European Commission

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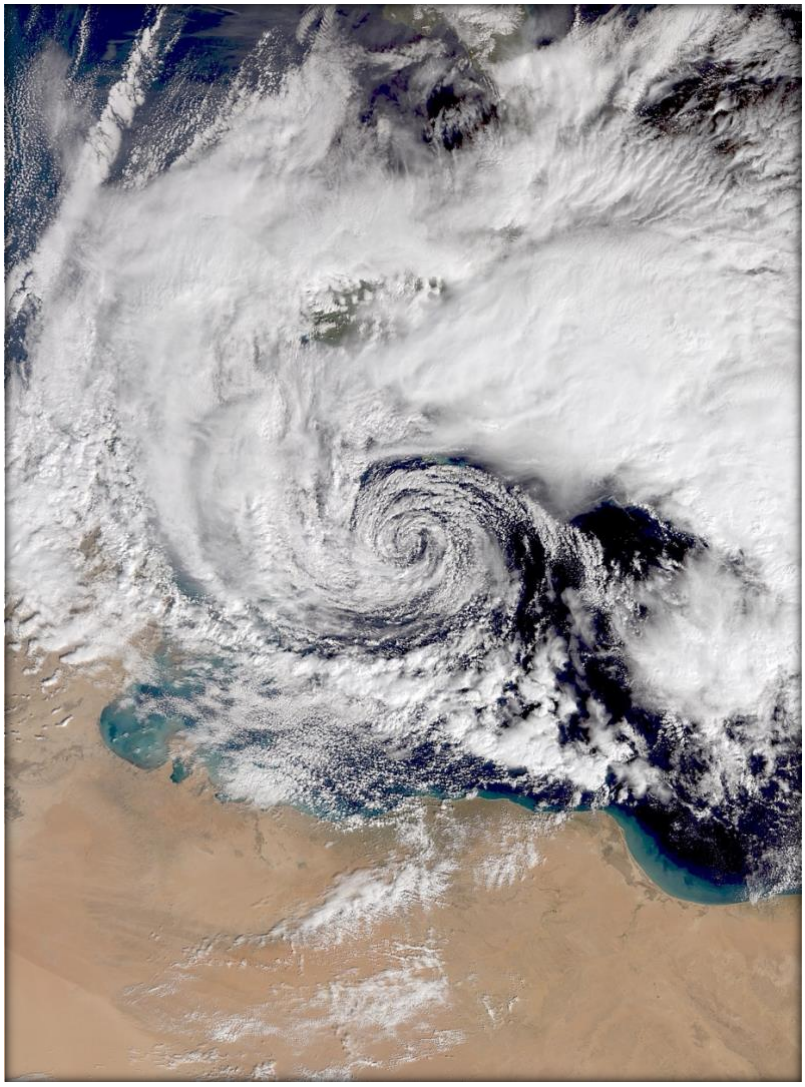
European Flood Awareness System

EFAS *Bulletin*

February – March 2023

Issue 2023(2)



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NEWS

New features

EFAS User Guide Webinar
A webinar to introduce the new EFAS User Guide was held on the 22 March and was hosted by EFAS Dissemination Centre. The topic of the webinar covered an overview of EFAS products and services and information on how to detect and analyze a flood signal from probabilistic forecasts.

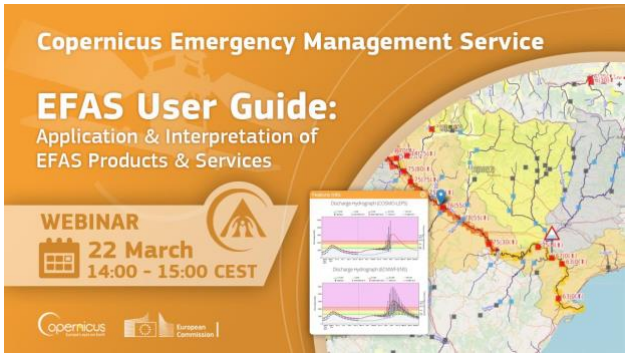

Figure 1: EFAS User Guide Webinar was held on 22 March 2023.

The webinar was freely open and available to anyone who was interested to learn more about EFAS and was specifically designed for non-hydrologists/non-meteorologists who need to make quick decisions based on EFAS forecasts. This webinar was also recommended for students who would like to receive an introduction to EFAS and to operational protocols.

The EFAS User Guide is an introduction to the EFAS System. It is hosted in the CEMS-Flood wiki pages. You can access the content using this link: https://confluence.ecmwf.int/display/CEMS/EFAS+User+Guide

This webinar will be made available on the EFAS website soon. We would also like to take the opportunity to remind you that all previous webinars are available on the EFAS website: https://www.efas.eu/en/webinars

New Partner – Croatia
We gladly welcome Ruđer Bošković Institute (RBI), Croatia, as new EFAS third party partner.

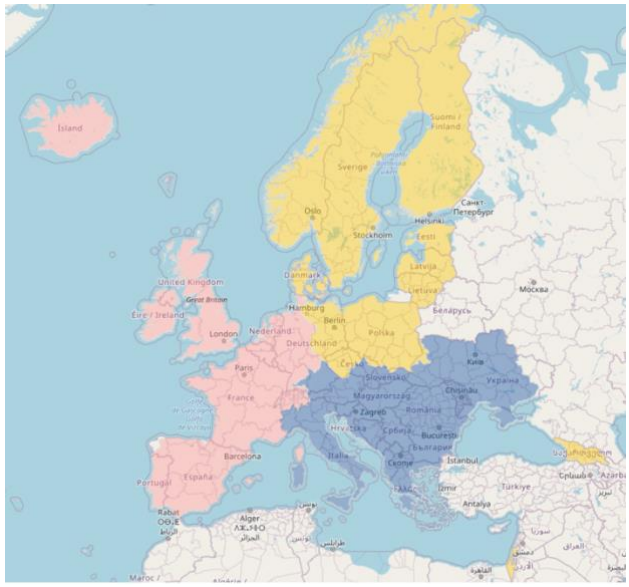

Figure 2: EFAS Partner Regions

RESULTS

Summary of EFAS Flood and Flash Flood Notifications

The 78 formal and 80 informal EFAS flood notifications issued in February – March 2023 are summarised in Table 1. The locations of all notifications are shown in Figure 18 and Figure 20 in the appendix.

604 flash flood notifications were issued in February – March 2023. They are summarised in Table 2. The locations of all notifications are shown in Figure 19 and Figure 21 in the appendix.

Meteorological situation

As of February 2022, reporting of the meteorological situation by the Meteorological Data Collection Centre (MDCC) will no longer be published in the EFAS bulletin. Instead, the state of recent meteorology will be conducted by the Copernicus Climate Change Service (C3S) and published as monthly Climate Bulletins.

Hydrological situation

by EFAS Hydrological Data Collection Centre

February
During the month of February, there were 137 stations with exceedances, 47% less than in the previous

month. Most of the stations are in Poland (33) all of them related to water level. In Spain, there are 14 stations with exceedances (both discharge and water level). Iceland (discharge) and Germany (mainly water level) have 12 stations each, while Croatia also stands out with 11 stations.

In addition, there are nine stations in Ukraine, eight in Italy and Romania, six in Bosnia and Herzegovina, and five in Hungary, Slovakia, and Serbia. Several countries have less than five exceedances this month: Norway (three), Sweden, and Austria (two), and only one station with values above the threshold on Israel and Lithuania.

As for the river basins, the main basin with values above the threshold, again, is the Danube, with 44 stations across nine different countries, with Croatia and Romania standing out with 10 and eight exceedances respectively. The Vistula River in Poland is the next basin with the highest number of stations (27), plus one in Ukraine. A total of 36 different river basins have experienced exceedances in February.

In terms of the stations that recorded values above the 90% quantile, 115 exceeded this threshold in February, nearly half of the previous month. In February, Norway was the country with the most stations in this situation (27), the same that in January. Spain and Poland (19 each) are the countries with the next highest number of stations. The Norwegian stations are distributed in 18 different basins, highlighting the Glomma river, with seven stations in this situation. In Spain, the Guadiana and Ebro river basins have the highest number of exceedance in the country, and in Poland, all stations are in the Vistula river Basin. In Sweden, 13 stations show values above this quantile. In Ukraine, there are nine stations that exceed this cliff, and eight in Iceland. Other stations exceed the 90% quantile value in up to eight countries.

By river basin, it is the aforementioned Vistula River which stands out with 27 stations. The Danube river basin is the second with the highest number of stations over this cliff, showing 12 stations in this situation and followed by the Dnieper with nine. A total of 52 different river basins have experienced exceedances over the 90% quantile in February.

Finally, and according to the number of stations recording mean values below the 10% quantile, we can find an increase of four times. In the month of February, there were 172 stations with average values below this cliff, which means 15 different countries.

This month, France is the country with the most stations (103), followed by Spain with 21 stations. Germany and Italy have nine and eight stations, respectively, with values below this threshold. With six stations we found England, Ireland, and Luxembourg. Belgium, Poland, Bulgaria, Norway, Croatia, Netherlands, Romania, and Switzerland also have a different number of stations in this situation.

In terms of river basins, this month the Loire in France is the river with the highest number of cases, with 37 stations with an average discharge below the 10% quantile. The Seine river has 20 stations in the same situation. Outside of France, the Ebro River is the next basin with the highest number of stations under this cliff (13). In total, as many as 32 different basins have values below this limit.

March

During the month of March, there were 114 stations with exceedances, which is 17% less when compared to the previous month. Most of the exceedance stations are in Bosnia and Herzegovina (16), with most of them being related to water level. In Poland, there are 15 stations with exceedances (water level), and 14 stations in Germany. Croatia and Italy also stand out with exceedances in 11 stations each.

In addition, there are nine stations in Hungary, eight in Ukraine, seven in Spain, and five in Romania. Several countries have less than five exceedances this month: Serbia and Slovenia (4), Slovakia (3), Czech Republic, Belgium, and Ireland (2), and only one station with values above the threshold in Iceland.

As for the river basins, the main one with exceedance values above the threshold is again the Danube, with 54 stations across ten different countries, with Bosnia and Herzegovina (14) and Croatia (10) standing out. The Vistula river in Poland is the next basin with the highest number of stations (11) with one additional station in Ukraine. A total of 23 different river basins have exceedances in March.

In terms of the stations that recorded values of mean discharge above the 90% quantile, 47 exceeded this

threshold in March, which is 60% less than in the previous month. In March, Norway was again the country with the most stations in this situation (12), half than in February. Spain and Ukraine with 6 each, are the countries with the next highest number of stations. The Norwegian stations are distributed across six different basins, highlighting the Glomma river, with five stations in this situation. In Spain, the Guadiana river basin has the highest number of exceedance in the country, and in Ukraine all stations are in the Dnieper river Basin. In Bosnia and Herzegovina and Finland five stations show values above this quantile. In Germany there are three stations that exceed this cliff, and two in Iceland and England. Other stations exceed the 90% quantile value in up to six countries.

By river basin, it is the Danube River which stands out with seven stations. The Dnieper river basin is the second with the highest number of stations over this cliff, showing six stations in this situation and followed by Glomma with five. A total of 23 different river basins have exceedances over the 90% quantile in March.

Finally, and according to the number of stations recording mean values below the 10% quantile, we can find a decrease of three times. In the month of March, there were 53 stations with average values below this cliff, which means 12 different countries.

This month, Spain is the country with the most stations (19), followed by France with nine stations. Italy has five stations with values below this threshold. In Bulgaria and Germany, we find three stations each. Romania, England, Austria, Hungary, Norway, and Croatia also have a different number of stations in this situation.

In terms of river basin, this month the Danube and the Ebro are the rivers with the highest number of cases, with eight stations each with an average discharge below the 10% quantile. The Siene and Llobregat rivers have four stations in the same situation. In total, as many as twenty-four different basins have values below this limit.

Verification

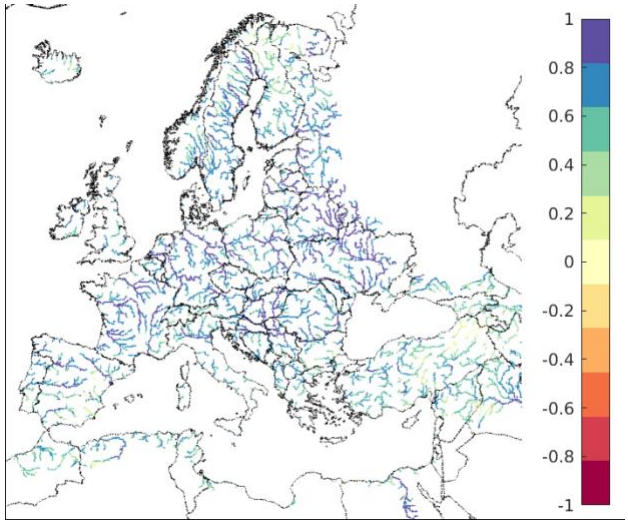

Figure 3: EFAS CRPSS at lead-time 1 day for February – March, for catchments >2000km2. The reference score is persistence of using previous day's forecast.

Error! Reference source not found. and **Error! Reference source not found.** shows the EFAS headline score, the continuous ranked probability skill score (CRPSS) for lead times 1 and 5 days for February - March across the EFAS domain for catchments larger than 2000km^2. A CRPSS of 1 indicates perfect skill, 0 indicates that the performance is equal to that of the reference, and any value <0 (shown in orange-red on the maps) indicates the skill is worse than the reference. The reference score is using yesterday's forecast as today's forecast, which is slightly different than we used previously and very difficult to beat.

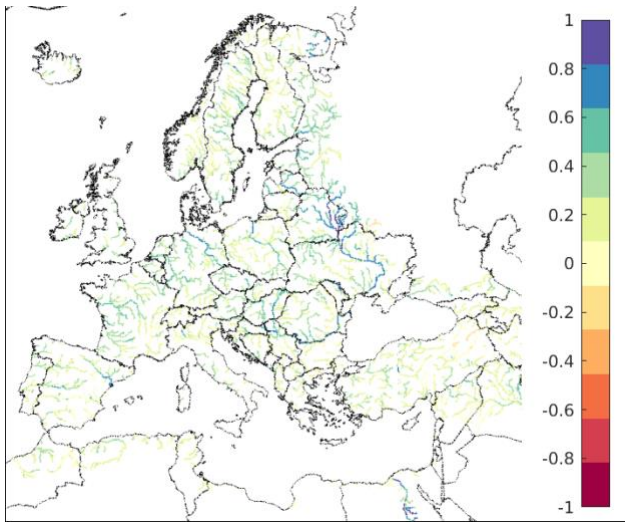

Figure 4: EFAS CRPSS at lead-time 5 days for February-March for catchments >2000km2. The reference score is persistence of using previous day's forecast.

These maps indicate that across much of Europe for forecasts are more skilful than persistence at both lead times. Regions shown in blue are those where EFAS forecasts are more skilful than persistence, with darker shading indicating better performance.

The skill of the forecast was quite good over the period, and similar to the same period last year (**Error! Reference source not found.**). An inter-annual variability of the scores is to be expected. The long-term trend is neutral over the first two years since the domain was extended, but there is an indication of increase in skill with EFAS 4.0, especially for the areas with generally lower skill.

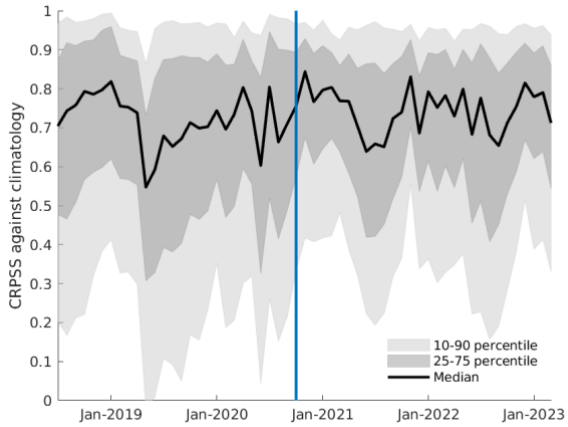

Figure 5: Monthly means of CRPSS the for lead-time 5 days for all the major river points in Europe with ECMWF ENS as forcing. Reference forecast was climatology. The skill is largest during the winter months, when there is less variation in the flow in large parts of Europe. The blue line indicates the release of EFAS version 4.0.

ARTICLES

Cyclone Helios, Malta and Italy – February 2023

by Richard Davies, floodlist

Cyclone Helios brought severe weather to Malta and southern Italy from 09 to 11 February 2023, including strong winds, snowfall, low temperatures, and heavy rain.

Malta saw its wettest February day on record when 140.40 mm of rain was recorded at Luqa on 10 February.

Heavy rains damaged a building at the Malta International Airport, where one person was injured.

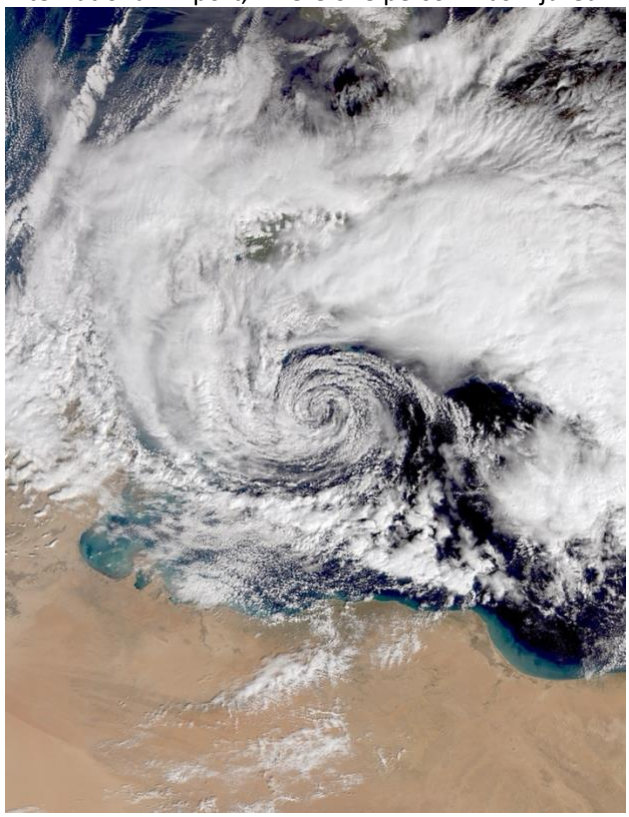

Figure 6: A true-colour image of Mediterranean Cyclone Helios near Malta during the morning on 10 February 2023 by the Ocean and Land Colour Instrument (OLCI) aboard European Space Agency's Sentinel-3A satellite.

Strong winds also caused damage including the collapse of balconies in Gharb and the collapse of a wall near a historic building in Gozo.

Rough seas caused some coastal flooding, such as in areas of resort towns Marsaskala and St. Julian's. One person was reported missing after being swept away by high waves near Fort Sant'Elmo.

Local media reported around 14 buildings were flooded in different parts of the country, including in Tarxien where teams from the Civil Protection Department (CPD) were called to assist. CPD officers were also called to rescue 17 people trapped in their vehicles.

In Sicily, Italy, the fire service Vigili del Fuoco carried out over 450 interventions for damage caused by Cyclone Helios in the provinces of Catania, Syracuse, and Ragusa. Civil Protection said they used boats to

rescue around 30 people from flooded areas of Syracuse.

Heavy rain caused an electrical failure leaving thousands without power in Syracuse and other parts of eastern Sicily.

The regional government reported flooding along the Gornalunga river, a tributary of the Simeto, in areas of Catania, Ramacca, and Lentini.

Copernicus Emergency Management Service (EMS) mapping was activated on 09 February. Images provided by EMS showed flooding in areas of Cuccumella, Acireale, Syracuse, Catania, and Pachin, among others.

Figure 7: Copernicus Emergency Management Service (EMS) images showed flooding (light blue) in areas of Syracuse, Sicily, 11 February 2023. Credit: Copernicus Emergency Management Service

Copernicus Emergency Management Service (EMS) images showed flooding (light blue) in areas of Syracuse, Sicily, 11 February 2023. Credit: Copernicus Emergency Management Service

President of the Sicily Region Renato Schifani declared a state of emergency and said "the damage suffered by the areas of eastern Sicily was enormous." On 01 March he announced a programme of maintenance and dredging of rivers and streams.

Floods in Southern Türkiye - March 2023

by Richard Davies, floodlist

Catastrophic flooding struck in Şanlıurfa and Adıyaman Provinces in the south of Türkiye on 15 March 2023, causing fatalities and damage in communities still recovering from the earthquakes of February 2023.

According to figures from Türkiye's General Directorate of Meteorology, in a 24-hour period to 15 March, Karaköprü in Şanlıurfa recorded 104.5 mm of rain and Çelikhan in Adıyaman recorded 125.6 mm.

Figure 8: Floods in Şanlıurfa, Türkiye, March 2023. Credit: Police Türkiye

Damage in the city of Urfa (officially Şanlıurfa) and surrounding areas of Şanlıurfa Province was considerable, with multiple vehicles wrecked and buildings and roads damaged. City streets were left strewn with flood debris. Some buildings were only accessible by boat. Residents were told to move to higher floors and not to remain in the basements or ground floors of buildings. Police and emergency teams evacuated several buildings including a hospital.

As of 15 March, Türkiye's Ministry of Interior Disaster and Emergency Management Presidency (AFAD) reported 12 people had died in floods in the city. Searches were continuing for people reported missing. Professional divers and Search and Rescue (SAR) personnel were working in the area, AFAD said.

Figure 9: Search and rescue operations following the floods in southern Turkey, 15 March 2023. Credit: AFAD

Several government ministers including the Interior Minister, Suleyman Soylu, visited affected areas on 15 March. Schools and some government offices were closed.

Flooding also affected parts of Adıyaman Province during this time. Two people died and 3 were reported missing in the Tut District. The victims are thought to have died when floodwaters inundated a container home sheltering earthquake survivors.

Figure 10: Floods in Şanlıurfa, Türkiye, 15 March 2023. Credit: Şanlıurfa Government

Thousands of homes were destroyed by earthquakes that struck the region in February 2023. Many of those affected by the flooding were living in tents in numerous temporary accommodation centres in the region. On 15 March the Adiyaman Provincial government announced a list of schools and mosques where those affected by the floods could shelter. The government also reported a bridge collapsed on the Adıyaman-Çelikhan Highway which was closed to traffic.

2nd CEMS Global Flood Forecasting and Monitoring Meeting (2023)

by Stefania Grimaldi

The 2nd CEMS Global Flood Forecasting and Monitoring Meeting was held online on 8 and 9 February, from 13 to 17 UTC. More than 300 participants attended the event over the two days.

Figure 11: 2nd CEMS Global Flood Forecasting and Monitoring Meeting

The meeting was highly interactive, with presentations on the latest developments of the Global Flood Awareness System (GloFAS), of the Global Flood Monitoring (GFM), and of the GloFAS and GFM data access and documentation. Keynotes and IGNITE talks provided the opportunity for 16 representatives of related initiatives to introduce their developments, use cases, and experiences using GloFAS and/or GFM data. A panel discussion was organized to share views on the actions required to support the United Nations #EarlyWarning4All initiative.

Full details of the event including an exhaustive meeting summary, presentations, and posters are available on the GloFAS website: https://www.globalfloods.eu/get-involved/event-detail/4/

Acknowledgements

The following partner institutes and contributors are gratefully acknowledged for their contribution:

- DG DEFIS - Copernicus and DG ECHO for funding the EFAS Project
- All data providers including meteorological data providers, hydrological services & weather forecasting centres
- The EFAS Operational Centres
- Richard Davies, Floodlist.com

Cover image: A true-colour image of Mediterranean Cyclone Helios near Malta during the morning on 10 February 2023 by the Ocean and Land Colour Instrument (OLCI) aboard European Space Agency's Sentinel-3A satellite.

Appendix – figures

As of February, reporting of the meteorological situation by the Meteorological Data Collection Centre (MDCC) will **no longer** be published in the EFAS bulletin. Instead, the state of recent meteorology will be conducted by the Copernicus Climate Change Service (C3S) and published as monthly Climate Bulletins.

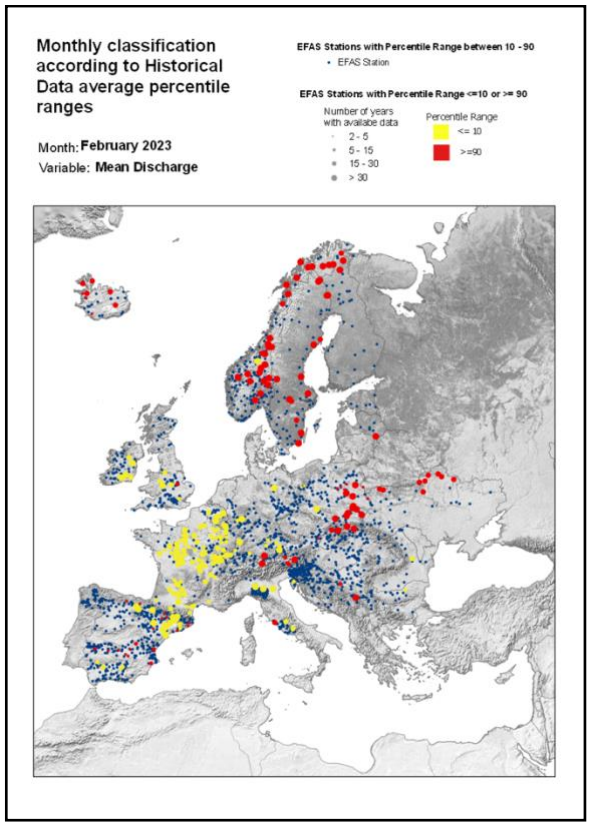

Figure 12: Monthly discharge anomalies February.

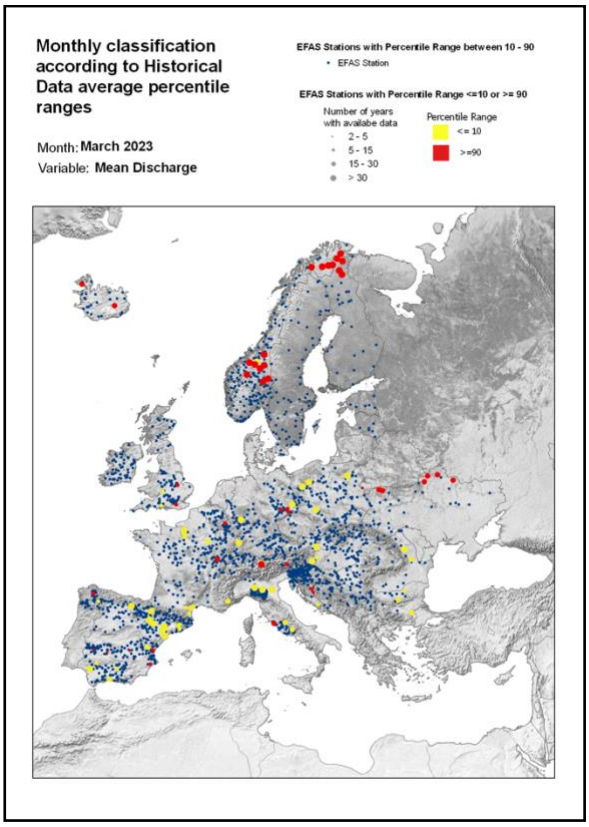

Figure 14: Monthly discharge anomalies March 2023.

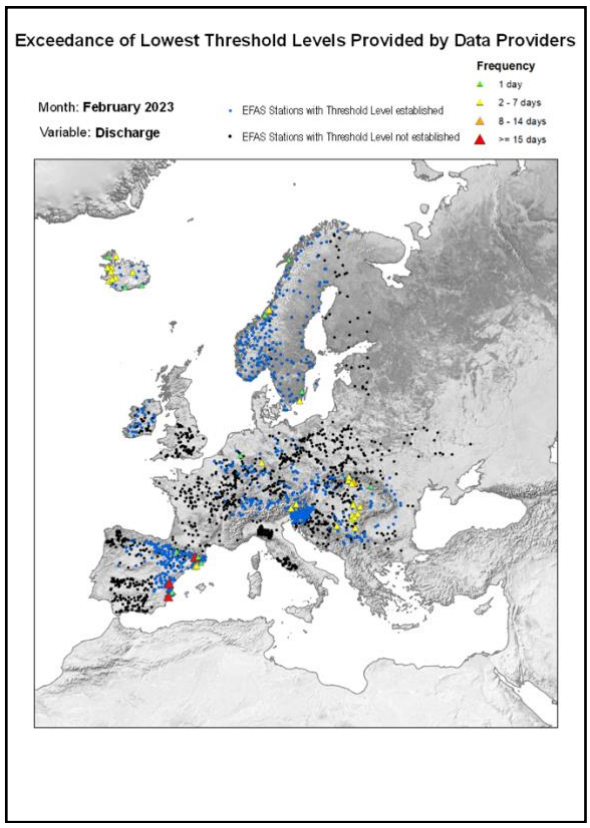

Figure 13: Lowest alert level exceedance for February.

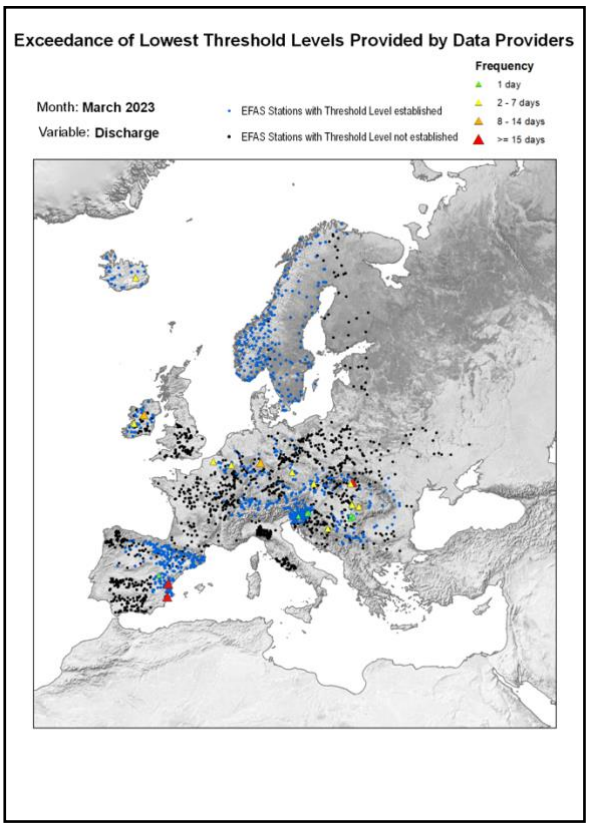

Figure 15: Lowest alert level exceedance for March 2023.

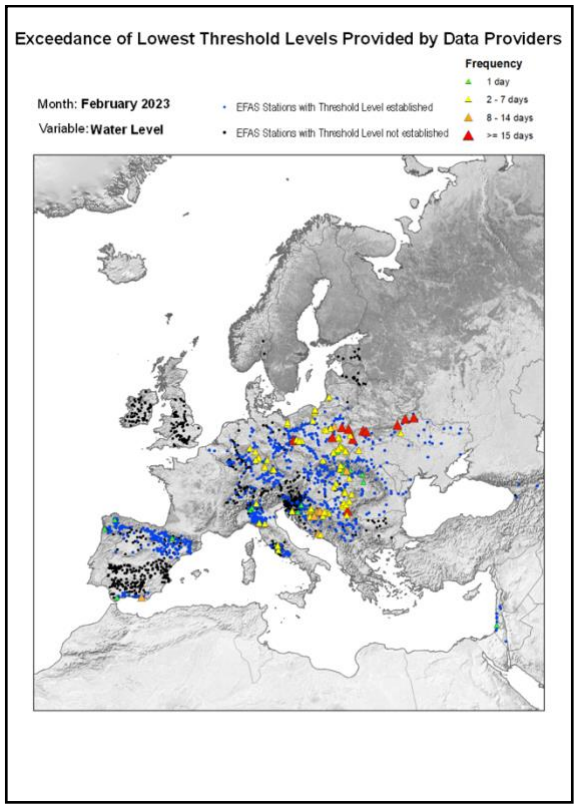

Figure 16: Lowest threshold exceedance for February.

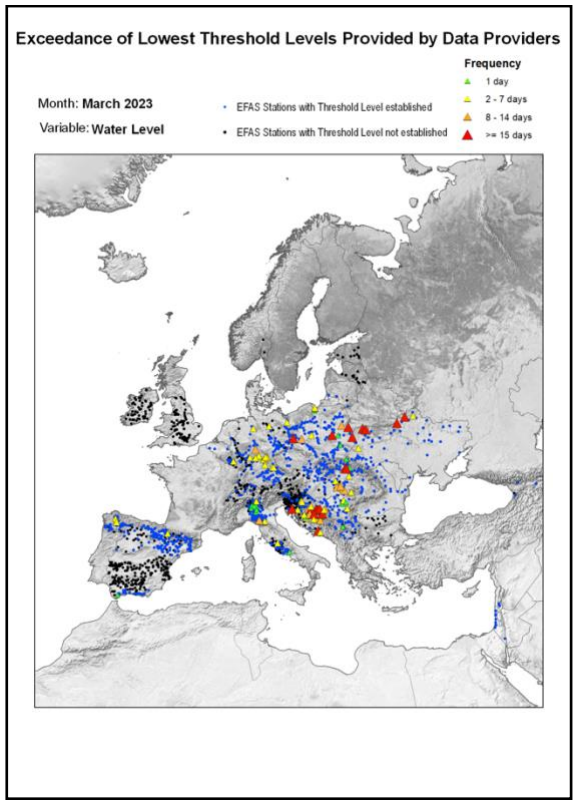

Figure 17: Lowest threshold exceedance for March 2023.

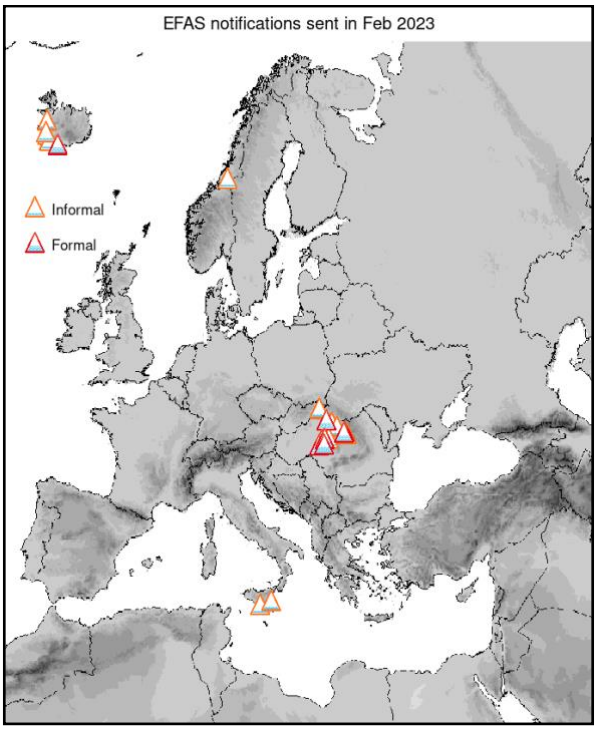

Figure 18: EFAS flood notifications sent for February.

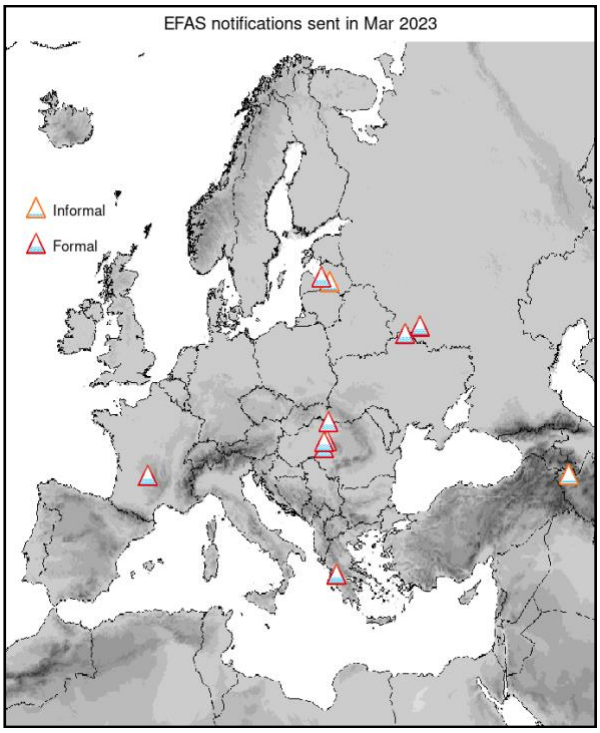

Figure 20: EFAS flood notifications sent for March 2023.

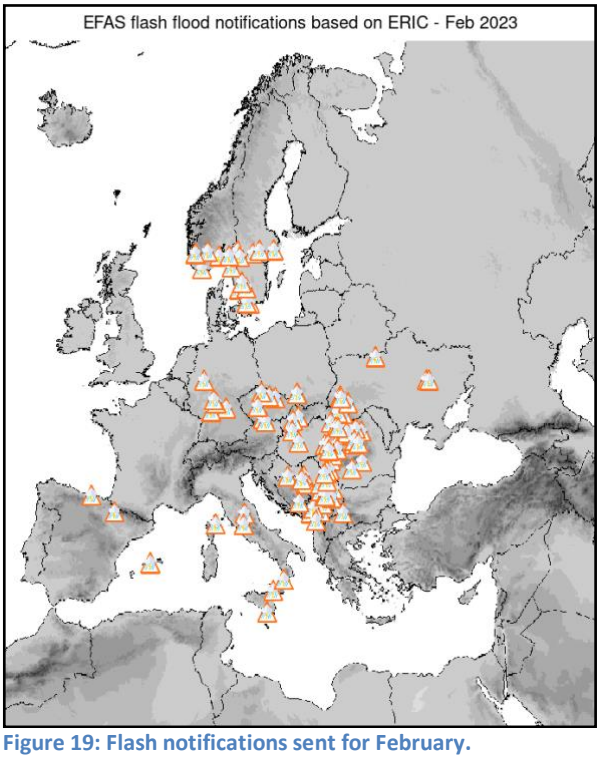

Figure 19: Flash notifications sent for February.

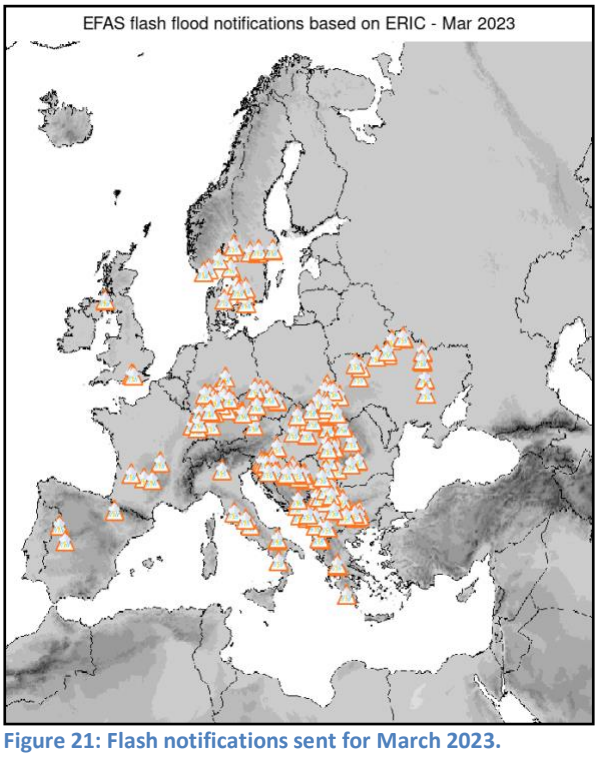

Figure 21: Flash notifications sent for March 2023.

Appendix - tables

Table 1: EFAS flood notifications sent in February – March 2023

Type	Forecast Date	Issue Date	Lead Time	River	Country
Informal	07/02/2023 12 UTC	08/02/2023	36	Coastal zone	Italy
Informal	09/02/2023 00 UTC	09/02/2023	18	IMERA MERIDIONALE	Italy
Informal	09/02/2023 12 UTC	10/02/2023	96	Coastal zone	Iceland
Informal	09/02/2023 12 UTC	10/02/2023	96	Pjorsa	Iceland
Informal	09/02/2023 12 UTC	10/02/2023	90	Hvita	Iceland
Informal	09/02/2023 12 UTC	10/02/2023	96	Coastal zone	Iceland
Informal	09/02/2023 12 UTC	10/02/2023	90	OELFUSA	Iceland
Formal	09/02/2023 12 UTC	10/02/2023	96	Leira	Iceland
Informal	12/02/2023 12 UTC	13/02/2023	12	Byaelva	Norway
Informal	16/02/2023 00 UTC	16/02/2023	78	Sieu	Romania
Informal	17/02/2023 00 UTC	17/02/2023	54	Turu	Romania
Informal	17/02/2023 00 UTC	17/02/2023	48	Somes	Romania
Formal	16/02/2023 12 UTC	17/02/2023	66	Crisul Negru	Romania
Informal	16/02/2023 12 UTC	17/02/2023	60	Sebes Koros	Romania
Formal	16/02/2023 12 UTC	17/02/2023	66	Somesul Mare	Romania
Formal	17/02/2023 12 UTC	18/02/2023	60	Crisul Repede	Romania
Informal	19/02/2023 12 UTC	20/02/2023	72	Ondava	Slovakia
Formal	22/02/2023 00 UTC	22/02/2023	96	Crisul Repede	Romania
Formal	23/02/2023 00 UTC	23/02/2023	90	Tisza	
Formal	23/02/2023 00 UTC	23/02/2023	60	Valea Mare	Romania
Formal	23/02/2023 00 UTC	23/02/2023	72	Cri»ôul Repede	Hungary
Formal	22/02/2023 12 UTC	23/02/2023	90	Koros	Hungary
Informal	24/02/2023 00 UTC	24/02/2023	90	OELFUSA	Iceland
Informal	25/02/2023 00 UTC	25/02/2023	42	Sieu	Romania
Informal	25/02/2023 12 UTC	26/02/2023	42	Somesul Mare	Romania
Informal	05/03/2023 00 UTC	05/03/2023	0	Aras	Azerbaijan
Formal	06/03/2023 00 UTC	06/03/2023	90	Crisul Negru	Romania
Formal	06/03/2023 00 UTC	06/03/2023	54	Crisul Repede	Romania
Formal	06/03/2023 00 UTC	06/03/2023	78	Cri»ôul Repede	Hungary
Informal	06/03/2023 00 UTC	06/03/2023	36	Acheloos	Greece
Formal	05/03/2023 12 UTC	06/03/2023	126	Tisza	
Formal	08/03/2023 12 UTC	09/03/2023	72	Dordogne	France
Formal	08/03/2023 12 UTC	09/03/2023	60	Acheloos	Greece
Informal	17/03/2023 12 UTC	18/03/2023	84	Ogre	Latvia
Formal	20/03/2023 00 UTC	20/03/2023	126	Gauja	Latvia
Formal	22/03/2023 00 UTC	22/03/2023	138	Desna	Ukraine
Formal	21/03/2023 12 UTC	22/03/2023	90	Svapa	Russian Federation

* Lead time [days] to the first forecasted exceedance of the 5-year simulated discharge threshold.

Table 2: EFAS Flash notifications sent in February – March 2023

Type	Forecast Date	Issue Date	Lead Time	Region	Country
Flash	01/02/2023 00 UTC	01/02/2023	42	Rhine	Germany
Flash	01/02/2023 00 UTC	01/02/2023	48		
Flash	01/02/2023 00 UTC	01/02/2023	48		
Flash	02/02/2023 00 UTC	02/02/2023	24	Rhine	Germany
Flash	02/02/2023 00 UTC	02/02/2023	30	Danube	Serbia
Flash	02/02/2023 00 UTC	02/02/2023	48	Danube	Romania
Flash	02/02/2023 00 UTC	02/02/2023	48		
Flash	02/02/2023 00 UTC	02/02/2023	48		
Flash	02/02/2023 00 UTC	02/02/2023	48	Danube	Romania
Flash	02/02/2023 00 UTC	02/02/2023	48		
Flash	01/02/2023 12 UTC	02/02/2023	30	Rhine	Germany
Flash	03/02/2023 00 UTC	03/02/2023	18	Danube	Slovakia
Flash	02/02/2023 12 UTC	03/02/2023	48		
Flash	02/02/2023 12 UTC	03/02/2023	36		
Flash	02/02/2023 12 UTC	03/02/2023	42	Danube	Serbia
Flash	02/02/2023 12 UTC	03/02/2023	42		
Flash	02/02/2023 12 UTC	03/02/2023	30		
Flash	03/02/2023 12 UTC	04/02/2023	24	Danube	Serbia
Flash	03/02/2023 12 UTC	04/02/2023	24	Danube	Romania
Flash	03/02/2023 12 UTC	04/02/2023	24		
Flash	06/02/2023 12 UTC	07/02/2023	42	Coastal zone	Spain
Flash	07/02/2023 12 UTC	08/02/2023	48	Italy (Ligurian Sea/Tyrrhenian Sea)	Italy
Flash	09/02/2023 00 UTC	09/02/2023	30	Coastal catchment Eastern Mediterranean Sea	Italy
Flash	09/02/2023 00 UTC	09/02/2023	42	Sweden	Sweden
Flash	09/02/2023 00 UTC	09/02/2023	42	Norway	Norway
Flash	08/02/2023 12 UTC	09/02/2023	36	Sicily	Italy
Flash	16/02/2023 00 UTC	16/02/2023	48	Danube	Romania
Flash	16/02/2023 00 UTC	16/02/2023	42	Sweden	Sweden
Flash	16/02/2023 00 UTC	16/02/2023	48	Sweden	Sweden
Flash	16/02/2023 00 UTC	16/02/2023	42	Common to Norway-Sweden	Sweden
Flash	16/02/2023 00 UTC	16/02/2023	48	Sweden	Sweden
Flash	16/02/2023 00 UTC	16/02/2023	36	Norway	Norway
Flash	15/02/2023 12 UTC	16/02/2023	48	Sweden	Sweden
Flash	17/02/2023 00 UTC	17/02/2023	24		
Flash	17/02/2023 00 UTC	17/02/2023	30	Danube	Hungary
Flash	17/02/2023 00 UTC	17/02/2023	24	Danube	Romania
Flash	16/02/2023 12 UTC	17/02/2023	42	Danube	Romania
Flash	16/02/2023 12 UTC	17/02/2023	42		
Flash	16/02/2023 12 UTC	17/02/2023	30	Helge	Sweden
Flash	18/02/2023 00 UTC	18/02/2023	42	Danube	Slovakia
Flash	18/02/2023 00 UTC	18/02/2023	42	Danube	Romania
Flash	18/02/2023 00 UTC	18/02/2023	36		
Flash	17/02/2023 12 UTC	18/02/2023	48		
Flash	17/02/2023 12 UTC	18/02/2023	48		

Flash	17/02/2023 12 UTC	18/02/2023	48	Wisla	Poland
Flash	17/02/2023 12 UTC	18/02/2023	36	Danube	Romania
Flash	17/02/2023 12 UTC	18/02/2023	36	Danube	Romania
Flash	17/02/2023 12 UTC	18/02/2023	36		
Flash	17/02/2023 12 UTC	18/02/2023	36	Danube	Romania
Flash	17/02/2023 12 UTC	18/02/2023	42	Danube	Romania
Flash	17/02/2023 12 UTC	18/02/2023	24	Dnepr	Ukraine
Flash	19/02/2023 00 UTC	19/02/2023	18	Danube	Austria
Flash	19/02/2023 00 UTC	19/02/2023	24		
Flash	19/02/2023 00 UTC	19/02/2023	18		
Flash	19/02/2023 00 UTC	19/02/2023	30	Common to Norway-Sweden	Sweden
Flash	19/02/2023 00 UTC	19/02/2023	30	Common to Norway-Sweden	Sweden
Flash	19/02/2023 00 UTC	19/02/2023	30	Sweden	Sweden
Flash	19/02/2023 00 UTC	19/02/2023	36	Sweden	Sweden
Flash	19/02/2023 00 UTC	19/02/2023	30	Moel	Norway
Flash	19/02/2023 00 UTC	19/02/2023	36	Helge	Sweden
Flash	18/02/2023 12 UTC	19/02/2023	42	Norway	Norway
Flash	18/02/2023 12 UTC	19/02/2023	30		
Flash	18/02/2023 12 UTC	19/02/2023	24	Wisla	Poland
Flash	18/02/2023 12 UTC	19/02/2023	30	Danube	Romania
Flash	18/02/2023 12 UTC	19/02/2023	30	Danube	Romania
Flash	18/02/2023 12 UTC	19/02/2023	30		
Flash	20/02/2023 12 UTC	21/02/2023	24		
Flash	21/02/2023 12 UTC	22/02/2023	36	Norway	Norway
Flash	23/02/2023 00 UTC	23/02/2023	48		
Flash	22/02/2023 12 UTC	23/02/2023	18	Ason	Spain
Flash	22/02/2023 12 UTC	23/02/2023	24	Ebro	Spain
Flash	22/02/2023 12 UTC	23/02/2023	48	Danube	Romania
Flash	24/02/2023 00 UTC	24/02/2023	48		
Flash	24/02/2023 00 UTC	24/02/2023	42		
Flash	24/02/2023 00 UTC	24/02/2023	36		
Flash	24/02/2023 00 UTC	24/02/2023	24	Danube	Slovakia
Flash	23/02/2023 12 UTC	24/02/2023	48	Danube	Romania
Flash	23/02/2023 12 UTC	24/02/2023	48		
Flash	23/02/2023 12 UTC	24/02/2023	48	Danube	Romania
Flash	23/02/2023 12 UTC	24/02/2023	42	Danube	Ukraine
Flash	25/02/2023 00 UTC	25/02/2023	18		
Flash	25/02/2023 00 UTC	25/02/2023	24	Danube	Croatia
Flash	25/02/2023 00 UTC	25/02/2023	18	Danube	Bosnia and Herzegovina
Flash	25/02/2023 00 UTC	25/02/2023	36	Danube	Montenegro
Flash	25/02/2023 00 UTC	25/02/2023	42	Crni Drim / Drin	
Flash	24/02/2023 12 UTC	25/02/2023	30	Danube	Serbia
Flash	24/02/2023 12 UTC	25/02/2023	30	Danube	Romania
Flash	24/02/2023 12 UTC	25/02/2023	30	Danube	Serbia
Flash	24/02/2023 12 UTC	25/02/2023	42	Adriatic Coast	Bosnia and Herzegovina
Flash	26/02/2023 00 UTC	26/02/2023	48	Coastal zone	Spain
Flash	26/02/2023 00 UTC	26/02/2023	24	Crni Drim / Drin	

Flash	25/02/2023 12 UTC	26/02/2023	36	Dnepr	Ukraine
Flash	25/02/2023 12 UTC	26/02/2023	36		
Flash	25/02/2023 12 UTC	26/02/2023	48	Danube	Romania
Flash	25/02/2023 12 UTC	26/02/2023	30	Danube	Romania
Flash	25/02/2023 12 UTC	26/02/2023	48	Danube	Romania
Flash	25/02/2023 12 UTC	26/02/2023	30	Danube	Romania
Flash	25/02/2023 12 UTC	26/02/2023	48	Danube	Kosovo
Flash	25/02/2023 12 UTC	26/02/2023	24		
Flash	25/02/2023 12 UTC	26/02/2023	24	Danube	Croatia
Flash	25/02/2023 12 UTC	26/02/2023	36		
Flash	25/02/2023 12 UTC	26/02/2023	36		
Flash	27/02/2023 00 UTC	27/02/2023	48	Strimonas(GR)/Struma(BG)	Bulgaria
Flash	27/02/2023 00 UTC	27/02/2023	24	Moraca/Bojana	Montenegro
Flash	27/02/2023 00 UTC	27/02/2023	48	Corsica	
Flash	26/02/2023 12 UTC	27/02/2023	30		
Flash	26/02/2023 12 UTC	27/02/2023	24	Danube	Romania
Flash	01/03/2023 12 UTC	02/03/2023	42		
Flash	03/03/2023 00 UTC	03/03/2023	42		
Flash	03/03/2023 00 UTC	03/03/2023	42	Ofanto	Italy
Flash	05/03/2023 00 UTC	05/03/2023	48	Danube	Romania
Flash	07/03/2023 00 UTC	07/03/2023	48	Rhine	Germany
Flash	07/03/2023 00 UTC	07/03/2023	48	Rhine	Germany
Flash	07/03/2023 00 UTC	07/03/2023	12	Acheloos	Greece
Flash	08/03/2023 00 UTC	08/03/2023	36		
Flash	08/03/2023 00 UTC	08/03/2023	42	Wisla	Poland
Flash	08/03/2023 00 UTC	08/03/2023	30		
Flash	08/03/2023 00 UTC	08/03/2023	36		
Flash	08/03/2023 00 UTC	08/03/2023	42	Ebro	Spain
Flash	08/03/2023 00 UTC	08/03/2023	36		
Flash	08/03/2023 00 UTC	08/03/2023	36	Rhine	Germany
Flash	08/03/2023 00 UTC	08/03/2023	42	Danube	Romania
Flash	08/03/2023 00 UTC	08/03/2023	42	Danube	Ukraine
Flash	08/03/2023 00 UTC	08/03/2023	36	Danube	Czech Republic
Flash	08/03/2023 00 UTC	08/03/2023	36	Danube	Austria
Flash	07/03/2023 12 UTC	08/03/2023	42		
Flash	07/03/2023 12 UTC	08/03/2023	42	Rhine	France
Flash	07/03/2023 12 UTC	08/03/2023	48	Tajo	Spain
Flash	07/03/2023 12 UTC	08/03/2023	48		
Flash	07/03/2023 12 UTC	08/03/2023	48		
Flash	07/03/2023 12 UTC	08/03/2023	48		
Flash	07/03/2023 12 UTC	08/03/2023	48		
Flash	07/03/2023 12 UTC	08/03/2023	42	Danube	Romania
Flash	07/03/2023 12 UTC	08/03/2023	48	Danube	ro
Flash	09/03/2023 00 UTC	09/03/2023	18	Dnepr	Ukraine
Flash	09/03/2023 00 UTC	09/03/2023	48	Danube	Romania
Flash	09/03/2023 00 UTC	09/03/2023	18	Danube	Romania
Flash	09/03/2023 00 UTC	09/03/2023	48	Danube	Serbia
Flash	09/03/2023 00 UTC	09/03/2023	42		
Flash	09/03/2023 00 UTC	09/03/2023	48	Danube	Slovakia
Flash	09/03/2023 00 UTC	09/03/2023	42	Adriatic Coast	Bosnia and Herzegovina

Flash	09/03/2023 00 UTC	09/03/2023	48	Acheloos	Greece
Flash	09/03/2023 00 UTC	09/03/2023	42	Italy (Ligurian Sea/Tyrrhenian Sea)	Italy
Flash	09/03/2023 00 UTC	09/03/2023	42	Crni Drim / Drin	
Flash	08/03/2023 12 UTC	09/03/2023	48	Tevere	Italy
Flash	08/03/2023 12 UTC	09/03/2023	48	Tevere	Italy
Flash	08/03/2023 12 UTC	09/03/2023	48	Moraca/Bojana	Montenegro
Flash	08/03/2023 12 UTC	09/03/2023	48	Adriatic Coast	Bosnia and Herzegovina
Flash	08/03/2023 12 UTC	09/03/2023	30		
Flash	10/03/2023 00 UTC	10/03/2023	42	Dordogne	France
Flash	10/03/2023 00 UTC	10/03/2023	30	Wisla	Poland
Flash	10/03/2023 00 UTC	10/03/2023	30	Danube	Croatia
Flash	10/03/2023 00 UTC	10/03/2023	30	Danube	Serbia
Flash	10/03/2023 00 UTC	10/03/2023	24		
Flash	10/03/2023 00 UTC	10/03/2023	30		
Flash	10/03/2023 00 UTC	10/03/2023	24	Danube	Romania
Flash	10/03/2023 00 UTC	10/03/2023	42	Danube	Romania
Flash	10/03/2023 00 UTC	10/03/2023	24	Mati	Albania
Flash	10/03/2023 00 UTC	10/03/2023	36	Danube	Ukraine
Flash	10/03/2023 00 UTC	10/03/2023	48	Dnepr	Ukraine
Flash	10/03/2023 00 UTC	10/03/2023	48		
Flash	09/03/2023 12 UTC	10/03/2023	30	Adriatic Coast	Croatia
Flash	09/03/2023 12 UTC	10/03/2023	42	Danube	Kosovo
Flash	09/03/2023 12 UTC	10/03/2023	48	Strimonas(GR)/Struma(BG)	Bulgaria
Flash	09/03/2023 12 UTC	10/03/2023	48		
Flash	09/03/2023 12 UTC	10/03/2023	36	Danube	Serbia
Flash	09/03/2023 12 UTC	10/03/2023	42	Danube	Serbia
Flash	09/03/2023 12 UTC	10/03/2023	48	Danube	Romania
Flash	09/03/2023 12 UTC	10/03/2023	48	Danube	Romania
Flash	09/03/2023 12 UTC	10/03/2023	48	Danube	Hungary
Flash	09/03/2023 12 UTC	10/03/2023	42	Danube	Slovakia
Flash	10/03/2023 12 UTC	11/03/2023	24	Seman	Albania
Flash	10/03/2023 12 UTC	11/03/2023	24	Strimonas(GR)/Struma(BG)	Bulgaria
Flash	10/03/2023 12 UTC	11/03/2023	24	Danube	Bulgaria
Flash	10/03/2023 12 UTC	11/03/2023	30	Loire	France
Flash	10/03/2023 12 UTC	11/03/2023	18		
Flash	10/03/2023 12 UTC	11/03/2023	18	Garonne	France
Flash	10/03/2023 12 UTC	11/03/2023	24		
Flash	10/03/2023 12 UTC	11/03/2023	48		
Flash	12/03/2023 00 UTC	12/03/2023	36	Helge	Sweden
Flash	12/03/2023 00 UTC	12/03/2023	48	Sweden	Sweden
Flash	12/03/2023 00 UTC	12/03/2023	48	Rhine	Germany
Flash	12/03/2023 00 UTC	12/03/2023	36	Sweden	Sweden
Flash	12/03/2023 00 UTC	12/03/2023	48	Rhine	Germany
Flash	12/03/2023 00 UTC	12/03/2023	48		
Flash	12/03/2023 00 UTC	12/03/2023	48	Rhine	France
Flash	13/03/2023 00 UTC	13/03/2023	48	Danube	Croatia
Flash	13/03/2023 00 UTC	13/03/2023	42		
Flash	13/03/2023 00 UTC	13/03/2023	30	Sweden	Sweden

Flash	13/03/2023 00 UTC	13/03/2023	18	Common to Norway-Sweden	Sweden
Flash	13/03/2023 00 UTC	13/03/2023	36	Sweden	Sweden
Flash	13/03/2023 00 UTC	13/03/2023	18	Common to Norway-Sweden	Sweden
Flash	13/03/2023 00 UTC	13/03/2023	30	Po	Italy
Flash	13/03/2023 00 UTC	13/03/2023	24	Rhine	Germany
Flash	13/03/2023 00 UTC	13/03/2023	24	Rhine	Germany
Flash	13/03/2023 00 UTC	13/03/2023	24		
Flash	12/03/2023 12 UTC	13/03/2023	42		
Flash	12/03/2023 12 UTC	13/03/2023	48	Sweden	Sweden
Flash	12/03/2023 12 UTC	13/03/2023	42	Sweden	Sweden
Flash	12/03/2023 12 UTC	13/03/2023	36	Rhine	Germany
Flash	12/03/2023 12 UTC	13/03/2023	36		
Flash	14/03/2023 00 UTC	14/03/2023	42	Danube	Serbia
Flash	14/03/2023 00 UTC	14/03/2023	48	Danube	Serbia
Flash	14/03/2023 00 UTC	14/03/2023	42		
Flash	14/03/2023 00 UTC	14/03/2023	42	Danube	Bosnia and Herzegovina
Flash	14/03/2023 00 UTC	14/03/2023	42		
Flash	14/03/2023 00 UTC	14/03/2023	30	Danube	Croatia
Flash	14/03/2023 00 UTC	14/03/2023	30	Danube	Bosnia and Herzegovina
Flash	14/03/2023 00 UTC	14/03/2023	42	Danube	Romania
Flash	13/03/2023 12 UTC	14/03/2023	48	Danube	Slovakia
Flash	13/03/2023 12 UTC	14/03/2023	48	Danube	Hungary
Flash	13/03/2023 12 UTC	14/03/2023	42	Moraca/Bojana	Montenegro
Flash	13/03/2023 12 UTC	14/03/2023	48	Danube	Bosnia and Herzegovina
Flash	13/03/2023 12 UTC	14/03/2023	42		
Flash	13/03/2023 12 UTC	14/03/2023	42	Danube	Croatia
Flash	13/03/2023 12 UTC	14/03/2023	42		
Flash	15/03/2023 00 UTC	15/03/2023	24		
Flash	15/03/2023 00 UTC	15/03/2023	24	Danube	Serbia
Flash	15/03/2023 00 UTC	15/03/2023	42		
Flash	15/03/2023 00 UTC	15/03/2023	36	Scotland	United Kingdom
Flash	14/03/2023 12 UTC	15/03/2023	18	Danube	Croatia
Flash	14/03/2023 12 UTC	15/03/2023	24	Danube	Slovakia
Flash	15/03/2023 12 UTC	16/03/2023	42	Norway	Norway
Flash	15/03/2023 12 UTC	16/03/2023	42	Norway	Norway
Flash	15/03/2023 12 UTC	16/03/2023	42	Greece (South)	Greece
Flash	15/03/2023 12 UTC	16/03/2023	30		
Flash	15/03/2023 12 UTC	16/03/2023	30		
Flash	16/03/2023 12 UTC	17/03/2023	24	Norway	Norway
Flash	20/03/2023 00 UTC	20/03/2023	48	Strimonas(GR)/Struma(BG)	Bulgaria
Flash	20/03/2023 00 UTC	20/03/2023	48		
Flash	20/03/2023 00 UTC	20/03/2023	48		
Flash	20/03/2023 00 UTC	20/03/2023	30	Ofanto	Italy
Flash	19/03/2023 12 UTC	20/03/2023	24	Ombrone	Italy
Flash	21/03/2023 00 UTC	21/03/2023	42	Common to Norway-Sweden	Sweden

Flash	21/03/2023 00 UTC	21/03/2023	42	Sweden	Sweden
Flash	21/03/2023 00 UTC	21/03/2023	30		
Flash	21/03/2023 00 UTC	21/03/2023	36	Danube	Bulgaria
Flash	20/03/2023 12 UTC	21/03/2023	48		
Flash	20/03/2023 12 UTC	21/03/2023	48		
Flash	20/03/2023 12 UTC	21/03/2023	36		
Flash	20/03/2023 12 UTC	21/03/2023	48	Danube	Serbia
Flash	20/03/2023 12 UTC	21/03/2023	36	Crni Drim / Drin	
Flash	20/03/2023 12 UTC	21/03/2023	48	Common to Norway-Sweden	Sweden
Flash	24/03/2023 00 UTC	24/03/2023	42		
Flash	24/03/2023 00 UTC	24/03/2023	48		
Flash	24/03/2023 00 UTC	24/03/2023	48		
Flash	24/03/2023 00 UTC	24/03/2023	48	Danube	Serbia
Flash	24/03/2023 00 UTC	24/03/2023	48	Danube	Romania
Flash	24/03/2023 00 UTC	24/03/2023	42	Wisla	Ukraine
Flash	24/03/2023 00 UTC	24/03/2023	18	Glomma	Norway
Flash	24/03/2023 00 UTC	24/03/2023	30	Sweden	Sweden
Flash	24/03/2023 00 UTC	24/03/2023	48	Dnepr	Ukraine
Flash	23/03/2023 12 UTC	24/03/2023	24		
Flash	23/03/2023 12 UTC	24/03/2023	48	Weser	Germany
Flash	23/03/2023 12 UTC	24/03/2023	42	Sweden	Sweden
Flash	25/03/2023 00 UTC	25/03/2023	48		
Flash	25/03/2023 00 UTC	25/03/2023	48		
Flash	25/03/2023 00 UTC	25/03/2023	24	Dnepr	Ukraine
Flash	25/03/2023 00 UTC	25/03/2023	24	Danube	Serbia
Flash	25/03/2023 00 UTC	25/03/2023	48		
Flash	25/03/2023 00 UTC	25/03/2023	48		
Flash	25/03/2023 00 UTC	25/03/2023	24	Danube	Ukraine
Flash	24/03/2023 12 UTC	25/03/2023	48		
Flash	24/03/2023 12 UTC	25/03/2023	36		
Flash	24/03/2023 12 UTC	25/03/2023	36	Dnepr	Ukraine
Flash	24/03/2023 12 UTC	25/03/2023	36	Danube	Slovakia
Flash	26/03/2023 00 UTC	26/03/2023	30		
Flash	26/03/2023 00 UTC	26/03/2023	48	Dnepr	Ukraine
Flash	26/03/2023 00 UTC	26/03/2023	42		
Flash	26/03/2023 00 UTC	26/03/2023	42	Seman	Albania
Flash	26/03/2023 00 UTC	26/03/2023	24		
Flash	26/03/2023 00 UTC	26/03/2023	24		
Flash	26/03/2023 00 UTC	26/03/2023	24		
Flash	26/03/2023 00 UTC	26/03/2023	24		
Flash	26/03/2023 00 UTC	26/03/2023	30	Danube	Slovakia
Flash	26/03/2023 00 UTC	26/03/2023	42		
Flash	26/03/2023 00 UTC	26/03/2023	42		
Flash	26/03/2023 00 UTC	26/03/2023	42	Crni Drim / Drin	
Flash	26/03/2023 00 UTC	26/03/2023	36	Danube	Serbia
Flash	26/03/2023 00 UTC	26/03/2023	36	Danube	Serbia
Flash	26/03/2023 00 UTC	26/03/2023	42	Wisla	Poland
Flash	26/03/2023 00 UTC	26/03/2023	42	Wisla	Poland
Flash	25/03/2023 12 UTC	26/03/2023	30	Elbe	Germany
Flash	25/03/2023 12 UTC	26/03/2023	24		

Flash	25/03/2023 12 UTC	26/03/2023	36		
Flash	25/03/2023 12 UTC	26/03/2023	48	Moraca/Bojana	Montenegro
Flash	25/03/2023 12 UTC	26/03/2023	48	Danube	Kosovo
Flash	25/03/2023 12 UTC	26/03/2023	48	Danube	Serbia
Flash	25/03/2023 12 UTC	26/03/2023	48	Danube	Romania
Flash	25/03/2023 12 UTC	26/03/2023	48	Danube	Romania
Flash	25/03/2023 12 UTC	26/03/2023	48	Danube	Hungary
Flash	25/03/2023 12 UTC	26/03/2023	42	Danube	Hungary
Flash	25/03/2023 12 UTC	26/03/2023	48	Danube	Hungary
Flash	25/03/2023 12 UTC	26/03/2023	42	Danube	Slovakia
Flash	25/03/2023 12 UTC	26/03/2023	48	Danube	Slovakia
Flash	25/03/2023 12 UTC	26/03/2023	48	Danube	Ukraine
Flash	27/03/2023 00 UTC	27/03/2023	24		
Flash	27/03/2023 00 UTC	27/03/2023	12	Crni Drim / Drin	
Flash	27/03/2023 00 UTC	27/03/2023	12	Danube	Slovakia
Flash	27/03/2023 00 UTC	27/03/2023	18	Danube	Serbia
Flash	26/03/2023 12 UTC	27/03/2023	30	Mesta(BG)/Nestos(GR)	Bulgaria
Flash	26/03/2023 12 UTC	27/03/2023	30	Crni Drim / Drin	
Flash	26/03/2023 12 UTC	27/03/2023	36	Danube	Romania
Flash	26/03/2023 12 UTC	27/03/2023	48	Dnepr	Ukraine
Flash	26/03/2023 12 UTC	27/03/2023	36	Dnepr	Ukraine
Flash	28/03/2023 00 UTC	28/03/2023	12	Dnepr	Ukraine
Flash	27/03/2023 12 UTC	28/03/2023	30		
Flash	29/03/2023 00 UTC	29/03/2023	48	Danube	Romania
Flash	30/03/2023 00 UTC	30/03/2023	48	Rhine	France
Flash	30/03/2023 00 UTC	30/03/2023	48	Weser	Germany
Flash	30/03/2023 00 UTC	30/03/2023	48	Rhine	Germany
Flash	30/03/2023 00 UTC	30/03/2023	48		
Flash	30/03/2023 00 UTC	30/03/2023	12	Danube	Germany
Flash	30/03/2023 00 UTC	30/03/2023	48	Danube	Hungary
Flash	30/03/2023 00 UTC	30/03/2023	30	Danube	Romania
Flash	30/03/2023 00 UTC	30/03/2023	30		
Flash	29/03/2023 12 UTC	30/03/2023	24	Rhine	Germany
Flash	29/03/2023 12 UTC	30/03/2023	48		
Flash	29/03/2023 12 UTC	30/03/2023	24	Rhine	Germany
Flash	29/03/2023 12 UTC	30/03/2023	42	Danube	Hungary
Flash	29/03/2023 12 UTC	30/03/2023	42	Danube	Romania
Flash	29/03/2023 12 UTC	30/03/2023	42	Danube	Romania
Flash	29/03/2023 12 UTC	30/03/2023	24	Denmark	Denmark

* Lead time [hours] to the forecasted peak of the event

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), in close collaboration with national hydrological and meteorological services and policy DG's of the European Commission.

EFAS has been transferred to operations under the European Commission's COPERNICUS Emergency Management Service led by DG GROW in direct support to the EU's Emergency Response Coordination Centre (ERCC) of DG ECHO and the hydrological services in the Member States.

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 ERCC.
A Spanish contractor, Ghenova Digital (formerly Soologic), has been awarded the contract for the EFAS Hydrological data collection centre. They are responsible for collecting discharge and water level data across Europe.
A German consortium (KISTERS and DWD) has been awarded the contract for the EFAS Meteorological data collection centre. They are responsible for collecting the meteorological data needed to run EFAS over Europe.
Finally, the JRC is responsible for the overall project management related to EFAS and further development of the system.

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