Diagnosis and forecast verification of an intense cyclogenesis during IOP 18 of HYMEX-SOP1

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During high-impact weather events occurred throughout the HYMEX-SOP1, a field campaign dedicated to heavy precipitation and flash flooding, large amount of ordinary and extraordinary observations had been collected. The availability of detailed observations offers a good opportunity to further explore these events and to assess the skill of numerical weather prediction models. In most of the six Intensive Observation Periods (IOPs) that affected the Spanish regions a cyclone was involved. In particular, during IOP 18 intense cyclogenesis occurred on 31 October 2012. The cyclone tracked along NW Mediterranean. Initially it intensified near of Catalonia, where heavy rain was recorded, and traveled towards North of the Minorca island, which was affected by strong winds. Finally, the cyclone moved towards the Gulf of Genoa, with heavy precipitation in some Italian regions.

First, the present study focuses on the diagnosis of the cyclogenesis event of IOP 18 by means of two numerical models, ECMWF model and Arome-WMED reanalysis.The cyclone has been detected and characterised from mslp analyses and its vertical structure has also been analysed by using phase space diagrams. The role of a cut-off from Iberian Peninsula, the release of latent heat during the precipitation period and the warm and wet air advection in the deepening of the cyclone is analysed. The cyclone evolution has been related to heavy rain and strong wind occurrence. We are also interested in the predictability of cyclone and therefore of the associated atmospheric weather. The quality of the surface cyclone forecast from the operational prediction model HIRLAM-HNR used during IOP18 has been assessed.