

# The New ARM Doppler Lidars for Direct Measurement of Clear-air Vertical Velocities

- SGP Central Facility
- TWP – Darwin
- AMF1

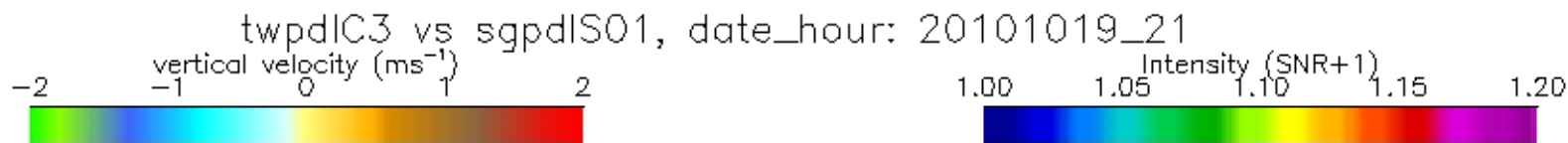
# Doppler Lidar Specifications

Manufacturer	Halo Photonics (UK)
Pulse width	150 ns (22.5 m)
Pulse Energy	100 $\mu$ J
Wavelength	1.5 $\mu$ m
Pulse rate	15 kHz
Minimum range	75m
Range for data collection	Standard: 0.06-10km
Range gate length	20-50m
Scanner	Fully programmable, two axis, step-stare scanner
Primary Scattering Mechanism	Aerosol

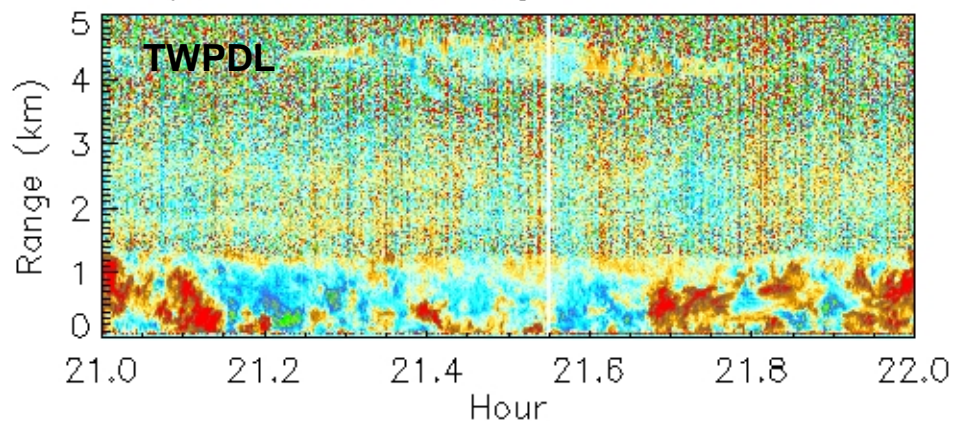


- Uses heterodyne detection to measure Doppler shift of return
- Sensitive to aerosol scattering, insensitive to molecular scattering, unaffected by solar
- Primarily limited to boundary layer, clear air, elevated aerosol layers, optically thin clouds or bases of optically thick clouds up to 10 km.

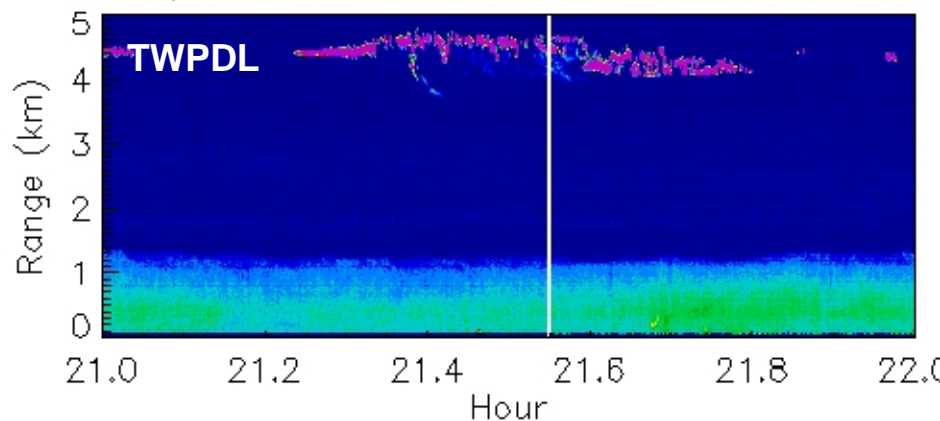
# Doppler Lidar Vertical Velocity Data Samples (1 second time average, 30 m range gate)



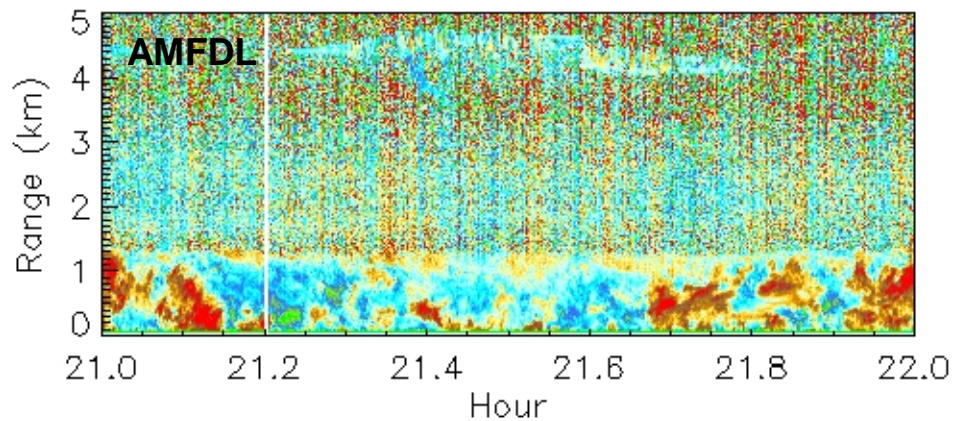
twpdIC3 vertical velocity



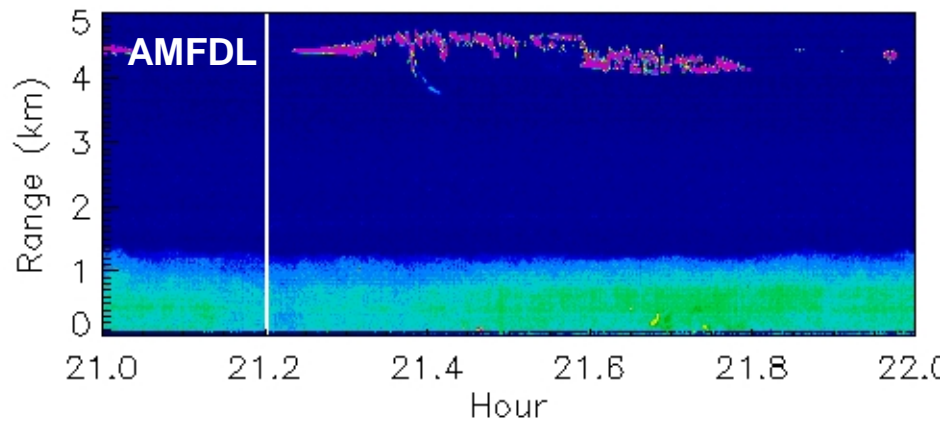
twpdIC3 SNR+1



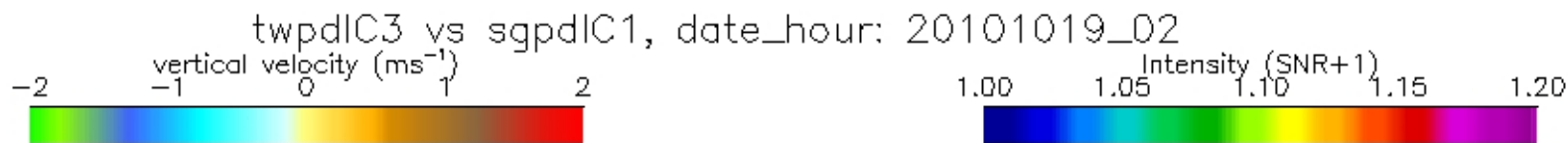
sgpdIS01 vertical velocity



sgpdIS01 SNR+1

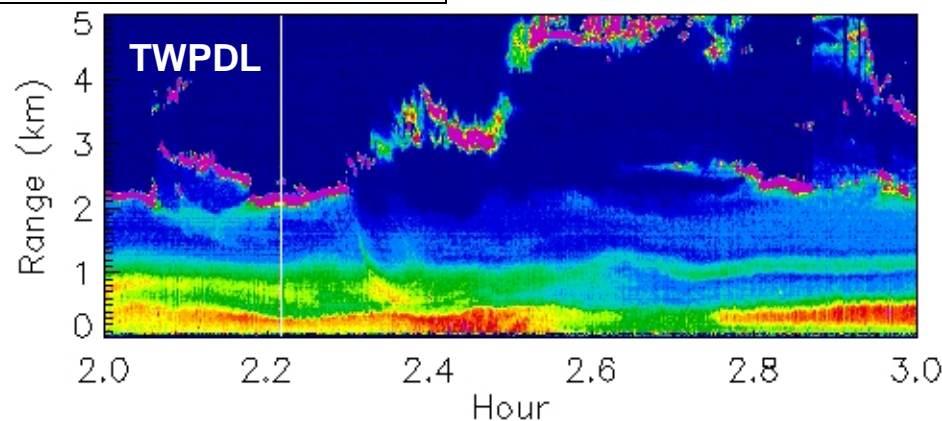
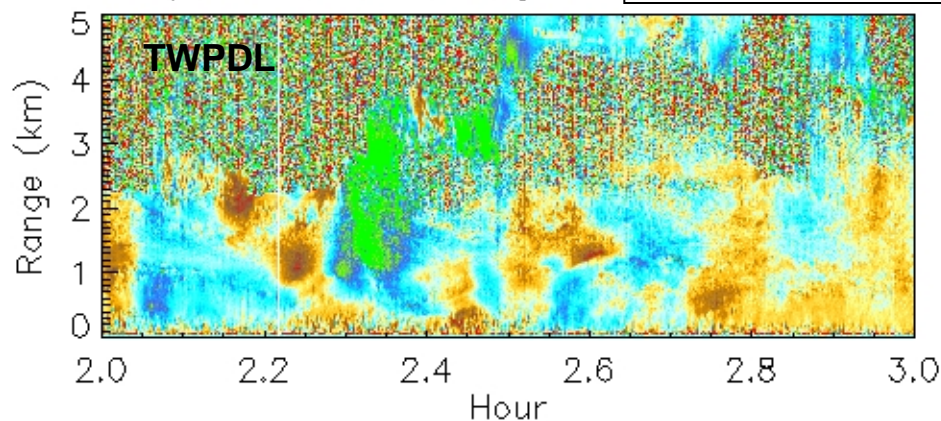


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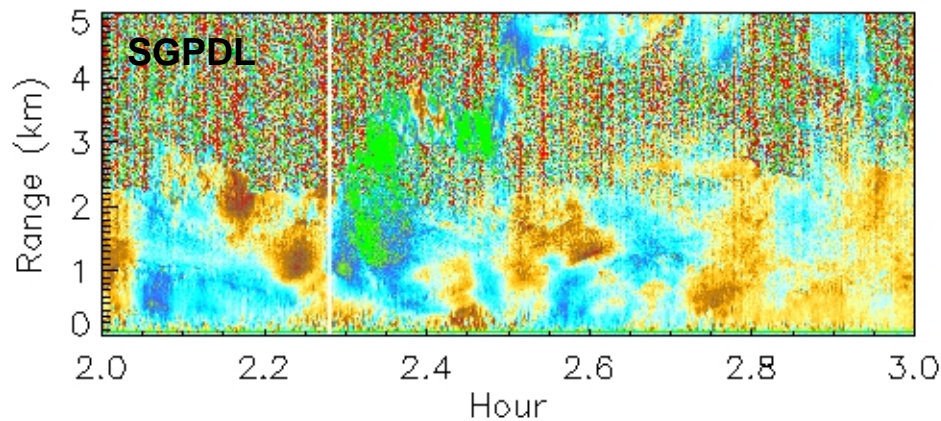


twpdlC3 vertical velocity

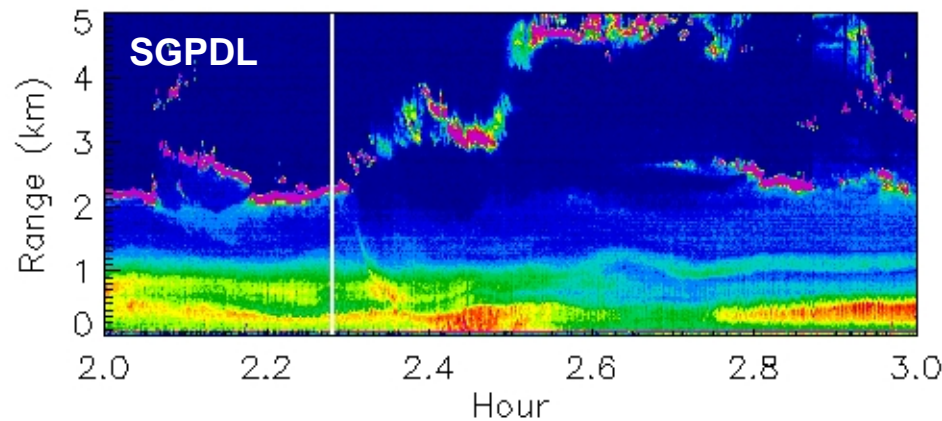
**Strong but brief thunderstorm with heavy precipitation**



sgpdlC1 vertical velocity



sgpdlC1 SNR+1



# ARM Doppler Lidar Deployment Status

- SGPDL
  - Operated from the deck behind the GIF at SGPC1 from 15 October to ~20 December 2010.
  - No data available since ~20 December due to computer malfunction. System sent back to Halo Photonics for repair
  - Repaired system will be sent back to SGP this week. System will be set up next to 915 MHz radar wind profiler.
- TWPDL
  - Installed in Darwin in December 2010, and has been (nearly) continuously operational since.
- AMFDL
  - Operated near RCF at SGPC1 from 18 October to ~30 November 2010
    - Performed coordinated dual-Doppler scans toward tower with the SGPDL
    - System performed well
  - In December 2010 the system was shipped to the AMF staging facility in Pagosa Springs, CO. It is currently awaiting deployment to India for GVAX.