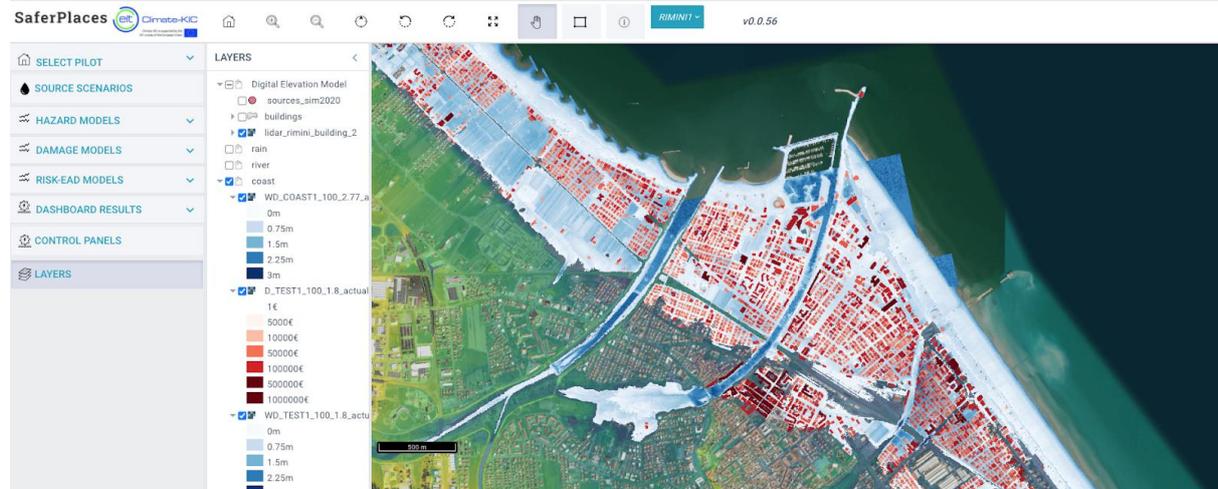


SaferPlaces - A climate service for flood hazard and risk assessment in urban areas to build safer and resilient communities: Rimini case study.



SaferPlaces is an innovative climate service developed within the EIT Climate-KIC funded project, in particular consists of a cloud web platform for cost-effective mapping of flood hazard and risk in urban areas under current and future climates.

The platform employs innovative climate, hydrological and hydraulic, topographic and economic modelling techniques to assess pluvial, fluvial and coastal flood hazard and risk. Therefore, the service is designed to advise identification and assessment of flood risk mitigation measures and plans, inform climate adaptation and disaster risk reduction strategies, and help to foster multi-stakeholder agreements for resilience building.

All models and tools embedded in the SaferPLACES cloud-web platform are research proofed as reported in the following peer reviewed publications:

- Samela et al. 2020 -Safer_RAIN: A DEM-Based Hierarchical Filling-&-Spilling Algorithm for Pluvial Flood Hazard Assessment and Mapping across Large Urban Areas *Water* 2020, 12(6), 1514; <https://doi.org/10.3390/w12061514>
- Paprotny et al. 2020 – Estimating exposure of residential assets to natural hazards in Europe using open data *Nat. Hazards Earth Syst. Sci.*, 20, 323–343, 2020; <https://doi.org/10.5194/nhess-20-323-2020>
- Paprotny et al. 2020 – Exposure and vulnerability estimation for modelling flood losses to commercial assets in Europe, *Sci. Total Environ.*, Vol. 737, 2020, 140011; <https://doi.org/10.1016/j.scitotenv.2020.140011>

SAFERPLACES platform is fully scalable and customisable, allowing the user to take a specific urban area prone to flooding and select from a range of different rainfall scenarios, river flow rates or rises in sea level and combine these with a potential mitigation options, such as permeable paving, or 'green based solutions', like increasing the natural water retention of the soil.

The SAFERPLACES process is less time consuming and more cost effective than conventional flood mapping methods, which usually require detailed knowledge of historic flood inundation. Its integrated economic and physical assessment of different flooding events also provides financial justification for long-term flood prevention measures and the 'open' data used is freely available and can be applied across an infinite number of scenarios.

The SaferPLACES team has developed the platform as a cloud-web service that can be made available to multiple end-users, allowing them all to perform flood hazard simulation in real-time according to their own scenarios.

This kind of integrated output serves as an excellent basis for a dialogue between all those involved in city planning and flood management, such as planners, engineers, civil protection agencies and insurance companies. These stakeholders can all use the SAFERPLACES output to identify the best risk reduction and climate adaptation strategies and calculate the economic benefits of different mitigation options.

SAFERPLACES platform is currently operative for four pilot case studies; Rimini and Milan, Northern Italy; Pamplona, in Spain, and Cologne, in Germany.

To date, much of the focus has been on Rimini, a town exposed to coastal flooding due sea level rises and storm surge events and the site of the largest water rehabilitation project in Italy.

Here, the SAFERPLACES tool is being used to devise a risk management plan for Rimini's Parco del Mare, simulating the physical and economic impact of different flooding scenarios using different mitigation measures. The results show a 60% reduction in economic loss from a coastal flooding event if new coastal dunes are built, providing a strong financial argument for their construction. The solution has also been important in determining the dune elevation required for long-term risk protection. At present, the team are working to demonstrate further applications for this type of efficient and scalable flood risk mapping and assessment in Pamplona and Cologne.

The potential of the SAFERPLACES solution is huge for the many towns and cities around the world that are increasingly threatened by flood hazards. Going forwards, the concept of combining climate scenarios with urban mapping, risk assessment and economic impact modelling could even be extended for other climate hazards, such as extreme heat.