TAMIR newsletter on end-user involvement

The TAMIR-project develops tools and services to provide impact forecasts of flash floods in the Pan-European scale and multi-hazard nowcasts for convective storms in a regional level for the use of civil protection authorities to support their decision making. The project has now reached its half-way stage. During the first year, the work has primarily concentrated on improvement and development of the products and preparing them for end-user testing. We are about to reach this point of end-user testing and we are planning a demonstration period for the summer and autumn of 2021.

End-user involvement

TAMIR demonstration phase will take place during the second part of 2021, in two different phases of end-user engagement.

From July 1st, end-users will be invited to explore the TAMIR mock-up products, constructed for pre-selected test cases and integrating feedback received during the TAMIR online end-user workshop (27 Oct 2020). Feedback, additional comments, and suggested improvements on the appearance and functionalities of the products will be collected from participating end-users through a survey, to be sent back to the TAMIR team by September 15th, 2021.

From mid-September, the TAMIR team will analyse the end-user survey to finalise the design of TAMIR products and to deliver prototype products, to be made available to end-users by December 15th, 2021. If you would like TAMIR prototypes to be built for a particular event, please get in touch with TAMIR team by mid-September, and we will work with you during the Autumn to create your use-case product. Data availability may limit the cases we can adopt, preferably the test cases would be from year 2018 onwards and located in OPERA domain. In case we receive an extensive number of requests, we may also need to limit the number of cases we can construct.

A preliminary agenda for the demonstration period is below, with additional information to be shared during June:

- **1 July 21:** Mock-up TAMIR products for pre-selected events available to end-users.
- **Jul-15 Sep 21:** Feedback collection on TAMIR mock-ups
- **Oct-Dec 21:** Prototype TAMIR products built from selected user-defined past event case studies (limited by the data availability) and made available by the end of 2021.
- **Jan-Feb 22:** Setting-up of quasi-operational suites for TAMIR products.
- **Mar-May 22:** Prototype TAMIR products available as experimental products in near-real time through EFAS-IS and data/web services.

News of the demonstrated products:

The Pan-European flash flood hazard product

- Hazard forecasts produced using seamless precipitation forecasts in the range 0-120h by blending radar nowcasting and NWP.
- Flash flood hazard estimation improved by accounting for the type of precipitation, and better estimation of the hazard with lead-time dependent rainfall thresholds from the analysis of long-term radar-based and NWP-based rainfall accumulations.
- An optimization procedure has been carried out to translate the probabilistic flash flood forecasts into deterministic guidance.
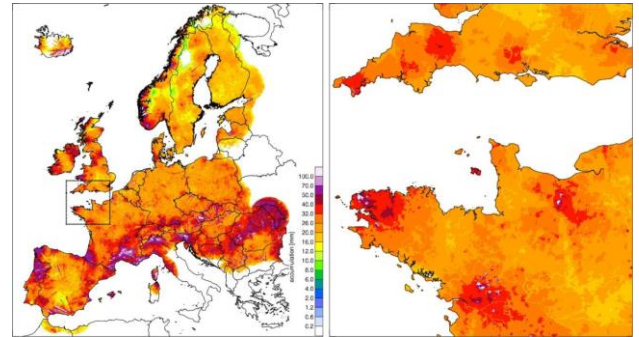

Figure 1. Thresholds for catchment-aggregated rainfall derived from gauge-adjusted radar observations from 2013 to 2020 for an accumulation window of 24 hours and return period 20 years.

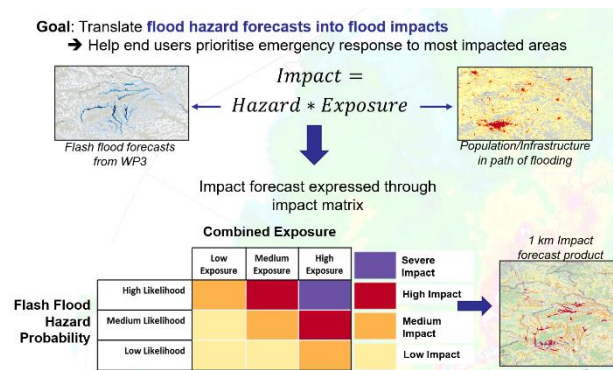**The Pan-European flood impact assessment**

Figure 2. Impact is estimated from an impact matrix, with flash flood hazard probability on the y-axis and combined exposure on the x-axis.

- Flash flood impact forecasts by combining the flash flood forecasts and exposure data.
- The Pan-European exposure dataset is created by combining different exposure layers (population, education and health facilities, transportation, energy generation) into a single layer at 1 km spatial resolution.
- The used data sources are Global Human Settlement Layer, OpenStreetMap, JRC, and HARCI-EU.
- Exposure layers highlighted as most important during the end-user workshop were incorporated.

Regional multi-hazard nowcasting product

- A weather radar-based nowcasting tool for multi-hazards caused by thunderstorms (heavy rainfall, wind gusts, hail, and lightnings) is developed.
- The product combines a cell-based storm nowcast model with a ML classification which estimates the hazard level of convective storm based on historical meteorological observations and emergency calls.
- The product is demonstrated on a local platform in Finland during summer 2021 to collect end-user feedback.
- Spatio-temporal resolution requests provided by the end-users during the workshop and the suggested exposure data for producing risk estimates are considered for the final product.
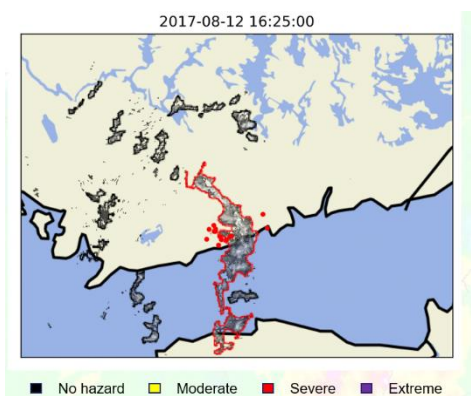

Figure 3. Estimated hazard level for identified storm cells and corresponding recorded emergency calls in red dots.