

## **9.5 Evaluation of the boundary layer temperature and moisture fields in the Hurricane Weather Research and Forecast (HWRF) system.**

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Realistic boundary layer (BL) temperature and moisture fields in coupled Numerical Weather Prediction (NWP) models are critical for accurately estimating the simulated air-sea fluxes that modulate tropical cyclone intensity and structure. In this work, we compare the BL temperature and moisture fields from the operational Hurricane Weather Research and Forecast (HWRF) system to Coyote Uncrewed Aircraft System (UAS) and dropsonde observations collected in the eyewall of Hurricane Maria. Results demonstrate a 1–2 degC cool, dry bias in the HWRF BL, with a maximum bias at a height of approximately 750 m ASL. However, near-zero bias exists at approximately 10-meter height. The resulting simulated temperature and moisture profiles are characterized by unrealistically steep temperature and moisture lapse rates within the BL. The effect of these biases on the air-sea fluxes and convective generation within the tropical cyclone will be shown, along with model development efforts to reduce the bias.