An exploratory analysis of radar-derived thunderstorm characteristics over the province of Styria, Austria

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An exploratory analysis of weather radar data was used to attain radar-derived thunderstorm characteristics from 2311 storms, from 15th April to 15th September each year from 2009 to 2016. In this article, we analyse the thunderstorm cloud characteristics over the province of Styria, Austria. This analysis uses volume-scan single polarisation C-band radar data and sophisticated storm cell tracking software to capture thunderstorm life cycle from developing stage to dissipating stage, cell tracking includes all merging or splitting echoes as part of the storm complex behaviour. A single cell, multiple cells, and frontal thunderstorms are included in this study. Objectively identify and track cells defined by radar reflectivity > 40 dBZ, with area >10 km2. Additional, only storm cells that existed longer than 30 min was chosen to eliminate minor storms. Furthermore, only storm cells that had a maximum top height (as defined by the height of the 40-dBZ contour) greater than or equal to 3.5 km are considered for this analysis in order to avoid the ground clutter. The following radar-derived parameters have been extracted for each storm cell: Duration of the storm cell, area and volume of the storm cell, the cloud top height, height of maximum radar reflectivity and the maximum reflectivity, vertically integrated liquid (VIL) (kg/m2). Some case studies and in detail results of radar-derived thunderstorm cloud characteristics will be presented. These datasets will be helpful in the evaluation of thunderstorm forecast models.