

To enable proper use of the data sharing and forecast application EnviroNet, DAREFFORT project also established an e-learning course to train users and educate stakeholders. Beyond the user manual of EnviroNet the e-learning courses cover several other topics, to educate people in the Danube Basin about the risks of floods, the national forecasting methods, the measuring methods, and practices of different countries. The course is available free of charge for the public on the project website.

During the 3 years of DAREFFORT project, partner institutions had to cope with the challenges of pandemic measures as well. Conferences and project meetings took place online, remote work became everyday phenomena among the partners. Still, the achievements came as planned. DAREFFORT contributes to the safety and comfort of the people living in countries of the Danube Basin area.



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[www.interreg-danube.eu/dareffort](http://www.interreg-danube.eu/dareffort)

### Project partners

VIZITERV Environ Ltd. (HU); Economica GmbH (AT); National Institute of Meteorology and Hydrology at the Bulgarian Academy of Sciences (BG); Croatian Waters - Legal entity for water management (HR); STASA Steinbeis Applied Systems Analysis GmbH (DE); General Directorate of Water Management (HU); National Institute of Hydrology and Water Management (RO); Slovak Water Management Enterprise, state enterprise (SK); Slovak Hydrometeorological Institute (SK); University of Ljubljana (SI); Ukrainian Hydrometeorological Center of the State Emergency Service of Ukraine (UA)

### ASP partners

Federal Ministry of Sustainability and Tourism, Water Department, Water Balance Subdep. (AT); Czech Hydrometeorological Institute; Bavarian State Ministry of the Environment and Consumer Protection; State Hydrometeorological Service of the Republic of Moldova; Republic Hydrometeorological Service of Serbia; Slovenian Environmental Agency; Ministry of the Environment and Spatial Planning of the Republic of Slovenia

### International ASP partners

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# DAREFFORT

## Danube River Basin Enhanced Flood Forecasting Cooperation



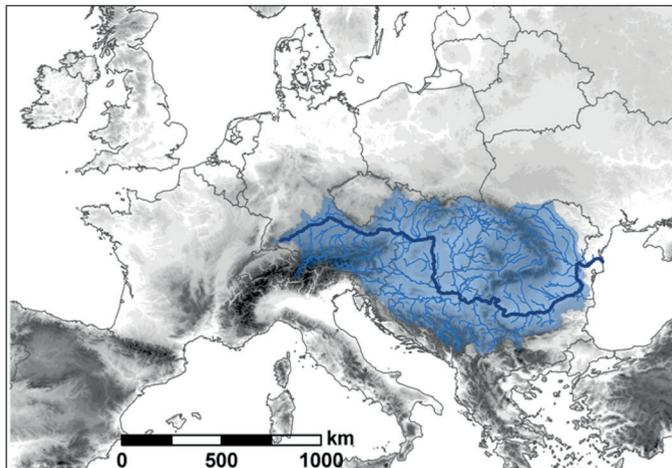
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Frequency of floods in the Danube River Basin increased in the 21st century underlining the need for a more effective and harmonized regional and cross-border cooperation in the field of flood and ice forecasting.

Flood forecasting is one of the most effective flood risk mitigation measures serving to protect human lives and property. However, the quality of hydrological forecast depends on several factors such as the accuracy of meteorological forecast, the quantity and quality of meteorological and hydrological data, data exchange, organizational structure of national hydrological and meteorological services, and many other factors.

The main aim of the **DAREFFORT (Danube River Basin Enhanced Flood Forecasting Cooperation)** project was to give a comprehensive overview about national flood and ice forecasting systems. Furthermore, DAREFFORT aimed to improve the exchange and availability of hydrological and meteorological data between the participating countries.

Despite the fact that most countries in the Danube River Basin have made significant progress in the modernization of the meteorological and hydrological monitoring networks and that the modernized networks provide high quality data for forecasting models and warning procedures, there is still room for improvement.



Satellite image of the Danube Basin

Although the strong cooperation of the countries in the Danube Basin is a common and widely accepted goal, it is hindered by the technical differences and legislative and bureaucratic environment of national data measuring and forecasting techniques. In the scope of the DAREFFORT project, partners also assessed and evaluated the current practices of measuring factors playing relevant role in the occurrence of floods.

As a result of the above assessment, it turned out, that in some countries, there are no adequate systematic measurements of river icing and snow water equivalent or their spatial distribution, despite the fact that floods in the Danube River Basin are mainly generated in mountainous areas as a combination of rainfall and snowmelt.

In the future, this issue needs to be addressed, both by improving the monitoring of snowpack parameters on the ground and installing composite observatories, but also by implementing and using new data management processes, based on data fusion of ground observation, satellite products and snow model simulations.

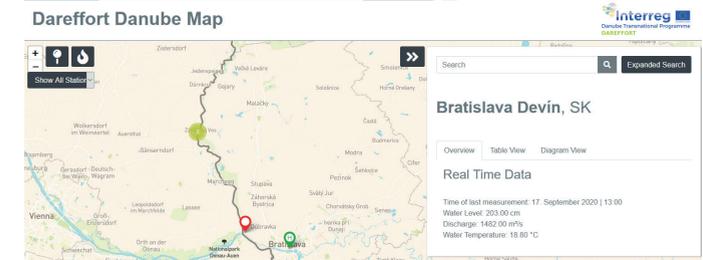
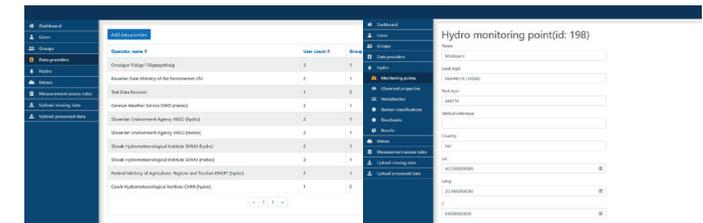
Preparations also included the harmonizing of such national practices, proposition to national stakeholders and data providers to establish the common ground of data sharing and charting the sources and quality of information basinwide. Since there are several partners involved in this process, especially data providers, it was necessary to develop a decentralized and modularized solution.

The EnviroNet Platform is a comprehensive software for exchanging hydrological and meteorological measured data in a common standardized format, that has been developed in the frame of DAREFFORT project and will serve as a basis for implementation of future DanubeHIS by ICPDR.

One of the most important outputs of the DAREFFORT project is the common data exchange platform, called EnviroNet. During 2020 it has been developed to serve as the technical basis for DanubeHIS to be operated by ICPDR. For exchanging hydrological and meteorological data between the countries in the Danube catchment via EnviroNet it is essential to merge the different national data in a common format and transfer them from the national data providers to the platform.

More than 600 observation points provide daily, or more frequent data to the platform, which becomes available for professional users of all participating countries. A comprehensive and user-friendly graphical dashboard enables the users to calculate, forecast and act, based on real-time data. What used to take days and a lot of effort to obtain and validate, will be available instantly in the future, as a result of the 3-year long DAREFFORT project.

In the scope of DAREFFORT, virtual modelling of flood occurrence situations also took place, during which project partners examined what advantages the EnviroNet data availability can bring for the preparations of the flood mitigation. The pilot action was successful, and the experiences showed good potential for using the results and in general this approach in the future, after the project end, for improving the flood forecasting capabilities in cooperating countries.



Screenshots of EnviroNet