

# Evaluation of SACR ADVance Velocity-Azimuth Display (SACR-ADV-VAD) Value-Added Product

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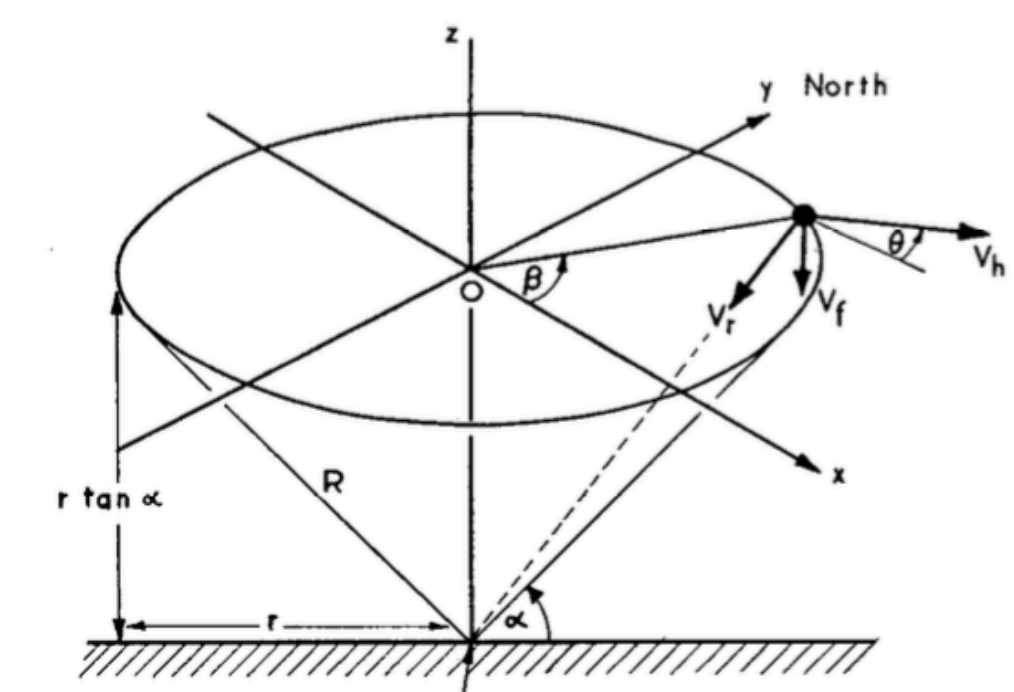
KASACR

## Abstract

The Velocity Azimuth Display (VAD) technique has historically been used to retrieve vertical profiles of the wind using weather radars (Lhermitte and Atlas, 1961). Scanning radar mean Doppler velocity observations at a constant range are combined to estimate wind speed and direction at a particular height above the radar location.

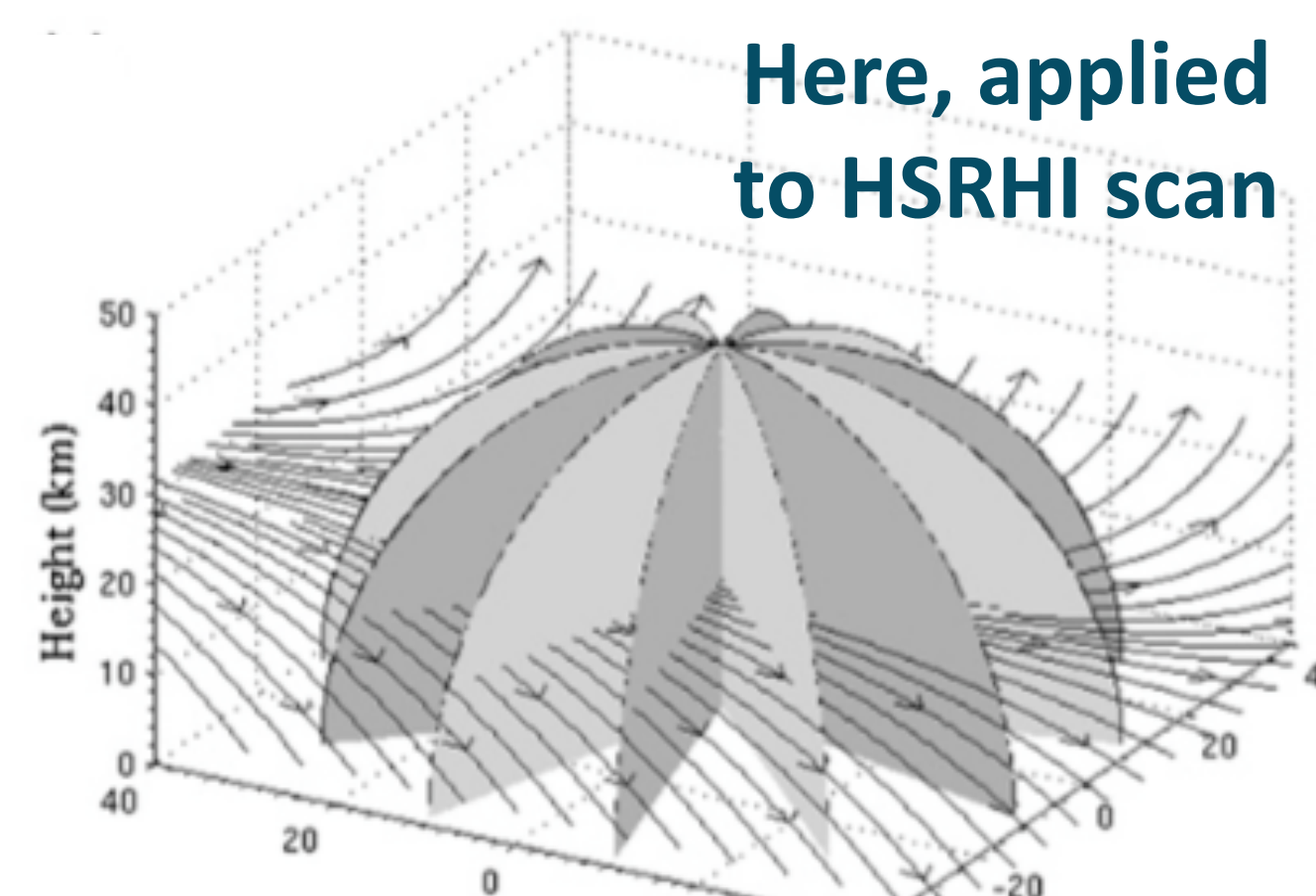
Here, the VAD technique is applied to the Ka-Band millimeter wavelength Scanning ARM Cloud Radar (KASACR) in the SACR ADVance Velocity-Azimuth Display (SACR-ADV-VAD) Value-Added Product (VAP). The VAP complements infrequent soundings by providing profiles of horizontal wind speed and direction in-cloud every time the SACR operates the Hemispherical Sky Range-Height Indicator (HSRHI) scan strategy.

Traditionally applied to plan position indicator (PPI) scan



Browning & Wexler 1968

Here, applied to HSRHI scan

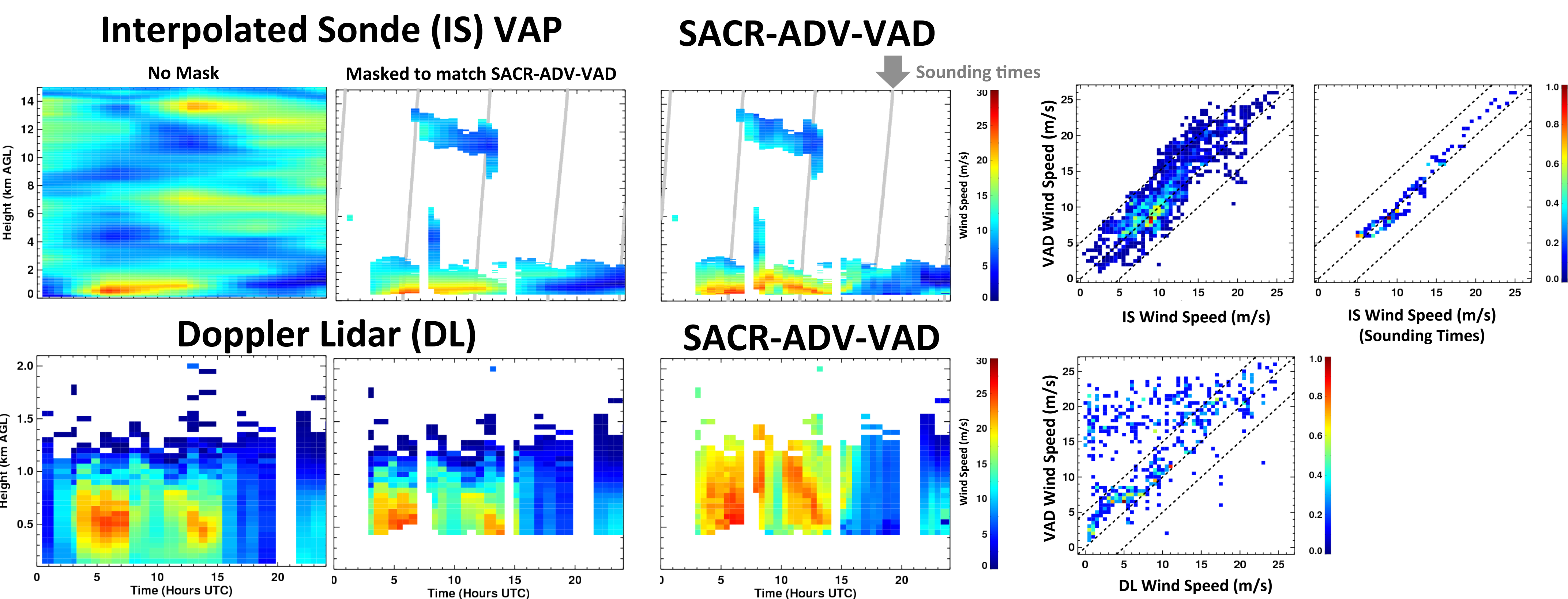


Kollias, 2014

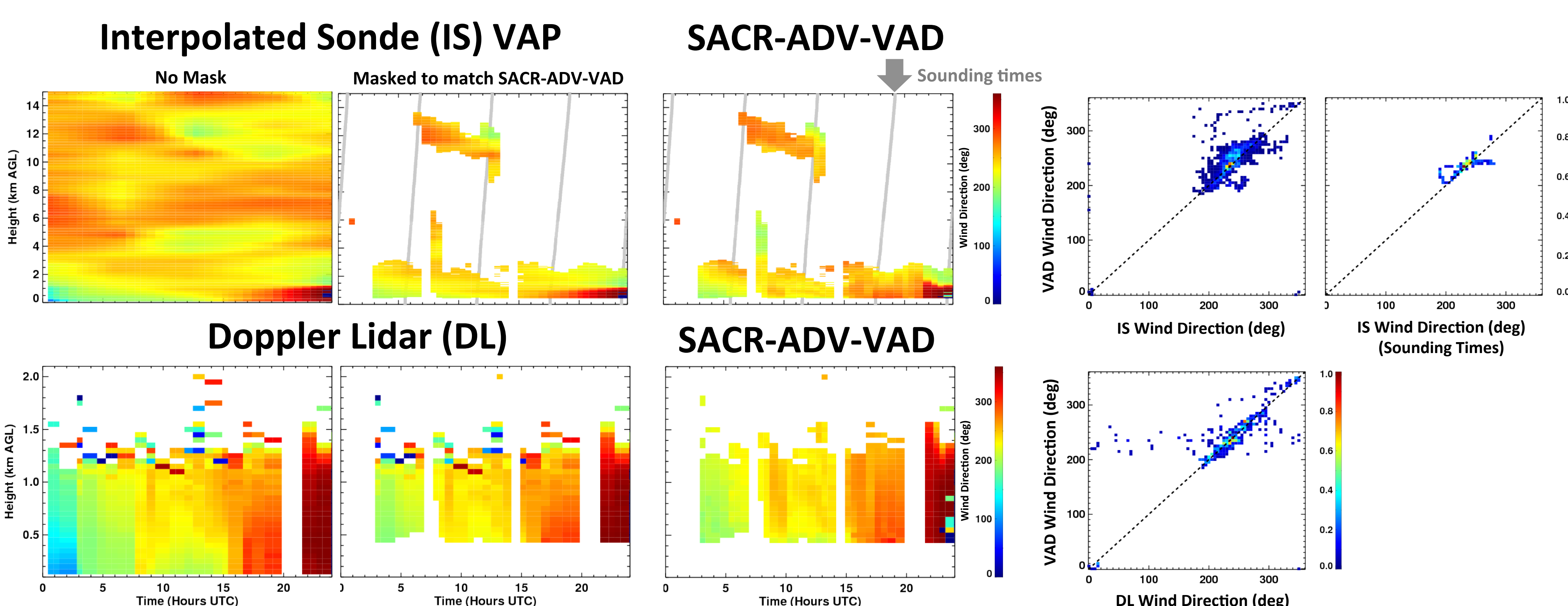
Data Product	Time Resolution	Height Resolution	Maximum Height	Conditions	Current Product Availability
SACR-ADV-VAD	~ 0.5 hour	50 m	15 km	Cloud/precipitation scatterers	Limited and in evaluation: ENA: 201612 – 201702 OLI: 201612 – 201702 SGP: 201208 PVC: 201209 TMP: 201408
Sonde	6 – 12 hour, site dependent	~ 5 – 12 m	~ 25 km	Nearly all	Routine at central facility
Interpolated Sonde (IS)	1 min	20 m; coarser above ~ 3.5 km	~ 25 km	Nearly all	Routine at central facilities, or soon-to-be
Radar Wind Profiler (RWP)	10 min	62.5 m	~ 1.6 – 2.2 km	Nearly all	Limited and in evaluation: ENA: 201505 – 201509, 201605 – 201609 SGP + Boundary Facilities: 201505 – 201509, 201605 – 201609
Doppler Lidar (DL)	0.25 – 1 hour	26 m	~ 1.5 – 2.0 km	Nearly all	Routine at central facility & boundary facilities

## 1. Evaluation Example #1: Southern Great Plains (SGP) August 4, 2012

### Wind Speed

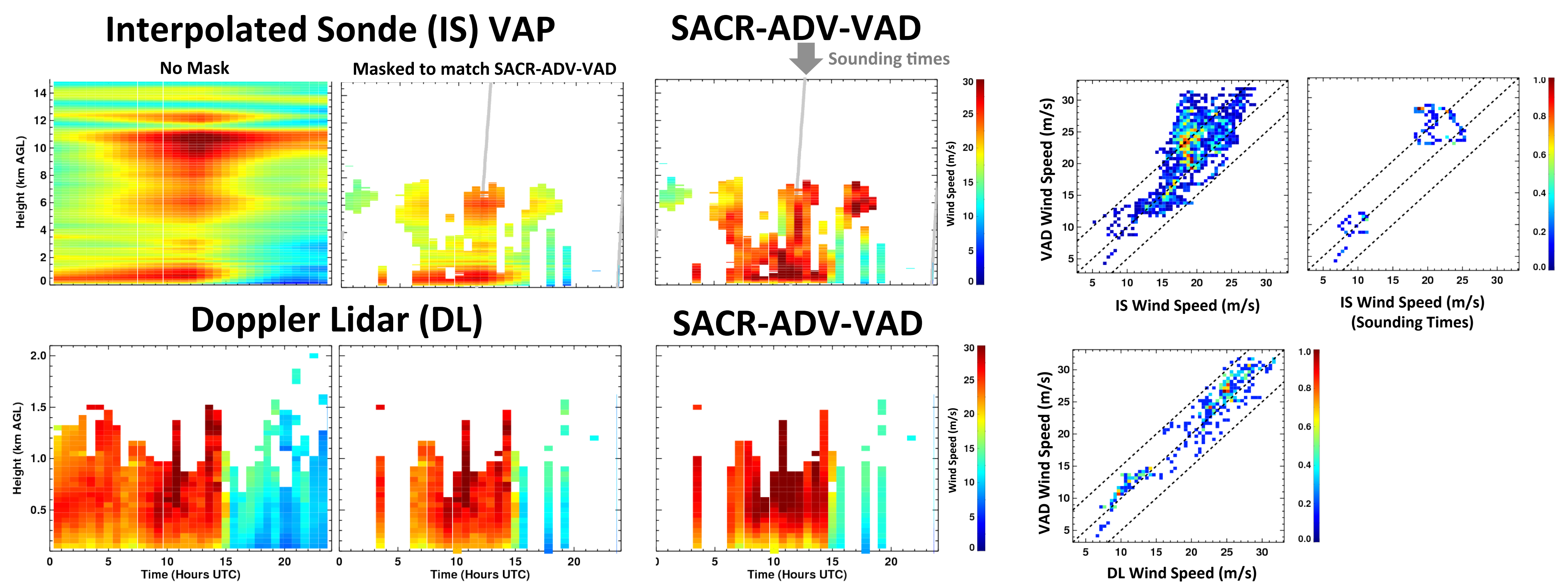


### Wind Direction

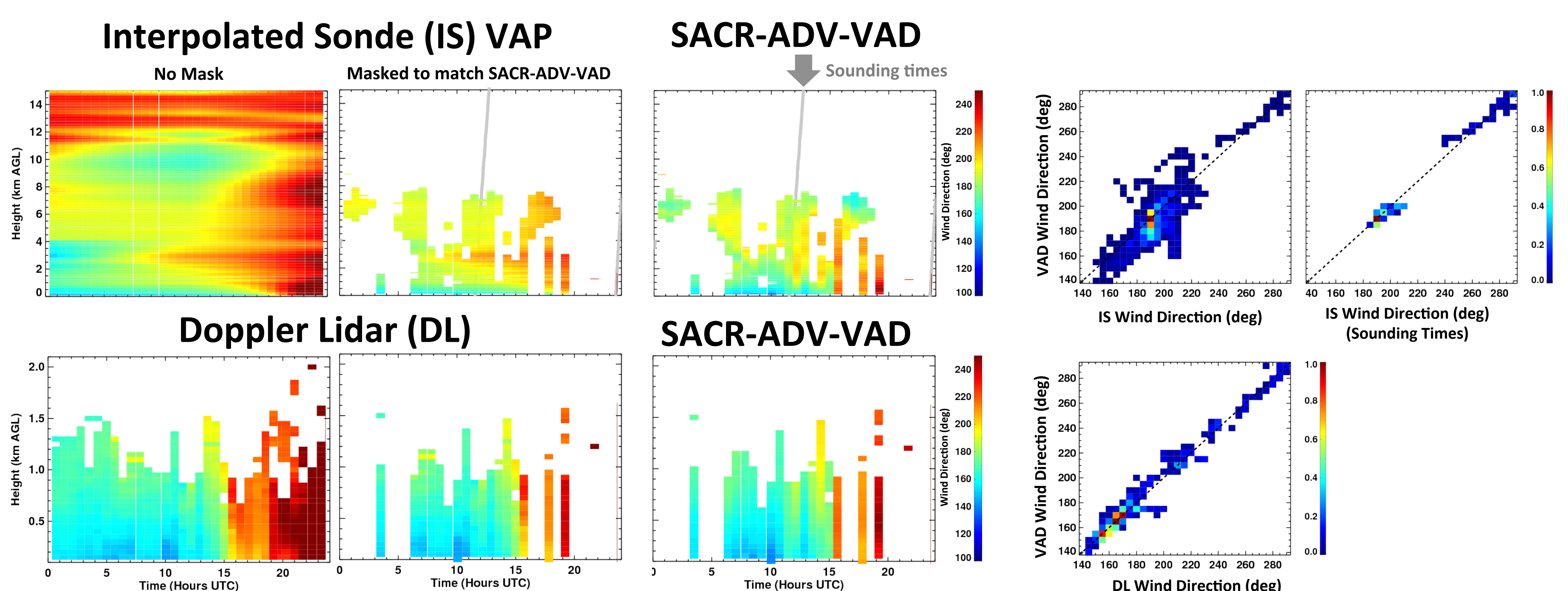


## 2. Evaluation Example #2: Eastern North Atlantic (ENA) January 16, 2017

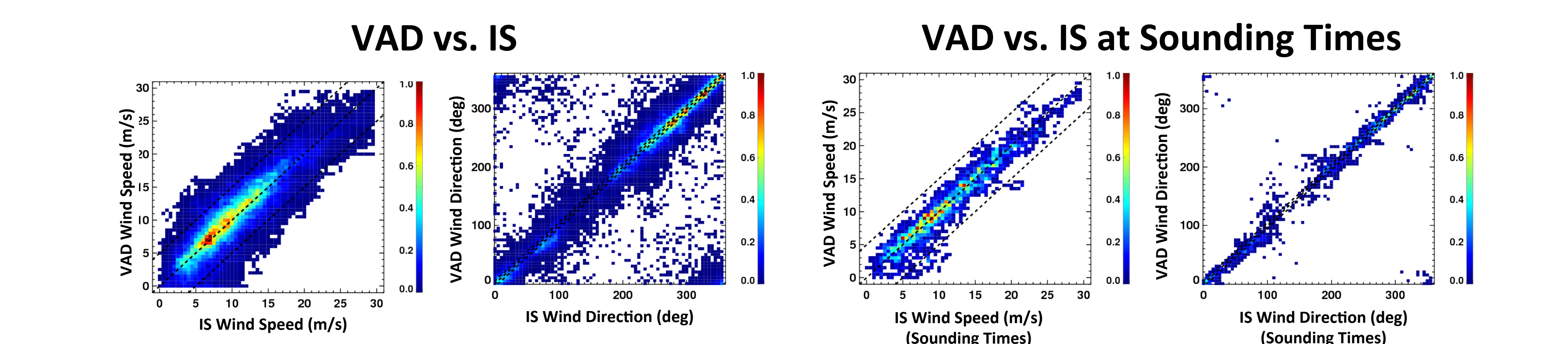
### Wind Speed



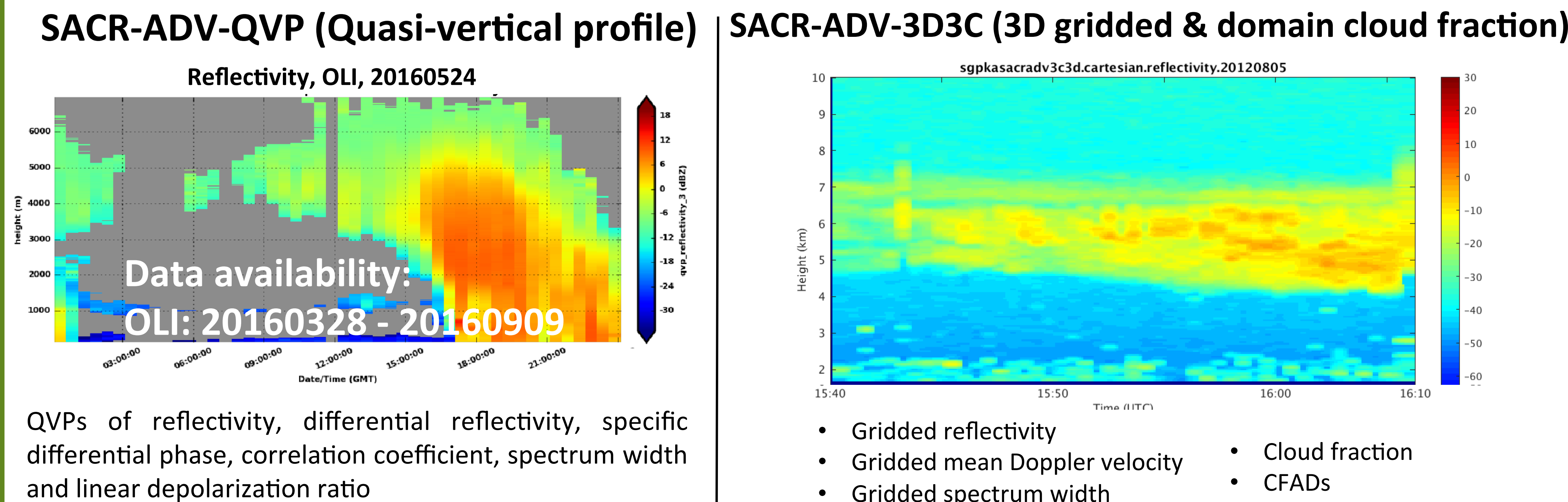
### Wind Direction



## 3. Summary Evaluation Plots: SGP August 2012



## 4. Other Code Sprint SACR-ADV Products



Kollias, P., N. Bharadwaj, K. Widener, I. Jo, and K. Johnson, 2014: Scanning ARM Cloud Radars. Part I: Operational Sampling Strategies. *J. Atmos. Oceanic Technol.*, 31, 569–582, doi: 10.1175/JTECH-D-13-00044.1.

Lhermitte, RM, and DA Atlas. 1961. "Precipitation motion by pulse Doppler radar." *Proc. 9th Weather Radar Conf.*, Boston, American Meteorological Society, Boston, Mass., 498-503.

Browning, K.; Wexler, R. The determination of kinematic properties of a wind field using Doppler radar. *J. Appl. Meteorol.* 1968, 7, 105–113.