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Impact of KITcube data on the prediction of maritime convective severe weather. Test for HYMEX IOP13 event.

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The Special Observation Period 1 (SOP1) was a great milestone reached by the HyMeX scientific community. Observations sampling on 20 cases of severe weather were taken under an unprecedented international collaboration. The nderlying objective of this campaign was to improve the knowledge of the mechanisms leading to heavy precipitation and flash flooding in the Mediterranean. One of the most active platforms during the campaign was the KITcube-observatory of Karlsruhe Institute of Technology, a mobile platform that includes ground-based remote sensors (radar and lidar) and instruments for in-situ measurements. During SOP1, the KITcube operated on the island of Corsica, providing direct observational data on severe weather occurring in the north-eastern region of the Western Mediterranean.

IOP 13 occurred between 15-16 October 2012 and it was characterized by heavy rains over northern and central Italy. Storms formed over the French coastlands and over the sea, progressing eastwards across the Gulf of Genoa. The most affected areas were north-eastern Italy (160mm/24h), LiguriaTuscany (120mm/24h) and central Italy (600mm/24h). The prediction of these maritime convection driven cases is highly demanding for both operational offices and high resolution numerical models. Ensemble data assimilation methods provide the tools to combine observational and modeling information to formalize the problem of optimal use and transference of information in the initialization and integration of a forecasting system.

We test the benefits offered by an Ensemble Kalman Filter (EnKF) system for the prediction of the IOP13 event. We assess the impacts of various in-situ special observations taken by the KITcube team during this event on the forecasts of socially sensible parameters such as probability of severe and accumulated precipitation. We discuss these impacts not only on the forecasts products but also in terms of the relevant physical mechanisms involved in the event.