

S-Pol

- Basic data (Z , V_r , SW)
- Dual-pol
- Rainfall estimates
- Microphysics
- Refractivity
- Dual-wavelength option

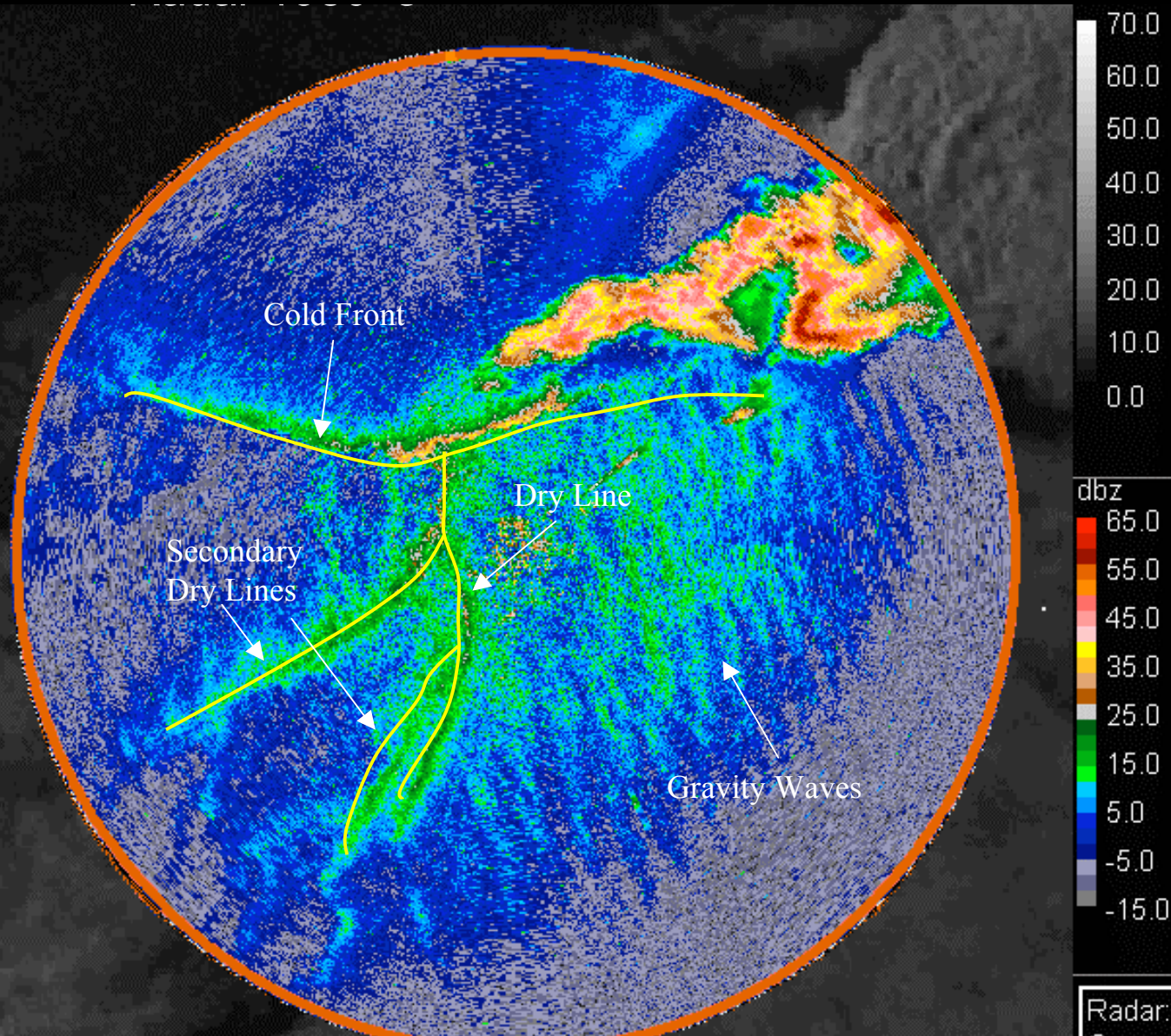


Photo by Scott Ellis

S-Pol Characteristics

- Diesel generator power
- 2.7-2.9 GHz (10 cm)
- 0.3-1.4 microsec pulse width
- Nominal PRF 1000 Hz
- >1 Mw peak transmit power
- MDS at 50 km/1 km is -15 dBZ/-52 dBZ at -6 dB SNR
- 0.91 deg beamwidth
- Scan rate up to 18 deg/sec
- Range gates 37.5-1000 m
- 16-1000 samples

S-Pol Reflectivity

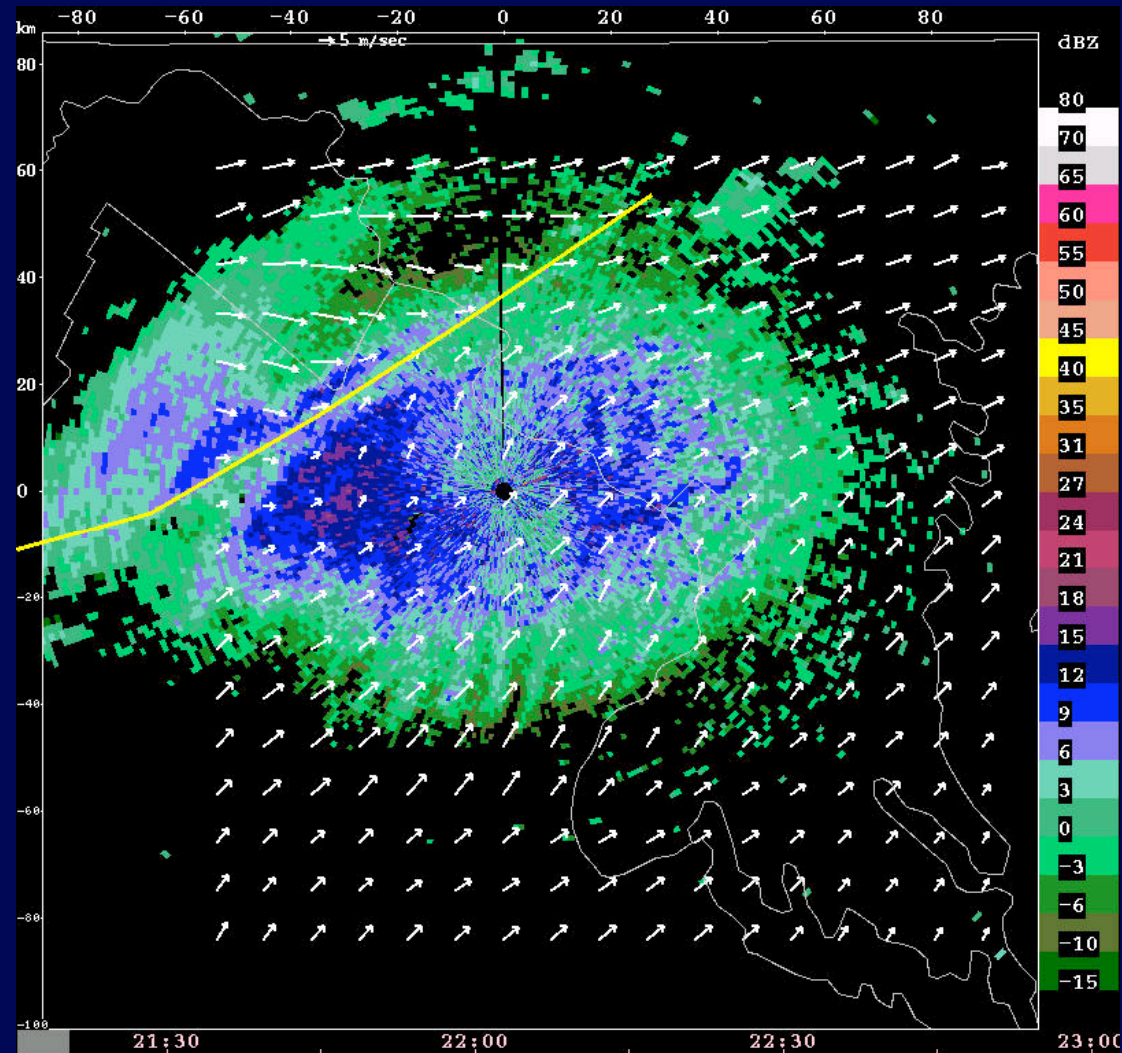


Radial Velocity

- Dual-Doppler within ~60 km of another Doppler radar
- VAD – single Doppler profiles
- VDRAS – Single Doppler wind retrievals

VDRAS 3D Wind Retrieval

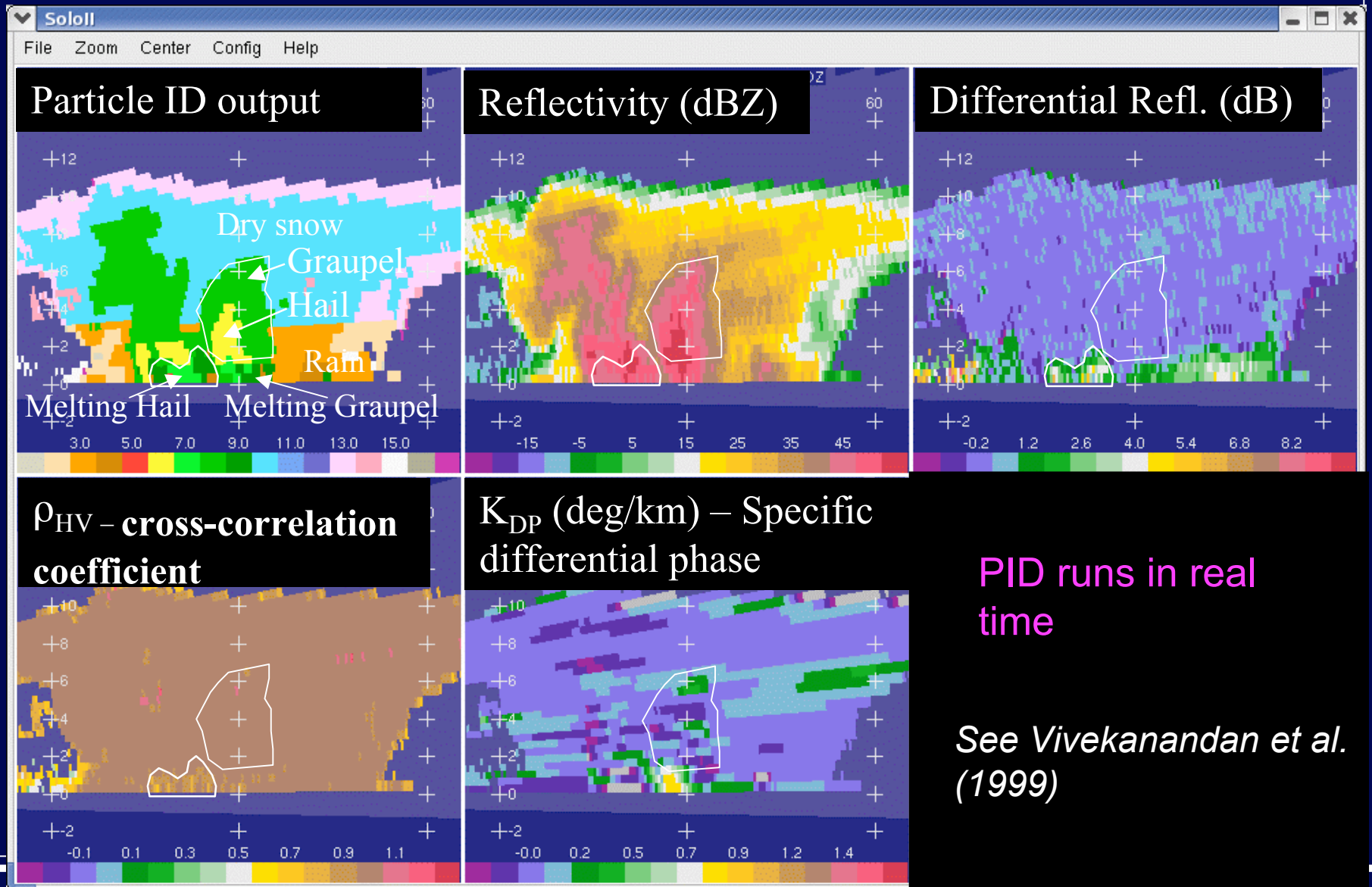
Variational
Doppler-Radar
Analysis
System



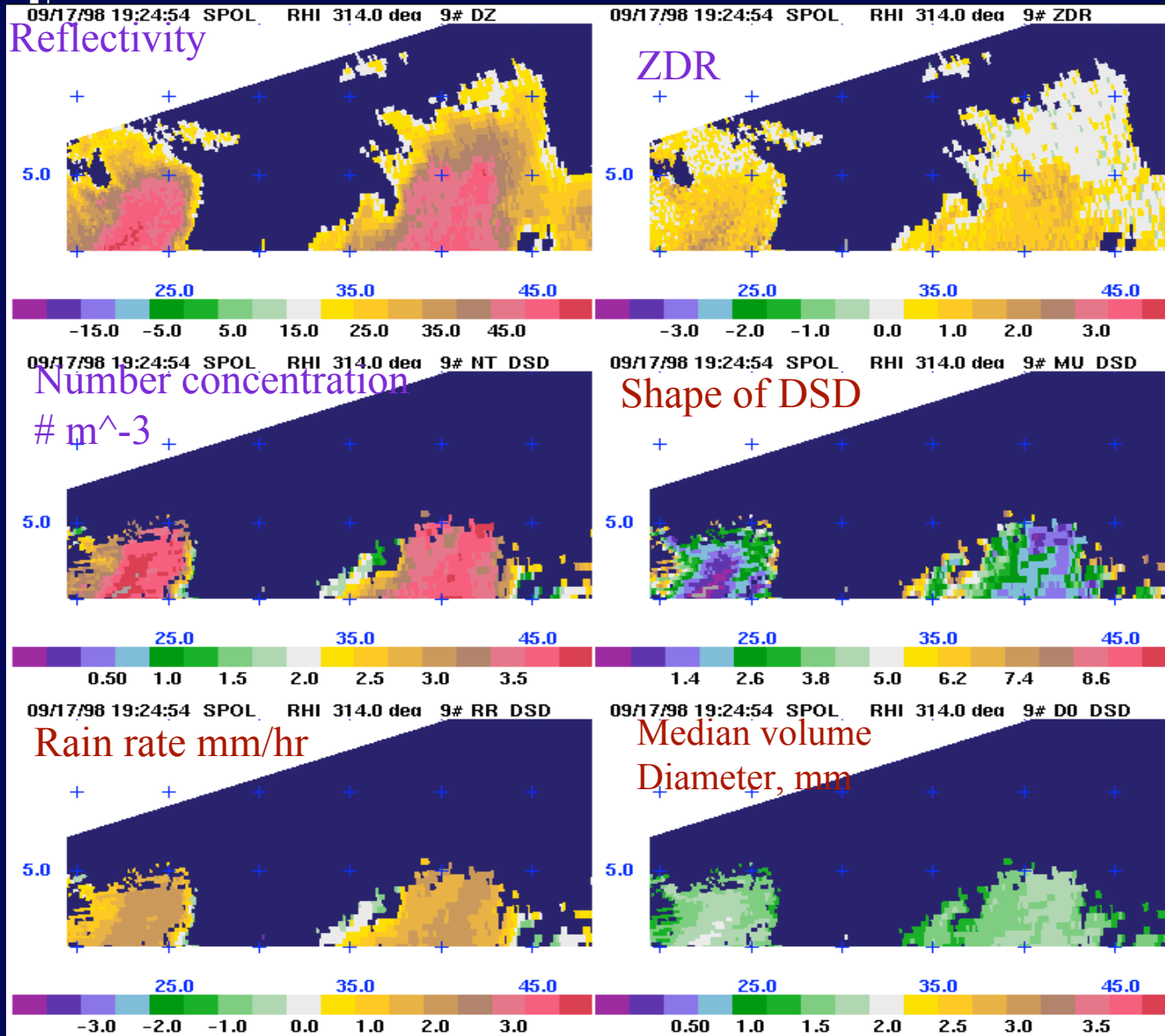
Courtesy Jenny Sun

*See Sun and Crook
(1997)*

Polarimetric Data & Particle ID



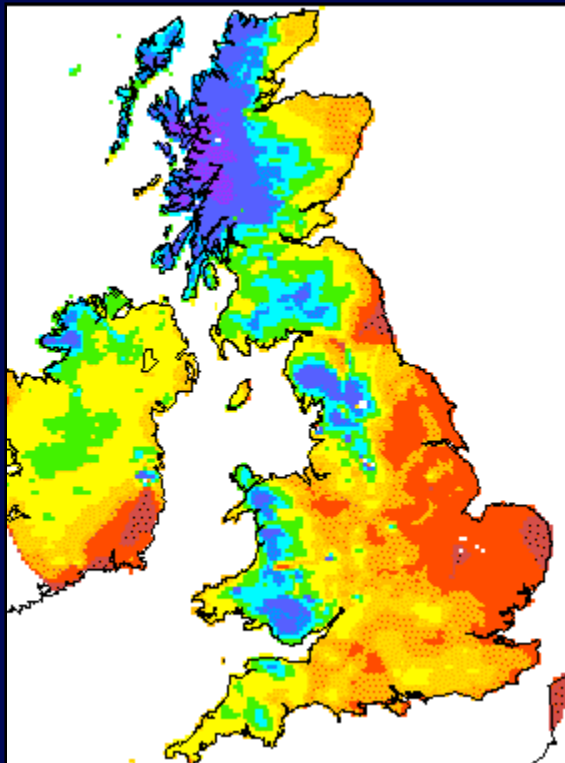
S-Pol Data and Retrievals



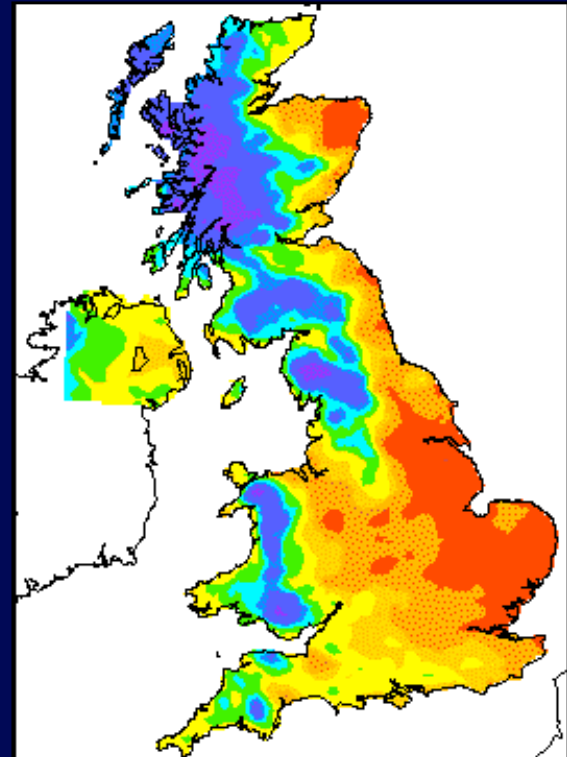
Polarimetric measurements

Retrieved DSD parameters and rain rate

Monthly rainfall for February 1997



Radar



Rain gauges
(3494 gauges used)

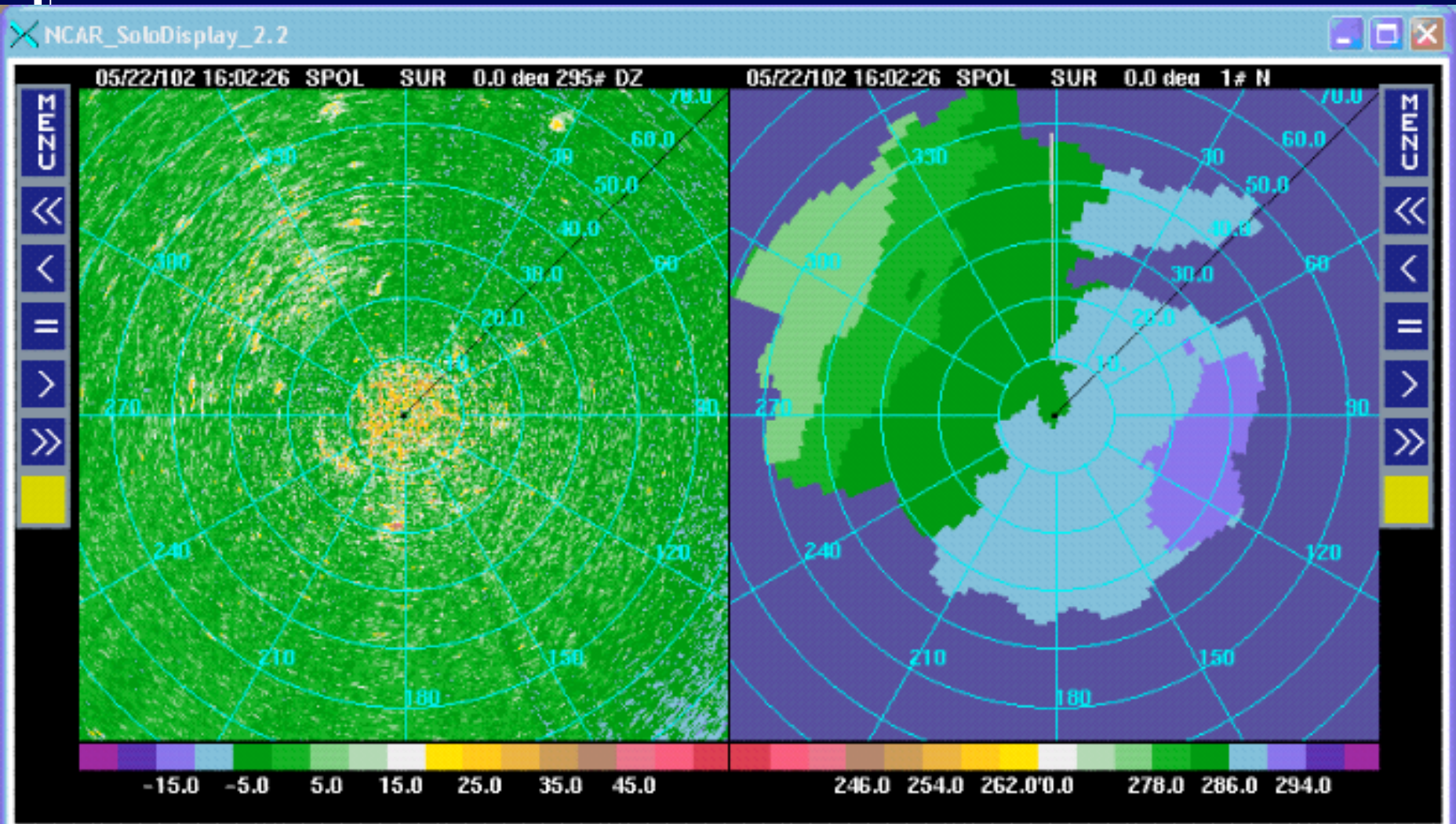
S-Pol rainfall
estimates run in
real time

25 50 75 100 150 200 250 300 500 mm



Courtesy UK Met Office

Refractivity Retrieval



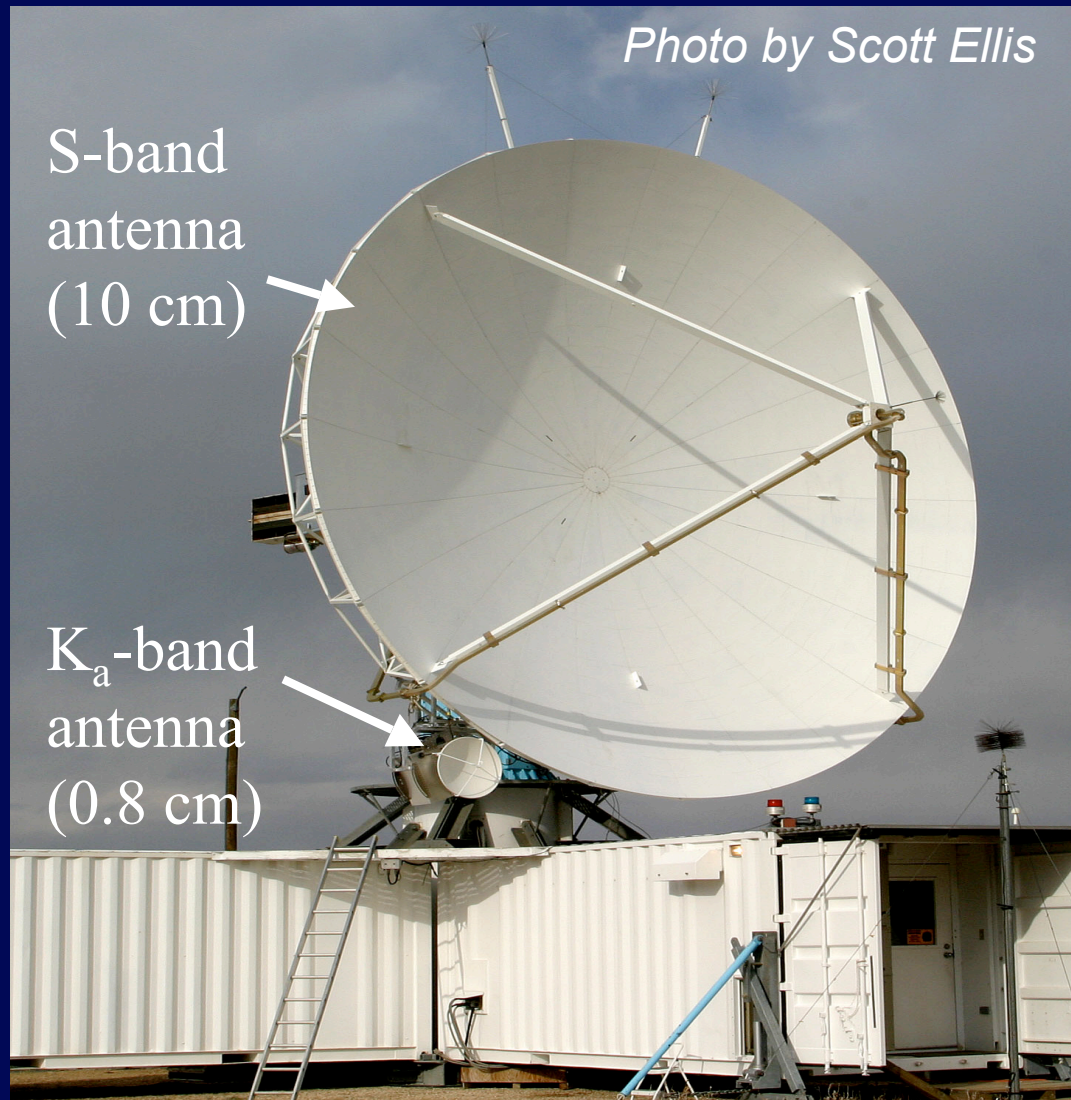
Refractivity is retrieved in real time

Warm, dry

Cool, moist

S-PolKa

Photo by Scott Ellis

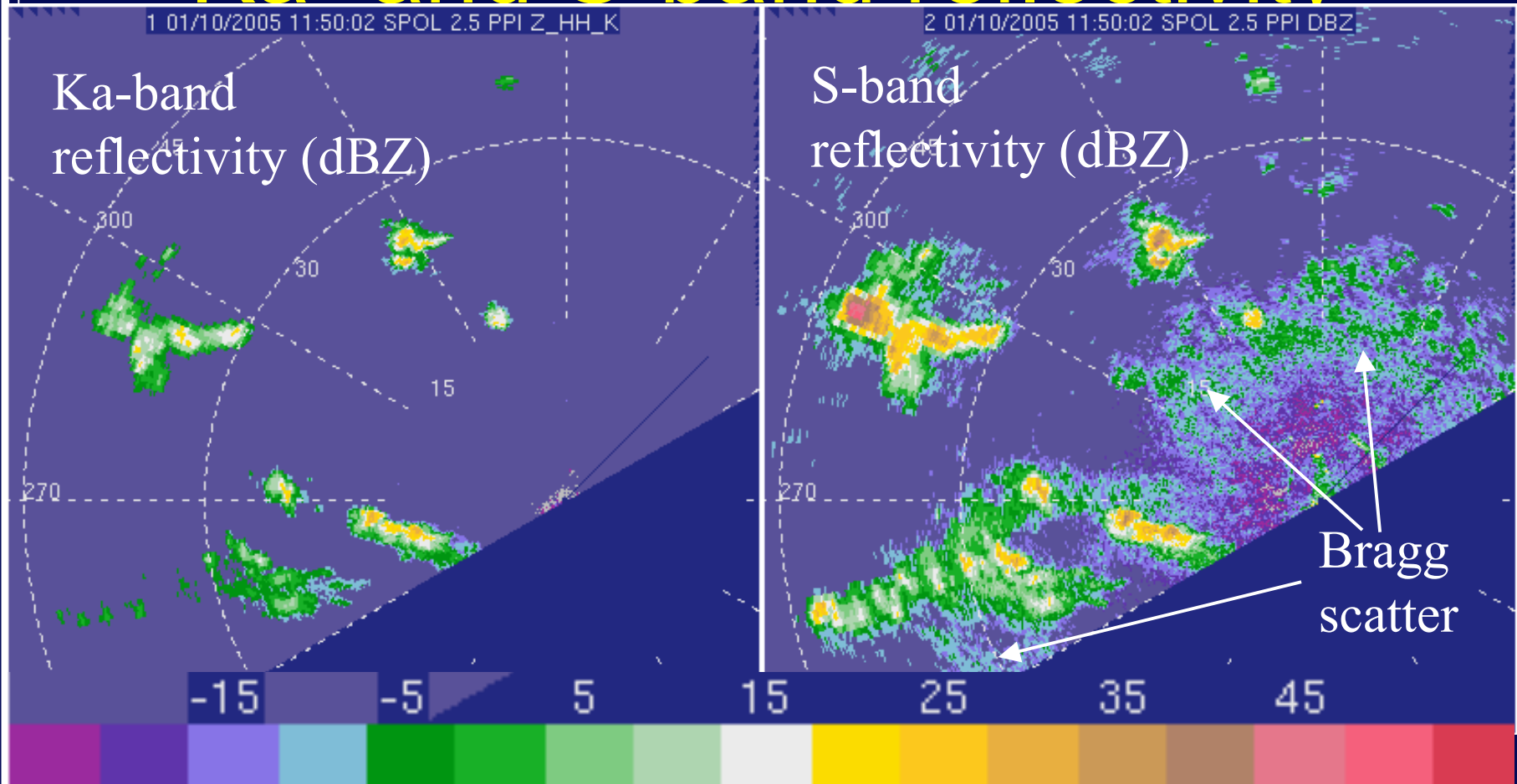


S-band
antenna
(10 cm)

K_a-band
antenna
(0.8 cm)

- Detection of cloud droplets
- Estimate of drop size and LWC
- Raindrop size distribution
- Effect of Bragg scatter is less at Ka-band
- Improved cloud microphysical retrieval using both dual-wavelength and dual-polarization observations

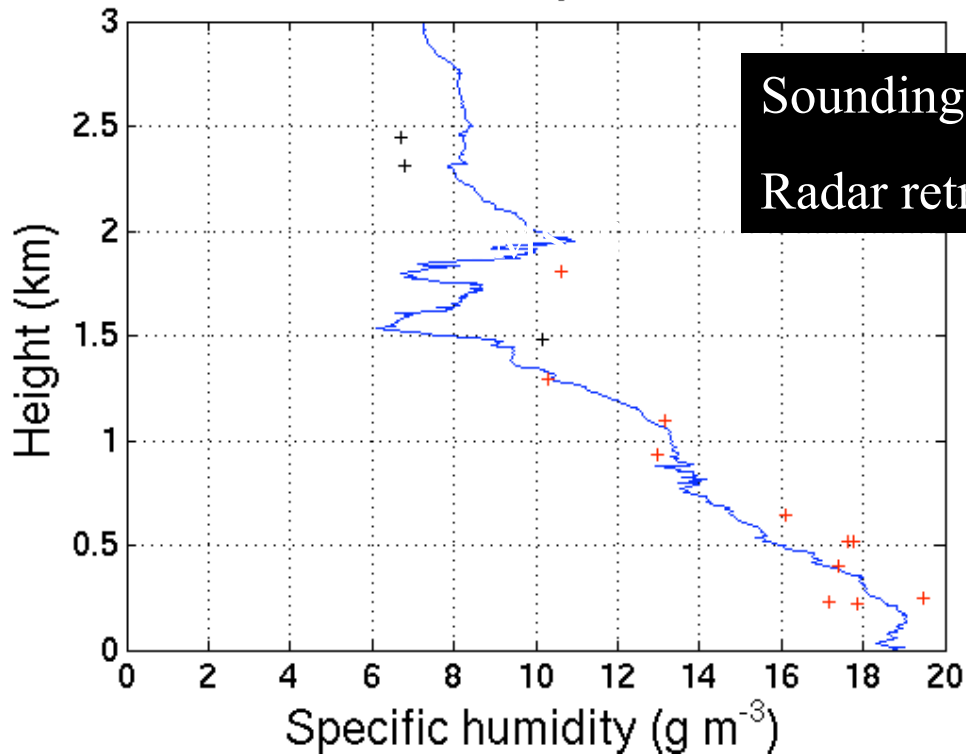
Ka- and S-band reflectivity



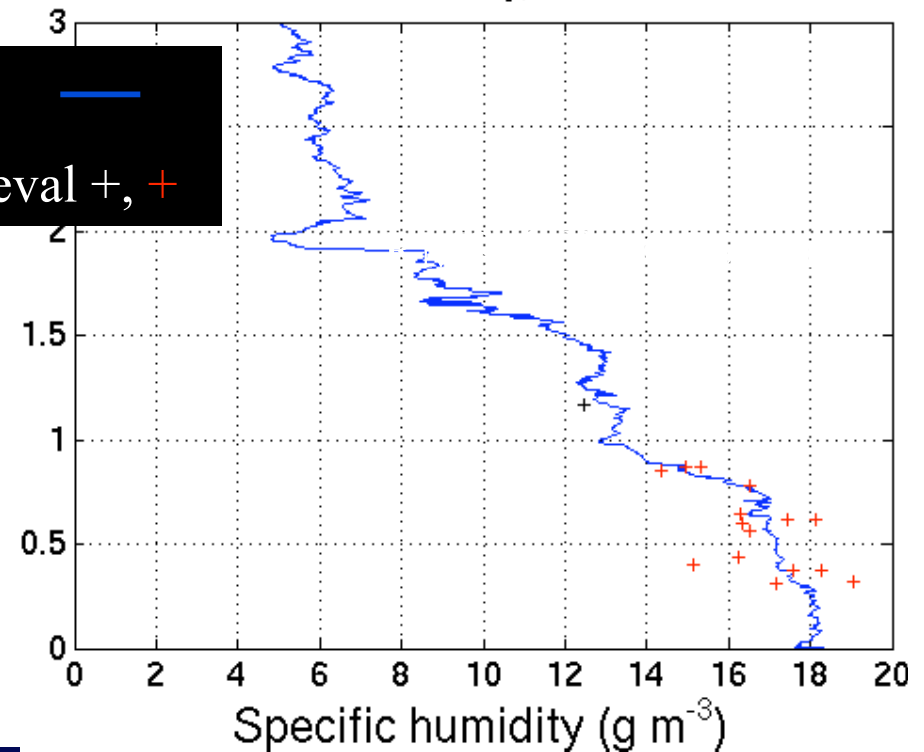
- Ka-band has very little Bragg scatter – Readily identified with dual-wavelength measurements
- Differences in precipitation Z values due to Mie scattering and attenuation at Ka-band

Dual-wavelength (S- and Ka-band) humidity retrieval results

10 January, 2005



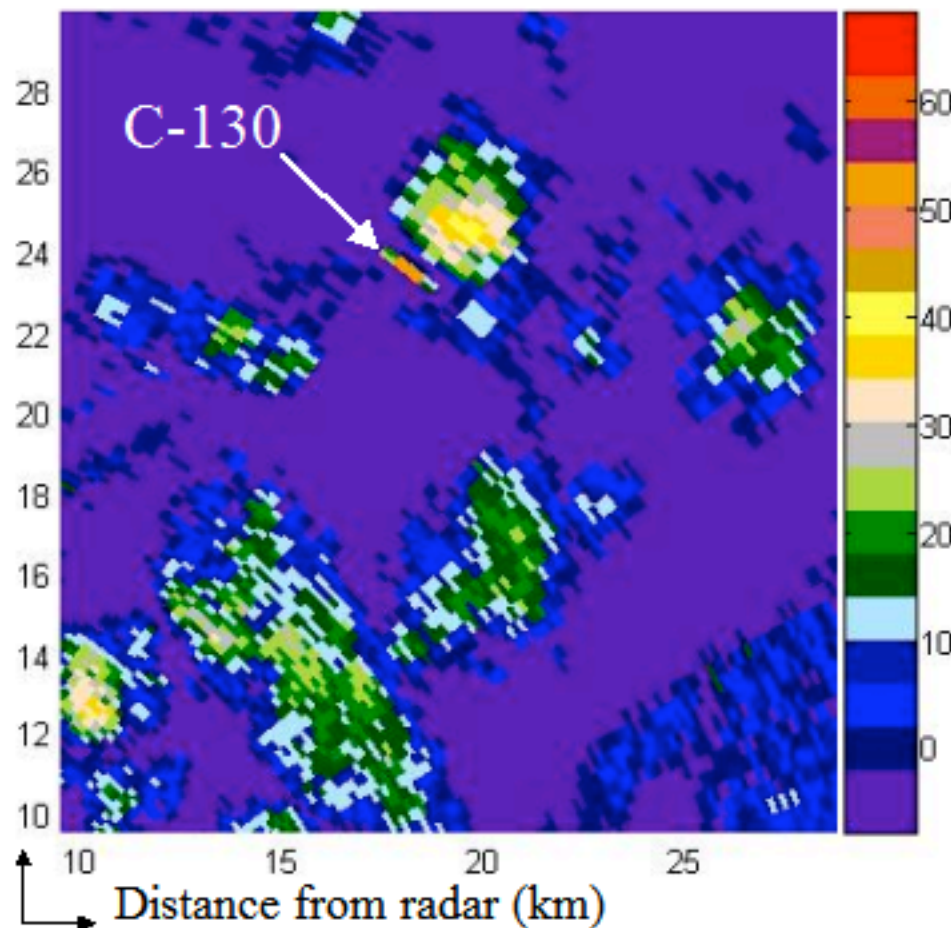
12 January, 2005



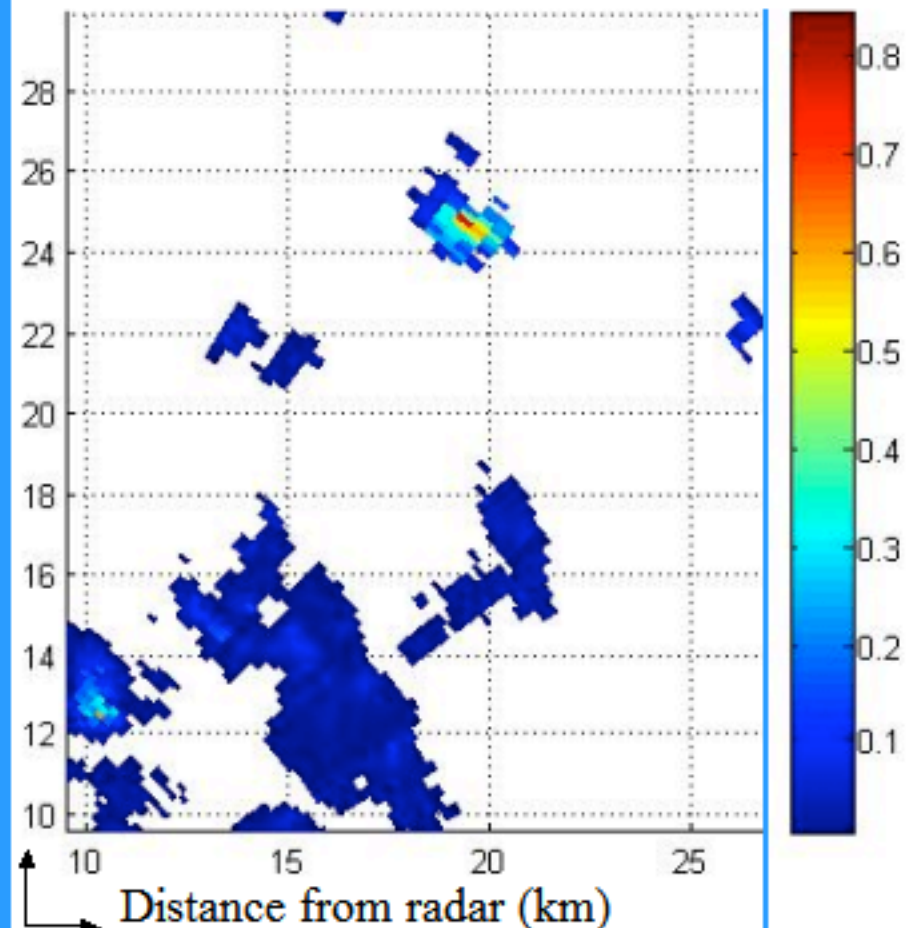
Courtesy Scott Ellis, NCAR

Liquid Water Content Retrievals

S-band reflectivity (dBZ)



LWC (g m^{-3})



The End