Appendix A.

Table A1: The priorities that were collected during the discussions and sent out in the questionnaire. They have been grouped according to their category (Cat). The last two columns denote the importance and their individual rank according to the survey results.

Number	Cat.	What	Brief Description	Why	Importance	Rank
1	1	Building a European Flood Forecasting infrastructure	Strengthen the operational European Flood Forecasting Community for example by fostering more knowledge exchange between the EFAS partners through organisation of workshops, staff exchange and other outreach activities.	Medium range ensemble flood forecasting is fairly novel in many countries and agencies. In particular operational decision making is in its infancy – better knowledge exchange will lead to good practise around Europe.	2.05	6
2	1	Replace/expand web forum by social networks	EFAS should be part of the social networks, such as twitter, LinkedIn, Facebook.	It would increase the exposure and make it easier for doing news groups, improve communications	3.83	23
3	1	Education and training of how to use and interpret forecasts	For example with dialogues, exercises and training courses for civil protection agencies, local authorities and forecasters. In particular train more young hydrologists.	More training will increase understanding and utility of medium range ensemble forecasts	1.91	4
4	2	Increase the frequency of forecasts	This option would make it possible to increase the number of forecasts for example from 2 to 4 times a day.	This would provide you with more up-to-date information during flood situations	3.09	21

5	2	Thresholds for warning levels (translation to return periods)	Homogenization of threshold definitions among basins (quantile differences) to real return periods	This would allow for comparable thresholds across Europe for all rivers and basins	2.35	12
6	2	Rapid risk and hazard maps based on EFAS forecasts	Combining EFAS forecasts with local flood hazard maps and rapid risk maps could provide more information on the potential hazard associated with predicted floods.	This would allow a better decision on the priorities of actions to prevent potential hazards	2.61	18
7	2	Improve the forecast dissemination	Invest to improve the delivery of forecast to the partners. This could include smart phone applications or web technology to include EFAS forecast directly in partners standard forecast interfaces and software by distributing GIS shape files or other WMS services. For example, there are many “spatial” outputs that might be further used in more detailed evaluation on national level especially in an alert situation	Better forecast dissemination will allow partners to have access to EFAS forecast from within their own system and thus increase usage.	2.17	9
8	2	Improve the visualisation and product generation	This investment is to improve forecasts are presented (e.g. make the interface more configurable), include additional products (for example satellite images) or other derivative products (e.g. specific	Better visualisation will lead to better decision making. New products can be used as auxiliary information to national and international services. Should be georeferenced and downloadable	2.43	17

			runoff, soil saturation or SWE forecasts)			
9	2	Flash flood guidance	Evaluation of soil-saturation to better estimate levels of dangerous heavy precipitation (<6 hourly). To be used in combination with flash-flood warnings	Useful tool for flash-flood warnings	2.36	13
10	3	Increase the average skill of the medium range forecast (>3 days).	This would mean that a forecast for day 5 would become as skill-full as a forecast for day 4 with the present system	A more skilful forecast will be a more useful forecast	1.90	3
11	3	Increase the average skill of the short range forecast (<3 days).	Invest in flash flood capability. For example develop a better Flash Flood Guidance based on evaluated saturation of soil and computation of "dangerous precipitation" comparing rainfall forecasts with observations from national networks	This would mean that EFAS develops more capability in the flash flood forecasting	2.38	14
12	3	Increase the temporal resolution of the forecast	For example apply hourly (30 min) time steps in the forecast instead of 6-hourly time steps	Higher temporal resolution will give more detail on the time a threshold is exceeded	2.91	20
13	3	Increase the spatial resolution of the forecast	Give prediction on smaller areas and smaller river basins For example EFAs will provide information on a $1km^2$ grid rather than $5km^2$	Higher spatial resolution will give more information on smaller catchment scale	2.39	15

14	3	Improve physical model representations	Improve model representation of hydrological structures to improve model performance. For example, a better representation of snow water equivalent or evapotranspiration.	Hydrological structures often dominate flood response and a better representation will be crucial for an improved forecast. Large parts of Europe suffer particularly under snow melt driven floods. Any improvement will be largely beneficial to the skill of these floodings.	2.29	10
15	3	Include reservoir management	Build a model in order to capture reservoir management, defining output flows in case of the reservoir would be empty or full.	In Europe there are many rivers that are heavily regulated.	2.41	16
16	3	Introduce more NWP ensembles for meteo input	Scientific literature shows that a multi-model approach with a grand ensemble of NWP ensembles increases the scores	This will lead to a more robust modelling system with better estimation of the uncertainties, especially regarding the rainfall forecasts.	1.96	5
17	3	Introduce multi-model approach for hydrological modelling	Scientific literature shows that there are many challenges in hydrological modeling that cannot be solved by single models. Multi-modeling systems provide one efficient solution to for have better understanding of the spatio-temporal characteristics of catchments	This will lead to better forecasts and hence be beneficial to everybody who uses the forecast. It will capture variability and uncertainty better. Different models model processes differently.	1.86	2
18	4	Distinguish between different	Give information about the type of flood expected, whether it is a snow-melt	Would make decisions easier on the action needed and the risk associated	3.09	22

		flood situations	driven spring flood, due to extreme weather (fluvial) or long-term raining related to ground water (pluvial)			
19	4	Report past performance for the hydrological and meteorological forecasts	Displaying selected statistics of forecast system performance at station level performance at individual stations both “Hind cast skill” for particular area, cross-section, point, season, forecast lead time as well as the most recent performance to detect “forecast busts”	Information about the past (climatology, mean bias, anomaly RMSE and anomaly correlation, ensemble spread and signal to noise ratio) is crucial to establish trust in a system and understand weaknesses and strengths in certain situations	1.77	1
20	4	Increase the historical time series	Collect data from larger time series to get better watches or alerts.	EFAS warnings are based on short time series.	2.30	11
21	4	Changing the way probabilities are calculated/presented	What is presented today as probabilities are strictly speaking the modelled frequencies of predicted floods. The calculation of probabilities could be done more robustly	It would improve the estimation of the real flood probabilities.	2.10	8
22	5	Blending of national and EFAS forecasts	Creation of a seamless forecasting system in which national short range forecasts (1-2) days build an intrinsic part of the medium range system (EFAS).	Flood forecasting is a continuous process in terms of lead time. Although different type of systems will have different strengths and weaknesses a seamless merging approach would make it easier to make decisions on all available information. It would enable to further	2.68	19

				include EFAS to national system		
23	5	Improve standardization of hydrological data	There is a plethora of data formats used in operational and real-time hydrology not only for measured and collected data, but also for model data. Data provision guidelines to standardize formats which will improve the forecasts, for example by promoting the INSPIRE standards.	Better access to data will lead to better forecasts as verification, calibration and updating tasks are made easier.	2.05	7