

Doppler Lidar Wind Measurements Around Hurricane Maria and Hurricane Lane during NOAA Hurricane Reconnaissance Programs

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July 10-11, 2019

Introduction

Although there are still issues such as cost, size and availability, after over thirty-five years of development, the Airborne Doppler Wind Lidar (ADWL) is now mature enough to be called operational.

Over the past fifteen years, Simpson Weather Associates (SWA) has participated in numerous ADWL missions and field campaigns that have allowed us to measure and investigate the 3-dimensional wind circulations of the lower troposphere and planetary boundary layer (PBL) and to compare with other observations (Profilers, dropsondes).

In 2017 and 2018, the ADWL was flown on the NOAA Hurricane Reconnaissance P3 aircraft making DWL wind profile measurements around Hurricane Maria and Hurricane Lane, respectively.

Airborne Doppler Lidar on the P3

The ADWL has successfully operated on a NOAA-P3 aircraft to measure winds in the lower atmosphere environment and near the center of hurricanes since 2015

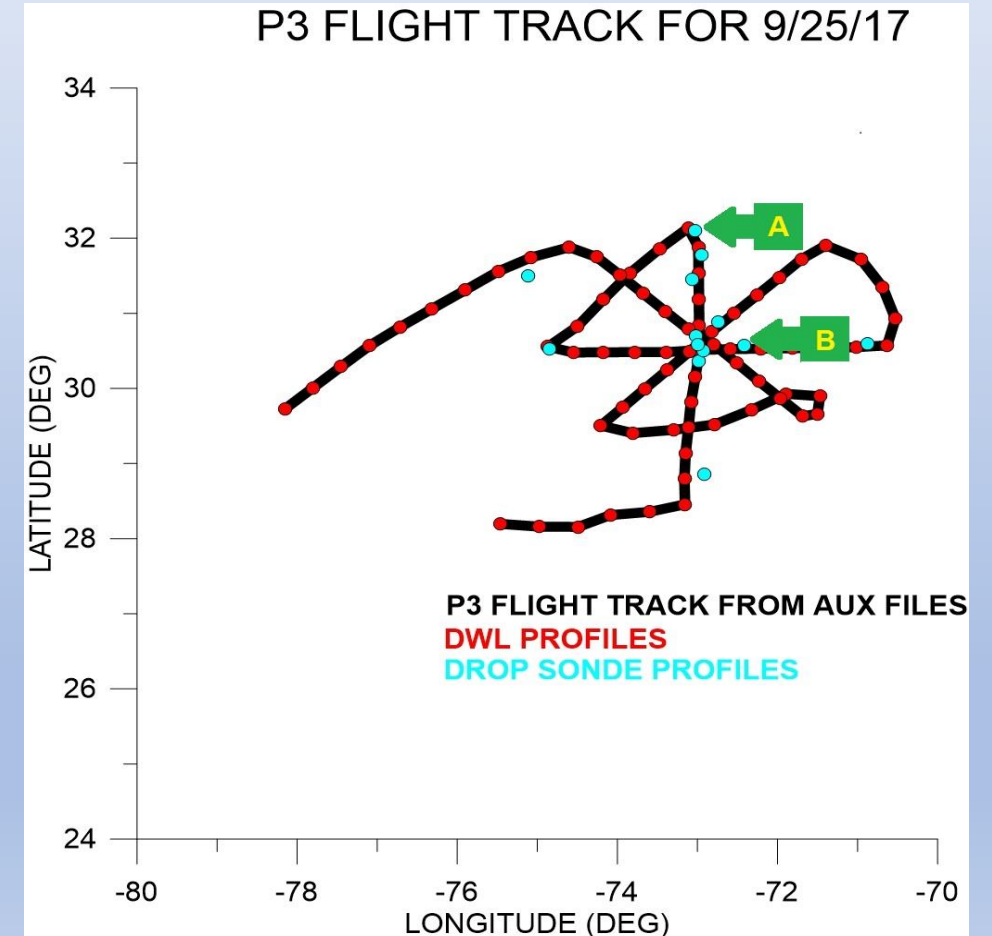
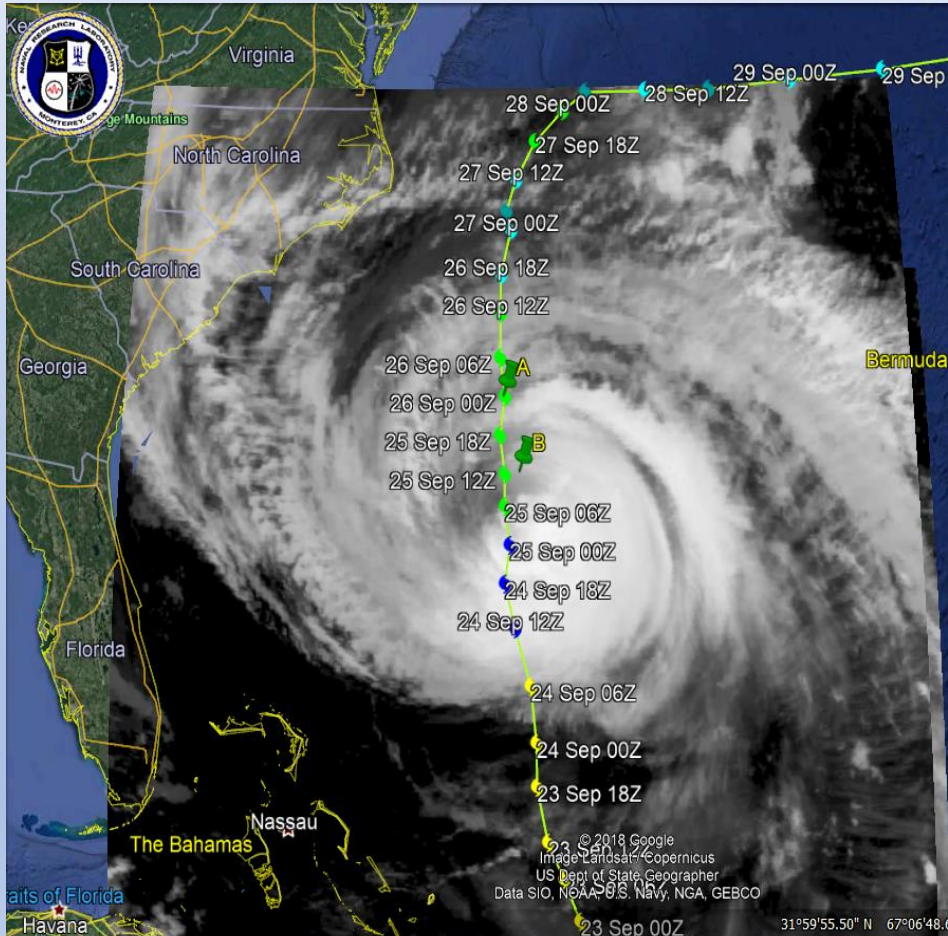


1.6 μm coherent
CTI wind Tracer (LM)

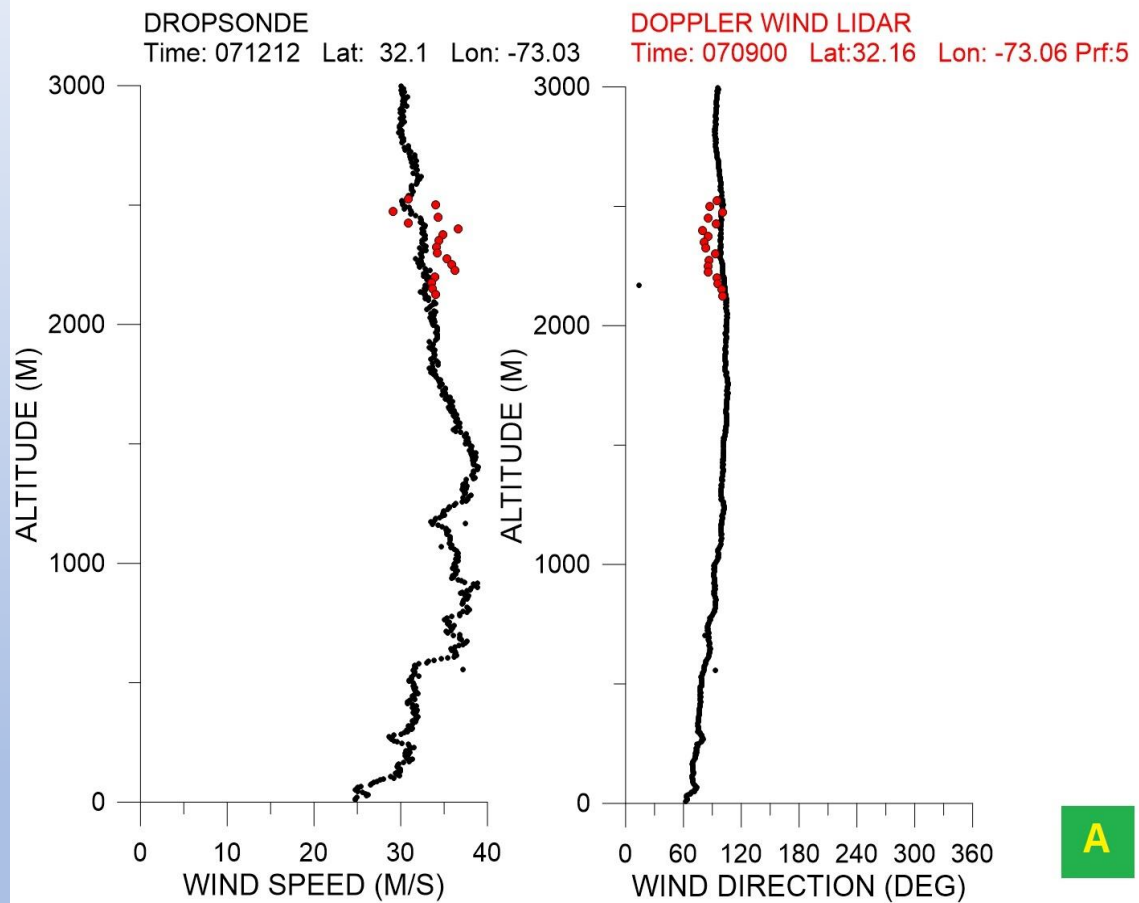
Side mounted
10 cm bi-axis
scanner (NASA LaRC)



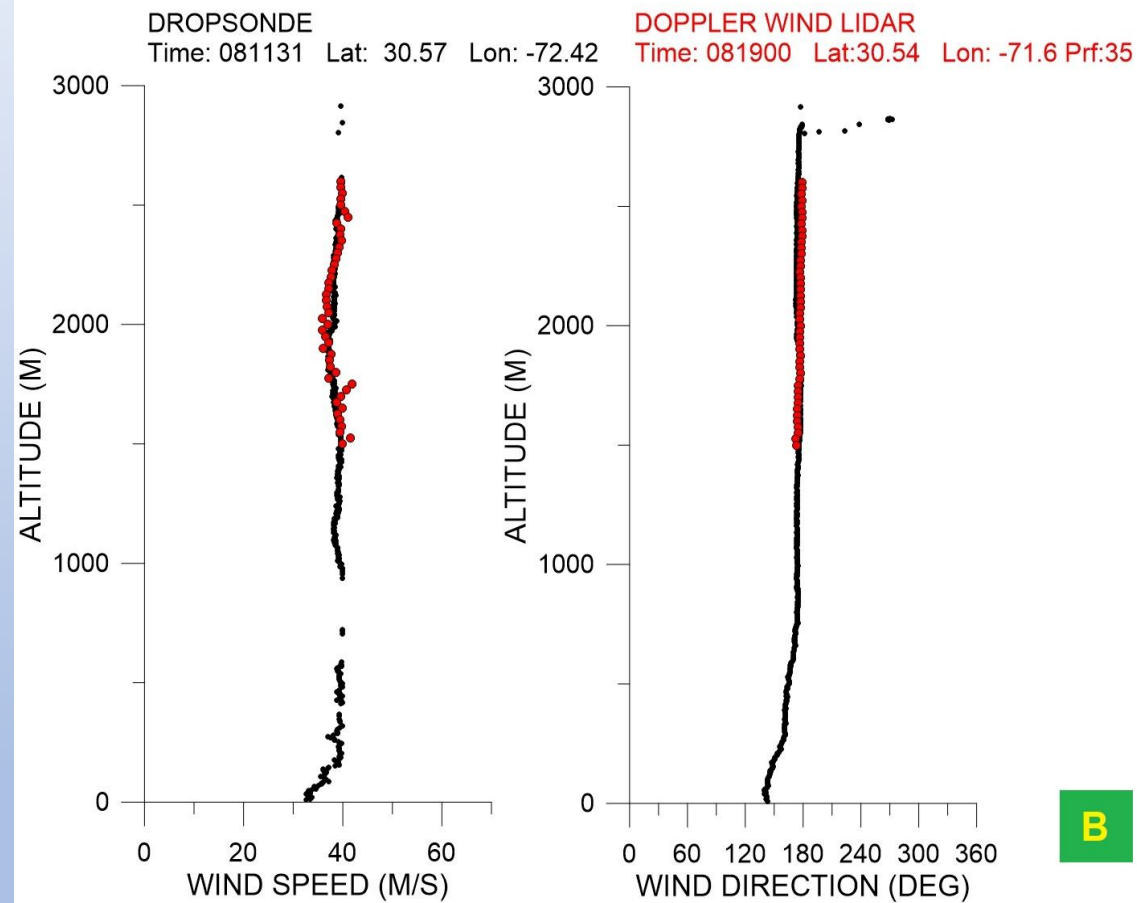
P3-DWL Hurricane Maria Investigation 9/17-25/17



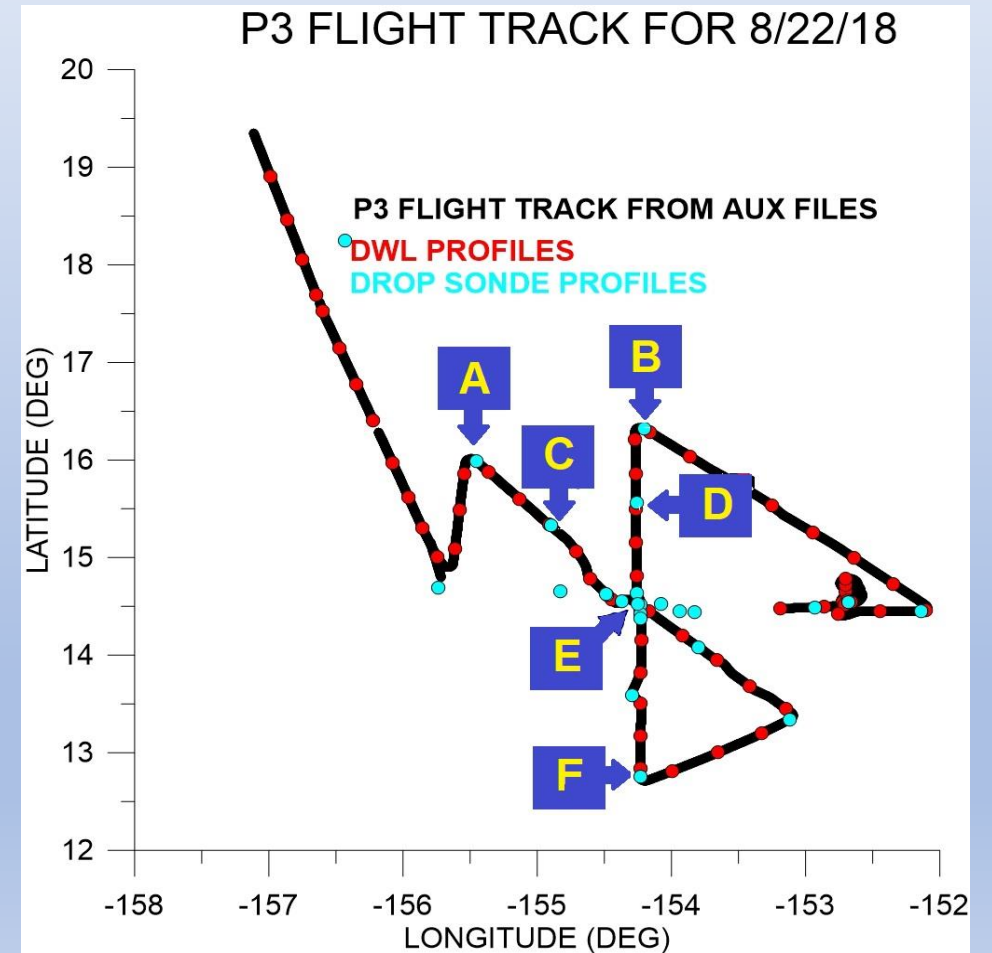
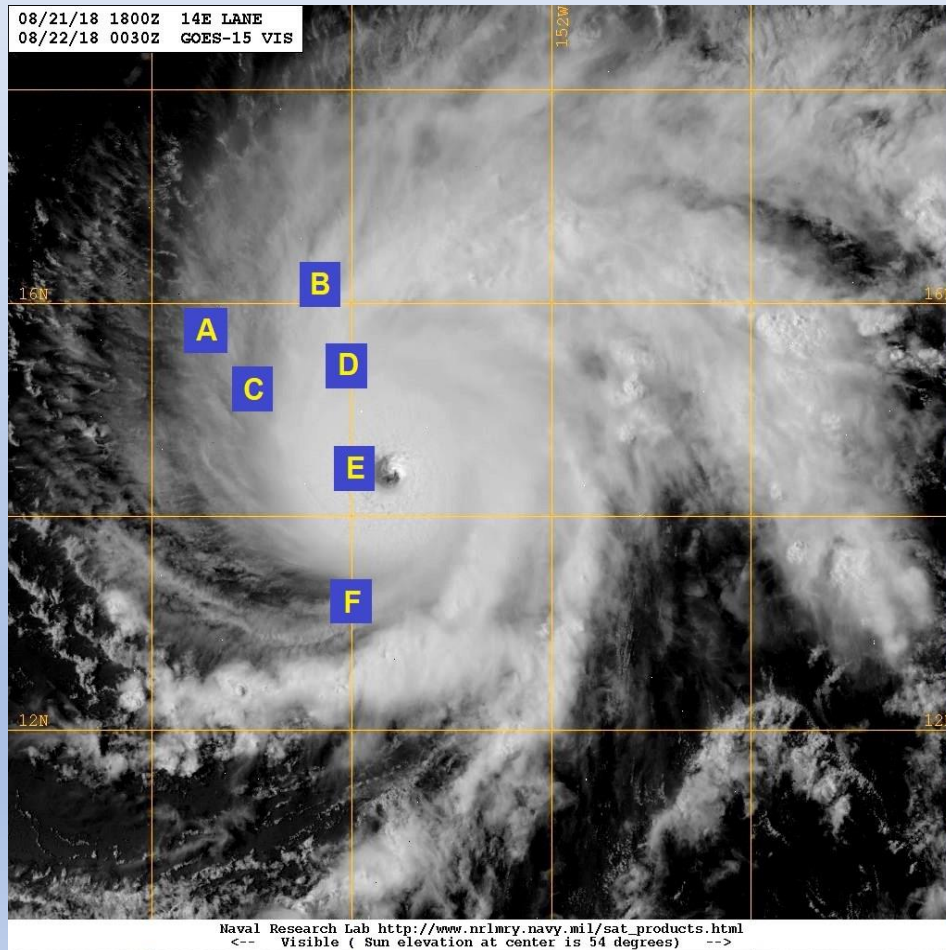
Hurricane Maria: Airborne DWL Profile vs Dropsonde on 09/25/17



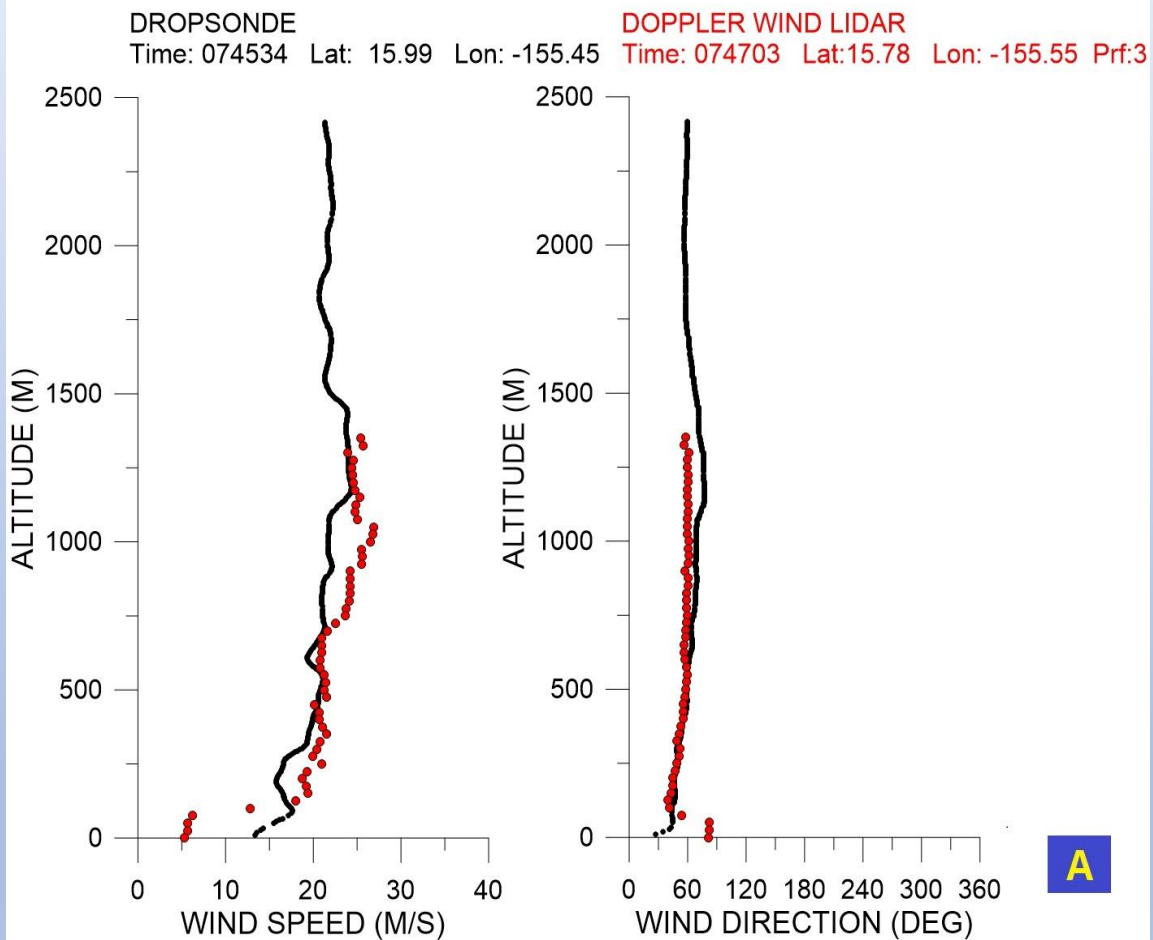
Hurricane Maria: Airborne DWL Profile vs Dropsonde on 09/25/17



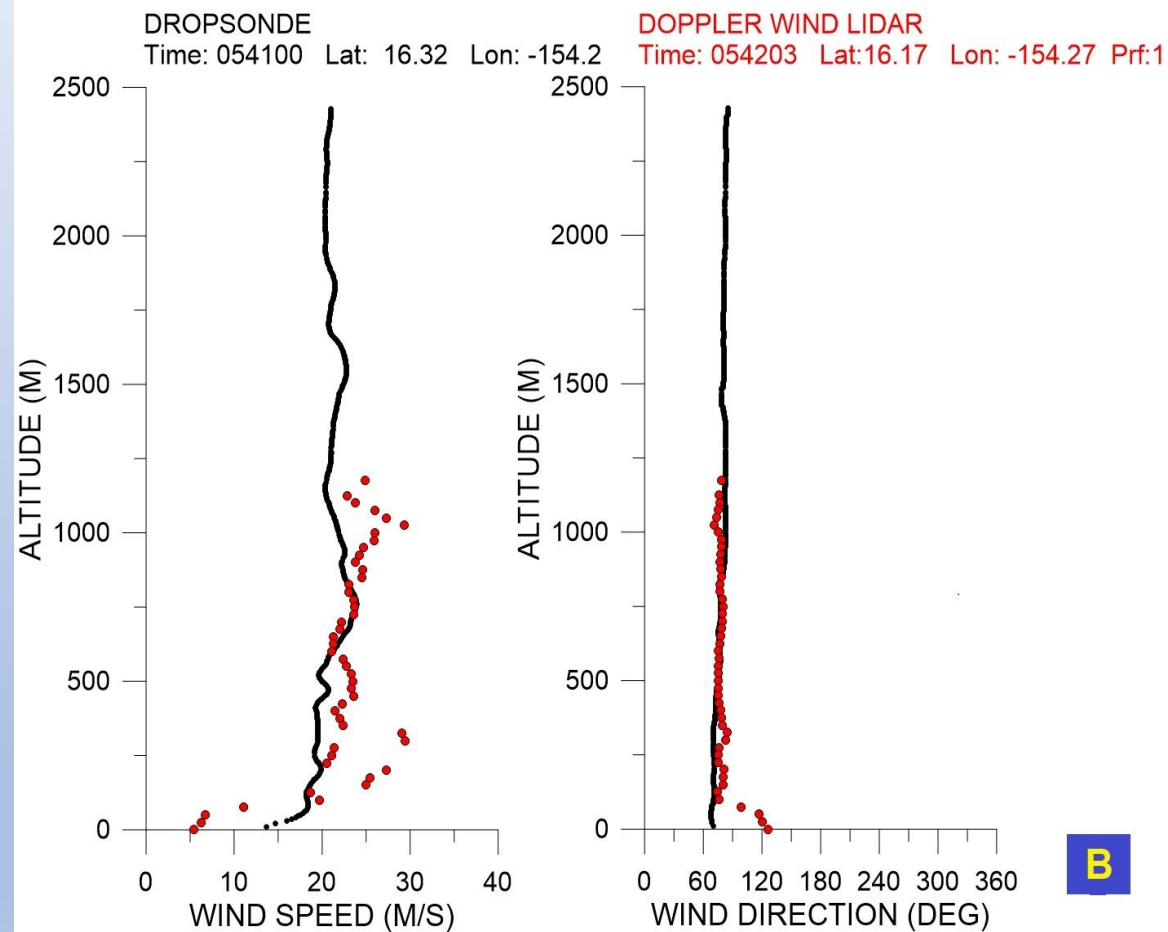
P3-DWL Hurricane Lane Investigation 8/19-22/2018



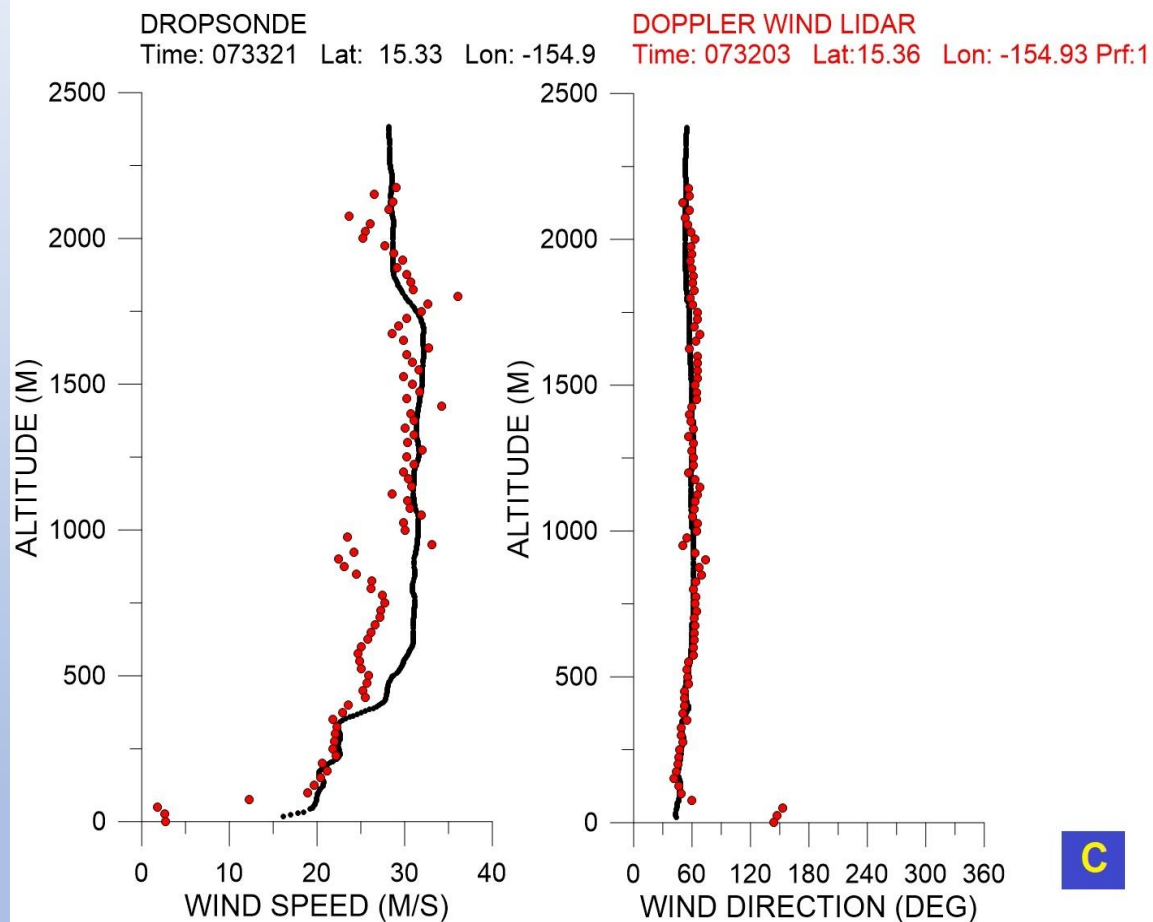
Hurricane Lane: Airborne DWL Profile vs Dropsonde on 08/22/18



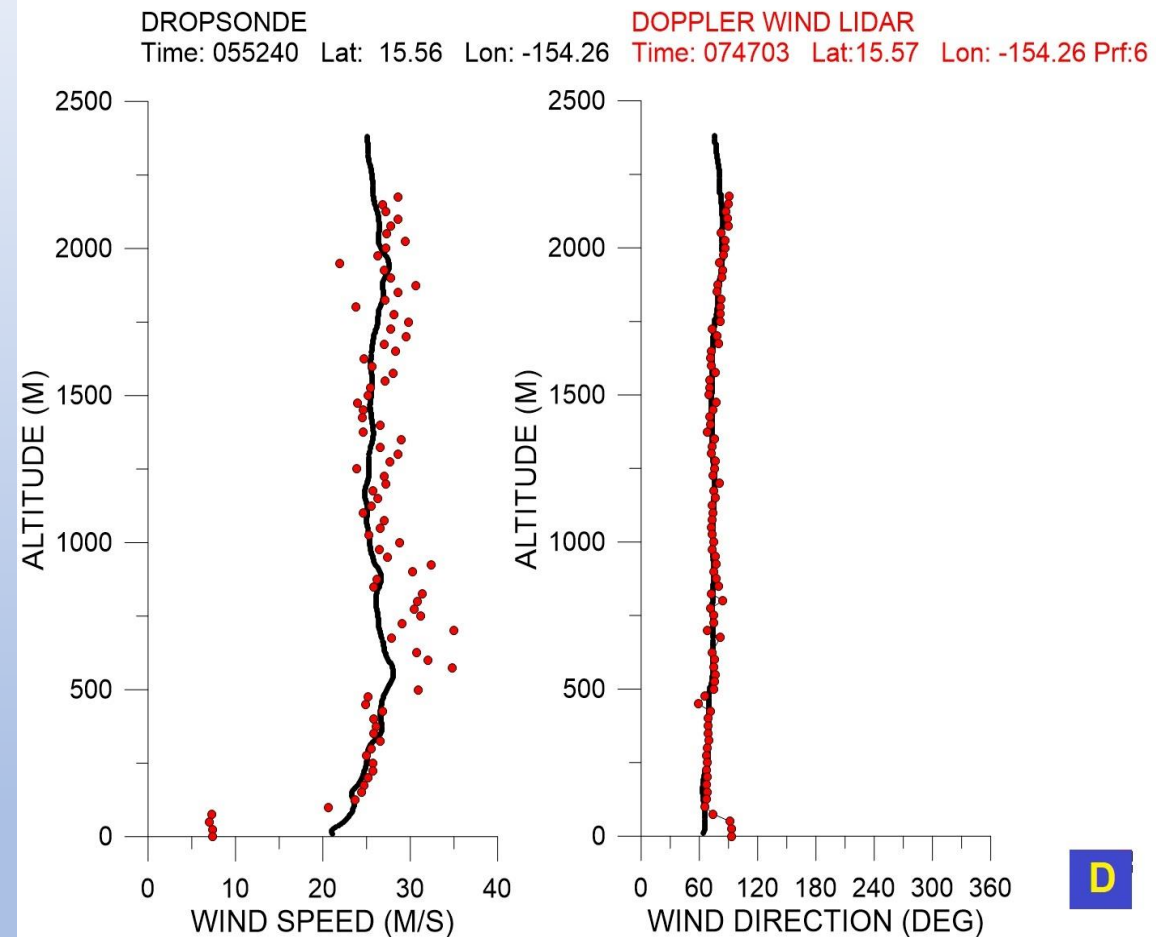
Hurricane Lane: Airborne DWL Profile vs Dropsonde on 08/22/18



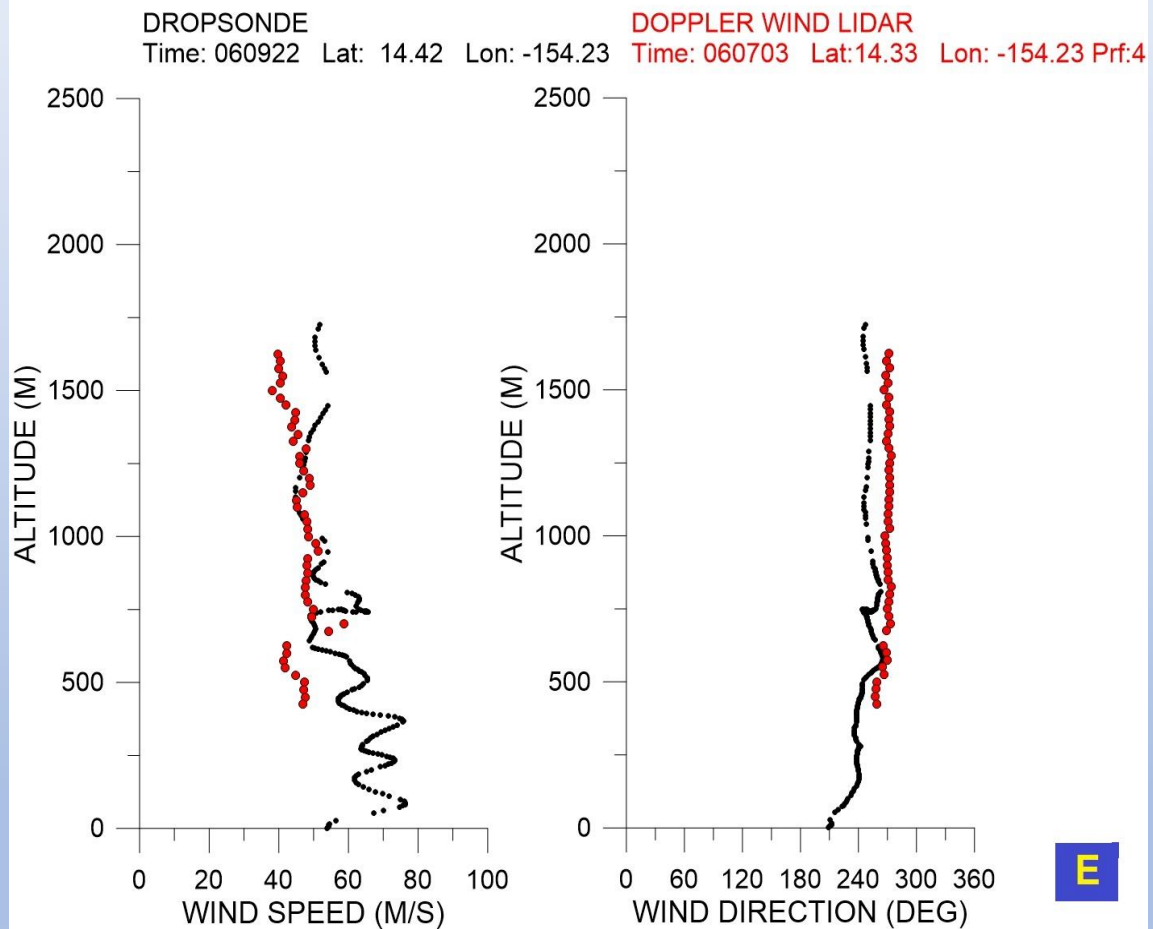
Hurricane Lane: Airborne DWL Profile vs Dropsonde on 08/22/18



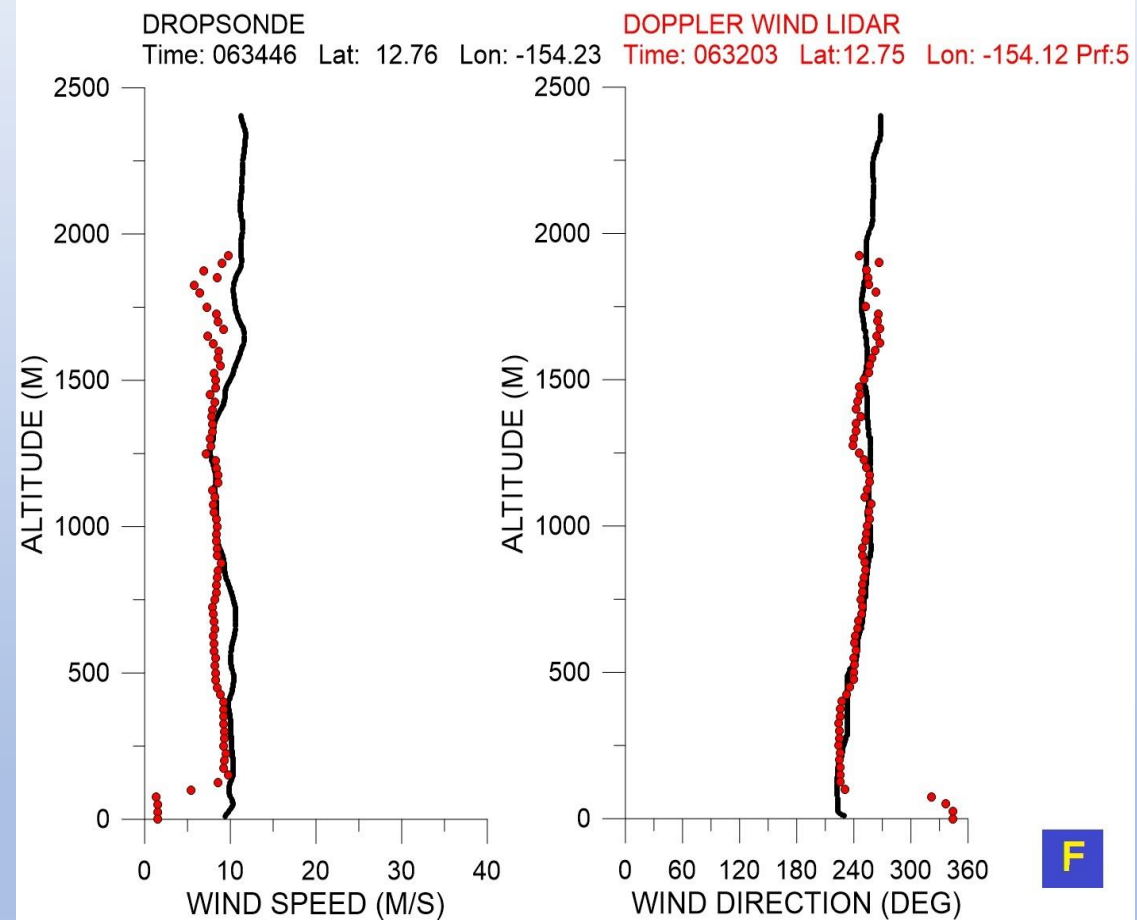
Hurricane Lane: Airborne DWL Profile vs Dropsonde on 08/22/18



Hurricane Lane: Airborne DWL Profile vs Dropsonde on 08/22/18



Hurricane Lane: Airborne DWL Profile vs Dropsonde on 08/22/18



Summary

- **The ADWL successfully operates on a NOAA-P3 aircraft to measure winds in the lower atmosphere environment and near the center of hurricanes**
- **Many of the wind profiles are complete PBL wind profiles**
- **The processing of on-board real time ADWL data has been successful and wind profiles have been down linked to NOAA**
- **Further processing of the ADWL data in the lower surface area region is intended**
- **The intention is to put the ADWL onto the P3 for this hurricane season**