

Between forecasting and nowcasting strong convective events

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1 Introduction

Let me refer to formulas presented in Newsletter 13. The 1st Formula, the best filter for strong Tornado or Downburst events expresses Fujita scale as a square root function merely of the IntraCloud discharges densities, while, the second for less severe events takes into account both: IntraCloud and Cloud-to-ground lightning discharges densities. It has occurred, that both formulas might have clear physical interpretation. Indeed, Formulas (1) and (2) distinctly differentiate between specific lightning activity that is characteristic for two various developing thunderstorm stages, i.e., for the mature and very active one, with dominant IC lightning activity and the second for the dissipation thundercloud formation, when CG flashes initiation is increasing and is more pronounced. Expression (1) by explicit inclusion of the ICi component is confirming well known fact that so-called spider lightning with great number of branches, with the great ICi points are appearing frequently during mature stages of supercells.

2 Action & Result

Operational monitoring of tornados that were observed over Poland showed that extreme Tornado or Downburst events are strictly correlated to IntraCloud number of flashes aggregated in cells over a 15 km radius area. Here, densities are calculated on the 7 by 7 km square grid. But to remain the accordance with typical supercells diameter I should enhance the commonly used values by a factor that varies from 5 to 12, according to weighting function which is growing with the distance from a square centre. (Parfiniewicz, EXPO2013).

Let's turn to Nowcasting and Forecasting SCE. The 3 categories are highlighted to distinguish between Nowcast and Forecast: ,i.e., lead time, the method used, and finally the targeted product. For lead time: we have tens of hours against 1 hour, for methodology: probabilistic interpretation of the model against tendency plus probabilistic interpretation plus possibly HD accurate simulations - if occurred, and finally: danger zones against accurate location. The successful nowcasting in fact is measured in minutes (after James Anderson, EXPO2013). What we have now in Poland on (<http://awiacja.imgw.pl/index.php?product=burze>) is the Observed Storms category which serves merely as an introduction to Nowcasting SCE showing their possible growth or decay and helps to understand how will they propagate.

References

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- [3] Parfiniewicz J., 2013: Nowcasting strong convective events (SCE) – the Thunderstorm Thermometer. *Meteorological Technology World Expo 2013*, Brussels, Belgium, 15 -17 oct.
- [4] www.ukintpress-conferences.com/uploads/SPMTWX13/Breakout_Session_d2_s2_p5_Jan_Parfiniewicz.pdf