





European Flood Awareness System



October – November 2023 Issue 2023(6)





NEWS

EFAS News



Figure 1: EFAS v5.0 Webinar

A webinar to decribe the updates of EFAS v5.0 was hosted by CEMS-COMP on 17 November 2023. The webinar was attended by 90 participants.

The EFAS v5.0 webiar covered topics relating to the latest major EFAS release, launched at the end of September 2023, including:

- Change in the spatial resolution of the system, from 5km (up to EFASV4) to ~1.4km (1arcmin/0.0167 degrees) and extension to the modelling domain
- Reporting points highlighted for catchments from 150km2 (instead of 500km2 until EFASv4) anywhere on the domain
- Major improvements in the hydrological modelling, including new processes and new calibration, with regionalised parameters in ungauged catchments
- Enhanced flood inundation forecasts with hazard maps now at 90m resolution (instead of 100 m)
- Enhanced hydrological post-processing products, with information on local threshold exceedance

The webinar was recorded for training purposes and material will be made available soon on the <u>Copernicus</u> <u>Emergency Management Service YouTube channel</u> and on the EFAS website: <u>https://www.efas.eu/en/webinars</u>

CEMS HDCC integrated hydrological station data from Providers



Figure 2: Scottish Environment Protection Agency stations (left) and Estonian Environmental Agency stations integrated in the CEMS HDCC database in November 2023.

125 stations from the Scottish Environment Protection Agency (SEPA) and 8 stations from the Estonian Environmental Agency have been recently integrated into the hydrological data collection.

The CEMS Hydrological Data Collection Centre (HDCC) activated hydrological data transfer for 125 new stations from the Scottish Environment Protection Agency (SEPA). 5 stations provide only historical data. 120 stations provide near real time data: 116 stations have water level and discharge values, 1 station provides exclusively discharge data, and 3 offer water level data. The near real time data have temporal resolution of 15 minutes and they have been incorporated into the HDCC database as part of the daily operational routines.

Furthermore, the CEMS HDCC team activated hydrological data transfer for 8 new stations from the Estonian Environmental Agency. These 8 stations provide near real time river water level and discharge data with hourly temporal resolution. These stations have been incorporated into the HDCC database as part of the daily operational routines.

Information on how hydrological data is used in EFAS, and on data collection and transfer methods are available <u>here</u>.

CEMS HDCC would like to thank the Scottish Environment Protection Agency and the Estonian Environmental Agency for providing data and making it accessible.

EFAS presented at 70th Anniversary of Institute of Hydrology of the Slovak Academy of Sciences

An international conference entitled "Current problems in hydrology" was organized to mark the 70th anniversary of the founding of the Institute of Hydrology of the Slovak Academy of Sciences. The conference was held at the Congress Centre of the Slovak Academy of Sciences in Smolenice on 27-29 September 2023. 72 registered participants from 8 institutions attended the conference. The scientific programme of the conference consisted of 21 lectures by distinguished hydrologists and PhD students.



Figure 3: Institute of Hydrology of the Slovak Academy of Sciences conference in Smolenice.

One of the lectures was devoted to EFAS, with a focus on its recent operational updates. The topic entitled "New developments in the European Flood Awareness System EFAS" was prepared by the hydrologists of the CEMS Hydrological Forecast – Analytics and Dissemination Centre.

The beautiful setting of the Congress Centre in Smolenice Castle and the beautiful weather contributed to the success of this scientific conference.

RESULTS

Summary of EFAS Flood and Flash Flood Notifications

The 51 formal and 75 informal EFAS flood notifications issued in October – November 2023 are summarised in Table 1. The locations of all notifications are shown in Figure 23 and Figure 25 in the appendix.

533 flash flood notifications were issued in October – November 2023. They are summarised in Table 2. The locations of all notifications are shown in Figure 24 and Figure 26 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 <u>Climate Bulletins</u>.

Hydrological situation

by EFAS Hydrological Data Collection Centre

October

During the month of October, there were 176 stations with exceedances, which is twice the number of the previous month. Most of the stations are located in Italy (65), related with the water level variable. In Slovenia there are 49 stations and in Spain there are 20 stations with exceedances.

Additionally, there are 11 stations in Austria, nine in Croatia and five in Poland and Ireland with exceedances. The following countries have recorded three ore less stations with exceedances this month: Switzerland, Hungary, Ukraine, Slovakia, Sweden, Bosnia and Herzegovina, Germany, and Norway.

As for the river basins, the main river basin with values above the thresholds this month is again the Po River, with 65 stations in two different countries, with Italia standing out. The Danube River in seven countries is the next river basin with the highest number of stations (58), followed by the Soca-Isonzo River basin with 13 stations showing exceedances in Slovenia. A total of 23 different river basins experienced exceedances in October.

In terms of recorded values of mean discharge above the 90% quantile, 171 stations exceeded this threshold during October. In October, Spain was the countries with the most stations in this situation (100), Ireland (14) and Luxembourg (13). The Spanish stations are distributed in eleven different river basins, highlighting the Minho River, with 36 stations exceeding this quantile. In Ireland there are seven basins affected, while in Luxembourg only the Rhine River basin is affected. In the United Kingdom, seven stations have values above this quantile. In France, six stations exceed this cliff. Other stations exceed the 90% quantile value in up to 17 countries. By river basin, the aforementioned Minho River stands out with 36 stations above the 90% quantile. The Ebro River basin (Spain) is the second with the highest number of stations over this cliff, showing 25 stations in this situation and followed by the Guadiana river basin (Spain) with 17 stations. A total of 50 different river basins have exceedances over the 90% quantile in October.

Finally, and according to the number of stations recording mean values below the 10% quantile, in October there were 100 stations with average values below this cliff at 18 different countries.

This month, Spain is the country with most of the stations (20), followed by Austria with 13 stations and Poland with 12 stations. Germany and Romania have eight stations with values below this threshold. With six stations we find France. Another 12 countries show five or less stations in this situation.

In terms of river basin, this month the Danube River is the one with the highest number of cases, with 49 stations with an average discharge below the 10% quantile. The Ebro River has 8 stations, same that the Oder river basin. In total, as many as 21 different basins have values below this limit in Europe.

November

During the month of November, there were 325 stations with exceedances, twice that of the previous month. Most of the stations are located again in Italy (67) and these exceedances relate to the water level variable. Slovenia (55) and Spain (51) were the next two countries with highest number of stations with exceedances.

Additional countries with high levels of station exceedances are Germany (33), Croatia (25), Switzerland (22), Austria (19). The following countries have recorded ten or less stations with exceedances this month: Sweden, Bosnia and Herzegovina, Norway, Ireland, Slovakia, Hungary, Poland, Belgium, Ukraine, Serbia, and France.

As for the river basins, the main river basin with values above the thresholds this month is the Danube River, with 122 stations in nine different countries, with Slovenia standing out. The Po River, focused in Italy, is the next river basin with the highest number of stations (63), followed by the Rhine River basin (27) showing exceedances in Germany and Switzerland. A total of 55 different river basins had exceedances in November.

In terms of stations that recorded values of mean discharge above the 90% quantile, 417 exceeded this threshold this month. In November, the country with the most stations in this situation was Spain (74). France (64) and Germany (60) are the countries with the next highest number of stations in this situation. The Spanish stations are distributed in nine different river basins, highlighting the Minho River (28) exceeding this quantile. In France there are eight basins affected while in Germany only the Danube river and Rhine river basins are affected. In Switzerland, 28 stations have values above this quantile. In Austria, 27 stations exceed this cliff. Other stations exceed the 90% quantile value in up to 23 countries.

By river basin, the aforementioned Danube River stands out with 95 stations above the 90% quantile. The Rhine River basin is the second with the highest number of stations over this cliff, showing 92 stations in this situation and followed by the Minho river basin (Spain) with 28. A total of 53 different river basins have exceedances over the 90% quantile in November.

Finally, and according to the number of stations recording mean values below the 10% quantile, in November there were 55 stations with average values below this cliff at ten different countries.

This month, Spain and Norway area the countries with most of the stations (20 each), followed by Romania with 7 stations and Bulgaria with 2 stations. Six countries show one station in this situation.

In terms of river basin, this month the Danube River is the one with the highest number of cases, with 10 stations with an average discharge below the 10% quantile. The Ebro River has 6 stations, one more than the Guadalquivir river basin. In total, as many as 33 different basins have values below this limit in Europe.

Verification

The verification is now based on the current operational system, EFAS version 5, which was released on 20 September 2023. Since EFAS version 5, the maps (Figure 4 and Figure 5) use climatology as the reference forecast as in Figure 6.



Figure 4: EFAS CRPSS at lead-time 1 day for October – November 2023, for catchments >1000km². The reference forecast is climatology.

Figure 4 and Figure 5 shows the EFAS headline score, the continuous ranked probability skill score (CRPSS) for lead times 1 and 5 days for October - November 2023 across the EFAS domain for catchments larger than 1000km². 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 yellow on the maps) indicates the skill is worse than the reference. Climatology is used as the reference forecast.



-1 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

Figure 5: EFAS CRPSS at lead-time 5 days for October-November 2023 for catchments >1000km². The reference forecast is climatology.

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

The skill of the forecast was high over the period, and similar to the same period last year (Figure 6). An interannual variability of the scores is to be expected. The long-term trend is neutral over the period since the domain was extended.



Figure 6: Monthly means of CRPSS for the 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 and red lines indicate the release of EFAS version 4 and EFAS version 5 respectively.

ARTICLES

Storm Babet impacts Ireland and the UK – October 2023 by Richard Davies, <u>floodlist</u>

Storm Babet triggered major flooding in parts of Ireland and the United Kingdom in October 2023. The UK's Met Office said some locations of the UK recorded well over their average October rainfall in just a few days.

Ireland

In Ireland, flood barriers were erected across Cork, Kerry and Waterford as Storm Babet moved across the country on 18 October 2023.

Severe flooding affected areas of Midleton in County Cork, where local authorities <u>reported as many as 100</u> <u>properties were flooded</u>. Defence Force teams were deployed to assist flood victims.

According to figures from the <u>Weather Observations</u> <u>Website</u> from Met Éireann, the weather station at Rostellan, Midleton, recorded 62.7 mm of rain on 18 October 2023.



Figure 7: Rostellan, Midleton rainfall accumulations from Weather Observations Website, Met Éireann

Scotland

In 19 October, heavy rain from Storm Babet, falling on previously saturated ground, caused flooding in parts of Scotland, UK. Parts of Scotland had already seen severe flooding and landslides earlier in the month after heavy rain on 07 October 2023. Copernicus EMS produced several maps of this event here: https://rapidmapping.emergency.copernicus.eu/EMS R698/download

During Storm Babet, residents of hundreds of homes were told to evacuate in Brechin, Tannadice and Finavon in western Scotland, UK, following warnings for flooding along the South Esk and North Esk Rivers, which reached record levels. Homes were also evacuated in Peterculter, Aberdeen.

Police later confirmed at least 3 storm-related fatalities in Scotland, including one in the flooding Water of Lee in Glen Esk and another in flood water near Marykirk in Aberdeenshire.

The South Esk River at Tannadice, Forfar, reached a record 4.32 metres on 20 October, exceeding the previous record high of 3.733 m set in December 2015, <u>according to figures</u> from the Scottish Environment Protection Agency (SEPA).

The North Esk (Tayside) River also reached a record high at Logie Mill, near Craigo, recording 5.074 metres

on 20 October, where the previous record high was 4.971 m set in November 2022.

England

Heavy rain from Storm Babet caused flooding in various parts of England from 20 October 2023. Areas of Suffolk, Derbyshire, Nottinghamshire, Lincolnshire and South Yorkshire were particularly badly affected.

The Environment Agency (EA) reported a total of 2,146 homes were damaged in England. An estimated 96,000 properties were protected as part of the EA's response which included the deployment of twenty high-volume pumps across several sites. The EA's flood warning service sent out over 300,000 messages by email, telephone and text during Storm Babet.

The Fire and Rescue Service rescued or evacuated people from homes in Sandiacre, Long Eaton and Stapleford near Nottingham and in areas of Chesterfield where an elderly person tragically died trapped in a flooded house. The local Member of Parliament, Toby Perkins, said 400 homes in his Chesterfield constituency were flooded.

Authorities urged residents of around 500 homes to evacuate after rising levels of the River Idle in Nottinghamshire threatened to flood areas of Retford, Ordsal, Retford, Eaton and Gamston. The River Idle reached record levels of 1.79 metres in Ordsal on 22 October. The previous record high was 1.65 metres set in June 2007.



Figure 8: Floods in Nottinghamshire, UK, following heavy rain from Storm Babet. Credit: Nottinghamshire Fire and Rescue Service

In the county of Lincolnshire, Fire and Rescue Service said dozens of homes and businesses were flooded in areas of Lincoln, Horncastle, Tattershall, Woodhall Spa, Wainfleet and Kirkby on Bain. Around 40 people evacuated their homes in Wainfleet. The River Steeping reached a record high of 2.22 metres on 21 October. The previous high was 2.12 metres set in June 2007.

<u>Lincolnshire County Council later confirmed</u> 583 properties including four schools, suffered internal flooding as a result of the storm.

Towns and villages in Babergh and Mid Suffolk districts in Suffolk were also badly affected. Suffolk County Council declared a major incident due to flooding, and asked people not to travel unless essential.



Figure 9: Flooding Suffolk, UK, following heavy rain from Storm Babet. Credit: Suffolk County Council

In South Yorkshire, around 250 homes were evacuated in Catcliffe near Rotherham where the River Rother reached record levels of 30.52 metres on 21 October. The previous high was 30.37 metres set in June 2007.

"Our heartfelt sympathies and condolences are with those who have lost loved ones in Storm Babet as well as those who are experiencing the devastating impact of having their homes and businesses flooded," Sarah Cook, flood duty manager at the Environment Agency, said.

Flooding in Tuscany Region, Italy - November 2023

by Richard Davies, <u>floodlist</u>

In the wake of Storm Ciarán's destructive path across Western Europe from late October to early November 2023, the region of Tuscany in central Italy faced catastrophic flooding and landslides that prompted officials to declare a state of emergency on 03 November.



Figure 10: Floods in Tuscany, Italy, early November 2023. Photo: Government of Tuscany

The <u>Regional Functional Center</u> in Tuscany, revealed significant rainfall figures, with several areas recording over 200 mm of rain within a 24-hour period up to 03 November. Notably, Vagli di Sotto's weather station recorded 246.6 mm during this timeframe. Additionally, the Pontedera weather station in the province of Pisa recorded 198.6 mm in just a 4-hour period from on 02 November.



Figure 11: Floods in Tuscany, Italy, early November 2023. Photo: Government of Tuscany

The torrential rain triggered multiple landslides and caused several water bodies to break their banks, including the Furba stream in Carmignano, the Bagnolo stream in Montemurlo and the Bisenzio River in Santa Maria a Campi. Swollen tributaries of Ombrone River flooded areas of Pistoia, Agliana, Quarrata and Serravalle Pistoiese in the Pistoia Province.



Figure 12: Floods in Tuscany, Italy, early November 2023. Photo: Government of Tuscany

In response to the crisis, teams from the National Civil Protection were swiftly deployed to the affected areas, utilizing helicopters, boats, and amphibious vehicles to conduct rescue operations and locate missing individuals. Between 02 and 03 November over 1,000 interventions were carried out across the provinces of Florence, Livorno, Lucca, Pisa, Pistoia, and Prato.

Tragically, fatalities were reported in various locations, including Montemurlo in the Province of Prato (2), Rosignano Marittimo in the Province of Livorno (1), Pistoia in the Province of Pistoia (2), Lamporecchio in the Province of Pistoia (1), and Campi Bisenzio in the Metropolitan City of Florence (1). The body of an eigth victim was later discovered in Prato.



Figure 13: Floods in Tuscany, Italy, early November 2023. Photo: Government of Tuscany

The disaster forced hundreds of people to evacuate their homes, with notable evacuations in Calcinaia and

San Miniato in the Province of Pisa, as well as various areas in the Province of Pistoia. Around 12,000 residents in Campi Bisenzio, Florence, and another 2,000 in Seano in Prato Province were forced to remain in their homes due to dangerously high floodwaters.



Figure 14: Floods in Tuscany, Italy, early November 2023. Photo: Government of Tuscany

Transportation services were severely impacted, with a regional train line suspended, leading to the evacuation of approximately 150 passengers. These individuals were provided temporary accommodation at a municipal building in Vaiano.

Copernicus EMS Rapid Mapping was activated to provide maps of the flood and damages: <u>https://rapidmapping.emergency.copernicus.eu/EMS</u> <u>R705/download</u>

In a report of 17 November, the regional government estimated the overall damage at over 2 billion euros.

CEMS-MDCC publishes Annual Report for 2022 by CEMS-MDCC

The CEMS Meteorological Data Collection Centre Annual Report for the reference year 2022 has now been published on the EFAS website, under the section <u>Resources</u>.

This report provides an overview of the data collection, quality control, and postprocessing activities completed during the year 2022. 35 data providers contributed to the CEMS MDCC database by sharing data from around 54,500 stations, of which 22,000 provide data in near-real time.



Figure 15: Spatial distribution of stations delivering real-time data for at least one meteorological parameter in 2022

The CEMS EFAS team, and particularly CEMS MDCC, would like to thank the EFAS Partners and Data providers that contributed to the CEMS meteorological data collection. Without their collaboration, the delivery of the report and of the service would not be possible.

Information on how to contribute to the CEMS MDCC database are available here: <u>Share your data with EFAS</u>

CEMS-HDCC publishes Annual Report for 2022 by CEMS-HDCC



Figure 16: Spatial distribution of stations delivering near real time data for at least one hydrological parameter in 2022

The CEMS Hydrological Data Collection Centre Annual Report for the reference year 2022 has now been

published on the EFAS website, under the section <u>Resources</u>.

This report provides an overview of the data collection, quality control, and post-processing activities completed during the year 2022. 49 EFAS data providers contributed to the CEMS HDCC database by sharing near real time data from 2,382 stations across Europe, covering 33 countries and 54% of all the European water basins.

Starting from 2022, CEMS HDCC is responsible for the collection, quality control, and harmonization of daily historical discharge data for the global domain: 2,588 stations from 98 countries and 46 data providers were included in the CEMS HDCC database.

The CEMS EFAS team, and particularly CEMS HDCC, would like to thank the EFAS Partners and Data providers that contributed to the CEMS hydrological data collection. Without their collaboration, the delivery of the report and of the service would not be possible.

Information on how to contribute to the CEMS HDCC database are available here: <u>Share your data with EFAS</u>

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: UK rainfall from Storm Babet. Credit: Met Office

Appendix – figures

Reporting of the meteorological situation by the Meteorological Data Collection Centre (MDCC) is **no longer** 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 <u>Climate Bulletins</u>.





Figure 18: Lowest alert level exceedance for October 2023.



Figure 20: Lowest alert level exceedance for November 2023.





Figure 22: Lowest threshold exceedance for November 2023.



Figure 23: EFAS flood notifications sent for October 2023



Figure 24: Flash notifications sent for October 2023



Figure 25: EFAS flood notifications sent for November 2023.



Figure 26: Flash notifications sent for November 2023.

Appendix - tables

Table 1: EFAS flood notifications sent in October – November 2023

Туре	Forecast Date	Issue Date	Lead Time	River	Country
Informal	03/10/2023 12 UTC	04/10/2023	18	Vuoksa	Russian
Informal		06/10/2022	20	Forth	Federation
Informal	00/10/2023 00 0TC	06/10/2023	50 42	Forth	United Kingdom
Informal	05/10/2025 12 010	00/10/2023	42	Tay	Einland
IIIIOIIIIdi	07/10/2025 00 010	07/10/2023	50	VUOKSI	Pussian
Informal	07/10/2023 00 UTC	07/10/2023	6	Vuoksa	Federation
Informal	06/10/2023 12 UTC	07/10/2023	18	Ness	United Kingdom
Formal	08/10/2023 12 UTC	09/10/2023	48	Vuoksi	Finland
Formal	08/10/2023 12 UTC	09/10/2023	48	Vuoksi	Finland
Informal	10/10/2023 00 UTC	10/10/2023	18	Norwegian Sea	Norway
Informal	11/10/2023 00 UTC	11/10/2023	144	Coastal	Iceland
Informal	11/10/2023 00 UTC	11/10/2023	132	Markarfljot	Iceland
Informal	11/10/2023 12 UTC	12/10/2023	138	Skaftá	Iceland
Informal	11/10/2023 12 UTC	12/10/2023	138	Olfusa	Iceland
Formal	11/10/2023 12 UTC	12/10/2023	138	Oelfusa	Iceland
Informal	13/10/2023 00 UTC	13/10/2023	114	Eldvatn	Iceland
Informal	12/10/2023 12 UTC	13/10/2023	126	Krosslækir	Iceland
Informal	12/10/2023 12 UTC	13/10/2023	108	Bruara	Iceland
Informal	16/10/2023 00 UTC	16/10/2023	48	Kúðafljót	Iceland
Informal	16/10/2023 00 UTC	16/10/2023	96	Don	United Kingdom
Formal	15/10/2023 12 UTC	16/10/2023	108	LAGARFLJOT	Iceland
Informal	15/10/2023 12 UTC	16/10/2023	84	DEE (SCOTLAND)	United Kingdom
Informal	15/10/2023 12 UTC	16/10/2023	54	Tiétar	Spain
Formal	17/10/2023 00 UTC	17/10/2023	60	Tiétar	Spain
Informal	16/10/2023 12 UTC	17/10/2023	72	Hólsá	Iceland
Formal	18/10/2023 00 UTC	18/10/2023	54	Durance	France
Informal	18/10/2023 00 UTC	18/10/2023	24	Lima	Portugal
Informal	18/10/2023 00 UTC	18/10/2023	36	Jarama	Spain
Informal	18/10/2023 00 UTC	18/10/2023	42	Duero	Spain
Formal	18/10/2023 00 UTC	18/10/2023	42	Alagón	Spain
Formal	17/10/2023 12 UTC	18/10/2023	48	Tay	United Kingdom
Informal	19/10/2023 00 UTC	19/10/2023	36	Rhine	Austria
Informal	19/10/2023 00 UTC	19/10/2023	30	Adda	Italy
Informal	19/10/2023 00 UTC	19/10/2023	36	Rhine	, Austria
Informal	19/10/2023 00 UTC	19/10/2023	24	Oglio	Italy
Informal	18/10/2023 12 UTC	19/10/2023	42	Rhine	, Switzerland
Formal	19/10/2023 12 UTC	20/10/2023	36	Duero	Spain
Informal	21/10/2023 00 UTC	21/10/2023	12	Tagus	Portugal
Informal	24/10/2023 12 UTC	25/10/2023	66	Latorica	Ukraine
Informal	24/10/2023 12 UTC	25/10/2023	36	Sil	Spain
Informal	26/10/2023 00 UTC	26/10/2023	6	MINHO	Portugal
Informal	26/10/2023 00 UTC	26/10/2023	36	Slana	Hungary
Formal	26/10/2023 00 UTC	26/10/2023	108	Duero	Spain
Formal	26/10/2023 00 UTC	26/10/2023	12	Vouga	Portugal

Informal	26/10/2023 00 UTC	26/10/2023	12	Cinca	Spain
Informal	25/10/2023 12 UTC	26/10/2023	48	Тересва	Ukraine
Informal	25/10/2023 12 UTC	26/10/2023	36	Isonzo	Italy
Informal	25/10/2023 12 UTC	26/10/2023	42	BODVAJ	Hungary
Formal	25/10/2023 12 UTC	26/10/2023	60	Bodrog	Hungary
Formal	25/10/2023 12 UTC	26/10/2023	60	Bodrog	Slovakia
Formal	25/10/2023 12 UTC	26/10/2023	54	Latorica	Slovakia
Formal	25/10/2023 12 UTC	26/10/2023	48	Uzh	Slovakia
Informal	25/10/2023 12 UTC	26/10/2023	42	Uzh	Ukraine
Formal	25/10/2023 12 UTC	26/10/2023	54	Latorica	Ukraine
Formal	25/10/2023 12 UTC	26/10/2023	18	Mino	Spain
Formal	28/10/2023 00 UTC	28/10/2023	42	Tiétar	Spain
Formal	28/10/2023 00 UTC	28/10/2023	48	Cinca	Spain
Formal	29/10/2023 00 UTC	29/10/2023	30	Cinca	Spain
Formal	29/10/2023 00 UTC	29/10/2023	144	Dordogne/ Garone	France
Informal	29/10/2023 00 UTC	29/10/2023	0	Lima	Portugal
Informal	29/10/2023 00 UTC	29/10/2023	36	Moll	Austria
Informal	29/10/2023 00 UTC	29/10/2023	36	Piave	Italy
Informal	29/10/2023 00 UTC	29/10/2023	26	Torronto Noco	Italy
Formal	29/10/2023 00 0TC	29/10/2023	126	Dordogno	Eranço
Formal	28/10/2023 12 UTC	29/10/2023	120	Minho	Spain
Formal	28/10/2023 12 UTC	29/10/2023	12		Spain
Formal	28/10/2023 12 UTC	29/10/2023	12	TAMEGA	Portugar
Informal	28/10/2023 12 UTC	29/10/2023	48	Lagiamento	Italy
Informal	30/10/2023 00 UTC	30/10/2023	18	Gall	Austria
Informal	30/10/2023 00 010	30/10/2023	18	Drava	Austria
Formal	29/10/2023 12 UTC	30/10/2023	84	SII	Spain
Formal	29/10/2023 12 010	30/10/2023	30	Dordogne	France
Formal	29/10/2023 12 010	30/10/2023	30	Dordogne	France
Formal	01/11/2023 00 UTC	01/11/2023	/8	Gavlean	Sweden
Formal	01/11/2023 00 01C	01/11/2023	156	Arbogaan	Sweden
Formal	31/10/2023 12 UTC	01/11/2023	36	Mino	Spain
Informal	01/11/2023 00 UTC	01/11/2023	42	Soca	Slovenia
Informal	01/11/2023 00 UTC	01/11/2023	42	Isonzo	Italy
Informal	01/11/2023 00 UTC	01/11/2023	36	Torrente Noce	Italy
Formal	31/10/2023 12 UTC	01/11/2023	48	Dordogne	France
Informal	31/10/2023 12 UTC	01/11/2023	48	Moll	Austria
Informal	31/10/2023 12 UTC	01/11/2023	48	Tagliamento	Italy
Formal	31/10/2023 12 UTC	01/11/2023	54	Piave	Italy
Informal	31/10/2023 12 UTC	01/11/2023	54	Brenta	Italy
Formal	31/10/2023 12 UTC	01/11/2023	60	Velino	Italy
Formal	01/11/2023 12 UTC	02/11/2023	18	Dordogne	France
Informal	01/11/2023 12 UTC	02/11/2023	24	ADIGE	Italy
Informal	03/11/2023 00 UTC	03/11/2023	18	Drava	Croatia
Informal	02/11/2023 12 UTC	03/11/2023	18	Drava	Slovenia
Informal	03/11/2023 12 UTC	04/11/2023	0	Norwegian Sea	Norway
Informal	03/11/2023 12 UTC	04/11/2023	0	Reka	Slovenia
Informal	03/11/2023 12 UTC	04/11/2023	42	Slana	Hungary
Informal	03/11/2023 12 UTC	04/11/2023	42	BODVAJ	Hungary
Informal	05/11/2023 00 UTC	05/11/2023	0	Sava	Croatia
Informal	08/11/2023 00 UTC	08/11/2023	42	Velino	Italy
Formal	08/11/2023 00 UTC	08/11/2023	0	Vézère	France

Informal	07/11/2023 12 UTC	08/11/2023	0	Mincio	Italy
Informal	09/11/2023 00 UTC	09/11/2023	6	Dordogne	France
Formal	08/11/2023 12 UTC	09/11/2023	48	Navia	Spain
Formal	08/11/2023 12 UTC	09/11/2023	0	Eyre	France
Formal	08/11/2023 12 UTC	09/11/2023	24	Dordogne	France
Informal	18/11/2023 00 UTC	18/11/2023	18	Danube	Romania
Formal	18/11/2023 00 UTC	18/11/2023	18	Danube	Romania
Formal	19/11/2023 00 UTC	19/11/2023	132	რიონი	Georgia
Formal	18/11/2023 12 UTC	19/11/2023	60	Markarfljot	Iceland
Formal	19/11/2023 12 UTC	20/11/2023	120	რიონი	Georgia
Informal	22/11/2023 00 UTC	22/11/2023	30	MINIJA	Lithuania
Informal	28/11/2023 00 UTC	28/11/2023	66	Sebes-Körös	Romania
Informal	28/11/2023 00 UTC	28/11/2023	90	Túr-belvíz-főcsatorna	Hungary
Formal	28/11/2023 00 UTC	28/11/2023	84	Crisul Repede	Hungary
Formal	28/11/2023 00 UTC	28/11/2023	72	Crisul Repede	Romania
Formal	28/11/2023 00 UTC	28/11/2023	66	Sebes-Körös	Romania
Informal	29/11/2023 00 UTC	29/11/2023	54	Aries	Romania
Informal	29/11/2023 00 UTC	29/11/2023	48	Iza	Romania
Informal	29/11/2023 00 UTC	29/11/2023	72	Koros	Hungary
Informal	28/11/2023 12 UTC	29/11/2023	54	Кира	Slovenia
Informal	28/11/2023 12 UTC	29/11/2023	60	КоІра	Slovenia
Formal	28/11/2023 12 UTC	29/11/2023	60	Кира	Croatia
Informal	28/11/2023 12 UTC	29/11/2023	66	Danube	Romania
Formal	28/11/2023 12 UTC	29/11/2023	84	Crisul Negru	Hungary
Formal	28/11/2023 12 UTC	29/11/2023	84	Crisul Negru	Romania
Formal	28/11/2023 12 UTC	29/11/2023	84	Harmas-Koros	Hungary
Formal	28/11/2023 12 UTC	29/11/2023	66	Someșul Mare	Romania

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

Table 2: EFAS Flash notifications sent in October – November 2023

Туре	Forecast Date	Issue Date	Lead Time	Region	Country
Flash Flood	02/10/2023 00 UTC	02/10/2023	36	Coastal	Denmark
Flash Flood	02/10/2023 00 UTC	02/10/2023	24	Humber	United Kingdom
Flash Flood	03/10/2023 00 UTC	03/10/2023	36	Scotland	United Kingdom
Flash Flood	02/10/2023 12 UTC	03/10/2023	24	Coastal	Sweden
Flash Flood	02/10/2023 12 UTC	03/10/2023	24	Gota	Sweden
Flash Flood	02/10/2023 12 UTC	03/10/2023	24	Coastal	Denmark
Flash Flood	04/10/2023 00 UTC	04/10/2023	36	Neman/Nemunas/Nyoman)	Lithuania
Flash Flood	06/10/2023 00 UTC	06/10/2023	42	Coastal	United Kingdom
Flash Flood	06/10/2023 00 UTC	06/10/2023	36	Scotland	United Kingdom
Flash Flood	06/10/2023 00 UTC	06/10/2023	42	North Sea	United Kingdom
Flash Flood	05/10/2023 12 UTC	06/10/2023	48	Coastal	United Kingdom
Flash Flood	05/10/2023 12 UTC	06/10/2023	48	Ness	United Kingdom
Flash Flood	05/10/2023 12 UTC	06/10/2023	42	North Atlantic	United Kingdom
Flash Flood	06/10/2023 12 UTC	07/10/2023	30	Coastal	United Kingdom
Flash Flood	10/10/2023 00 UTC	10/10/2023	48	Coastal	Ireland
Flash Flood	10/10/2023 00 UTC	10/10/2023	36	Coastal	United Kingdom

Flash Flood	10/10/2023 00 UTC	10/10/2023	36	Mersey	United Kingdom
Flash Flood	09/10/2023 12 UTC	10/10/2023	48	Coastal	United Kingdom
Flash Flood	09/10/2023 12 UTC	10/10/2023	48	Coastal	United Kingdom
Flash Flood	10/10/2023 12 UTC	11/10/2023	12	Norwegian Sea	Norway
Flash Flood	10/10/2023 12 UTC	11/10/2023	30	Severn	United Kingdom
Flash Flood	10/10/2023 12 UTC	11/10/2023	24	Barrow	Ireland
Flash Flood	12/10/2023 00 UTC	12/10/2023	42	Lagen	Norway
Flash Flood	12/10/2023 00 UTC	12/10/2023	30	Mersey	United Kingdom
Flash Flood	12/10/2023 00 UTC	12/10/2023	30	Coastal	United Kingdom
Flash Flood	11/10/2023 12 UTC	12/10/2023	42	Trent	United Kingdom
Flash Flood	12/10/2023 12 UTC	13/10/2023	30	Lagen	Norway
Flash Flood	14/10/2023 12 UTC	15/10/2023	48	Dnieper	Ukraine
Flash Flood	16/10/2023 00 UTC	16/10/2023	42	Ireland	Ireland
Flash Flood	17/10/2023 00 UTC	17/10/2023	48	Mino/Minho	Spain
Flash Flood	17/10/2023 00 UTC	17/10/2023	18	Tagus/Tejo	Spain
Flash Flood	17/10/2023 00 UTC	17/10/2023	48	Iberian Peninsula	Portugal
Flash Flood	17/10/2023 00 UTC	17/10/2023	42	Coastal	Ireland
Flash Flood	17/10/2023 00 UTC	17/10/2023	48	Coastal	United Kingdom
Flash Flood	16/10/2023 12 UTC	17/10/2023	36	Vouga	Portugal
Flash Flood	16/10/2023 12 UTC	17/10/2023	42	Tagus/Tejo	Spain
Flash Flood	16/10/2023 12 UTC	17/10/2023	48	Coastal	Ireland
Flash Flood	16/10/2023 12 UTC	17/10/2023	24	Tyrrhenian Sea, Ligurian Sea	Italy
Flash Flood	18/10/2023 00 UTC	18/10/2023	48	Coastal	United Kingdom
Flash Flood	18/10/2023 00 UTC	18/10/2023	24	Hérault	France
Flash Flood	18/10/2023 00 UTC	18/10/2023	48	Ebro	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	48	Ebro	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	42	Douro/Duero	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	42	Douro/Duero	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	42	Tagus/Tejo	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	42	Mino/Minho	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	42	Douro/Duero	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	42	Tagus/Tejo	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	42	Guadiana	Portugal
Flash Flood	18/10/2023 00 UTC	18/10/2023	42	Guadiana	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	42	Guadalquivir	Spain
Flash Flood	18/10/2023 00 UTC	18/10/2023	48	Coastal	Spain
Flash Flood	17/10/2023 12 UTC	18/10/2023	36	Shannon	Ireland
Flash Flood	19/10/2023 00 UTC	19/10/2023	30	Spey	United Kingdom
Flash Flood	19/10/2023 00 UTC	19/10/2023	48	Wear	United Kingdom
Flash Flood	19/10/2023 00 UTC	19/10/2023	42	Coastal	United Kingdom
Flash Flood	19/10/2023 00 UTC	19/10/2023	42	Nene	United Kingdom
Flash Flood	19/10/2023 00 UTC	19/10/2023	36	Rhone	France
Flash Flood	19/10/2023 00 UTC	19/10/2023	36	Rhine	Switzerland
Flash Flood	19/10/2023 00 UTC	19/10/2023	36	Rhone	Switzerland
Flash Flood	19/10/2023 00 UTC	19/10/2023	30	Rhone	France
Flash Flood	19/10/2023 00 UTC	19/10/2023	18	Coastal	Portugal
Flash Flood	19/10/2023 00 UTC	19/10/2023	48	Coastal	Germany
Flash Flood	19/10/2023 00 UTC	19/10/2023	48	Baltic Sea	Germany
Flash Flood	19/10/2023 00 UTC	19/10/2023	42	Coastal	Italy
Flash Flood	19/10/2023 00 UTC	19/10/2023	42	Adriatic Sea	Italy

Flash Flood	19/10/2023 00 UTC	19/10/2023	48	Soca/Isonzo	Slovenia
Flash Flood	18/10/2023 12 UTC	19/10/2023	36	Coastal	United Kingdom
Flash Flood	18/10/2023 12 UTC	19/10/2023	42	Coastal	United Kingdom
Flash Flood	18/10/2023 12 UTC	19/10/2023	42	Coastal	United Kingdom
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	Coastal	United Kingdom
Flash Flood	18/10/2023 12 UTC	19/10/2023	42	Тау	United Kingdom
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	North Sea	United Kingdom
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	Tees	United Kingdom
Flash Flood	18/10/2023 12 UTC	19/10/2023	12	Trent	United Kingdom
Flash Flood	18/10/2023 12 UTC	19/10/2023	42	Loire	France
Flash Flood	18/10/2023 12 UTC	19/10/2023	42	Rhone	France
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	Rhone	France
Flash Flood	18/10/2023 12 UTC	19/10/2023	42	Rhone	France
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	Ро	Switzerland
Flash Flood	18/10/2023 12 UTC	19/10/2023	42	Rhone	France
Flash Flood	18/10/2023 12 UTC	19/10/2023	24	Mondego	Portugal
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	Sella	Spain
Flash Flood	18/10/2023 12 UTC	19/10/2023	30	Douro/Duero	Spain
Flash Flood	18/10/2023 12 UTC	19/10/2023	30	Guadiana	Spain
Flash Flood	18/10/2023 12 UTC	19/10/2023	30	Guadalquivir	Spain
	40/40/2022 42 1170	40/40/2022	40	Tyrrhenian Sea, Ligurian	14 - L
Flash Flood	18/10/2023 12 010	19/10/2023	48	Sea	italy
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	Ро	Italy
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	Ро	Italy
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	Ро	Italy
Flash Flood	18/10/2023 12 UTC	19/10/2023	48	Adige	Italy
Flash Flood	18/10/2023 12 UTC	19/10/2023	36	Coastal	Croatia
Flash Flood	20/10/2023 00 UTC	20/10/2023	36	Venta	Latvia
Elach Elood	20/10/2022 00 LITC	20/10/2022	26	Neman/Nemunas/Nyoman	Lithuania
Flash Flood	20/10/2023 00 010	20/10/2023	30)	Litiluallia
Flash Flood	19/10/2023 12 UTC	20/10/2023	42	Tweed	United Kingdom
Flash Flood	19/10/2023 12 UTC	20/10/2023	30	Thames	United Kingdom
Flash Flood	19/10/2023 12 UTC	20/10/2023	30	Coastal	United Kingdom
Flash Flood	19/10/2023 12 UTC	20/10/2023	18	Rhone	France
Flash Flood	19/10/2023 12 UTC	20/10/2023	42	Kävlingeån	Sweden
Flash Flood	19/10/2023 12 UTC	20/10/2023	42	Gudena	Denmark
Flash Flood	19/10/2023 12 UTC	20/10/2023	18	Seine	France
Elash Elood	10/10/2023 12 LITC	20/10/2023	18	Neretva	Bosnia and
Tasii Tioou	19/10/2023 12 010	20/10/2023	40	Neretva	Herzegovina
Flash Flood	19/10/2023 12 UTC	20/10/2023	48	Neretva	Croatia
Flash Flood	19/10/2023 12 UTC	20/10/2023	48	Adriatic Sea	Croatia
Flash Flood	19/10/2023 12 UTC	20/10/2023	30	Coastal	France
Flash Flood	19/10/2023 12 UTC	20/10/2023	48	Krka	Croatia
Flash Flood	19/10/2023 12 UTC	20/10/2023	48	Zrmanja	Croatia
Flash Flood	19/10/2023 12 UTC	20/10/2023	18	Ро	Italy
Flash Flood	21/10/2023 00 UTC	21/10/2023	18	Lielupe	Latvia
Flash Flood	21/10/2023 00 UTC	21/10/2023	24	Danube	Slovakia
Flash Flood	21/10/2023 00 UTC	21/10/2023	30	Danube	Slovakia
Flash Flood	21/10/2023 00 UTC	21/10/2023	48	Douro/Duero	Spain
Flash Flood	21/10/2023 00 UTC	21/10/2023	48	Douro/Duero	Spain
Flash Flood	21/10/2023 00 UTC	21/10/2023	48	Tagus/Tejo	Spain

Flash Flood	21/10/2023 00 UTC	21/10/2023	48	Tagus/Tejo	Spain
Flash Flood	21/10/2023 00 UTC	21/10/2023	48	Tagus/Tejo	Spain
Flash Flood	21/10/2023 00 UTC	21/10/2023	48	Guadiana	Spain
Flash Flood	21/10/2023 00 UTC	21/10/2023	48	Douro/Duero	Spain
Flash Flood	20/10/2023 12 UTC	21/10/2023	30	North Sea	United Kingdom
Flash Flood	20/10/2023 12 UTC	21/10/2023	30	Coastal	United Kingdom
Flash Flood	22/10/2023 00 UTC	22/10/2023	48	Rhone	France
Flash Flood	22/10/2023 00 UTC	22/10/2023	18	Guadiana	Portugal
Flash Flood	22/10/2023 00 UTC	22/10/2023	18	Tagus/Tejo	Spain
Flash Flood	22/10/2023 00 UTC	22/10/2023	24	Douro/Duero	Spain
Flash Flood	21/10/2023 12 UTC	22/10/2023	24	Oder	Poland
Flash Flood	21/10/2023 12 UTC	22/10/2023	48	Coastal	Ireland
Flash Flood	21/10/2023 12 UTC	22/10/2023	36	Douro/Duero	Spain
Flash Flood	21/10/2023 12 UTC	22/10/2023	36	Douro/Duero	Spain
Flash Flood	21/10/2023 12 UTC	22/10/2023	18	Danube	Slovakia
Flash Flood	21/10/2023 12 UTC	22/10/2023	18	Danube	Slovakia
Flash Flood	21/10/2023 12 UTC	22/10/2023	18	Danube	Slovakia
Flash Flood	21/10/2023 12 UTC	22/10/2023	30	Tagus/Tejo	Portugal
Flash Flood	23/10/2023 00 UTC	23/10/2023	30	Rhone	France
Flash Flood	23/10/2023 00 UTC	23/10/2023	42	Adriatic Sea	Italy
Flash Flood	23/10/2023 00 UTC	23/10/2023	36	Adriatic Sea	Italy
Flash Flood	23/10/2023 00 UTC	23/10/2023	36	Ро	Italy
Flash Flood	22/10/2023 12 UTC	23/10/2023	48	Ро	Italy
Flash Flood	22/10/2023 12 UTC	23/10/2023	42	Rhone	France
Flash Flood	22/10/2023 12 UTC	23/10/2023	42	Rhone	France
Flash Flood	24/10/2023 00 UTC	24/10/2023	24	Tiber	Italy
Flash Flood	24/10/2023 00 UTC	24/10/2023	18	Coastal	Italy
Flash Flood	24/10/2023 00 UTC	24/10/2023	18	Soca/Isonzo	Slovenia
Flash Flood	24/10/2023 00 UTC	24/10/2023	48	Dnieper	Ukraine
Flash Flood	24/10/2023 00 UTC	24/10/2023	18	Corsica And Sardinia	France
Flash Flood	24/10/2023 00 UTC	24/10/2023	36	Coastal	Denmark
Flash Flood	23/10/2023 12 UTC	24/10/2023	18	Rhone	France
Flash Flood	23/10/2023 12 UTC	24/10/2023	18	Rhone	France
Flash Flood	23/10/2023 12 UTC	24/10/2023	36	Coastal	France
Flash Flood	23/10/2023 12 UTC	24/10/2023	42	Tyrrhenian Sea, Ligurian Sea	Italy
Flash Flood	23/10/2023 12 UTC	24/10/2023	36	Coastal	Croatia
Flash Flood	23/10/2023 12 UTC	24/10/2023	42	Coastal	Croatia
Flash Flood	25/10/2023 00 UTC	25/10/2023	48	Rhone	France
Flash Flood	25/10/2023 00 UTC	25/10/2023	48	Rhine	Switzerland
Flash Flood	25/10/2023 00 UTC	25/10/2023	48	Coastal	Italv
Flash Flood	25/10/2023 00 UTC	25/10/2023	12	Seine	France
Flash Flood	25/10/2023 00 UTC	25/10/2023	12	Seine	France
Flash Flood	25/10/2023 00 UTC	25/10/2023	12	Seine	France
Flash Flood	25/10/2023 00 UTC	25/10/2023	36	Ebro	Spain
Flash Flood	25/10/2023 00 UTC	25/10/2023	36	Coastal	Spain
Flash Flood	25/10/2023 00 UTC	25/10/2023	36	Douro/Duero	Portugal
Flash Flood	24/10/2023 12 UTC	25/10/2023	36	Mati	Albania
Flash Flood	24/10/2023 12 UTC	25/10/2023	48	Mino/Minho	Spain
Flash Flood	24/10/2023 12 UTC	25/10/2023	24	Coastal	Denmark
Flash Flood	24/10/2023 12 UTC	25/10/2023	48	Navia	Spain

Flash Flood	24/10/2023 12 UTC	25/10/2023	42	Mino/Minho	Spain
Flash Flood	24/10/2023 12 UTC	25/10/2023	48	Iberian Peninsula	Portugal
Flash Flood	26/10/2023 00 UTC	26/10/2023	42	Vistula	Poland
Flash Flood	26/10/2023 00 UTC	26/10/2023	42	Vistula	Ukraine
Flash Flood	26/10/2023 00 UTC	26/10/2023	24	Rhone	France
Flash Flood	26/10/2023 00 UTC	26/10/2023	24	Rhone	Switzerland
Flash Flood	26/10/2023 00 UTC	26/10/2023	30	Reka	Slovenia
Flash Flood	25/10/2023 12 UTC	26/10/2023	48	Danube	Ukraine
Flash Flood	25/10/2023 12 UTC	26/10/2023	18	Iberian Peninsula	Spain
Flash Flood	25/10/2023 12 UTC	26/10/2023	24	Vouga	Portugal
Flash Flood	25/10/2023 12 UTC	26/10/2023	48	Danube	Hungary
Flash Flood	25/10/2023 12 UTC	26/10/2023	48	Danube	Hungary
Flash Flood	25/10/2023 12 UTC	26/10/2023	48	Danube	Hungary
Flash Flood	25/10/2023 12 UTC	26/10/2023	48	Danube	Hungary
Flash Flood	25/10/2023 12 UTC	26/10/2023	48	Danube	Slovakia
Flash Flood	25/10/2023 12 UTC	26/10/2023	48	Danube	Slovakia
Flash Flood	25/10/2023 12 UTC	26/10/2023	48	Danube	Slovakia
Flash Flood	25/10/2023 12 UTC	26/10/2023	40	Danube	Slovakia
Flash Flood	25/10/2023 12 UTC	26/10/2023	40 // R	Danube	Slovakia
Flash Flood	25/10/2023 12 UTC	26/10/2023	40 //2	Soca/Isonzo	
Flash Flood	25/10/2023 12 UTC	26/10/2023	42 12	Danube	Slovenia
Flash Flood	25/10/2023 12 UTC	26/10/2023	42	Soca/Isonzo	Slovenia
Flash Flood	25/10/2023 12 UTC	20/10/2023	42		Slovenia
Flash Flood	25/10/2023 12 UTC	20/10/2023	42 10	Coastal	Creatia
Flash Flood	25/10/2025 12 UTC	20/10/2023	40	Coastal	Croatia
Flash Flood	25/10/2025 12 UTC	20/10/2023	42 10	Coastal Box Of Biccov	Croacia
Flash Flood	27/10/2023 00 UTC	27/10/2023	40	Bdy Of BISCdy	Fidlice
Flash Flood	27/10/2023 00 010	27/10/2023	24 40	Vistula Deuro (Duero	Polaliu
Flash Flood	2//10/2023 00 0TC	27/10/2023	40	Douro/Duero	Portugal
Flash Flood	20/10/2023 12 UTC	27/10/2023	30	Danube	Romania
Flash Flood	20/10/2023 12 UTC	27/10/2023	24	Danube	Siovakia
Flash Flood	26/10/2023 12 UTC	27/10/2023	24	Danube	Romania
Flash Flood	26/10/2023 12 UTC	27/10/2023	30	Danube	Slovakia
Flash Flood	26/10/2023 12 UTC	27/10/2023	24	Danube	Slovenia
Flash Flood	28/10/2023 00 UTC	28/10/2023	48	Coastal	United Kingdom
Flash Flood	28/10/2023 00 UTC	28/10/2023	48	Coastal	United Kingdom
Flash Flood	28/10/2023 00 UTC	28/10/2023	24	Bay Of Biscay	France
Flash Flood	28/10/2023 00 UTC	28/10/2023	30	Douro/Duero	Spain
Flash Flood	28/10/2023 00 UTC	28/10/2023	66	lagus/lejo	Spain
Flash Flood	28/10/2023 00 UTC	28/10/2023	54	Guadiana	Spain
Flash Flood	27/10/2023 12 UTC	28/10/2023	60	Tagus/Tejo	Spain
Flash Flood	27/10/2023 12 UTC	28/10/2023	36	Lima/Limia	Portugal
Flash Flood	27/10/2023 12 UTC	28/10/2023	48	Dee	United Kingdom
Flash Flood	29/10/2023 00 UTC	29/10/2023	30	Tagus/Tejo	Spain
Flash Flood	29/10/2023 00 UTC	29/10/2023	30	Douro/Duero	Spain
Flash Flood	29/10/2023 00 UTC	29/10/2023	48	Danube	Austria
Flash Flood	29/10/2023 00 UTC	29/10/2023	48	Danube	Austria
Flash Flood	29/10/2023 00 UTC	29/10/2023	42	Adige	Italy
Flash Flood	29/10/2023 00 UTC	29/10/2023	48	Adriatic Sea	Italy
Flash Flood	29/10/2023 00 UTC	29/10/2023	48	Adige	Italy
Flash Flood	29/10/2023 00 UTC	29/10/2023	48	Ро	Italy
Flash Flood	28/10/2023 12 UTC	29/10/2023	18	Tees	United Kingdom

Flash Flood	30/10/2023 00 UTC	30/10/2023	18	Rhone	France
Flash Flood	29/10/2023 12 UTC	30/10/2023	12	Douro/Duero	Spain
Flash Flood	29/10/2023 12 UTC	30/10/2023	30	Rhone	France
Flash Flood	29/10/2023 12 UTC	30/10/2023	36	Danube	Switzerland
Flash Flood	29/10/2023 12 UTC	30/10/2023	12	Douro/Duero	Spain
Flash Flood	29/10/2023 12 UTC	30/10/2023	42	Soca/Isonzo	Slovenia
Flash Flood	29/10/2023 12 UTC	30/10/2023	30	Po	Italy
Flash Flood	29/10/2023 12 UTC	30/10/2023	36	Coastal	Italy
Flash Flood	01/11/2023 00 UTC	01/11/2023	48	Coastal	Norway
Flash Flood	01/11/2023 00 UTC	01/11/2023	30	Douro/Duero	Spain
Flash Flood	01/11/2023 00 UTC	01/11/2023	24	Mino/Minho	Spain
Flash Flood	01/11/2023 00 UTC	01/11/2023	30	Douro/Duero	Portugal
Flash Flood	01/11/2023 00 UTC	01/11/2023	48	Coastal	France
Flash Flood	01/11/2023 00 UTC	01/11/2023	40	Coastal	Croatia
Flash Flood	01/11/2023 00 UTC	01/11/2023	18	Danube	Slovenia
Flash Flood	01/11/2023 00 UTC	01/11/2023	10	Soco/Isonzo	Slovenia
Flash Flood	01/11/2023 00 UTC	01/11/2023	40	Danuha	Austria
	01/11/2023 00 UTC	01/11/2023	40 10	Danuba	Austria
	01/11/2023 00 010	01/11/2023	40	Danube	Austria
Flash Flood	01/11/2023 00 010	01/11/2023	48	Danube	Austria
Flash Flood	01/11/2023 00 010	01/11/2023	48	Adige	Italy
Flash Flood	01/11/2023 00 010	01/11/2023	48	Adriatic Sea	italy
Flash Flood	01/11/2023 00 UTC	01/11/2023	42	Po	Italy
Flash Flood	01/11/2023 00 UTC	01/11/2023	42	Po	Italy
Flash Flood	01/11/2023 00 UTC	01/11/2023	42	Tyrrhenian Sea, Ligurian Sea	Italy
Flash Flood	31/10/2023 12 UTC	01/11/2023	48	Navia	Spain
Flash Flood	31/10/2023 12 UTC	01/11/2023	48	Mino/Minho	Spain
Flash Flood	31/10/2023 12 UTC	01/11/2023	48	Douro/Duero	Portugal
Flash Flood	31/10/2023 12 UTC	01/11/2023	48	Ebro	Spain
Flash Flood	31/10/2023 12 UTC	01/11/2023	48	Ebro	Spain
Flash Flood	31/10/2023 12 UTC	01/11/2023	42	Douro/Duero	Spain
Flash Flood	31/10/2023 12 UTC	01/11/2023	42	Coastal	Ireland
Flash Flood	02/11/2023 00 UTC	02/11/2023	24	Danube	Austria
Flash Flood	02/11/2023 00 UTC	02/11/2023	42	Svärtaån	Sweden
Flash Flood	02/11/2023 00 UTC	02/11/2023	48	Mati	Albania
Flash Flood	02/11/2023 00 UTC	02/11/2023	42	Drini	Albania
Flash Flood	02/11/2023 00 UTC	02/11/2023	42	Drini	Albania
	- , ,	- , ,			Bosnia and
Flash Flood	02/11/2023 00 UTC	02/11/2023	36	Neretva	Herzegovina
Flash Flood	02/11/2023 00 UTC	02/11/2023	30	Tyrrhenian Sea, Ligurian Sea	Italy
Flash Flood	02/11/2023 00 UTC	02/11/2023	24	Coastal	France
Flash Flood	02/11/2023 00 UTC	02/11/2023	6	Coastal	Spain
Flash Flood	02/11/2023 00 UTC	02/11/2023	42	Danube	Ukraine
Flash Flood	02/11/2023 00 UTC	02/11/2023	36	Danube	Slovakia
Flash Flood	02/11/2023 00 UTC	02/11/2023	12	Rhone	Switzerland
Flash Flood	02/11/2023 00 UTC	02/11/2023	12	Rhone	France
Flash Flood	01/11/2023 12 UTC	02/11/2023	48	Gota	Sweden
Flash Flood	01/11/2023 12 UTC	02/11/2023	42	Skien	Norway
Flash Flood	01/11/2023 12 UTC	02/11/2023	30	Danube	Switzerland
Flash Flood	01/11/2023 12 UTC	02/11/2023	24	Rhone	France

Flash Flood	01/11/2023 12 UTC	02/11/2023	42	Coastal	United Kingdom
Flash Flood	01/11/2023 12 UTC	02/11/2023	42	Tweed	United Kingdom
Flash Flood	01/11/2023 12 UTC	02/11/2023	48	Danube	Slovakia
Flash Flood	01/11/2023 12 UTC	02/11/2023	48	Danube	Montenegro
Flash Flood	01/11/2023 12 UTC	02/11/2023	48	Neretva	Bosnia and Herzegovina
Flash Flood	01/11/2023 12 UTC	02/11/2023	42	Krka	Croatia
Flash Flood	01/11/2023 12 UTC	02/11/2023	42	Coastal	Croatia
Flash Flood	01/11/2023 12 UTC	02/11/2023	48	Adriatic Sea	Croatia
Flash Flood	01/11/2023 12 UTC	02/11/2023	42	Zrmanja	Croatia
Flash Flood	01/11/2023 12 UTC	02/11/2023	42	Reka	Slovenia
Flash Flood	01/11/2023 12 UTC	02/11/2023	48	Tyrrhenian Sea, Ligurian Sea	Italy
Flash Flood	01/11/2023 12 UTC	02/11/2023	42	Tiber	Italy
Flash Flood	01/11/2023 12 UTC	02/11/2023	42	Tyrrhenian Sea, Ligurian Sea	Italy
Flash Flood	03/11/2023 00 UTC	03/11/2023	48	Rhone	Switzerland
Flash Flood	03/11/2023 00 UTC	03/11/2023	42	Dordogne/ Garone	France
Flash Flood	03/11/2023 00 UTC	03/11/2023	24	Elbe	Czechia
Flash Flood	03/11/2023 00 UTC	03/11/2023	36	Danube	Bulgaria
Flash Flood	03/11/2023 00 UTC	03/11/2023	36	Coastal	Greece
Flash Flood	03/11/2023 00 UTC	03/11/2023	36	Vardar	North Macedonia
Flash Flood	03/11/2023 00 UTC	03/11/2023	36	Seman	Albania
Flash Flood	03/11/2023 00 UTC	03/11/2023	12	Danube	Czechia
Flash Flood	02/11/2023 12 UTC	03/11/2023	48	Dordogne/ Garone	France
Flash Flood	02/11/2023 12 UTC	03/11/2023	30	Coastal	Italy
Flash Flood	02/11/2023 12 UTC	03/11/2023	48	Vardar	North
		02/11/2022	40		Macedonia
Flash Flood	02/11/2023 12 010	03/11/2023	48	Nestos/Mesta	Bulgaria
Flash Flood	02/11/2023 12 010	03/11/2023	48	Danube	Bulgaria
Flash Flood	02/11/2023 12 010	03/11/2023	48	Vjosa	Albania
Flash Flood	02/11/2023 12 UTC	03/11/2023	42	Svärtaan	Sweden
Flash Flood	02/11/2023 12 UTC	03/11/2023	18	Coastal	Croatia
Flash Flood	02/11/2023 12 UTC	03/11/2023	24	Danube	Slovakia
Flash Flood	04/11/2023 00 UTC	04/11/2023	30	Loire	France
Flash Flood	04/11/2023 00 UTC	04/11/2023	18	Southern Bug/Pivdenny Buh	Ukraine
Flash Flood	03/11/2023 12 UTC	04/11/2023	24	Mellan Åkersström Och Norrström	Sweden
Flash Flood	03/11/2023 12 UTC	04/11/2023	24	Mellan Åkersström Och Norrström	Sweden
Flash Flood	03/11/2023 12 UTC	04/11/2023	42	Adriatic Sea	Croatia
Flash Flood	03/11/2023 12 UTC	04/11/2023	42	Danube	Slovenia
Flash Flood	03/11/2023 12 UTC	04/11/2023	24	Struma River	Bulgaria
Flash Flood	03/11/2023 12 UTC	04/11/2023	30	Danube	Romania
Flash Flood	03/11/2023 12 UTC	04/11/2023	48	Danube	Hungary
Flash Flood	03/11/2023 12 UTC	04/11/2023	36	Dniestr	Ukraine
Flash Flood	04/11/2023 12 UTC	05/11/2023	24	Danube	Slovakia
Flash Flood	08/11/2023 00 UTC	08/11/2023	24	Douro/Duero	Spain
Flash Flood	07/11/2023 12 UTC	08/11/2023	24	Drini	Albania

Elach Elaad	07/11/2022 12 LITC	09/11/2022	24	Danuha	Kosovo
Flash Flood	07/11/2023 12 UTC	08/11/2023	24	Dalabe	Ilkraino
FIGSII FIOOU	0//11/2025 12 010	00/11/2025	50	Tyrrhonian Soa Ligurian	OKIAIIIE
Flash Flood	09/11/2023 00 UTC	09/11/2023	48	Sea	Italy
Flash Flood	10/11/2023 00 UTC	10/11/2023	42	Mati	Albania
Flash Flood	10/11/2023 00 UTC	10/11/2023	24	Coastal	Croatia
Flash Flood	09/11/2023 12 UTC	10/11/2023	36	Mino/Minho	Spain
Flash Flood	09/11/2023 12 UTC	10/11/2023	48	Navia	Spain
Flash Flood	11/11/2023 00 UTC	11/11/2023	24	Danube	Romania
Flash Flood	10/11/2023 12 UTC	11/11/2023	42	Danube	Ukraine
Flash Flood	10/11/2023 12 UTC	11/11/2023	42	Danube	Hungarv
Flash Flood	10/11/2023 12 UTC	11/11/2023	42	Danube	Romania
Flash Flood	12/11/2023 00 UTC	12/11/2023	30	Corrib	Ireland
Flash Flood	12/11/2023 00 UTC	12/11/2023	36	Coastal	United Kingdom
i lusii i lood	12, 11, 2023 00 010	12/11/2023	50	Tyrrhenian Sea Ligurian	onnea hingaonn
Flash Flood	11/11/2023 12 UTC	12/11/2023	36	Sea	Italy
Flash Flood	13/11/2023 00 UTC	13/11/2023	42	Rhone	Switzerland
Flash Flood	13/11/2023 00 UTC	13/11/2023	42	Rhine	France
Flash Flood	13/11/2023 00 UTC	13/11/2023	24	Danube	Germany
Flash Flood	12/11/2023 12 UTC	13/11/2023	48	Rhone	Switzerland
Flash Flood	12/11/2023 12 UTC	13/11/2023	48	Rhone	France
Flash Flood	12/11/2023 12 UTC	13/11/2023	48	Danube	Romania
Flash Flood	12/11/2023 12 UTC	13/11/2023	42	Danube	Ukraine
Flash Flood	14/11/2023 00 UTC	14/11/2023	30	Danube	Romania
Flash Flood	14/11/2023 00 UTC	14/11/2023	24	Danube	Austria
Flash Flood	13/11/2023 12 UTC	14/11/2023	30	Rhine	Switzerland
Flash Flood	13/11/2023 12 UTC	14/11/2023	30	Rhone	France
Flash Flood	15/11/2023 00 UTC	15/11/2023	18	Danube	Romania
Flash Flood	14/11/2023 12 UTC	15/11/2023	18	Danube	Hungary
Flash Flood	14/11/2023 12 UTC	15/11/2023	18	Danube	Romania
Flash Flood	16/11/2023 12 0TC	16/11/2023	24	Danube	Germany
Flash Flood	16/11/2023 00 UTC	16/11/2023	24	Bhine	France
Flash Flood	16/11/2023 00 0TC	17/11/2023	2 4 10	Dapuba	Ukraino
Flash Flood	10/11/2023 12 UTC	19/11/2023	40	Phino	Gormany
Flash Flood	17/11/2023 12 UTC	10/11/2023	4Z 20	Dapuba	Bomonio
	17/11/2023 12 UTC	10/11/2023	30	Danube	Romania
	17/11/2023 12 UTC	10/11/2023	30	Danube	Romania
Flash Flood	1//11/2023 12 UTC	18/11/2023	30	Danube	Romania
Flash Flood	20/11/2023 00 UTC	20/11/2023	30	Danube	Croatia
Flash Flood	21/11/2023 00 01C	21/11/2023	42	Drini	Albania
Flash Flood	20/11/2023 12 UTC	21/11/2023	24	Danube	Boshia and
					Bosnia and
Flash Flood	20/11/2023 12 UTC	21/11/2023	24	Danube	Herzegovina
Flash Flood	20/11/2023 12 UTC	21/11/2023	42	Golo	France
Flash Flood	20/11/2023 12 UTC	21/11/2023	48	Coastal	Norway
Flash Flood	22/11/2023 00 UTC	22/11/2023	30	Skien	Norway
Flash Flood	22/11/2023 00 UTC	22/11/2023	30	Ana	Norway
Flash Flood	22/11/2023 00 UTC	22/11/2023	12	Etneelva	Norway
Flash Flood	22/11/2023 00 UTC	22/11/2023	36	Neman/Nemunas/Nyoman)	Lithuania
Flash Flood	22/11/2023 00 UTC	22/11/2023	42	Adriatic Sea	Italy

Flash Flood	21/11/2023 12 UTC	22/11/2023	24	Adriatic Sea	Italy
Flash Flood	21/11/2023 12 UTC	22/11/2023	24	Danube	Serbia
Flash Flood	21/11/2023 12 UTC	22/11/2023	36	Venta	Latvia
Flash Flood	21/11/2023 12 UTC	22/11/2023	48	Venta	Lithuania
Flash Flood	21/11/2023 12 UTC	22/11/2023	48	Neman/Nemunas/Nyoman)	Lithuania
Flash Flood	21/11/2023 12 UTC	22/11/2023	48	Neman/Nemunas/Nyoman)	Lithuania
Flash Flood	23/11/2023 00 UTC	23/11/2023	48	Danube	Serbia
Flash Flood	22/11/2023 12 UTC	23/11/2023	30	Adriatic Sea	Italy
Flash Flood	24/11/2023 12 UTC	25/11/2023	48	Dnieper	Ukraine
Flash Flood	24/11/2023 12 UTC	25/11/2023	24	Danube	Bulgaria
Flash Flood	26/11/2023 00 UTC	26/11/2023	24	Dnieper	Ukraine
Flash Flood	27/11/2023 00 UTC	27/11/2023	42	Coastal	Greece
Flash Flood	27/11/2023 00 UTC	27/11/2023	48	Mati	Albania
Flash Flood	26/11/2023 12 UTC	27/11/2023	48	Drini	Montenegro
Flash Flood	26/11/2023 12 UTC	27/11/2023	48	Drini	Albania
Flash Flood	26/11/2023 12 UTC	27/11/2023	42	Tyrrhenian Sea, Ligurian Sea	Italy
Flash Flood	28/11/2023 00 UTC	28/11/2023	36	Dnieper	Ukraine
Flash Flood	28/11/2023 00 UTC	28/11/2023	30	Ishem	Albania
Flash Flood	27/11/2023 12 UTC	28/11/2023	36	Drini	Albania
Flash Flood	27/11/2023 12 UTC	28/11/2023	24	Vjosa	Albania
Flash Flood	27/11/2023 12 UTC	28/11/2023	30	Akheloos	Greece
Flash Flood	27/11/2023 12 UTC	28/11/2023	24	Neretva	Croatia
Flash Flood	29/11/2023 00 UTC	29/11/2023	48	Coastal	Croatia
Flash Flood	29/11/2023 00 UTC	29/11/2023	48	Danube	Romania
Flash Flood	29/11/2023 00 UTC	29/11/2023	48	Danube	Romania
Flash Flood	29/11/2023 00 UTC	29/11/2023	36	Mondego	Portugal
Flash Flood	29/11/2023 00 UTC	29/11/2023	42	Douro/Duero	Spain
Flash Flood	29/11/2023 00 UTC	29/11/2023	48	Ebro	Spain
Flash Flood	29/11/2023 00 UTC	29/11/2023	48	Tagus/Tejo	Spain
Flash Flood	29/11/2023 00 UTC	29/11/2023	48	Rhone	France
Flash Flood	29/11/2023 00 UTC	29/11/2023	48	Rhone	France
Flash Flood	29/11/2023 00 UTC	29/11/2023	48	Rhone	France
Flash Flood	29/11/2023 00 UTC	29/11/2023	42	Dordogne/ Garone	France

* 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.

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

<u>www.efas.eu</u> <u>www.ecmwf.int</u>