Quality Evaluation of Quantitative Precipitation Estimates from CMA for Grid Precipitation verification

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A highly spatial-temporal resolution (0.1°lat/lon) quantitative precipitation estimates products have been developed in Chinese Meteorological Administration (CMA), the optimum Interpolation (OI) technique is used to combine the NCEP CMORPH precipitation data with the Chinese Precipitation Analysis (CPA) which achieved with hourly gauged rainfall from more than 30000 automatic weather stations (AWS). The QPEs are applying to grid verification, as a preliminary research work, quality evaluation should be carried out firstly.

This study evaluated 1h precipitation analysis of CMORPH and merged QPE (CMP) for Aug 2014, the comparison of the two kinds of rainfall products consisted of a series of analyses including correlation coefficient (CC), bias and Root-Mean-Square-Error (RMSE) between precipitation analysis and gauge observations, the evaluation reveals the merged precipitation estimates represent large improvement which provides smaller bias relative to gauge rainfall, in terms of the RMSE and CC it outperforms the products from satellite-based precipitation estimates (CMORPH). Otherwise, Using Stable equitable error in probability space (SEEPS) precipitation skill score, the 24h combined merged QPE has been tested to reveal outstanding analysis ability for precipitation amount of all categories.

After analyzing the bias characteristic of merged QPE and CMORPHY precipitation products, some further analysis are designed to evaluate capability of forecast verification. Using operational regional model GRAPES_MESO 4.0 forecast products with 0.1°lat/lon resolution for testing merged QPE's evaluation capability. By traditional precipitation categorical scores, verification against gridded merged precipitation estimates consistently keeps the similar trend with point verification which is based on hourly gauged rainfall products. While, by examining spatial rainfall distribution, the merged precipitation estimates shows good performance on the space structure of rainfall over China even where there are few gauge within the evaluating regions.