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The Status of a Quantitative Precipitation Estimation Technique in Central Weather Bureau of Taiwan

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A quantitative precipitation estimation technique called QPESUMS (Quantitative Precipitation Estimation-Segregation Using Multiple Sensors) system is an integrated system incorporating data from multiple radars, numerical models, satellite, lightning and surface sensors. All data are mosaicked to a common grid coordinate with the goals of making reasonable QPE and quantitative precipitation forecast (QPF) on severe weather events.

The Z-R relationship p of $Z = 32.5R^{1.65}$ is applied in the QPESUMS system for the routine operational QPE. It is noted that the QPE's made by the QPESUMS tend to deviate from the raingauge data, resulting from different types of precipitating systems (convective or stratiform, etc.). Yet, once the previous QPE is adjusted by the raingauge data, the upcoming QPE will be highly correlated with the corresponding rainfall observation. Subsequently, time series of the adjusted QPE with respect to the rainfall observation of a certain raingauge station show a high consistency. In addition, the QPE's for different river basins also show good agreement with the observation as well.

Tasks to be accomplished in the forthcoming years for the QPESUMS system are: (1) the real-time operation of a statistical analysis to reveal the relationship between the radar estimated rainfall and rain gauge data, (2) an adjustment of satellite rainfall estimation based on radar data to estimate the precipitating systems, which are beyond the coverage of radar network, moving toward Taiwan, (3) the application of lightning data to demonstrate the lead or lag of lightning with respect to rainfall events, (4) 0-1hr QPF technique development, (5) the inclusion of dual-polarization techniques for a more precise segregation of convective and stratiform precipitation and etc.

Keywords: QPESUMS; Z-R relationship; QPF; severe weather