Range Effects at S and X Band Radars in São Paulo

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When radars are used to far ranges, as demanded when large areas are to be covered with a limited number of units, the issue of range effects is emphasized. This issue is also to be taken into consideration when surveillance of specific areas with modest size radars, e.g. X-band units, is required. Until now, the state of São Paulo in Southeastern Brazil has been covered by 4 S-band long range radars featuring 2° beam-width antennas, with quantified measurements reaching 240 km. The region encompassing the capital (RMSP, São Paulo metropolitan region) has been monitored with a dedicated mobile X-band polarimetric radars to a quantified range of about 100km. As part of the research program on weather radar carried out at IPMet (Meteorological Research Institute/UNESP-Bauru) a study is being developed in the search for range effects in the observations made by the radars in the state network. This paper presents early results on the impact of range on the distribution of reflectivity for different range rings along the radar coverage. Data used are PPIs from the Bauru (22°21’29’’S, 49°01’40’’W) S-band radar and the X-band polarimetric radar deployed at São José dos Campos (-45,952817°,-23.208702°), near São Paulo, during a field campaign of the research CHUVA project. All data were acquired during the summer season when high reflectivity gradients, typical of strong tropical convection, occur. CDF(probability distribution function) curves are constructed for different range rings to the 240km quantification range for the Bauru radar and 100 km for the X-band polarimetric radar at São José dos Campos. The curves are stratified by daily intervals defined in previous studies, reflecting the rainfall distribution along the day.