



Sensitivities of Mediterranean High Impact Weather: From MEDEX to Ghostbusting?

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Back in the early 2000's, the idea of investigating the potential of forecast sensitivities for high-impact Mediterranean events persuaded the scientific community of MEDEX, under an ever increasing societal demand for cost cuts and more precise and oriented forecasts. Shortly after that, the coauthors of this communication bravely faced the exciting challenge of learning, computing and finally analyzing Mediterranean forecast sensitivities using a comprehensive approach and with the vision of providing support to both specific cases in targeting campaigns and also to long-term initiatives aimed at optimizing permanent observational strategies that accounted for the Mediterranean region, such as the European Composite Observing System (EUCOS) and eventually the Global Observing System. Since then, substantial progress has been done in this field, with a better understanding of the challenges and limitations of using forecast sensitivity calculation techniques to guide observation-related decisions. In any case, this research line has produced a collection of results, both end-products and methodological findings, that have contributed to better understand the fundamental predictability problem of Mediterranean high-impact weather (MHIW) phenomena.

The talk will provide an overview of the sensitivity calculation methods implemented or developed in recent years in order to identify the main climatologically sensitive areas for MHIW. On the one hand, an atmospheric adjoint model rendered the first climatology of forecast sensitivities of Mediterranean intense cyclones. These dynamical results were confronted with a new statistical method based on the definition of clusters of events recorded in a reanalysis. These works have provided a general vision of the most influential areas for the forecast of MHIW events. However, the pursue for a methodical and rigorous attempt to quantify the value of such sensitivity products has yielded unexpectedly discouraging results but also the blossom of fundamental questions regarding the strict disconnection between current sensitivity products and the most pragmatic objective that underlies targeting strategies. We will show a historical perspective of the findings along this research line obtained during the last decade within MEDEX, and also provide some evidences that we still have little idea of what we are really looking for.