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Targeted Observations Strategies for the Dropsonde Observations for Typhoon Surveillance near the Taiwan Region (DOTSTAR) – the Adoint-Derived Sensitivity Steering Vector

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The targeted observation strategies used in the field experiment, Dropsonde Observations for Typhoon Surveillance near the TAiwan Regions (DOTSTAR) will be presented. Multiple techniques are used to help design the flight path for the targeted observations for DOTSTAR: (1) the area with the largest forecast deep-layer-mean wind bred vectors from the NCEP Global Ensemble Forecasting System at the observation time, (2) the Ensemble Transform Kalman Filter, which predicts the reduction in forecast error ariance for all feasible deployments of targeted observations, and (3) the NOGAPS singular vectors that identify sensitive regions; (4) the Adoint-derived sensitivity steering vector (ADSSV), which shows the sensitivity at the observing time to the steering flow (response function) at the verifying time based on the adjoint model. These techniques will be compared and contrasted. The emphasis will be put on the ADSSV, which is a new design to show the sensitivity to the steering flow of a tropical cyclone at the verifying time to the vorticity field at the observing time based on the adjoint model.