



Skill assessment of precipitation nowcasting in Mediterranean Heavy Precipitation Events

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Very short-term precipitation forecasting (i.e. nowcasting) systems may provide valuable support in the weather surveillance process as they allow to issue automated early warnings for heavy precipitation events (HPE) as reviewed recently by Pierce et al. (2012). The need for warnings is essential in densely populated regions of small catchments, such as those typically found in Mediterranean coastal areas, prone to flash-floods. Several HPEs that occurred in NE Spain are analyzed using a nowcasting system based on the extrapolation of rainfall fields observed with weather radar following a Lagrangian approach developed and tested successfully in previous studies (Berenguer et al. 2005, 2011). Radar-based nowcasts, with lead times up to 3 h, are verified here against quality-controlled weather radar quantitative precipitation estimates and also against a dense network of raingauges. The basic questions studied are the dependence of forecast quality with lead time and rainfall amounts in several high-impact HPEs such as the 7 September 2005 Llobregat Delta river tornado outbreak (Bech et al. 2007) or the 2 November 2008 supercell tornadic thunderstorms (Bech et al. 2011) – both cases had intense rainfall rates (30' amounts exceeding 38.2 and 12.3 mm respectively) and daily values above 100 mm. Verification scores indicated that forecasts of 30' precipitation amounts provided useful guidance for lead times up to 60' for moderate intensities (up to 1 mm in 30') and up to 2.5h for lower rates (above 0.1 mm). On the other hand correlations of radar estimates and forecasts exceeded Eulerian persistence of precipitation estimates for lead times of 1.5 h for moderate intensities (up to 0.8 mm/h). We complete the analysis with a discussion on the reliability of threshold to lead time dependence based on the event-to-event variability found. This work has been done in the framework of the ProFEWS project (CGL2010-15892).

References

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