



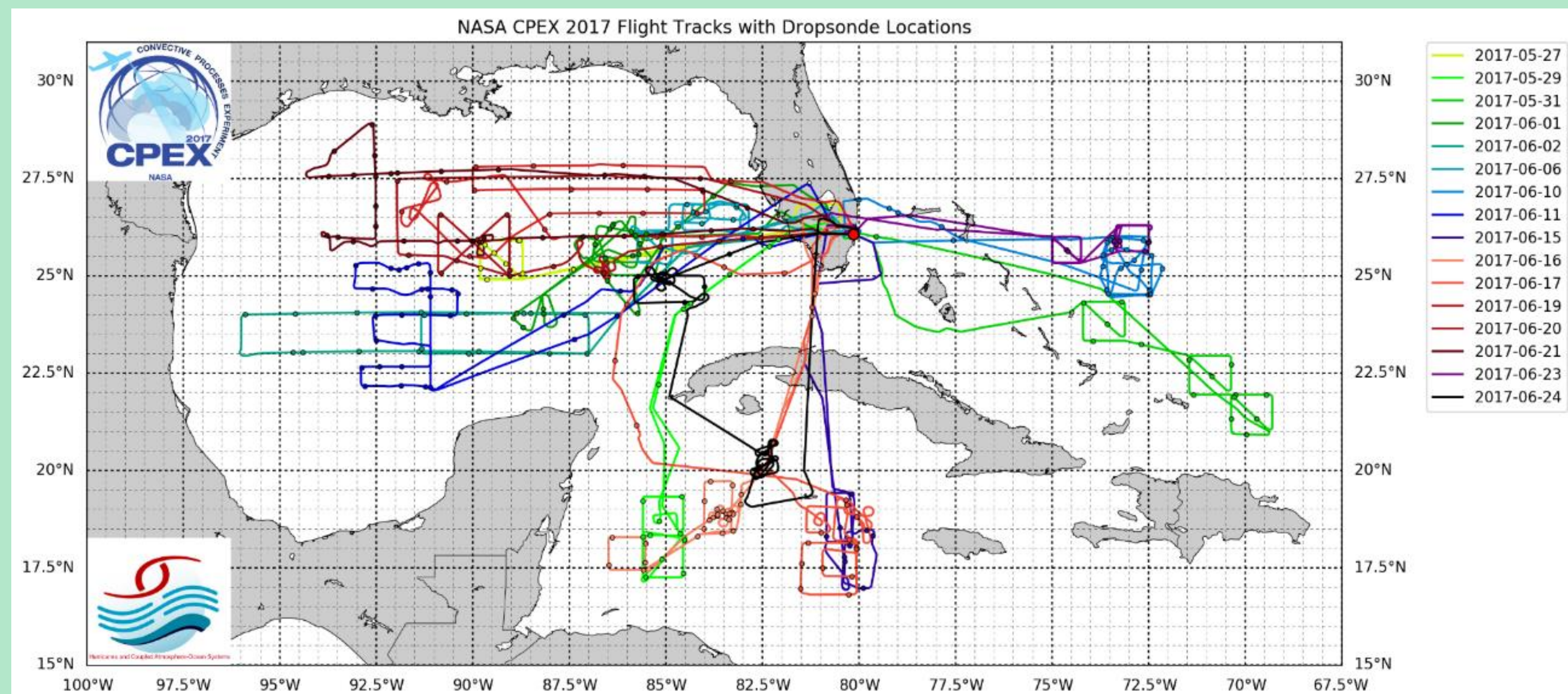
DAWN Lidar from CPEX 2017: Convective Process Studies and Comparisons with other Wind Measurements and Numerical Models

S, Greco¹, G.D. Emmitt, M. Garstang¹, M. Kavaya² and Z. Pu³

¹ – Simpson Weather Associates, Charlottesville, VA, USA; ² – NASA LaRC, Langley, VA, USA; ³ – Univ. of Utah, SLC, UT; USA

CPEX 2017 - 25 May – 24 June 2017

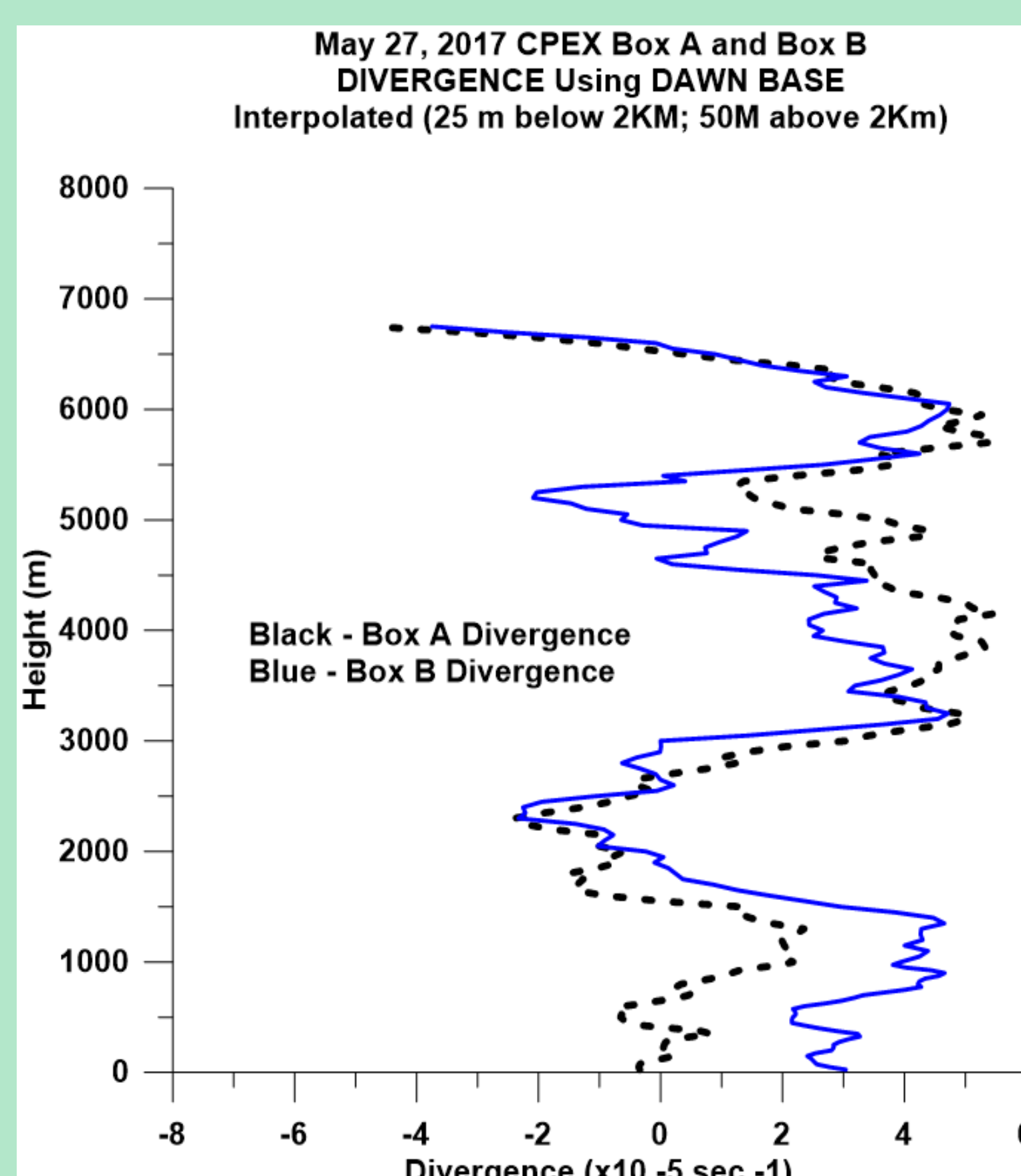
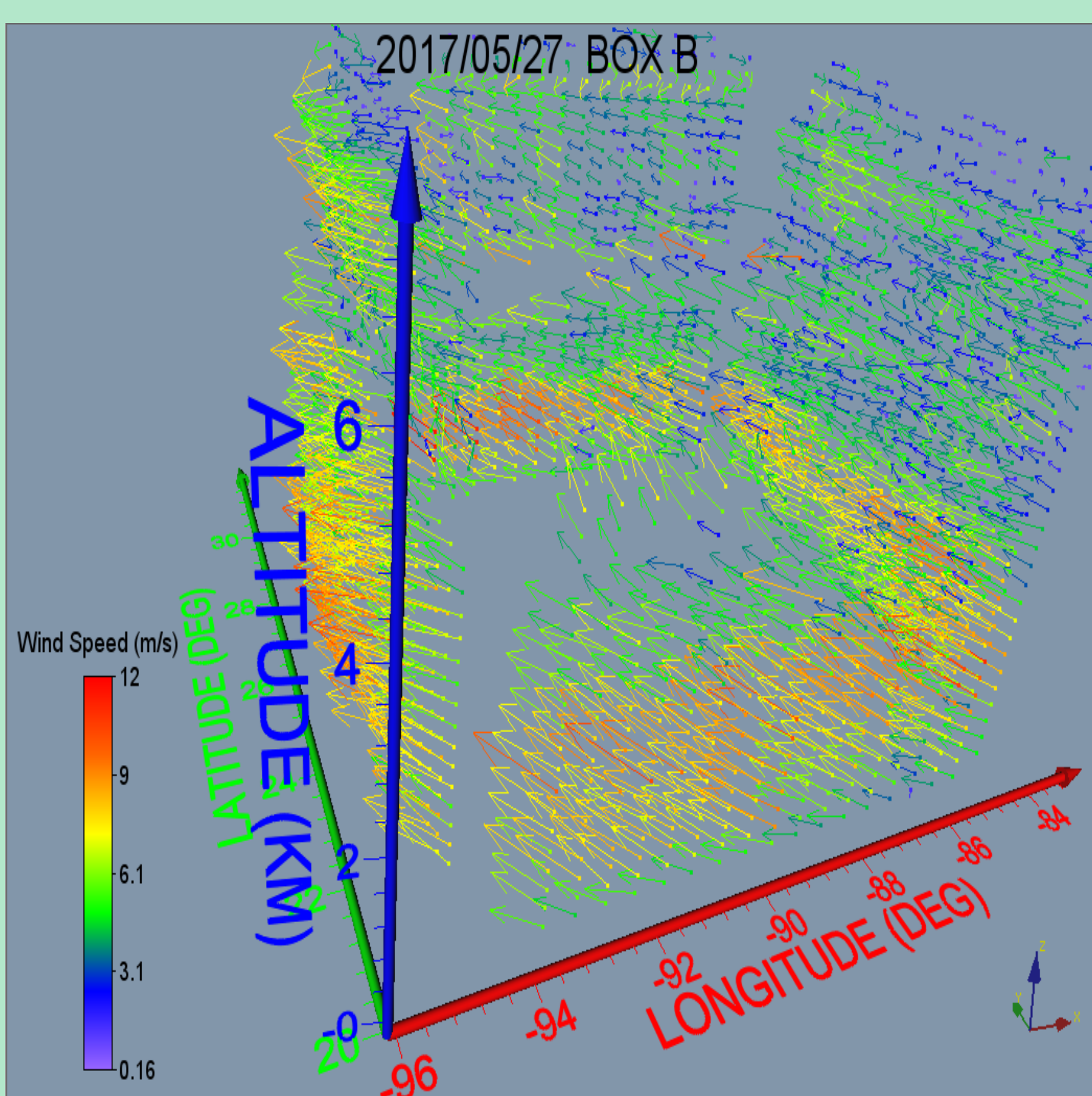
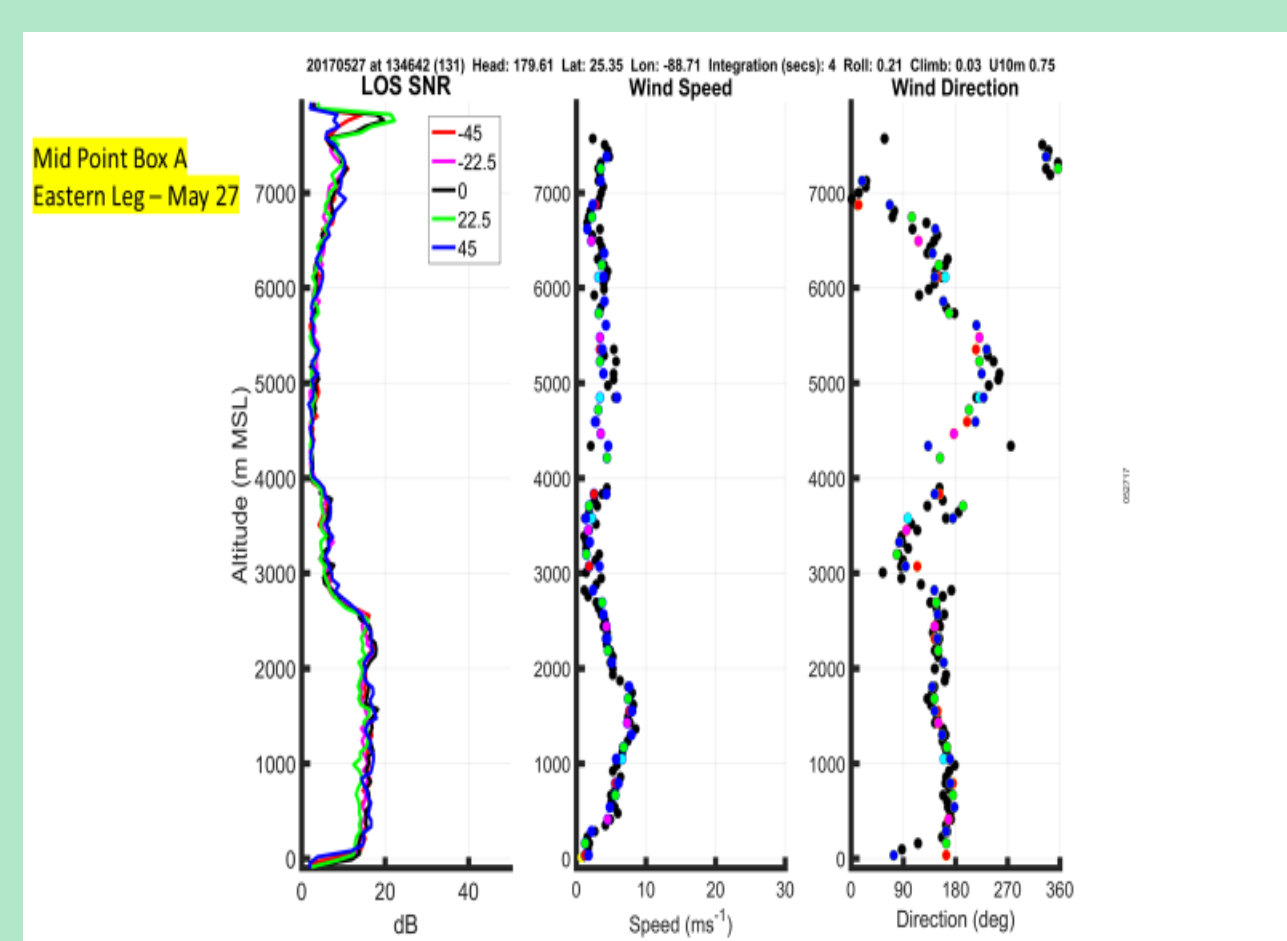
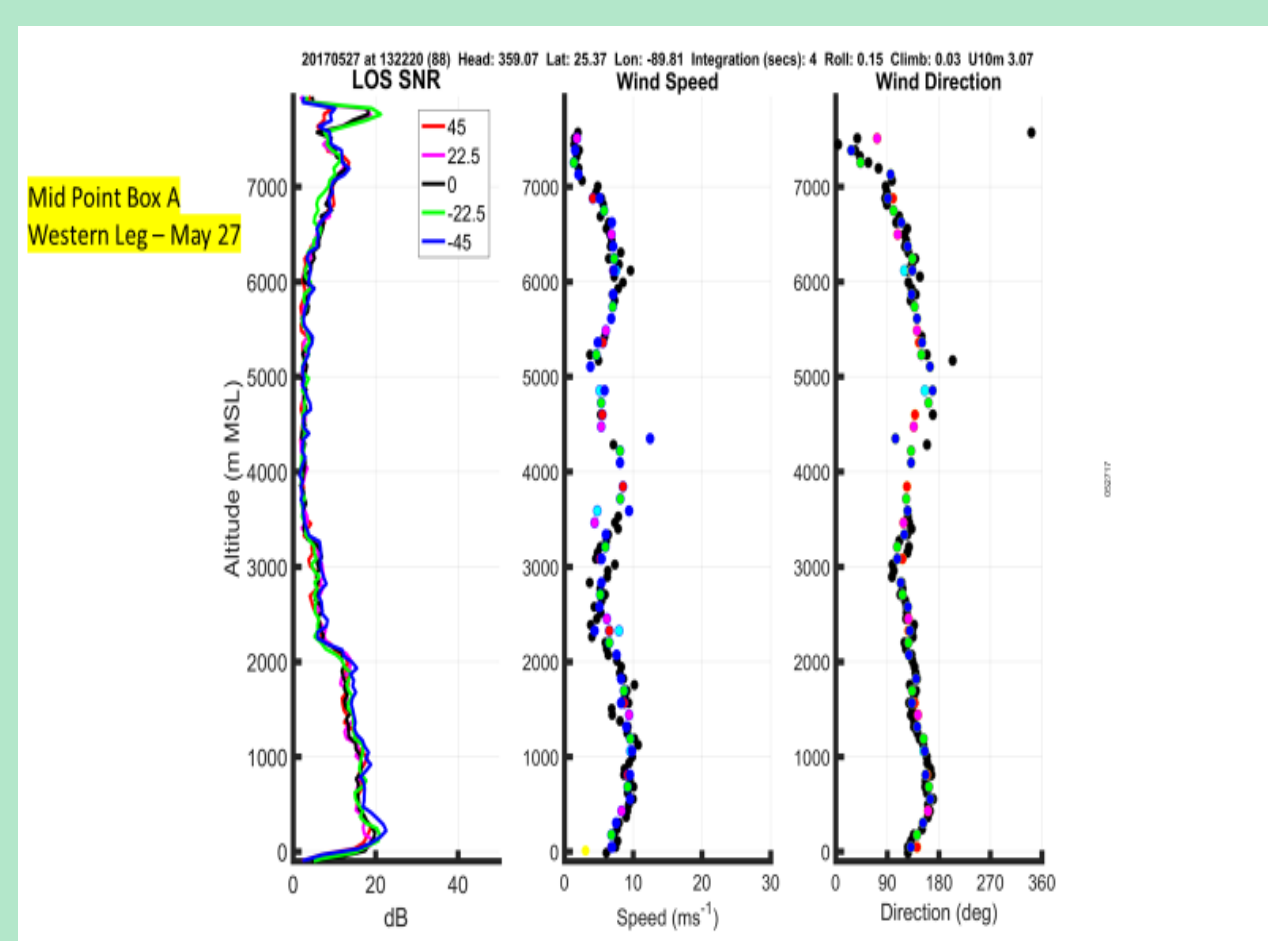
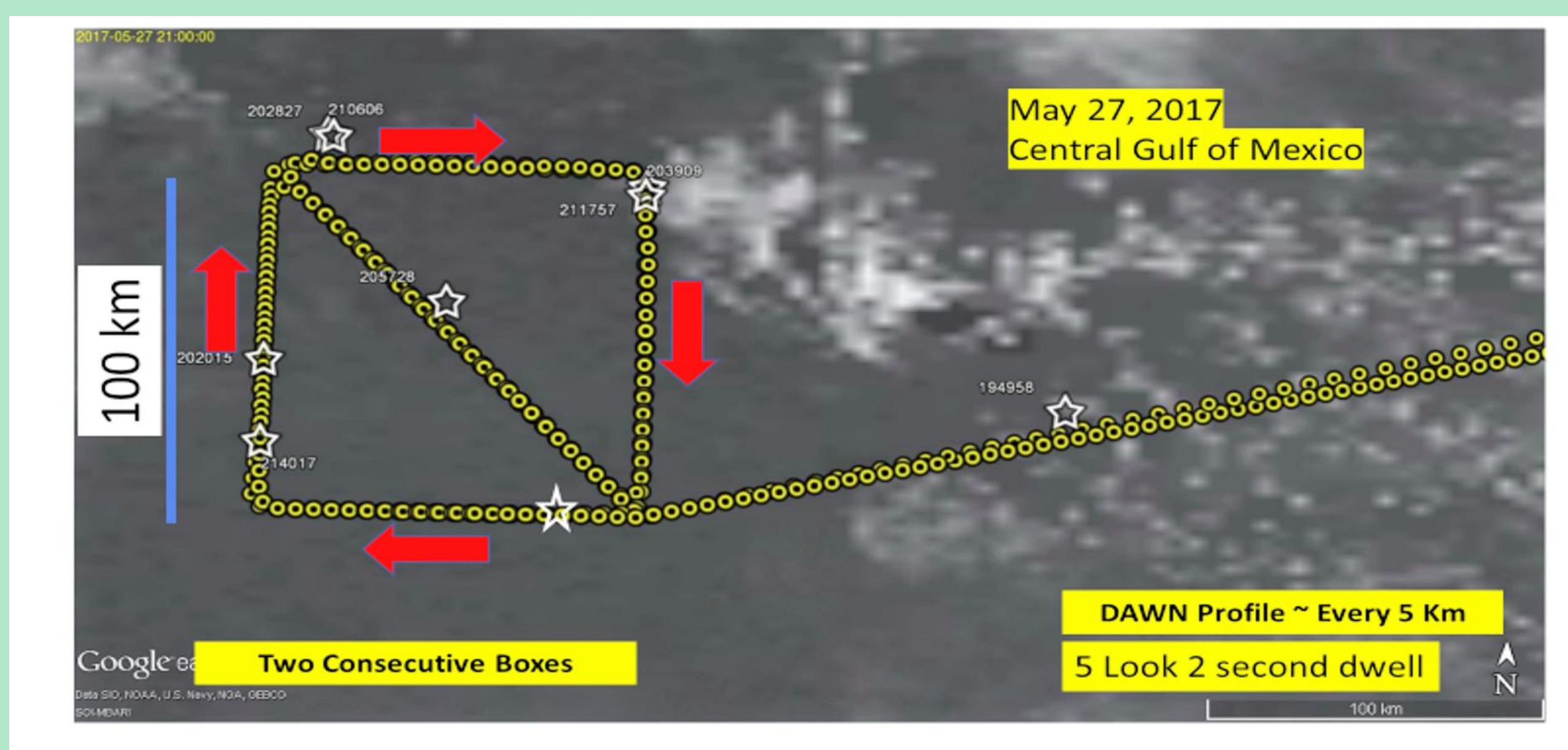
The NASA funded 2017 CPEX (Convective Processes EXperiment) airborne campaign flew 16 missions over the Atlantic Ocean, Caribbean Sea and the Gulf of Mexico and included the Doppler Aerosol WiNd (DAWN) wind profiles and the HDSS dropsondes.



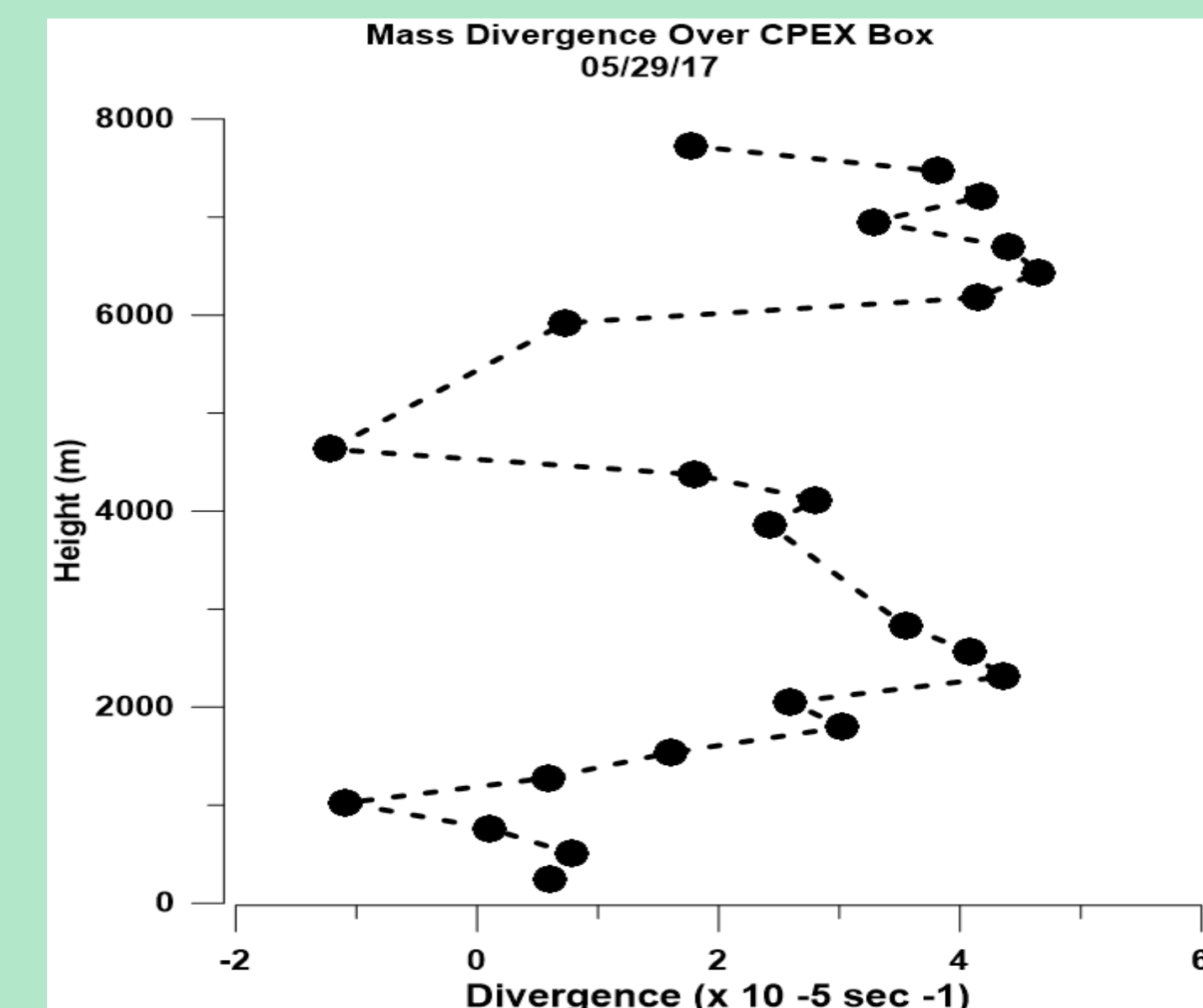
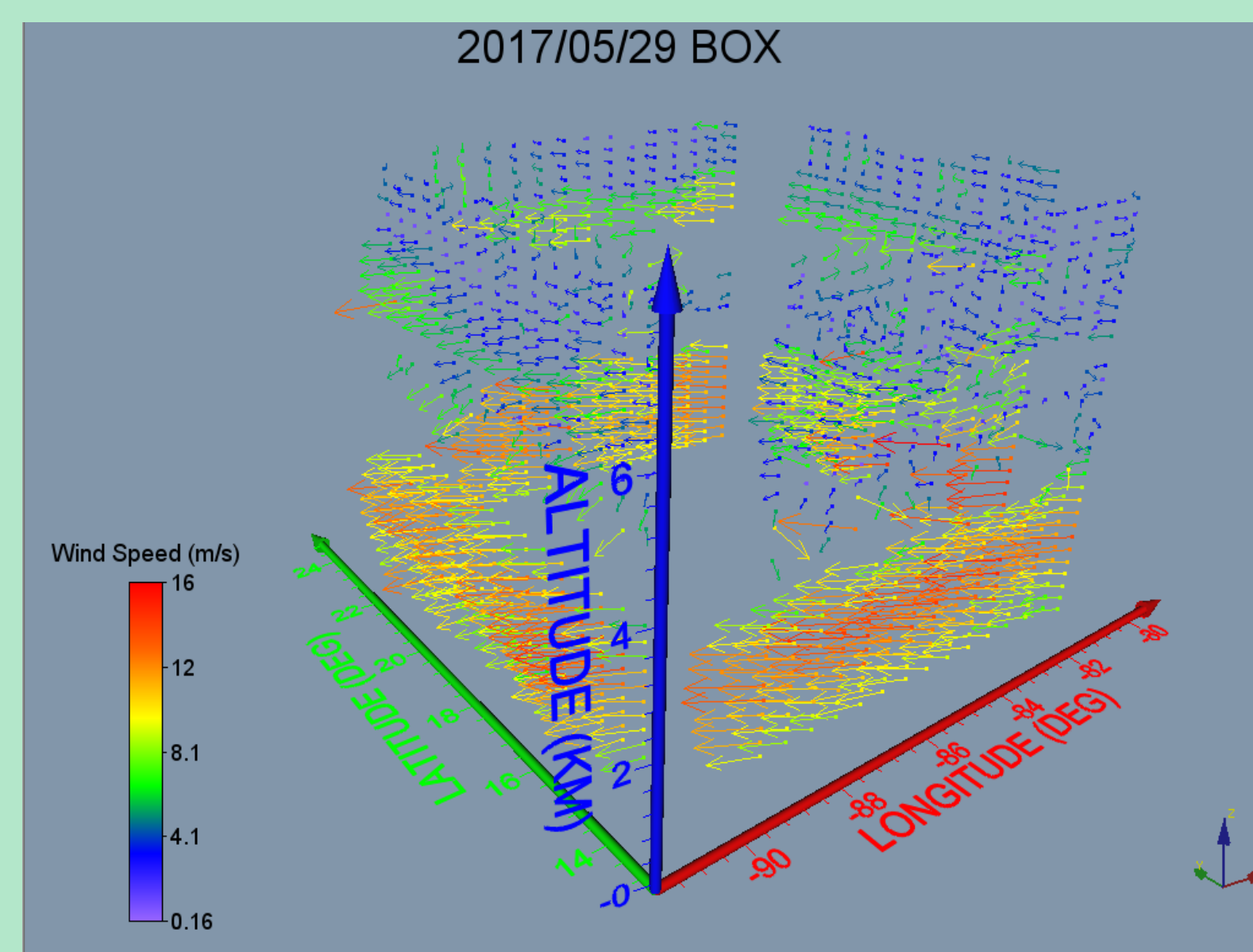
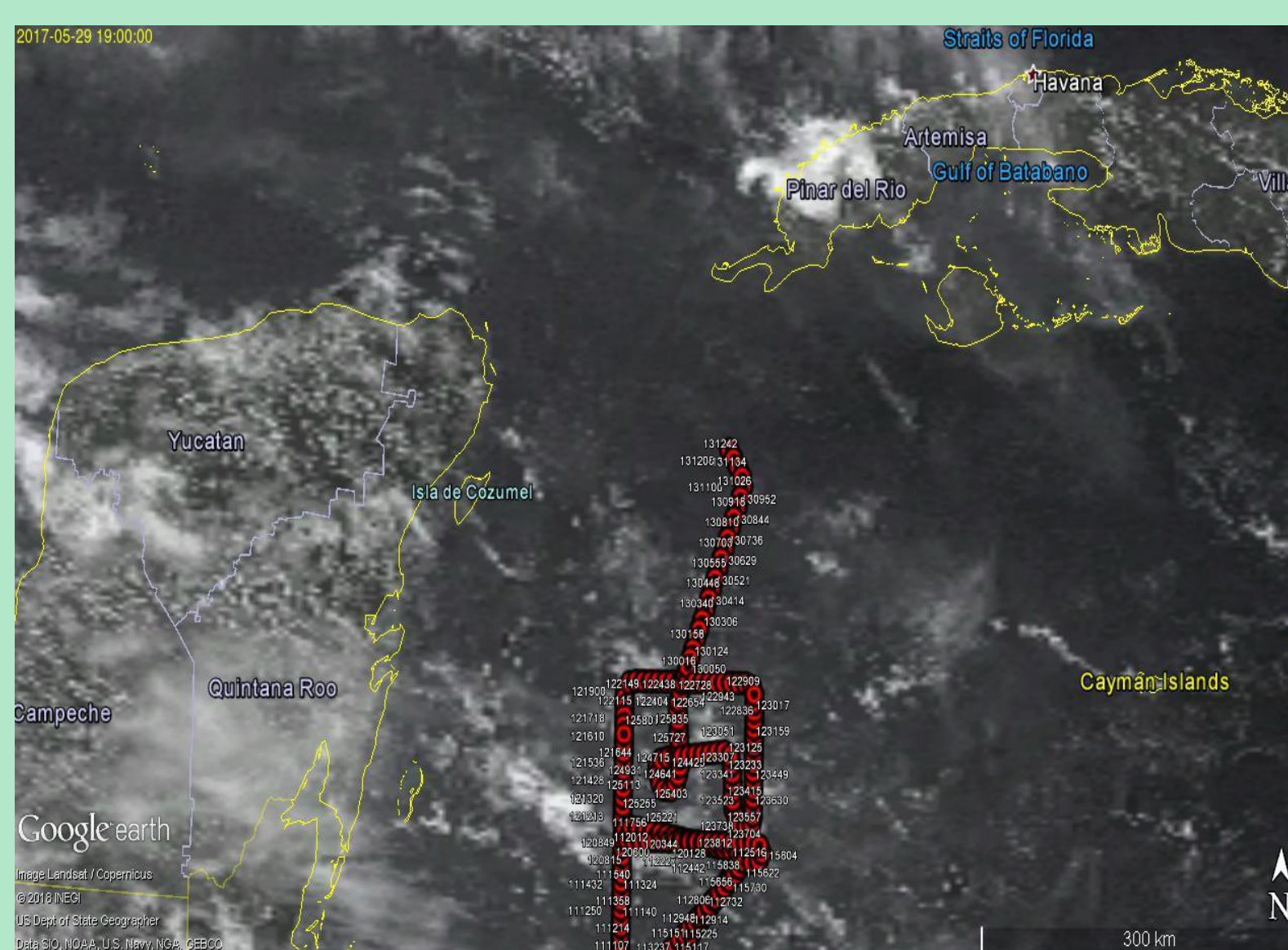
DAWN and CPEX Science Objectives

- 1) DAWN is a NASA LaRC developed coherent 2 micron DWL that provided over 5000 wind profiles taken over 16 missions:
 - Vertical profiles of wind and SNR every 5-15 km, depending on speed of aircraft and integration length chosen
 - Vertical resolution of 50-100 m; Vertical extent of 4-12 km.
- 2) Study dynamics of the tropical atmosphere by flying missions that allowed the computation of mass budgets for 23 ~ 100 km x 100 km x 10 km volumes with varying convection

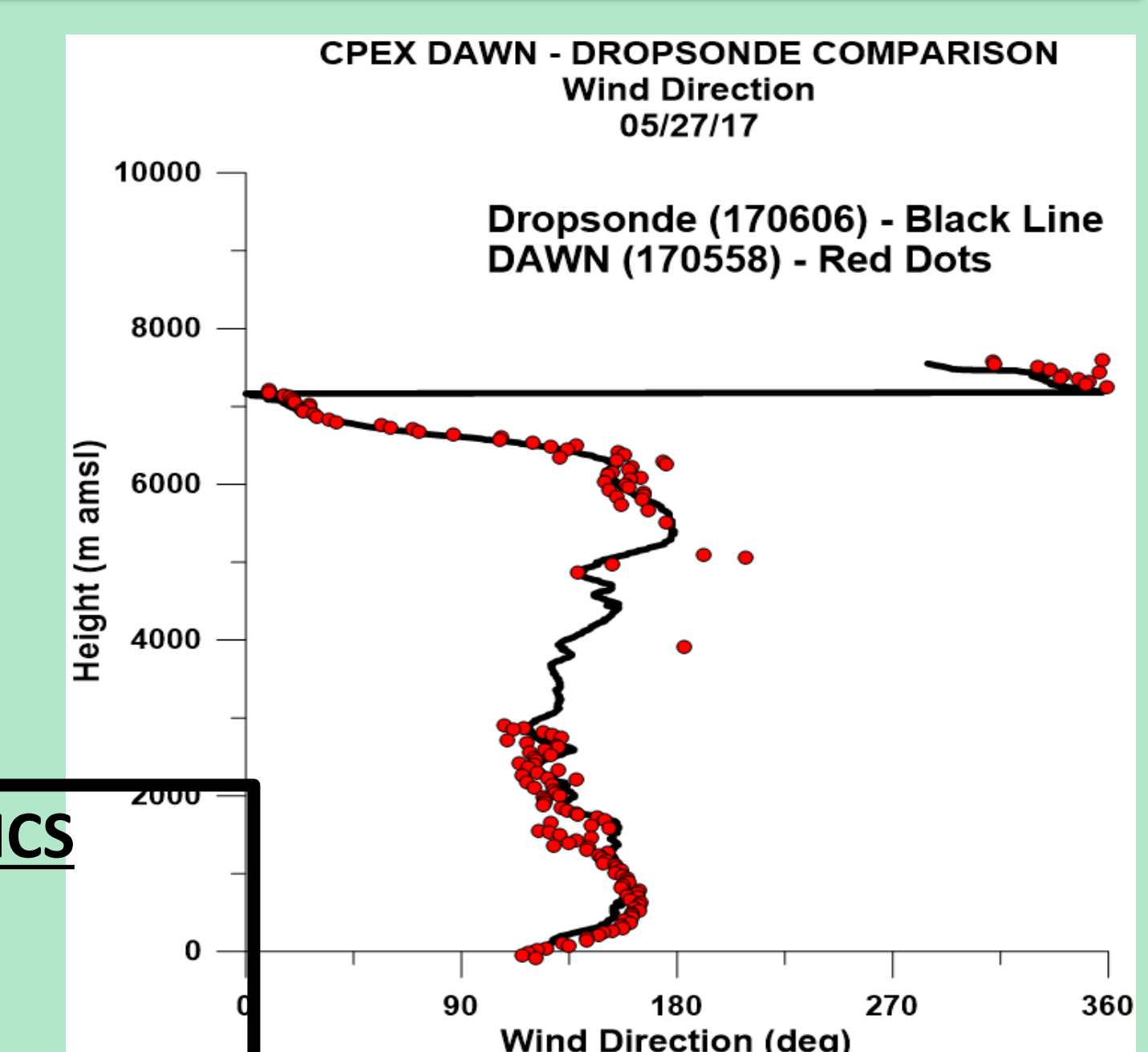
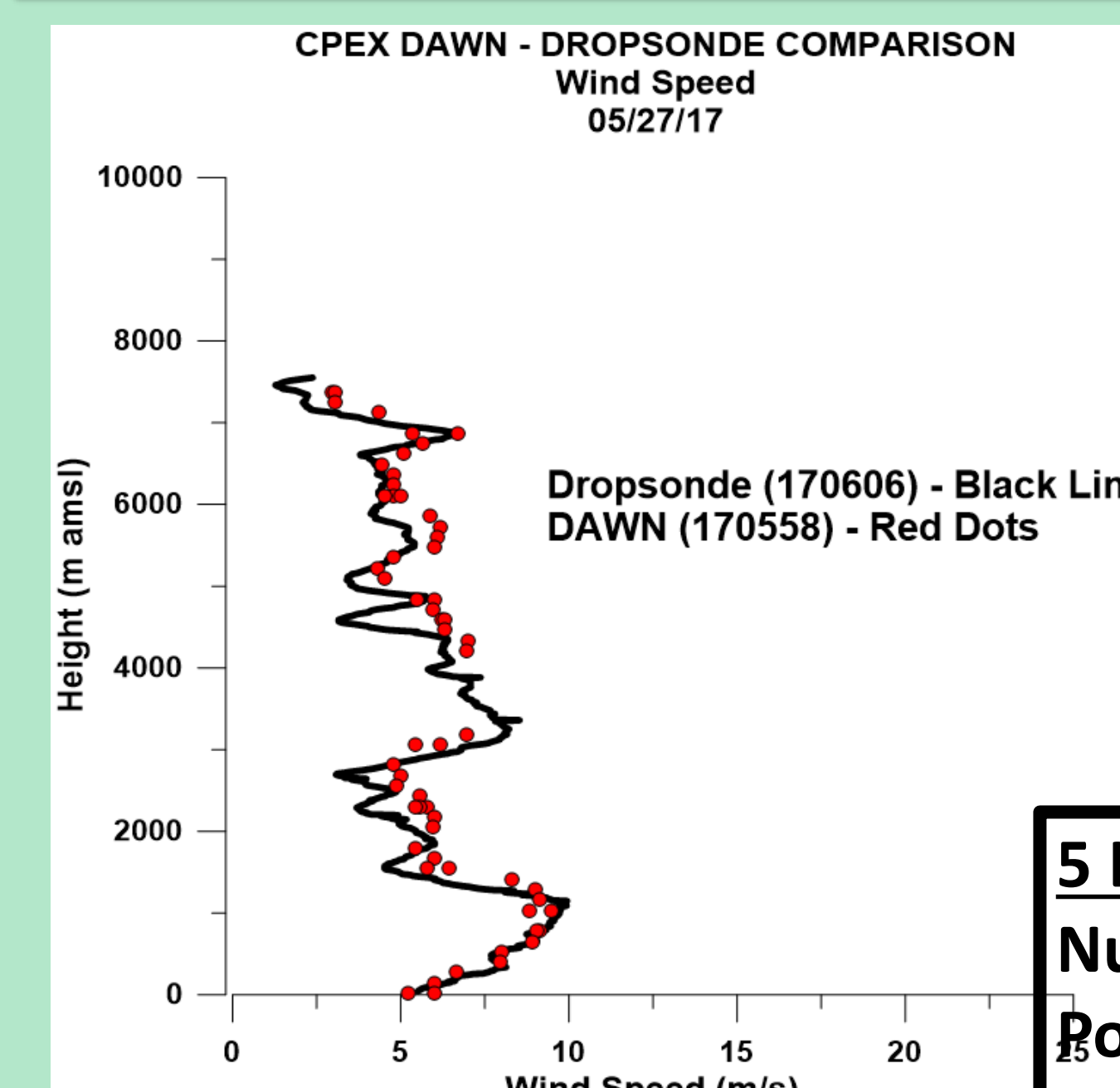
Undisturbed Conditions Central GoM – May 27



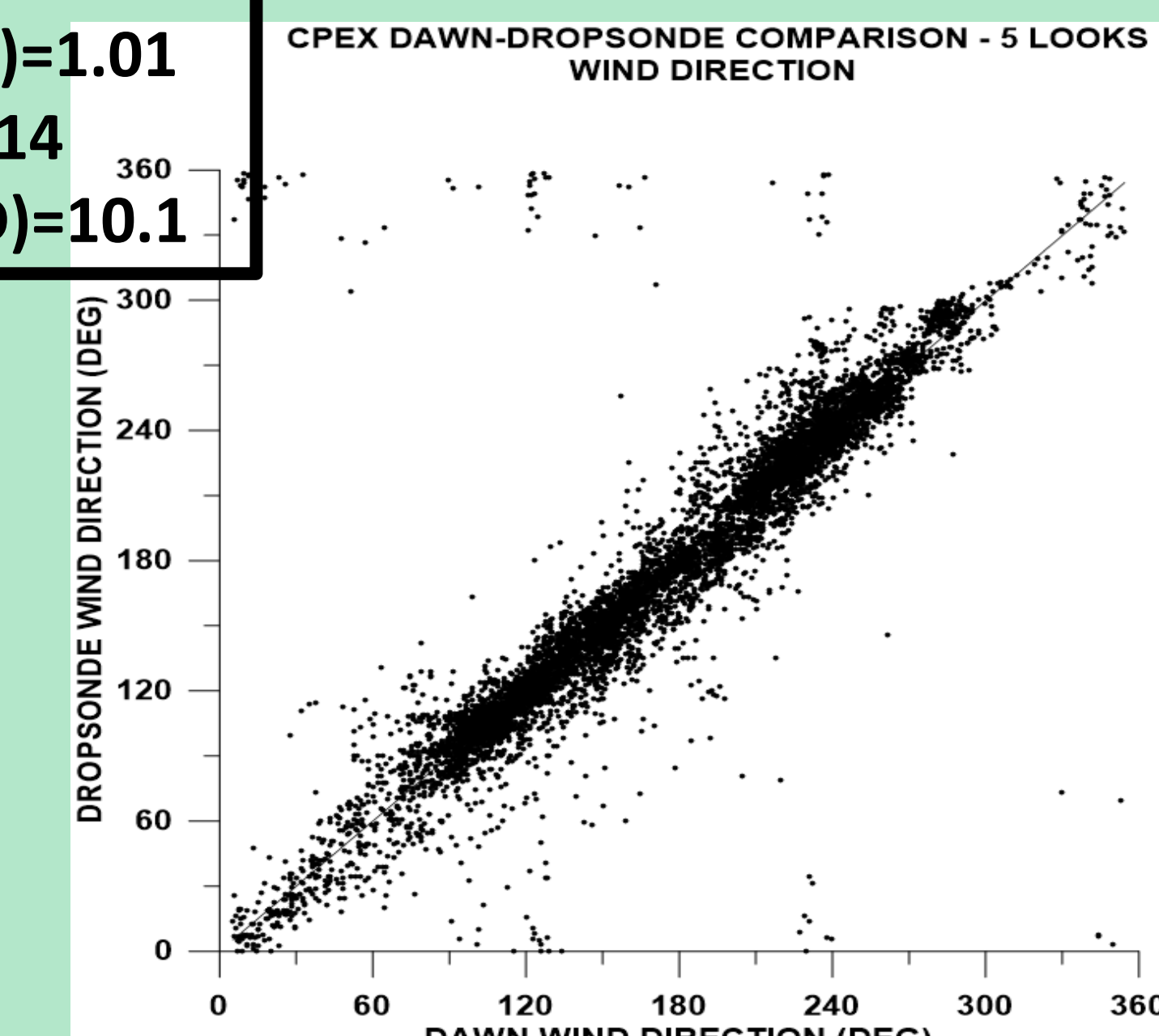
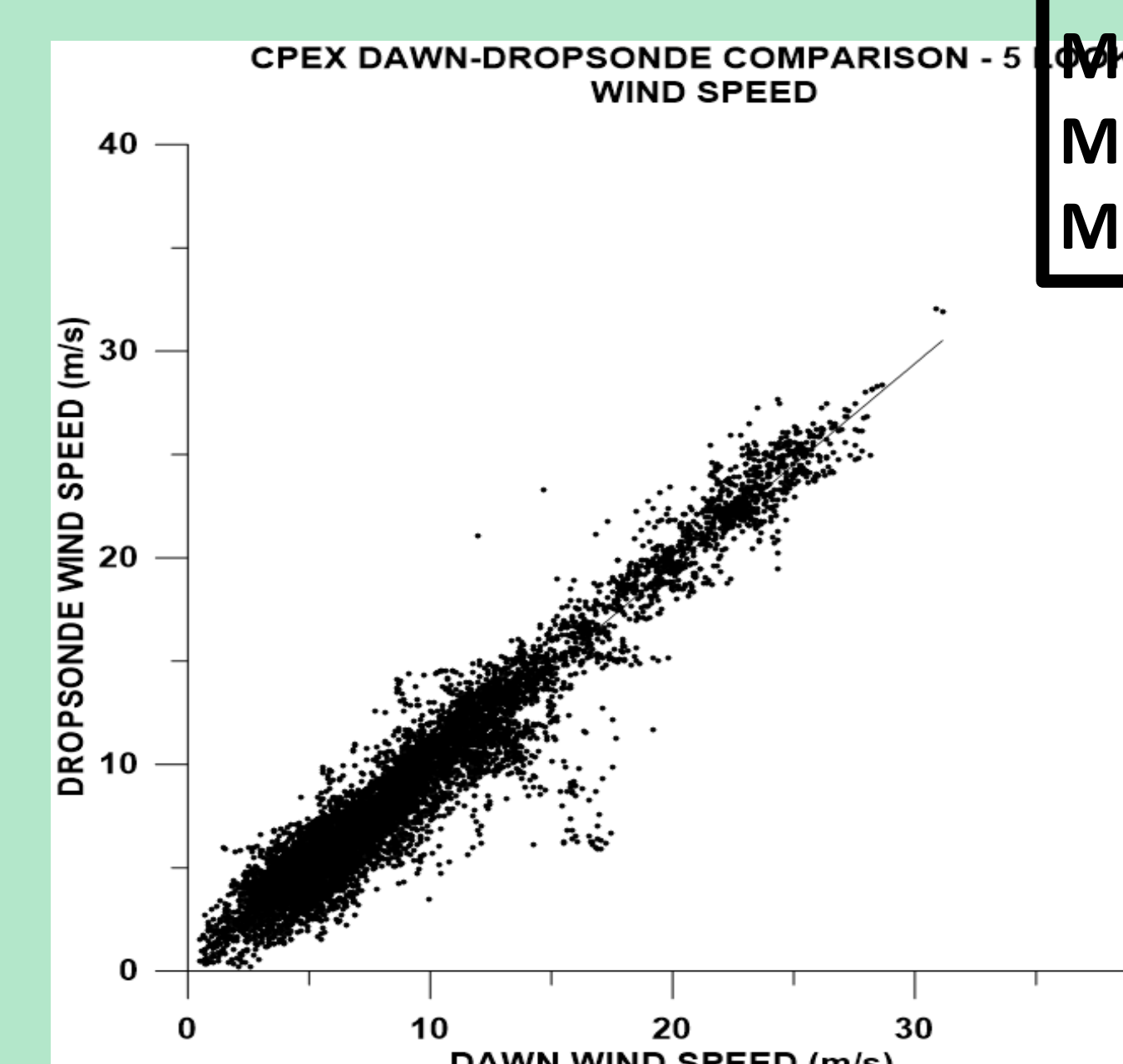
Scattered Convection W. Caribbean Sea – May 29



DAWN-Dropsonde Comparisons for CPEX

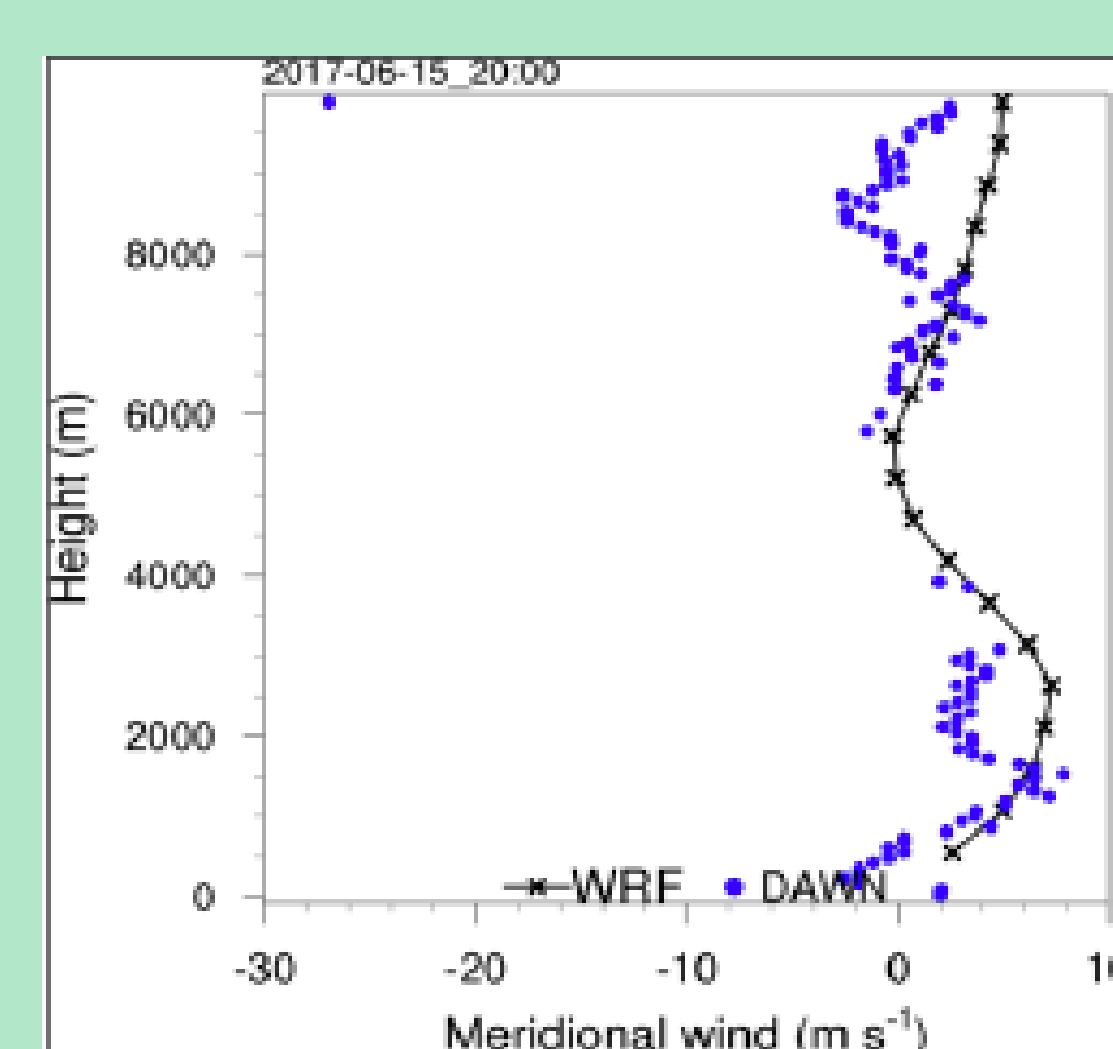
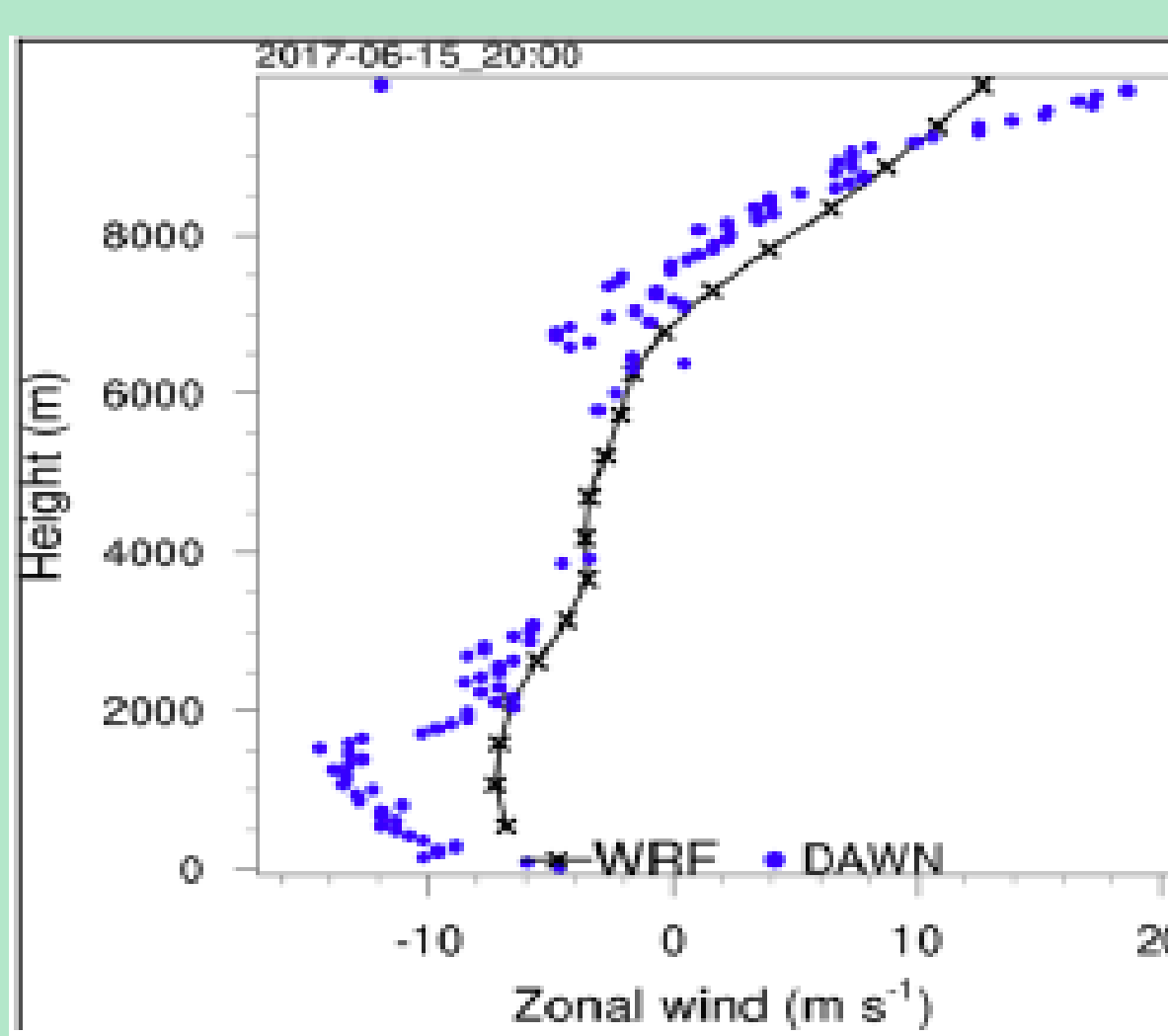
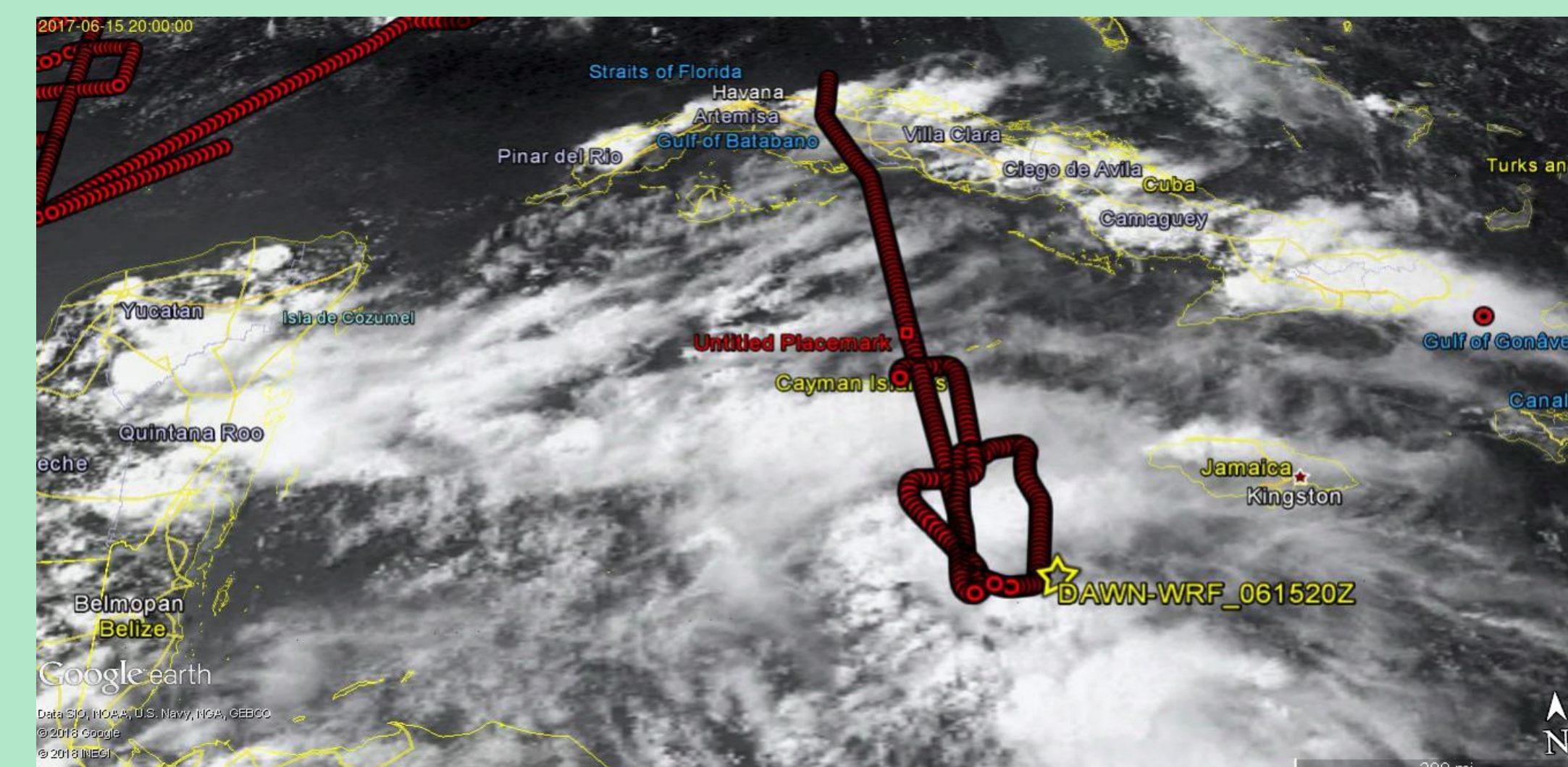


5 LOOK STATISTICS
Number = 8617
Points = 8617
Mean $\Delta WS = 0.14$
Mean $ABS(\Delta WS) = 1.01$
Mean $\Delta WD = 0.14$
Mean $ABS(\Delta WD) = 10.1$



Comparisons with WRF Model Simulations

Univ. of Utah WRF simulations for active convection (6/15/2017)



WDM Microphysics
rrtmg radiation
YSU BL
Unified Noah Land
Revised MM5 M-O
New Tiedke cumulus
Nested Grids:
- 27 km
- 9 km
- 3 km
- 1 km