TARGETING FOR MEDITERRANEAN HIGH IMPACT WEATHER FORECASTS: FROM CLIMATOLOGY TO REALTIME MEDEX EXPERIMENTS

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I. INTRODUCTION

The Mediterranean region is persistently affected by high impact weather episodes that poses great challenges to short range forecasting offices of the region. Important aspects of the events, such as the intensity and position of the low level circulations as well as the areas prone to heavy rains, are frequently not well forecast by mesoscale models, primary forecaster's guidance for these episodes due to the key role played by subsynoptic scales. During recent years, and under an ever increasing societal demand for cost cuts and more precise forecasts, great interest has grown within the operational weather community on the adaptable component of observational networks. During the first phase of MEDEX, progress has been done towards the construction of a climatology of sensitivities of Mediterranean high impact weather. First results of these investigations are already accounted for in the EUCOS consortium in its compromise in designing and coordinating the evolution of the European composite observing system (EUCOS) to be optimized with a view to improve short range forecasts over Europe without increasing the overall cost.

Work is still being done regarding the completion of the climatology of sensitivities but a new objective has been proposed for the second phase of MEDEX. Real-time targeting of sensitive regions that would lead to the improvement of the 24-48h numerical forecast of Mediterranean high impact weather is planned to be tested in the coming months. First attempts along these lines would consist on increasing the frequency of radiosound ascents in specially sensitive regions of the day.

II. CLIMATOLOGY OF SENSITIVITIES

The main challenge of building a climatology of sensitivities of severe weather episodes in the Mediterranean is to define a database of events to start from when no exhaustive and systematized database of Mediterranean high-impact weather episodes exists. Various approaches are explored to build the climatology of sensitivities. A first attempt makes use of the link between Mediterranean hazardous weather and intense cyclones. An objective classification of the most intense Mediterranean cyclones from the ECMWF ERA40 analysis is performed and sensitivities are computed for each group making use of an adjoint model. This results in a prototype sensitivity field for each class of Mediterranean intense cyclone.

Latest results show that although the sensitive areas computed for the intense cyclones are not particularly confined, it is remarkable how regions poorly sampled by the regular observing networks, such as North Africa, the Mediterranean sea and the eastern North-Atlantic, are highlighted in the resulting climatological sensitivity maps.

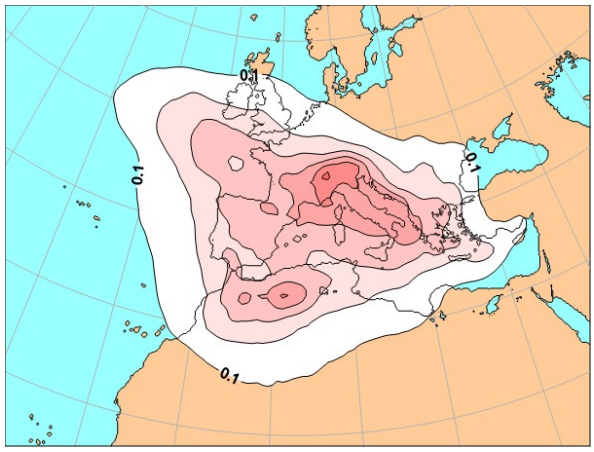

FIG. 1: Average sensitivity (darker regions larger sensitivity) of Mediterranean intense cyclones. A total of 24 types of Mediterranean intense cyclones are averaged with a weight proportional to its frequency of occurrence within the database.

However, an important portion of the hazardous events in the Mediterranean basin are not linked to significantly intense cyclones. For these cases, alternatives based on different proxies for threatening weather are discussed.

Additionally, an alternative approach to compute sensitivities based on the statistical dispersion of the high impact weather classes is used as a measure of verification of the adjoint results.

III. REAL TIME TARGETING CAMPAIGN

A framework is currently being set up to coordinate the targeting of Mediterranean high impact weather in several campaigns during the next 4-5 years. From the computation of a set of forecasts, sensitivity estimations, the definition of the guidelines and decision supporting tools for the forecasters in charge and the final execution of extra sounding launches, all is being defined and coordinated with other European projects aimed at adaptive observational strategies.