Skill in nowcasting high-impact heavy precipitation events

Joan Bech
University of Barcelona, Dep. Astronomy and Meteorology, Barcelona, Spain
Marc Berenguer (Centre for Applied Research on Hydrometeorology, Polytechnical University of Catalonia, Barcelona, Spain)

E-mail: joan.bech@ub.edu

The objective of the study is to assess the skill of a precipitation nowcasting system, with particular emphasis on high-impact Heavy Precipitation Events (HPE). The nowcasting system is based on the extrapolation of quality controlled Quantitative Precipitation Estimates (QPE) derived from weather radar data time series using a Lagrangian approach to obtain Quantitative Precipitation Forecasts (QPF) up to 3h. This system provided good results in previous studies regarding hydrological applications (Berenguer et al. 2005) and here is used to examine high-impact Mediterranean HPE in Catalonia (NE Spain), such as the 2005 tornado outbreak or the November 2008 flooding and tornadic thunderstorm event (Bech et al. 2011). To assess the skill of precipitation nowcasts we consider two approaches. Firstly the comparison of the QPF nowcasts with QPE which, given the large number of samples, allows for an assessment of forecast skill as a function of lead time along the event (e.g. time series of verification scores). For example, in the 2008 case, we examine the effect of a thunderstorm splitting into two intense cells upon the predictability of the precipitation field. The second approach used to assess forecast skill compares precipitation nowcasts with a dense raingauge network, providing local verification values for specific thresholds and lead-times. This study is partly funded by the ProFEWS project (CGL2010-15892).

REFERENCES

Bech J, N Pineda, T Rigo, M Aran, J Amaro, M Gayà, J Arús, J Montanyà, O van der Velde, 2011: A Mediterranean nocturnal heavy rainfall and tornadic event. Part I: Overview, damage survey and radar analysis. Atmospheric Research 100:621-637 http://dx.doi.org/10.1016/j.atmosres.2010.12.024

Berenguer M, C Corral, R Sánchez-Diezma, D Sempere-Torres, 2005: Hydrological validation of a radar-based nowcasting technique. Journal of Hydrometeorology 6: 532-549 http://dx.doi.org/10.1175/JHM433.1