



A Comparison Study on Three Adaptive Observation Methods for Northwest Pacific Tropical Cyclones

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Three adaptive observation methods, the conditional nonlinear optimal perturbation (CNOP), the first singular vector (FSV) and the ensemble transform Kalman filter (ET KF) are compared for 36-hours forecast of two northwest Pacific TC cases named Matsa in 2005 and Nock-Ten in 2004. Rankings of hypothetical test probes are designed respectively according to the above three methods, to identify the proper sites to deploy the dropwindsondes, by investigating the reduction of forecast-error variance (signal variance) of each individual hypothetical test probes. The signal variance obtained by the best test probe designed according to the sensitive regions calculated by the CNOP is more than that of FSV, both of which are much more than the best track designed using the ET KF. That is to say, the sensitive regions calculated by the CNOP and FSV are sufficient for adaptive observation. It is not necessary to design as many as possible test probes as the ET KF does, which could save computation cost. Moreover, the CNOP could locate more sensitive regions for adaptive observations.