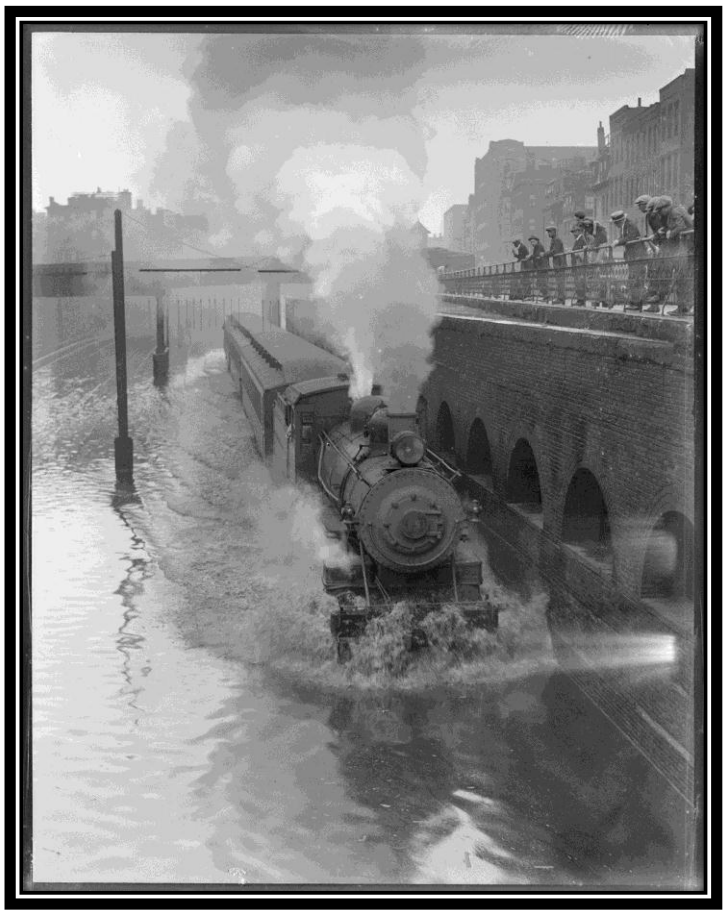
ECMWF

European Flood Awareness System

EFAS *Bulletin*

December 2012 – January 2013

Issue 2013(1)



Copernicus

JRC EUROPEAN COMMISSION

The European Flood Awareness System (EFAS) produces European overviews of ongoing and forecasted floods up to 10 days in advance and contributes to better protection of the European citizens, the environment, properties and cultural heritage. It has been developed at the European Commission's in house science service, the Joint Research Centre (JRC), since 2002, in close collaboration with national hydrological and meteorological services, the Monitoring and Information Centre (MIC) of the European Civil Protection Mechanism, and other research institutes.

Since 2011, EFAS is part of the initial operations of the Copernicus (formerly GMES) Emergency Management Service, (GIO EMS) and was transferred to operational service in 2012 through public tender procurement.

As a result of the procurement procedure,

ECMWF has been awarded the contract for the EFAS Computational centre. It is responsible for providing daily operational EFAS forecasts and 24/7 support to the technical system.

A consortium of Swedish Meteorological and Hydrological Institute (SMHI), Rijkswaterstaat (RWS) and Slovak Hydro-Meteorological Institute (SHMU) has been awarded the contract for the EFAS Dissemination centre. They are responsible for analysing EFAS output and disseminating information to the partners and the MIC.

A Spanish consortium (REDIAM and ELIMCO) has been awarded the contract for the EFAS Hydrological data collection centre. They are responsible for collecting discharge and water level data across Europe.

The work related to the EFAS Meteorological data collection centre has been outsourced but onsite the JRC. Finally, the JRC is responsible for the overall project management related to EFAS and further development.

Contact details:

European Centre for Medium-Range Weather Forecasts (ECMWF)
Shinfield Park
Reading, RG2 9AX
UK

Tel: +44-118-9499-303
Fax: +44-118-9869-450
Email: comp@efas.eu

http://www.efas.eu
http://www.ecmwf.int

Cover image: Train plows through water
Courtesy of the Boston Public Library, Leslie Jones Collection.

EFAS news

8th EFAS Annual Meeting

This year's meeting is scheduled for two days on 24th - 25th April 2013 in Bratislava, Slovakia. As every year, the meeting will cover a review of EFAS results for 2012, feedback from EFAS partners, and discussions on future developments. In addition, formalizing the EFAS membership, which replaces the old Memorandum of Understanding, will be on the agenda. Furthermore, a training session relevant to EFAS will be proposed. If you would like to have a specific topic covered please contact the EFAS Dissemination Centre (dissemination@efas.eu).

New features/model updates

The bi-monthly EFAS bulletin is now available online on www.efas.eu. It can be accessed both from the home page (no login required) and in the website private area, through the "EFAS Bulletin" page in the "Utility" menu.
In the near future, the EFAS bulletin will be posted on the Copernicus (previously known as GMES) website www.copernicus.eu.

New partners

The Norwegian Water Resources and Energy Directorate (www.nve.no) has become an EFAS partner. From now on, EFAS Flood Alerts/Watches will be issued in case significant risk of flooding is detected for the Glomma River basin, in southern Norway.

EFAS results

Meteorological situation for December 2012 - January 2013

The month of December 2012 has recorded an opposite trend in precipitation accumulations throughout several parts of Europe, in comparison with those of the previous month. As shown in Figure 3, largest accumulations were recorded in Wales, SW England, Montenegro, Albania, W Greece, Switzerland and NW Spain, among others. Little or no precipitation was measured in vast areas of SE Spain, NW Italy, N Norway, Poland and the main islands of the W Mediterranean Sea. Largest positive anomalies of cumulated precipitation are located in E Romania, Moldova, Ukraine, UK and N Sweden, though the central part of Europe recorded generally positive anomalies compared to climatological averages (see Figure 4). Short and intense extreme precipitation events occurred in December were mostly located in Greece, Scotland and in the NW part of the Iberian Peninsula, as shown in Figure 9.

In January 2013, the largest monthly accumulations of precipitation were mostly recorded in Southern Europe, with peaks in Portugal, N Spain, Croatia and Montenegro (see Figure 5). Positive precipitation anomalies are located in Eastern Europe, in the Balkan region, N Spain and SW France (Figure 6). On the other hand, relatively dry conditions persisted in the eastern coast of Spain, S France, NW Italy, Norway, and extended in January in the southern part of Scandinavia.

Summary of EFAS flood alerts for December 2012 - January 2013

The following EFAS Flood Alerts have been sent in December 2012 - January 2013 (see Figure 7 and Figure 8): Trent (UK), Great Ouse (UK), Ebro, section Gallego - Jalon (ES).

The following EFAS Flood Watches have been sent in December 2012 - January 2013: Stour (UK), Thames (UK), Saone, below Doubs (FR), Risle (FR), Neckar (DE), Avon (UK), Great Ouse (UK), Ribble (UK), Ebro, section Aragon - Jalon (ES), Garonne, section Tarn - Lot (FR), Neman, section Sheshule - Sysa (LT), Narew, above Bug and Biebrza, above Narew (PL), Lonja, Ilova and Pakra (HR).

Summary of flash flood watches for December 2012 - January 2013

In December 2012, 71 flash flood reporting points were detected by EPIC (Figure 9), having probability higher than 60% of exceeding the high threshold (5-year return period). The forecast lead time of the predicted storm peaks is in the range 6 - 60 hours, with average lead time of 36 hours. Catchment size of flash flood alerts is in the range 51 - 3237 km^2, with average size of 670 km^2.

In January 2013, 9 flash flood reporting points were detected by EPIC (Figure 10), having probability higher than 60% of exceeding the high threshold (5-year return period). The forecast lead time of the predicted storm peaks is in the range 24 - 60 hours, with average lead time of 35 hours. Catchment size of flash flood alerts is in the range 67 - 1099 km^2, with average size of 382 km^2.

Based on these points EFAS Flash Flood watches have been sent to the corresponding EFAS partners for various locations in Scotland (19th,20th and 21st December) and southern Andalusia, Spain (19th January).

Forecast verification

Some verification scores of EFAS streamflow predictions have recently been tested spatially. This means that, twice per day, skill scores are computed on more than 38,000 grid points included in the simulated river network of Europe at 5 km resolution. Reference values used for validation (i.e., as proxy truth) are taken from the EFAS water balance (WB), which is a hydrological simulation of the whole European domain, updated on a daily basis using the previous model states and new meteorological observations as input. In addition, EFAS WB is used to initialize daily forecast runs, so that the initial conditions of the hydrological model always start from the best estimate. Figure 1 is an example map of observed daily precipitation collected on February 1st, 2013, and then used to update the model states together with other observed weather parameters.

Scores can be visualized on maps, thus enabling the evaluation of the spatial variability of the prediction performance across different regions, including variations along the drainage network of the same river basin.

Figure 2 shows the Nash-Sutcliffe (NS) efficiency of EFAS ensemble streamflow predictions for about 4 months of daily simulations starting in October 2012. Results in the figure are computed for the ensemble mean of hydrological simulations driven by the ECMWF 51-member ensemble forecasts, and are shown for a lead time (LT) of 7 days. NS values range from -∞ to 1, the latter corresponding to perfect forecasts. NS above 0 means that forecasts perform better than climatological values.

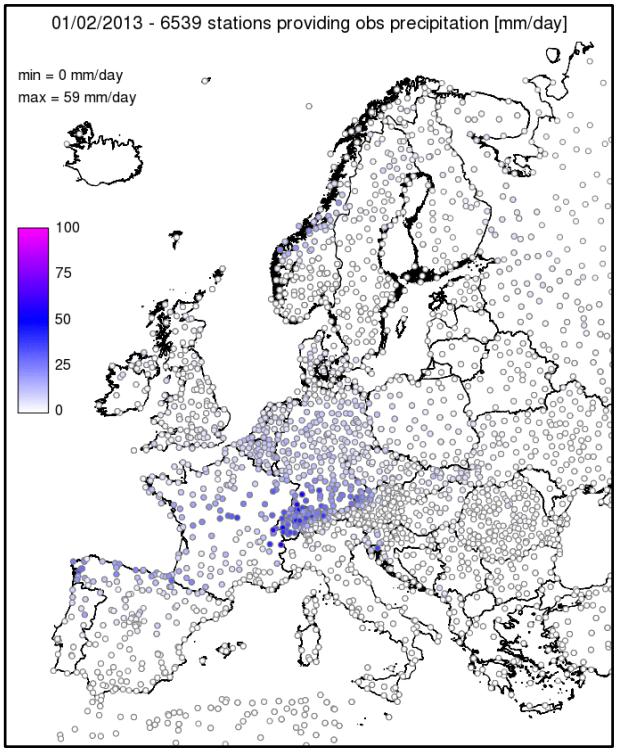


Figure 1: Stations providing observed daily precipitation on 01/02/2013.

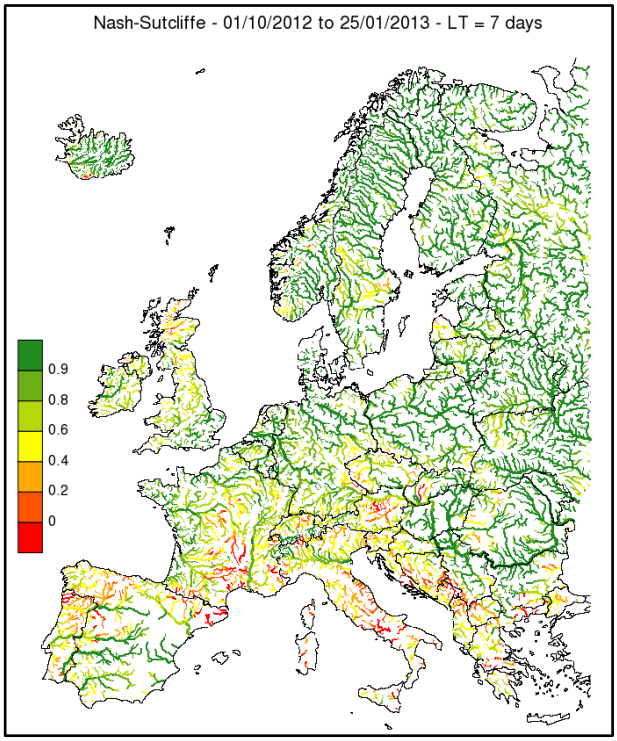


Figure 2: Nash-Sutcliffe efficiency of ECMWF ensemble mean from October 2012 onwards, 7-day lead time.

Recent team publications

Thirel, G., Notarnicola, C., Kalas, M., Zebisch, M., Schellenberger, T., Tetzlaff, A., Duguay, M., Mölg, N., Burek, P. and de Roo, A.: Assessing the quality of a real-time Snow Cover Area product for hydrological applications, Remote Sensing of Environment, 127, 271–287, doi:10.1016/j.rse.2012.09.006, 2012.

Andalucía participa en el Centro de Datos Hidrológicos que suministrará a la UE información a tiempo real del estado de los ríos europeos. Boletín iagua. Madrid. January 2013 (in Spanish). http://www.iagua.es/noticias/espana/13/01/17/andalucia-participa-en-el-centro-de-datos-hidrologicos-que-suministrara-la-ue-informacion-tiempo-rea-25

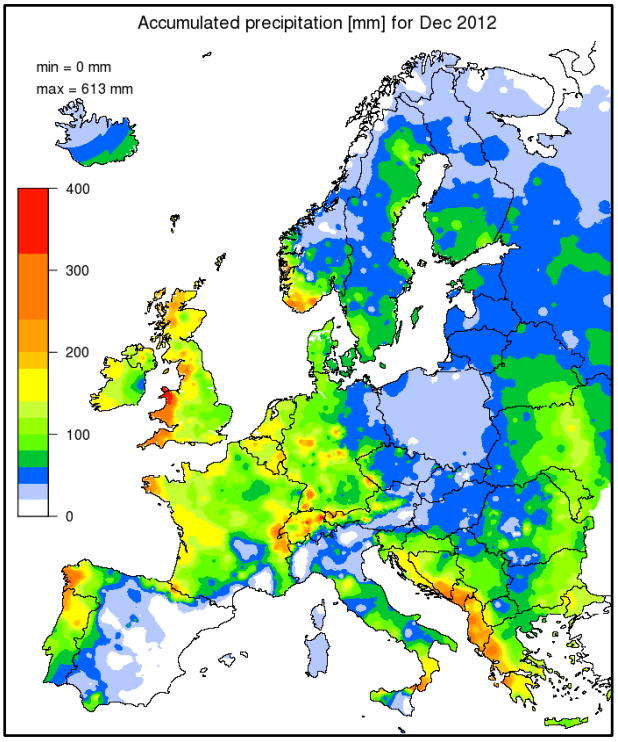


Figure 3: Accumulated precipitation [mm] for December 2012.

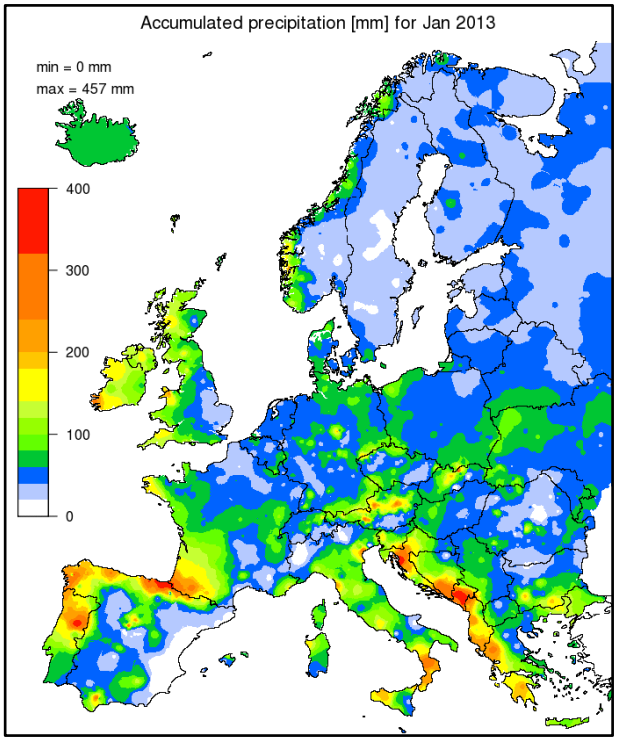


Figure 5: Accumulated precipitation [mm] for January 2013.

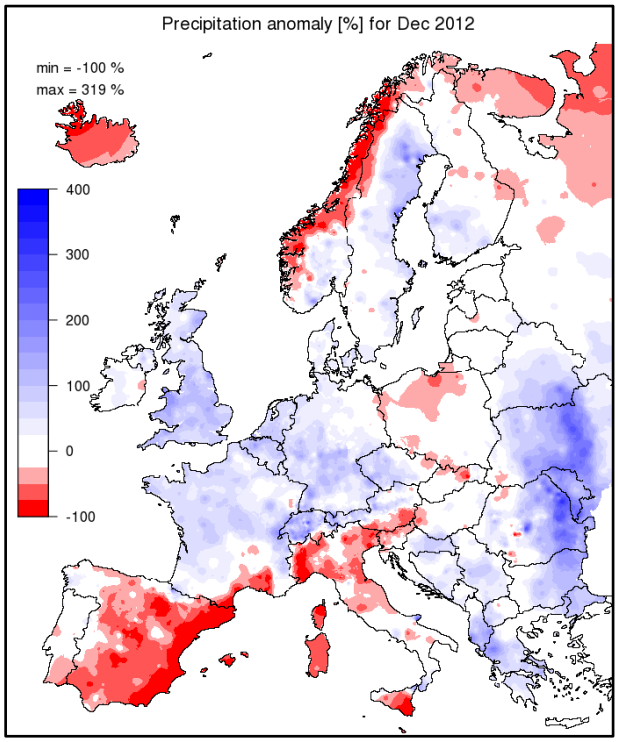


Figure 4: Precipitation anomaly [%] for December 2012, relatively to a long term average (1990-2011).

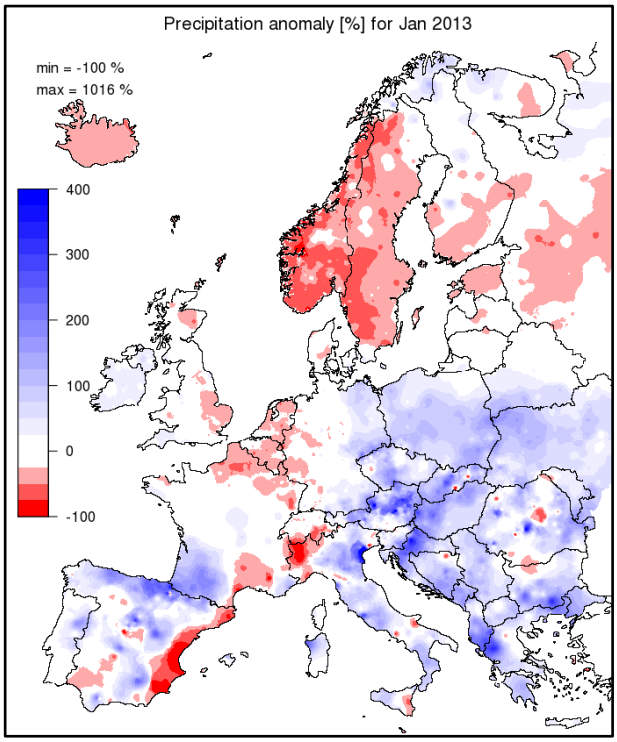


Figure 6: Precipitation anomaly [%] for January 2013, relatively to a long term average (1990-2011).

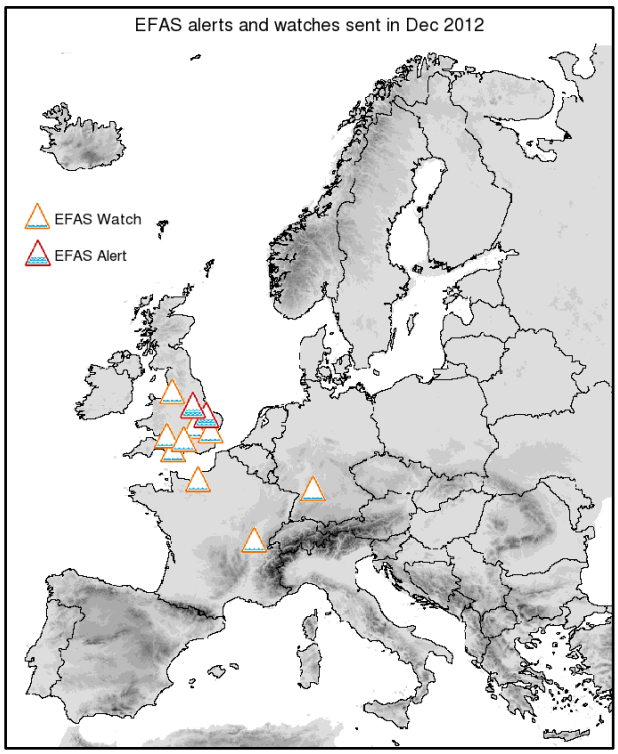


Figure 7: EFAS flood alerts and watches for December 2012.

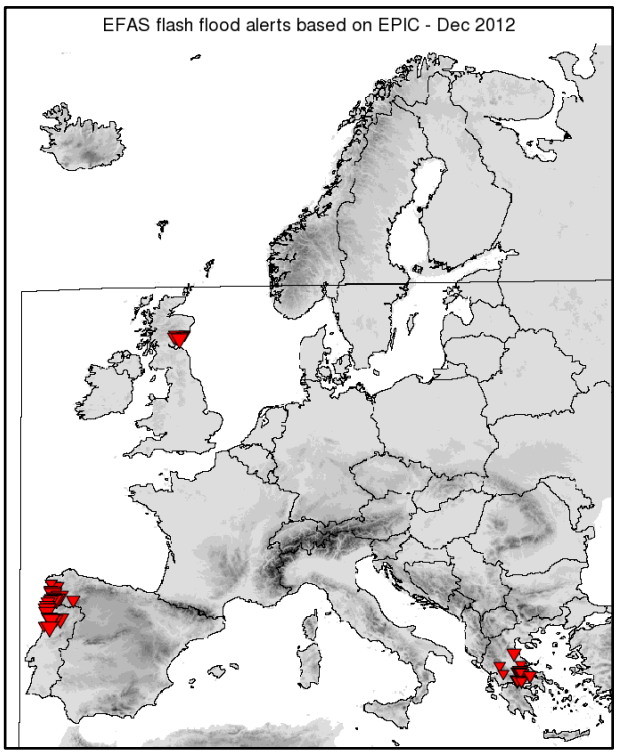


Figure 9: Flash flood reporting points for December 2012.

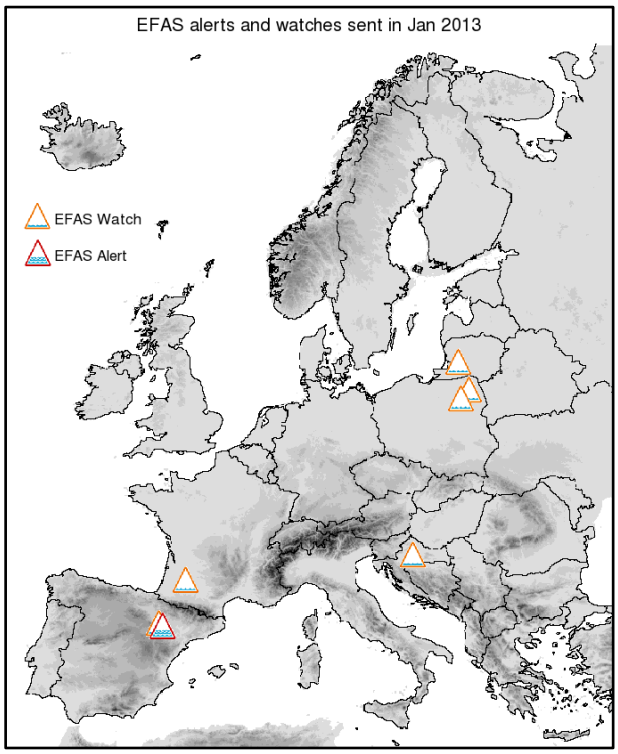


Figure 8: EFAS flood alerts and watches for January 2013.

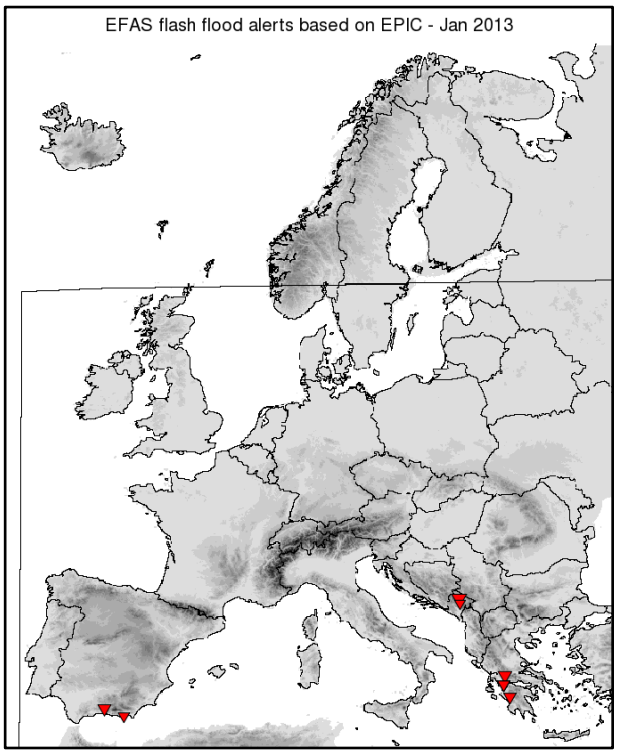


Figure 10: Flash flood reporting points for January 2013.

Acknowledgements

The following partner institutes are gratefully acknowledged for their contribution:

- Copernicus and DG ECHO for funding the EFAS Project.
- All data providers, including meteorological data providers, hydrological services and weather forecasting centres.
- The EFAS Operational Centres.
- The Hydrological Ensemble Prediction Experiment (HEPEX) community for providing inspiration and scientific support.