GENESIS STAGE EXPERIMENT
Science Goals & Observational Applications

Favorable Air Mass (FAM) Experiment: Ghassan Alaka (PI), Jon Zawislak, Jason Dunion, Alan Brammer (CSU/CIRA), Chris Thorncroft (Univ. at Albany-SUNY)

Goal: To investigate the favorability in both dynamics (e.g., vertical wind shear) and thermodynamics (e.g., moisture) for tropical cyclogenesis in the environment near a pre-tropical depression, especially the downstream environment [*IFEX Goals 1, 3*]. See the 2019 HRD HFP web page for additional details: http://www.aoml.noaa.gov/hrd/HFP2019/index.html

Observational Applications: Observations resulting from this science goal have the potential to improve operational forecasts of tropical cyclone formation by identifying characteristics of the large-scale environment near the disturbance. Aircraft observations may provide more details about the thermodynamic and dynamic vertical structure that cannot be measured by satellites. These observations can be stratified into developing and non-developing categories to determine critical differences that are associated with tropical cyclogenesis. Further, these observations may translate into refinement of satellite-based guidance to better determine whether or not a particular disturbance will develop into a tropical cyclone. Ultimately, conclusions from these evaluations may be incorporated statistical genesis probabilities issued by the National Hurricane Center. These environmental observations may also be used to evaluate model forecasts and to identify model biases, especially in regards to relative humidity. The Hurricane Weather Research and Forecasting (HWRF) Model consistently runs high-resolution forecasts for "invest" disturbances, and dropsondes will be critical to evaluate environmental humidity and wind profiles in the model.