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Identification of convective and stratiform areas towards improved precipitation estimation with a local area X-band radar

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An algorithm for the partitioning of radar reflectivity into convective and stratiform rain has been adapted to the data of a high resolution X-band (9.41 GHz) radar. This radar is scanning at a fixed elevation of 5° with a time resolution of 30 s, a range resolution of 2° with a beamwidth of 2.4°.
First of all, the X-band radar is absolutely calibrated taking into account the attenuation due to precipitation by using a nearby vertically pointing Micro Rain Radar (MRR) that has been itself absolutely calibrated using a collocated surface disdrometer.
Then, the convective and stratiform areas are separated on the basis of the intensity and sharpness of the peaks and echo intensity. Applying this algorithm on the X-band radar data allows to detect even the smallest convective cells. The accuracy of this algorithm is checked by the presence of a bright band on the MRR measurements. Furthermore, the simultaneous measurements of these two radars in their common volume are analysed and the MRR measurements allow to derive the specific drop size distribution and Z-R relationships for these regimes.
Finally, the specific Z-R relationships are used to estimate the rainfall over the whole area covered by the X-band radar. This estimation is confronted to that using one single relationship and to the measurements of several raingages.