# Should we go further in observational resolution? Diagnostic Study of a High Impact Weather Episode in the Western Mediterranean Region: IOP8 a HyMeX case.

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Fall season heavy rainfall in the Western Mediterranean (WMed) region is one of the most threatening phenomena in the area. Devastating flash floods occur every year resulting in a large amount of property losses, destruction of infrastructures, enormous agricultural losses and human fatalities. The forecast of the underlying High Impact Weather (HIW) is a subject of special concern for local meteorologists because of its catastrophic nature. Model predictions in the area are not always correct, since quite often Mesoscale Convective Systems (MCSs) are missed or misplaced.

Large-scale conditions favouring HIW in the WMed are generally well-known. The inhomogeneities in the boundary layer are in many occasions responsible for the initiation of convection. How well the spatial and temporal variability of these inhomogeneities is represented in models is crucial. Additionally, the assimilation of adequate observations improves our prediction skills. In the last years the resolution of observational networks in the area has been enhanced. Is it enough with the resolution of the networks that are now available? Are the relevant processes well represented within these networks?

With the purpose of answering these questions and within the framework of HyMeX (Hydrological cycle in the Mediterranean eXperiment), a heavy precipitation event which took place on the south and eastern part of the Spanish coast, moving afterwards towards France southern coast, is investigated. During this event casualties and important economic damage were registered. The amounts of precipitation locally overpassed 200 mm in 24 hours and a tornado occurred in Gandia (Valencia).

In this investigation, a comprehensive description of the physical atmospheric processes giving rise to the intense precipitation and its movement along the Spanish coast is given based on the analysis of the available observational data sets. A dense network of global positioning systems (GPS), raingauges, surface measurements and radiosoundings are analyzed to document in detail the evolution of the warm and wet air masses which fed the high precipitation event systems, as well as the low-level convergence to which the main convective systems were associated. The resolution of the aforementioned networks adequately sampled the temporal and spatial variability of the tropospheric water vapour, which played a key role in the initiation and evolution of MCSs, as well as the position of the convergence line. However, higher number of GPS stations over Spain, as well as additional observations over North Africa and the Mediterranean Sea could be helpful in future campaigns.