

Uncertainty Analysis Using the Maximum Likelihood Ensemble Filter and WRF and Comparison with Dropwindsonde Observations in Typhoon Sinlaku (2008)

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In this study, the maximum likelihood ensemble filter (MLEF) is applied to a tropical cyclone case to identify the uncertainty areas in the context of targeting observations, using the WRF model. Typhoon Sinlaku (2008), from which dropwindsonde data are collected through THORPEX Pacific Asian Regional Campaign (T-PARC), is selected for the case study. For the uncertainty analysis, a measurement called the deep layer mean (DLM) wind variance is employed. With assimilation of conventional rawinsonde data, the MLEF-WRF system demonstrated stable data assimilation performance over multiple data assimilation cycles and produced high uncertainties mostly in data-void areas, for the given tropical cyclone case. Dropwindsonde deployment through T-PARC turned out to occur inside or near the weak uncertainty areas that are identified through the MLEF-WRF system. The uncertainty analysis using the MLEF method can provide a guide for identifying more effective targeting observation areas.

References

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