Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)
Recent Advances in Equatorial, Low- and Mid-latitude Mesosphere, Thermosphere and Ionosphere Studies (C1.1)

IMPACTS OF TROPOSPHERIC EXTREME WEATHER SYSTEMS ON THE UPPER ATMOSPHERE BASED ON FABRY-PEROT INTERFEROMETER RED LINE AIRGLOW EMISSION DATA.

Christiano Marques Garnett Brum, cbrum@naic.edu
Arecibo Observatory, 00612, Puerto Rico
Pedrina Santos, pterra@naic.edu
Arecibo Observatory, Arecibo, Puerto Rico, United States
Ângela Santos, angelasantos_1@yahoo.com.br
National Institute for Space Research (INPE), SÃO JOSÉ DOS CAMPOS, Brazil
Robert B Kerr, rkerr@cpi.com
Computational Physics, INC., Boulder, Colorado, United States
Sudha Kapali, sudha@cpi.com
Computational Physics, INC., Boulder, Colorado, United States
Juanita Riccobono, nita@sci-sol.com
United States
Michael Migliozzi, mike@sci-sol.com
United States
Carlos Perez, cperez@naic.edu
Arecibo Observatory, Arecibo, Puerto Rico
Christian Cortes, ccortes@naic.edu
Arecibo Observatory, Arecibo, Puerto Rico
Raul Garcia, raulgarcia5577@gmail.com
Arecibo Observatory, Arecibo, Puerto Rico

Understanding the Earth's atmosphere and ionosphere as an integrated, coupled system is one of the biggest challenges of the aeronomy community. The continuous influence of meteorological (below) and space weather (above) drivers on this system makes it even more challenging to identify and avoid ambiguities in interpreting observations or for modeling purposes. Several forcings that modify the upper atmosphere comes from the troposphere and the objective of this work is to understand the impacts of extreme weather systems (EWS) at thermospheric altitudes over the Caribbean region. For this, we will be analyzing Fabry-Perot Interferometer (FPI) red line OI6300 (250 km) airglow emission spanned for a period of 8 years (2014-2021) during the Atlantic Hurricane seasons (June to November). The FPI is located at Arecibo

Observatory (18°2048N 66°4510W), which is in the path of most of EWS approaching the Caribbean and US every year. Preliminary results based on data registered during the EWS category IV Hurricane Maria in 2017 have shown a decrease in the airglow brightness of about 15 Rayleigh. This unusual behavior might indicate changes in the scale height of the neutral atmosphere caused by the variations of the atmospheric pressure (O2, O, and N2) and in the electron-and-ions vertical concentration (Ne, O2+, NO+), or both. These hypotheses seem to be linked to changes in the tide modes' phase once the decrease of both emissions lasts for the entire night (in this case the gravity wave generation and smaller periodicities had been not considered).