

NASA  
Marshall Space Flight Center  
Natural Environments Branch  
Range Report Summary

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MSFC Natural Environments

110<sup>th</sup> Range Commanders Council Meteorology Group Meeting  
5 - 7 June 2018

# MSFC Natural Environments Branch

## Terrestrial & Planetary Environments Team

- Personnel
  - 6 Civil Servants, 4 Support Contractors
- Operations & Test Support Activity
  - Exploration Systems Development
    - Space Launch System (SLS), Orion Multipurpose Crew Vehicle, Exploration Ground Systems, Lunar Orbiting Platform Gateway
  - Commercial Crew Program
  - Global Reference Atmospheric Model Upgrade Task
- Applied Research & System Testing
  - Certification of the Kennedy Space Center Tropospheric Doppler Radar wind Profiler for use by SLS (Exploration Mission 1 launch expected late 2019)
- Instrumentation & Support Software Projects
  - None

- Collaboration, Cost Savings, and Intangible Savings

# Boundary Layer Technology Demonstration

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MSFC Natural Environments

14 May 2018

# Background

- NASA/MSFC Natural Environments Branch conducting analysis of BL Technology Demonstration
- Technology Demonstration Sites:
  - Vandenberg, CA
  - Cape Canaveral, FL
- Instruments under consideration:
  - Lidar
    - NRGSystems
    - a.k.a. “windcube”
    - Single instrument transported between Ranges
  - 449 MHz Doppler Radar Wind Profiler
    - Radiometrics
    - One instrument at each range
- Analysis entails comparisons of instrument wind profiles to concurrent balloon wind profiles, as well as assessments of data availability.

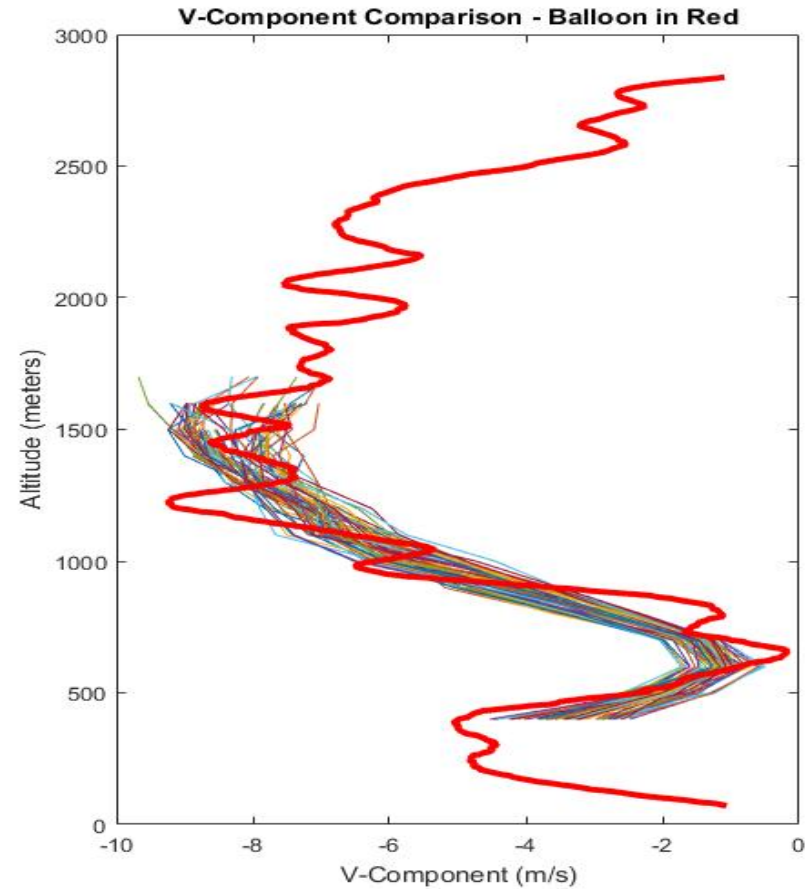
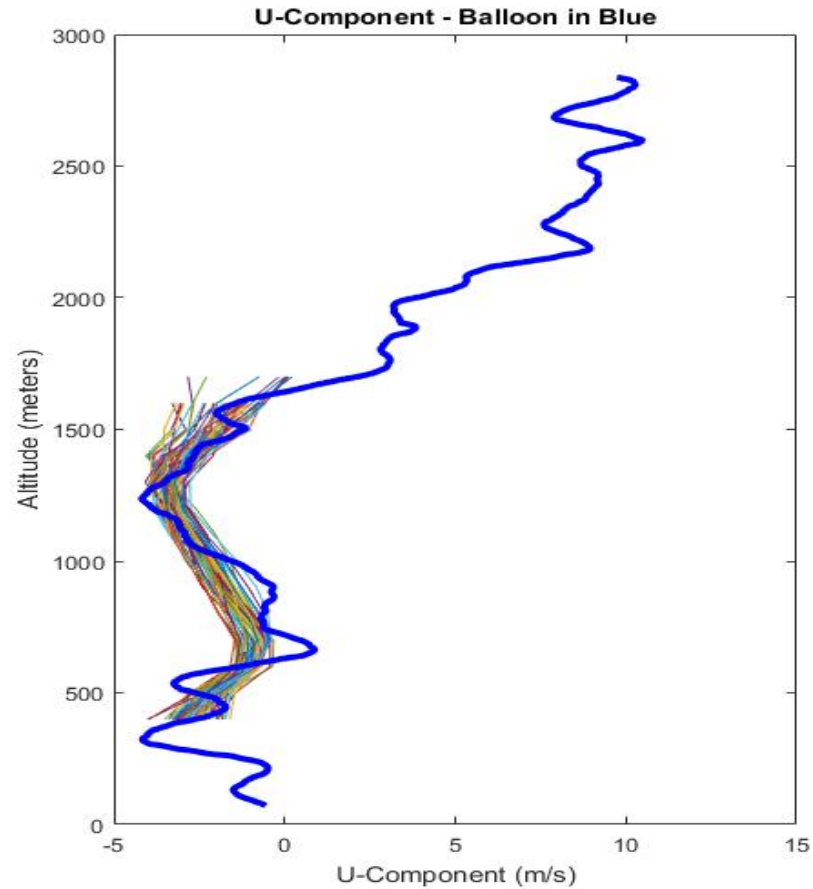


Range	System	Period of Record
ER	AMPS Balloon	2/5/2018 - 4/27/2018
ER	449-MHz DRWP	1/22/2018 - 3/4/2018, 3/19/2018 - 3/25/2018
ER	Windcube	2/5/2018 - 3/19/2018
ER	Radiometer	1/16/2018 - 3/25/2018
ER	915-MHz DRWP	2/1/2018 - 4/29/2018
WR	AMPS Balloon	11/20/2017 - 3/14/2018
WR	449-MHz DRWP	11/16/2017 - 3/4/2018
WR	Windcube	12/4/2017 - 1/19/2018
WR	Radiometer	11/14/2017 - 3/20/2018
WR	915-MHz DRWP	11/20/2017 - 3/14/2018

# MSFC Analysis Plan

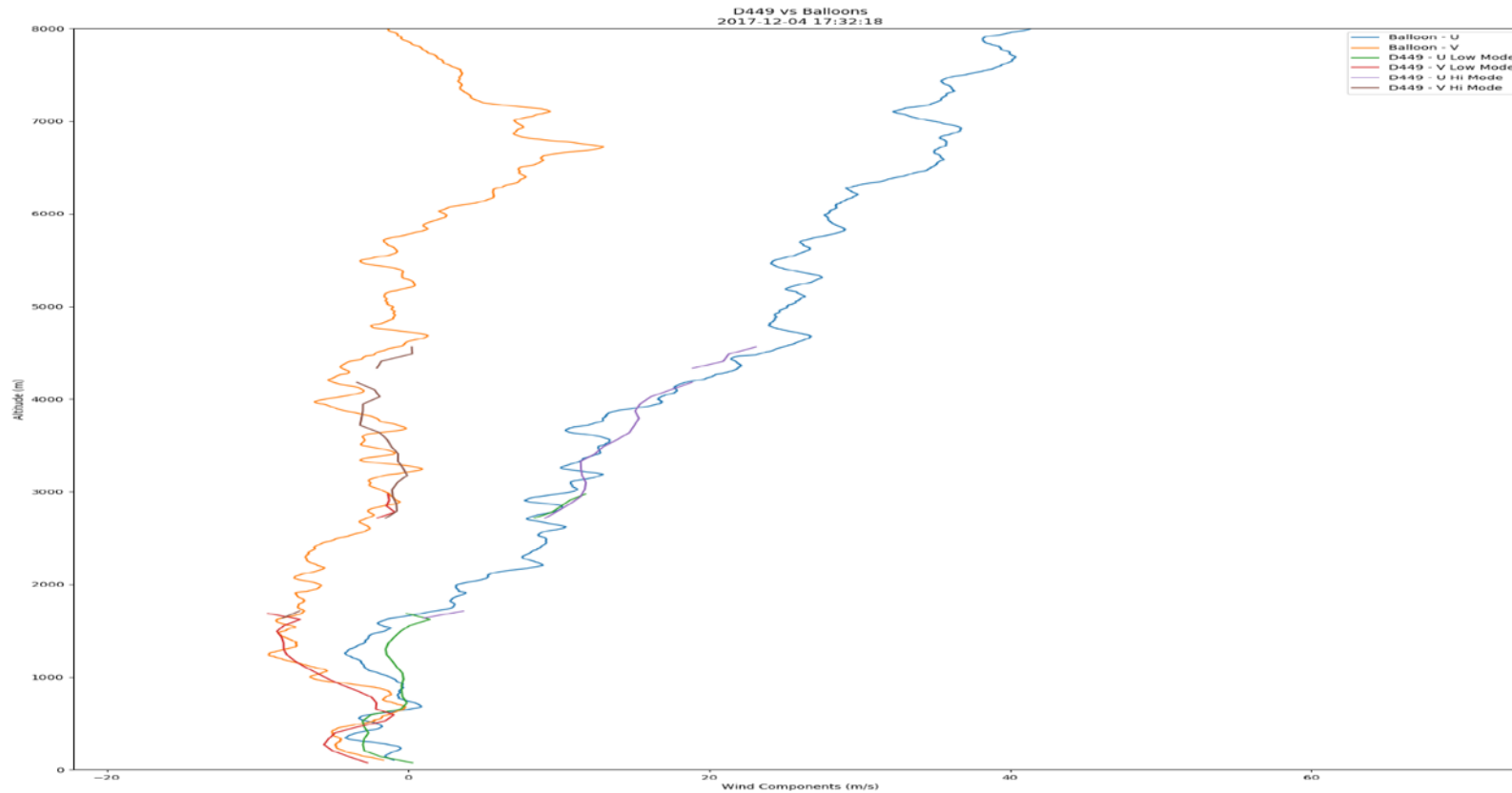
- Comparison to concurrent balloon and 915-MHz
  - Quantify the difference between instruments
- Examine data quality
  - Quantify data availability vs Height
  - Examine time-Height cross-sections
- Shear Comparison
- Spectral Analysis

# WR Wind Cube Data Comparison



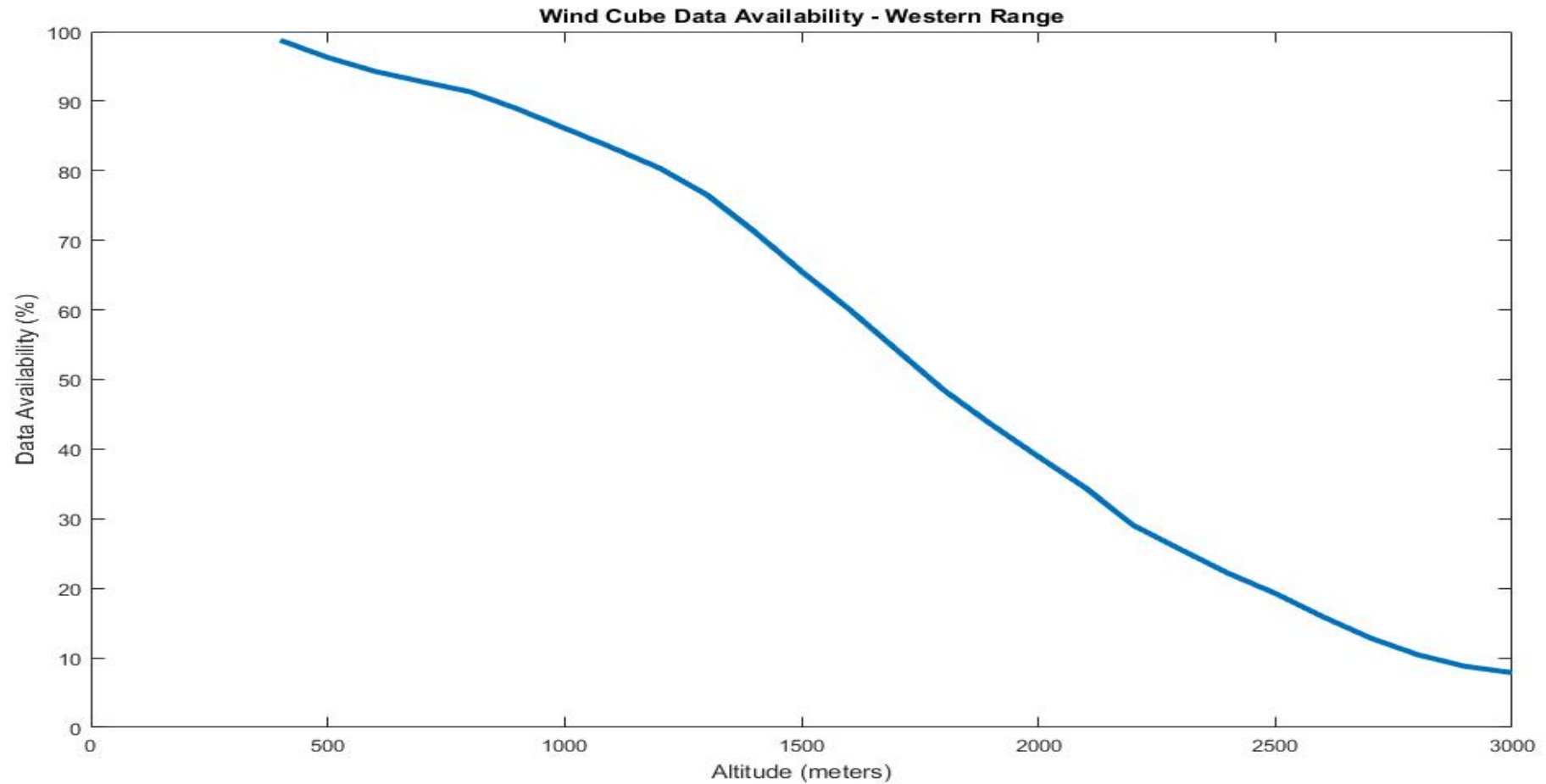
December 4<sup>th</sup> – 18Z Comparison

# WR 449 MHz Profiler Data Comparison



December 4<sup>th</sup> – 18Z Comparison

# WR Wind Cube Data Availability

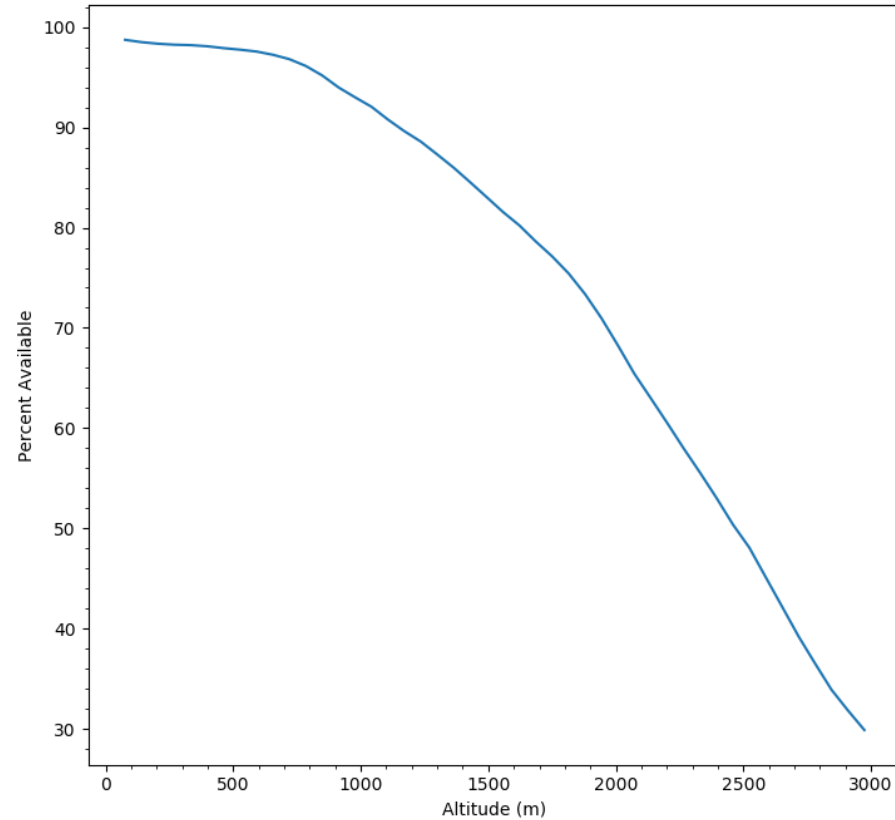


Number of Possible Profiles = 1049680



# WR 449 MHz Profiler Data Availability

449-MHz DRWP "Low" Mode Western Range  
Data Availability - U Component  
n = 35826



449-MHz DRWP "Hi" Mode Western Range  
Data Availability - U Component  
n = 35826

