

10D.4 - Hurricane Coherent Turbulence Structure from Saildrone Uncrewed Surface Vehicle Observations



Wednesday, May 8, 2024



11:30 AM - 11:45 AM



Seaview Ballroom (Hyatt Regency Long Beach)

Abstract

Tropical cyclones obtain and lose energy through turbulent processes at the air-sea interface. Thus, it is important to improve our understanding of these processes for improving intensity prediction. Numerical and observational studies have shown that coherent features such as eye-eyewall meso-vortices and rolls may have a significant impact on turbulent transfer in the hurricane boundary layer. However, the limited availability of observations near the air-sea interface has hindered efforts to improve our knowledge of coherent structure impacts. This study analyzes unprecedented high-frequency wind data collected by saildrone uncrewed surface vehicles to examine the characteristics of hurricane near-surface coherent features. Velocity spectra and co-spectra are derived to quantify dominant eddy sizes and their variations with wind speeds and radial locations. Effects of coherent structures on momentum transfer are evaluated. The results may offer useful guidance in numerical weather prediction efforts aimed at improving forecast of hurricane intensity. Because of the small sample size analyzed in this work, further analyses of the turbulent characteristics in the hurricane surface layer are imperative.

Co-Authors



Jun A. Zhang (Presenter)

CIMAS/University of Miami and NOAA/AOML/HRD
Miami, FL
USA



Gregory Foltz
NOAA
Miami, FL
USA



Chidong Zhang

PMEL
Seattle, WA
USA



Dongxiao Zhang
CICOES/University of Washington and NOAA/Pacific Marine Environmental Laboratory
Seattle, WA
USA



Andrew M. Chiodi
NOAA
Seattle, WA
USA



Frank D. Marks
AOML
Miami, FL
USA



Lev B. Looney
Univ. of Georgia
Athens, GA
USA
