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**Space-borne Quantitative Precipitation Estimation from**

**Cloud-top Features - Preliminary Result on Typhoon Cases**

**Abstract**

The space-borne precipitation products have the advantage of wide coverage in comparison with ground-based precipitation observations. The objective of this study is to develop the quantitative precipitation estimation (QPE) by using the new generation Himawari-8 geostationary satellite, which has high spatiotemporal resolution at multi-band observation and derived cloud microphysical properties. Together with the ground rain gauge information obtained from CWB automatic weather stations scattered on Taiwan island, we try to seek the opportunity to produce satellite QPE from the blended data from above. Two typhoons that made landfall in Taiwan was was investigated, in terms of Typhoon MERANTI on 13-15 Sep, 2016 and Typhoon MEGI on 26-28 Sep, 2016. The Back Propagation Neural Network (BPNN) is chosen as the primary method to lead the relationship between surface precipitation and cloud top microphysical properties.

The performance of model is evaluated by a number of verification parameters, including real-valued precipitation accuracy and uncertainty estimation, and compared with 3 operational products, Global Satellite Mapping of Precipitation (GSMaP), Integrated Multi-satellitE Retrievals for GPM (IMERG), Precipitation Estimation from Remotely Sensed Information Using Artificial Neural Networks–Cloud Classification System (PERSIANN-CCS), respectively. The experiment shows that compared to rain gauge, all operational precipitation products underestimate the rainfall rate, and the underestimation increases with rainfall rate. The QPE model performance shows significant improvements when we categorized by cloud phase before training the model. For the real-valued precipitation estimation, the categorized model is 4% lower in RMSE,and has a 14% higher correlation coefficient. The performance is better when the cloud microphysical properties is used.

**Keyword**

Back Propagation Neural Network(BPNN)