

Response of the Caribbean upper atmosphere to the Category IV Hurricane Maria

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Abstract:

Puerto Rico (PR) was struck by the Extreme Weather System (EWS) category IV hurricane Maria on Sep 20, 2017. This work presents a preliminary analysis of the marked variability in the upper atmosphere observed by instruments at Arecibo Observatory (AO), PR. During various stages of Maria, these instruments detected distinct, altitude-dependent thermospheric responses in an extensive area from the center of this EWS. On the night of Sept 17, 2017, when Maria was about 850 km southeast from AO, an all-sky imager registered wavefronts propagating northwestward (away from the convective source) in three wavelengths. A photometer detected a decrease in the OI5577 (~95km) before Maria's landfall. Ionosonde data acquired during Maria's approach and landfall indicate an intensification of the tidal amplitudes near the peak of the F-region (~300 km) during nighttime. As the EWS Maria progressed northward, a VLF receiver operating at the AO confirmed fluctuations in the D-region ionospheric conditions via the observed atmospheric gravity waves.

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References:

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