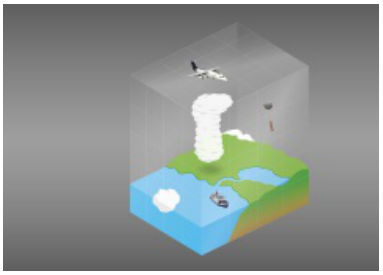

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Examples of targeted high-altitude airborne dropsonde deployment strategies for improved tropical cyclone and winter storm prediction

Tuesday, 11 June 2019 16:00 (30 minutes)

Two recent Tropical Cyclone (TC) Forecast Demonstration Projects (TCFDP) have utilized new and innovative technologies and targeted observing strategies for improving TC track and intensity forecasting: 1) Sensing Hazards with Operational Unmanned Technologies (SHOUT, 2015-16) and 2) East Pacific Origins and Characteristics of Hurricanes (EPOCH, 2017). Both of these projects share the objective of complementing legacy G-IVSP RD-94 dropsonde observational capability of the mid- and upper troposphere with improved NRD-94 mini-dropsonde observing strategy deployed from Global Hawk UAV vehicles in the lower stratosphere.

During the 2018 hurricane season and planned for the 2019 hurricane season is the use of improved versions of the ensemble targeting strategies developed at U. Albany in concert with the U.S. National Hurricane Center and Environmental Modeling center using ECMWF global model together with new instrument design in high-altitude dropsonde deployments from the NOAA GIVSP aircraft. The new targeting strategy and a third generation dropsonde design were implement mid-way through the 2018 hurricane season. Adding to these developments is a second ensemble targeting system utilizing the GFS global model that was developed for use in hurricanes and which was first implemented in the recently completed 2019 Atmospheric Rivers Reconnaissance program for winter storm event forecasting improvement along the U.S. West Coast. This program was directed by the Scripps Center for Western Weather and Water Extremes (C3WE) and conducted jointly with the Air Force Reserve Command (AFRC), NOAA/ Environmental Modeling Center (EMC), National Center for Atmospheric Research (NCAR) and the ONR/Naval Research Lab (NRL). The AFRC/ 53rd Weather Reconnaissance Squadron flew two WC-130J aircraft at maximum altitude, deploying new third generation NCAR/EOL designed, Vaisala produced RD-41 dropsondes.

A new dropsonde targeting strategy was developed at U. Albany using ECMWF ensemble forecasts in the 48-72 hour period to estimate regions of high observational uncertainty for prediction of track and intensity. Midway through the ARR-2019 program a similar product was introduced by EMC using GEFS ensemble global model, allowing consensus uncertainty regions to be identified. The Global Hawk patterns flown in both of these projects used the U. Albany strategy in developing dropsonde deployment locations for each flight. This paper describes how the resulting dropsonde locations compared with these regions of maximum uncertainty. In addition, the locations of these high uncertainty regions relative to key environmental and storm relative features is described and depicted using GOES visible and IR imagery, microwave imagery and concurrent airborne and land-based radar imagery.

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