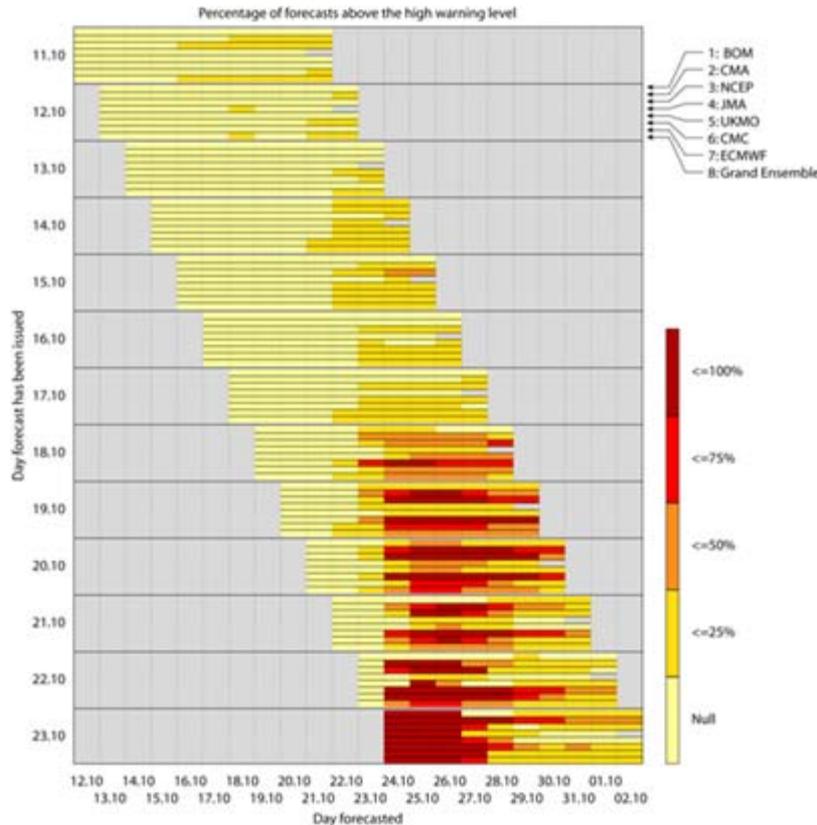
THORPEX/TIGGE archive

Joint Research Centre

Probability of exceeding 25mm/48hrs, Forecast date: 18.10.2007, lead time: 3-5days



# EFAS research in 2008



- severe events can be entirely missed by single EPS.

-a grand-ensemble instead of single ensemble systems appears to produce more reliable results of severe events

-longer time series for statistical analysis necessary

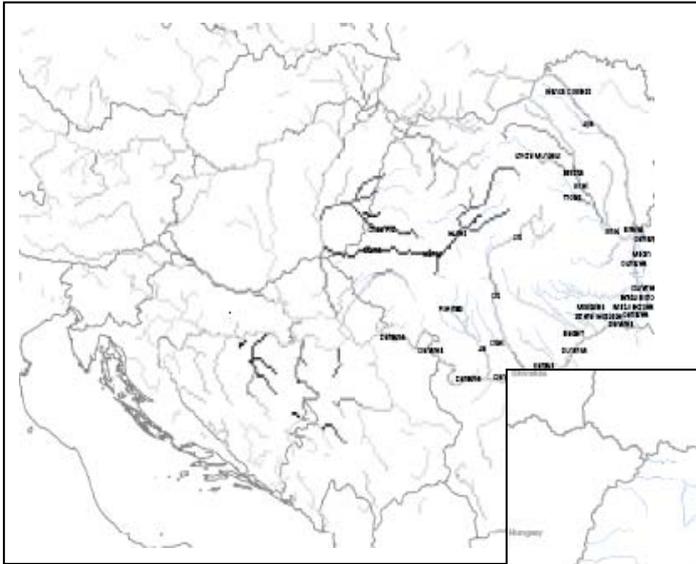
-Computationally heavy

Pappenberger et al., 2008a, 2008b

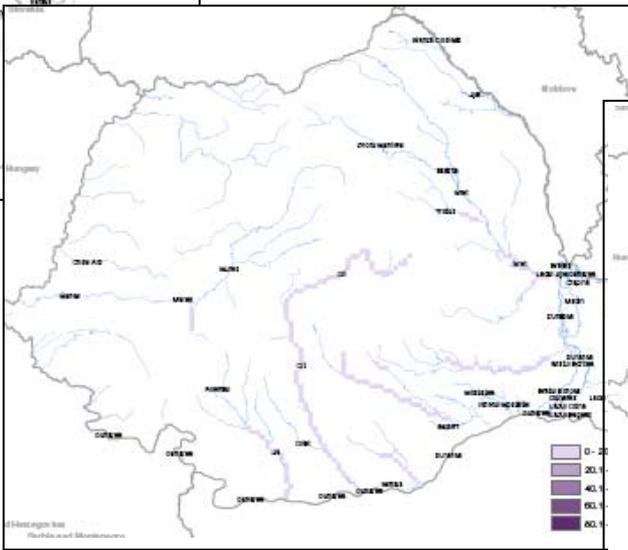
# EFAS research in 2008

## Seamless flood forecasting by using 30 day, 15 day & 5 day ensemble forecasts – a case study

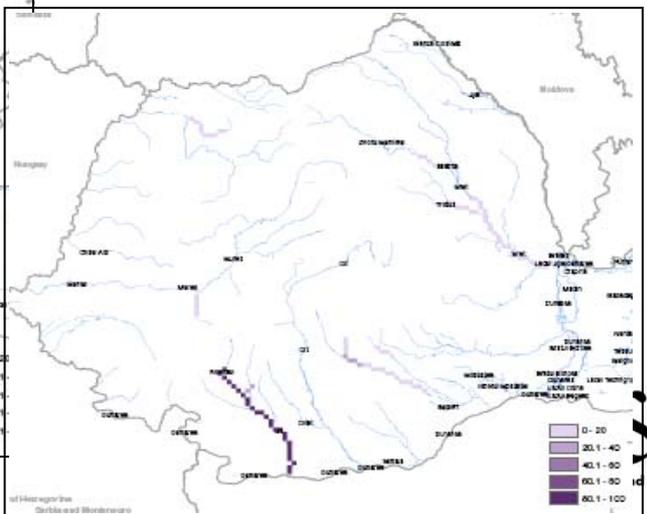
MONTHLY 20070927



VAREPS 20071021



COSMO 20071021



# Sequential Data Assimilation of near real time discharge

## Aim:

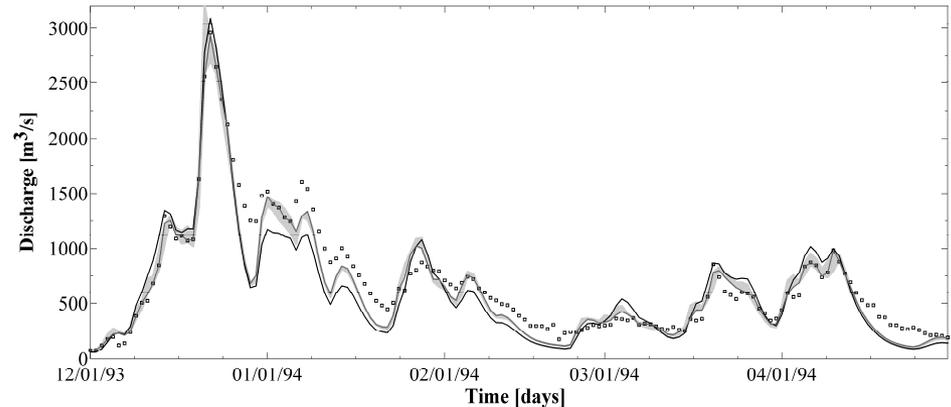
- Improve initial conditions
- Provide uncertainty estimate of initial conditions

Method: ● Particle filtering

Results: ● Case study for the Meuse catchment

## Future work:

- Semi-operational case study of assimilating multiple discharge stations within a large scale European catchment
- Quantification of the different sources of uncertainty for initial conditions



Salamon P., and Feyen L. (submitted)  
Karssenber D., et al. (submitted)

## Post-processing of discharge ensembles

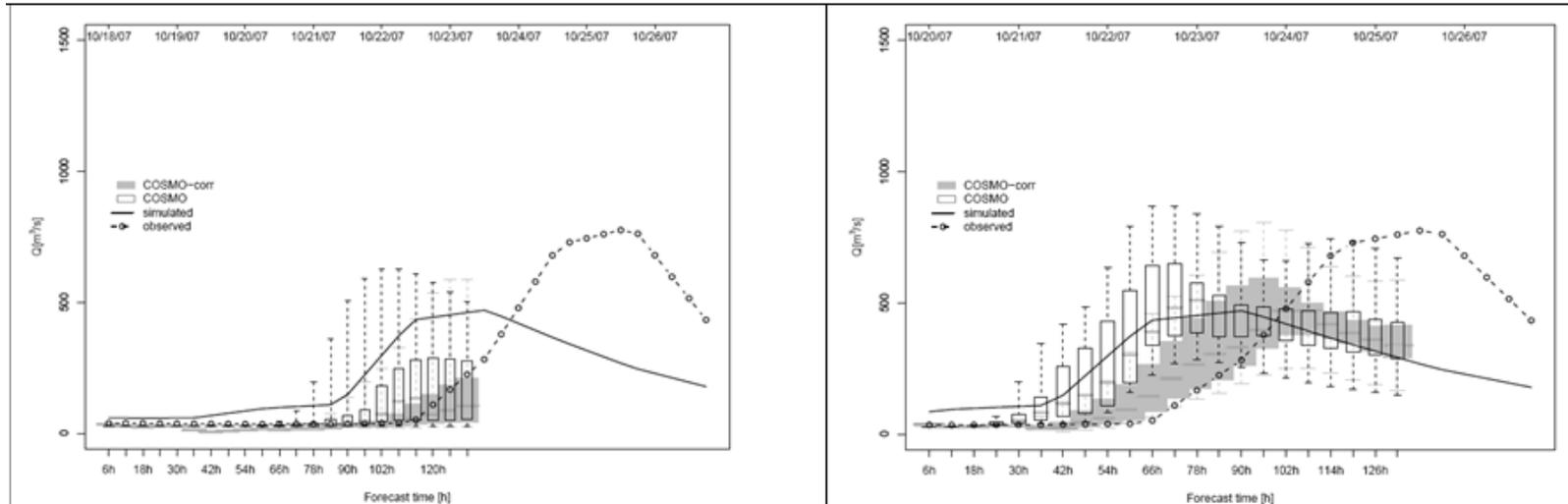


Figure 10 Forecast for the Jiu river at the station Podardi from the 17<sup>th</sup> and 19<sup>th</sup> of October 2007 with and without error corrected COSMO-LEPS



# EFAS publications in 2008

## On the system

[Thielen, J.](#), [Bartholmes, J.](#), [Ramos, M.-H.](#), [De Roo, A.](#) (2008) The European Flood Alert System - Part 1: Concept and development, Hydrology and Earth System Sciences Discussions 5 (1), pp. 257-287 (revised version accepted for HESS)

[Bartholmes, J.C.](#), [Thielen, J.](#), [Ramos, M.H.](#), [Gentilini, S.](#) (2008) The European Flood Alert System EFAS - Part 2: Statistical skill assessment of probabilistic and deterministic operational forecasts, Hydrology and Earth System Sciences Discussions 5 (1), pp. 289-322 (revised version accepted for HESS)

Bartholmes, J., Thielen J. , and Kalas M. (2008) "Forecasting medium-range flood hazard on European scale", Georisk Vol.2, No.4, December 2008, 0-00

# EFAS publications in 2008

## Case studies

Pappenberger F, Bartholmes J, Thielen J, Cloke HL, Buizza R, de Roo A (2008) New dimensions in early flood warning across the globe using grand-ensemble weather predictions. *Geophysical Research Letters*. 35, L10404, doi:10.1029/2008GL033837

Younis J., M.-H. Ramos and J. Thielen (2008) EFAS forecasts for the March–April 2006 flood in the Czech part of the Elbe River Basin – a case study, *Atmos. Sci. Let.* 9:88-94

Kalas, M., Ramos, M.-H., Thielen, J., Babiakova, G. (2008) Evaluation of the medium-range European flood forecasts for the March-April 2006 flood in the Morava River, *J. Hydrol. Hydromech J. Hydrol. Hydromech*, 56, 2008, 2, 116-132

## Research

Bogner K. and Kalas M (2008) Error-correction methods and evaluation of an ensemble based hydrological forecasting system for the Upper Danube catchment, *Atmos. Sci. Let.* 9, 95–102



# EFAS publications in 2008

## Reports

Pappenberger F. et al. (2008) New dimensions in early flood warning across the globe using grand ensemble weather predictions, ECMWF Technical Memorandum 557

# EFAS publications submitted in 2008

## Research

Salamon P., and Feyen L. (2008) Assessing parameter, precipitation, and predictive uncertainty in a distributed hydrological model using sequential data assimilation with the particle filter. *Submitted to Journal of Hydrology.*

Karssenber D., Schmitz O., Salamon P., Bierkens M., and de Jong K. (2008) A software framework for construction of process-based stochastic spatio-temporal models assimilated with observational data. *Submitted to Environmental Modelling & Software.*

Thielen J.1, Bogner K.1, Pappenberger F.2, Kalas M., del Medico M. 1, de Roo A.1 (2008), Monthly-, medium-, short-range flood warning: testing the boundaries of predictability (a case study), *Meteorological Applications* (accepted)