

COST Action CA19109 “MedCyclones” – Working Group 1**Deliverable D1.7****Setting up a prototype/experimental cyclone-devoted forecasting
service with contributions from the Action partners***First release October 2023**Final version October 2024*

The Mediterranean Sea is well known for its significant cyclonic activity, which affects various sectors, including agriculture, transportation, and disaster preparedness. The gravity of these implications has become quite evident with the impacts of cyclone Daniel in early September 2023, which resulted in the tragic loss of thousands of lives and inflicted billions of euros in damages, predominantly affecting Libya and Greece. Despite the increasing significance of understanding and forecasting Mediterranean cyclones, there is still a lack of centralized and easily accessible forecasting information in the Mediterranean region.

To bridge this critical gap, a collaborative initiative named "Dynamics and Operational Forecasts of Mediterranean Cyclones (DynForMed)" was launched in the first year of the Action, it is still ongoing and it is planned to continue beyond the end of the Action.

The DynForMed Initiative and the website

DynForMed is a significant community effort that aims to develop a prototype website providing operational forecast information on Mediterranean cyclones. The primary goal is to offer a central platform that predicts cyclone tracks, intensities and impacts tailored to the needs of researchers, forecasters, and stakeholders. Currently, the absence of centralized and reliable cyclone information in the Mediterranean region often leads to confusion and challenges in decision-making processes.

DynForMed engages eight operational modelling systems (more are expected in the near future) that provide deterministic forecasts on a daily basis and extend up to three-to-seven days ahead. The result is the creation of a comprehensive website that serves as a valuable forecasting benchmark. This will be useful not only for researchers and the public but also for the contributors seeking to assess the performance of their forecasting modeling systems.

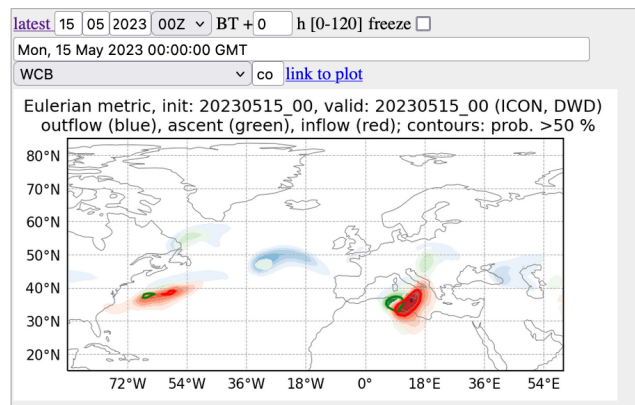
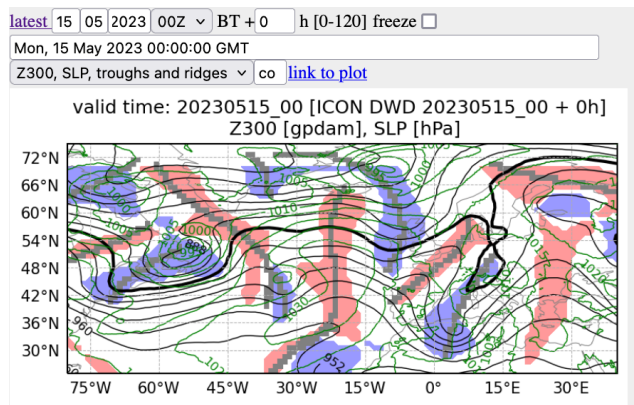
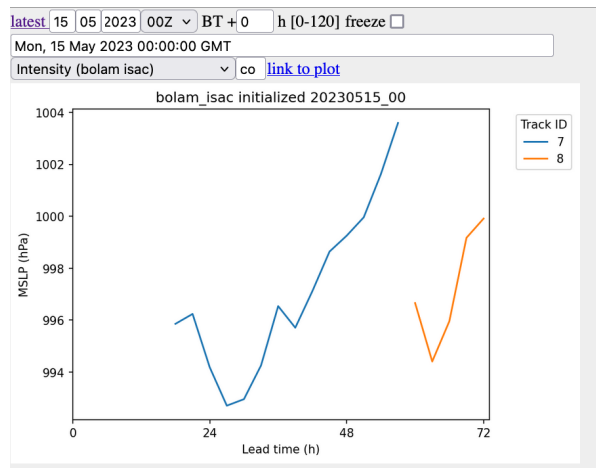
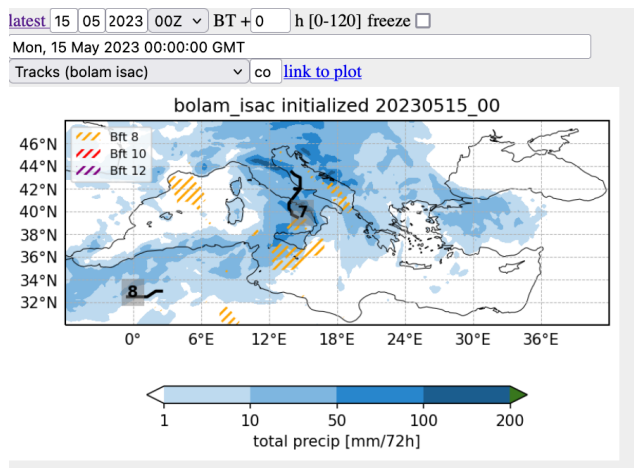
Over the years, the DynForMed website has undergone significant development efforts to enhance its usability and utility. In particular, the inclusion of impact-related data on the maps has been a notable improvement. Users can now easily identify regions possibly experiencing intense precipitation and strong winds, providing valuable insights for decision-makers and the public.

It is worth stressing that this web site is not considered to replace National Weather Service (NWS) duties. On the contrary, it aims at being an additional useful tool to be used to a variety of users, including NWS, based on the most advanced scientific achievements provided by the networking research activities carried on by the Cost Action.

The DynForMed prototype page has been accessible through an internal website hosted by ETHZ:

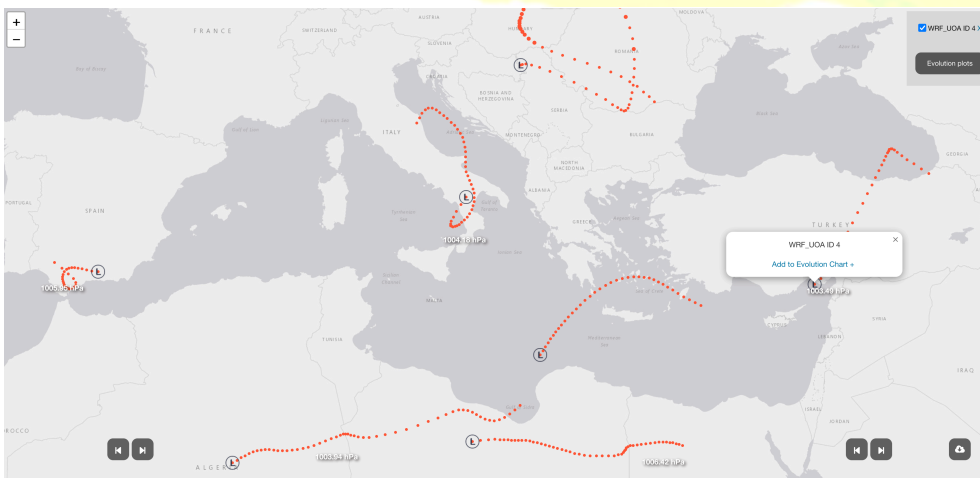
<https://data.iac.ethz.ch/cost/>

The web site still includes an archive of forecasts and analysis from different modelling systems, including impacts:



Recently, the web site was migrated to the National and Kapodistrian University of Athens (NKUA) where it is operational and future developments are planned in order to keep it active beyond the end of the Action:

<https://medcyclones.eu/dynformed/>



Interactive graphics have been already implemented and allow to show and compare the forecast characteristics of the Mediterranean cyclones. These enhancements are designed to create a dynamic and engaging user experience, making it easier than ever to explore and understand cyclone forecasts.



One key upgrade that took place during the migration phase is the **Composite Tracks Approach**. This enhancement involves the exploitation and implementation of the "composite tracks" methodology, a concept developed during another scientific initiative developed in the first two years of the Action and named "3T: Tracks Task Team". This approach (for more detail see <https://doi.org/10.5194/wcd-4-639-2023>) aims to refine the selection of cyclone tracks by adopting only those with a high level of agreement among different cyclone tracking algorithms. This ensures that users are presented with the most accurate and reliable cyclone track information. It should be mentioned that for the operational needs of this initiative, seven tracking algorithms are adopted.

Future Developments

The DynForMed team is also actively exploring the addition of new features to enrich the website's capabilities. These potential additions include phase space diagrams tailored for specific cyclone cases and impact-oriented graphics. These features will provide users with deeper insights into cyclone dynamics and their potential effects, further enhancing the utility of the platform.

