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Radar rainfall estimation in the context of post-event analysis of flash-flood events

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This communication is about a methodology for radar rainfall estimation in the context of post-event analysis of flash-flood events developed within the HYDRATE project. For such extreme events, some raingauge observations (operational, amateur) are available at the event time scale, while few raingauge time series are generally available at the hydrologic time steps. Radar data is therefore the only way to access to the rainfall space-time organization, but the quality of the radar data may be highly variable as a function of (1) the relative locations of the event and the radar(s) and (2) the radar operating protocol(s) and maintenance. A positive point: heavy rainfall is associated with convection implying better visibility and lesser bright band contamination compared with more current situations.

In parallel with the development of a regionalized and adaptive radar data processing system (TRADHy; Delrieu et al. 2009), a pragmatic approach is proposed here to make best use of the available radar and raingauge data for a given flash-flood event by: (1) Identifying and removing residual ground clutter, (2) Applying the "hydrologic visibility" concept (Pellarin et al. 2002) to correct for range-dependent errors (screening and VPR effects for non-attenuating wavelengths, (3) Estimating an effective Z-R relationship through a radar-raingauge optimization approach to remove the mean field bias (Dinku et al. 2002)

A sensitivity study, based on the high-quality volume radar datasets collected during two intense rainfall events of the Bollène 2002 experiment (Delrieu et al. 2009), is first proposed. Then the method is implemented for two other historical events occurred in France (Avène 1997 and Aude 1999) with datasets of lesser quality.

References:

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