Radar Mosaic Scheme for Quantitative Precipitation Estimation in the China Yangtze River Three Gorges

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Compared to conventional rain gauge networks, ground-based weather radar systems offer a number of advantages in the real-time monitoring context. However, weather radars operating in complex orographic areas are as usually suffer from partial or total beam blockage caused by surrounding mountains. This shielding effect may restrict seriously the use of the lowest antenna elevation angles which provide the most useful information for QPE (Quantitative Precipitation Estimations). Therefore, beam blockage correction schemes have to be applied in order to minimize the effect of topography, especially if QPE are required in mountainous areas .

In this paper, two radar mosaic schemes for QPE in a mountainous region, the China Yangtze River Three Gorges, are developed. The hybrid scan lookup tables of three CINRAD (China New Generation Radar) weather radars are calculated using 1:250000 DEM (Digitized Elevation Model). Based on the hybrid scan lookup tables, two schemes for calculating the masks identifying acceptable coverage area from each radar are presented: one only takes into account the beam blockage; the other takes into account the beam height above ground level in addition to the beam blockage. The resulting masks were different from each other, especially for those grid cells with multiple radar coverage. This research is the initial work for the creation of radar mosaic precipitation images in mountainous areas, and it is necessary to verify which scheme is more beneficial.

References

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