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# Characterization and nowcasting of severe weather events over Milano Malpensa

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Extreme weather events in Europe have increased in frequency and intensity in the last decades, especially in some areas like Alpes and Balkans, and is expected to increase even more in the upcoming years due to the climate change. Monitoring and forecasting the severe weather events locally developed and in a short time range is very challenging but also very important for aviation safety. Several studies have been made for studying the pre-convective environment, however there are still gaps in the knowledge of the dynamical processes of regional and short duration deep convective systems.

This study is implemented within the SESAR ALARM project and focuses on the analysis of the pre-convective and convective environment in support to the air traffic management and air traffic control. The work focuses in the detection, analysis and nowcasting of severe weather events in a selected hotspot: the area of Milano Malpensa airport in Italy. We have used the data from 28 weather stations, 8 GNSS stations, radar and lightning detectors, in the period 2010-2020 to train a nowcasting algorithm and to characterize the pre-convective environment.

Our first results for different locations in the area of interest, show on average that the root mean square error of the rainfall prediction lie in the range 0.1029-0.2838 mm and 0.2720-0.7815 m/s for the wind speed prediction. Our algorithm shows the best rain predictive performance in the next 10 minutes higher than 90%, and higher than 80% in the next 30 minutes. Moreover, the pre-convective environment analysis shows that all the cases with wind field divergence never show an increasing trend of GNSS Zenith Total Delay before the event.