



Stony Brook University
*School of Marine and
Atmospheric Sciences*

PERiLS Instrument/Data

2022-2023

Goals

- Use SKYLER-II dual-pol phased-array radar to obtain rapid-scan data of QLCS mesovortices and/or tornadoes within C/X dual-Doppler lobes
 - would be one of few roving radars and would target “areas of interest” within QLCS
 - also launch Windsonds from deployment location of truck
- 2023 → with availability of RaXPoI, added possibility of collecting rapid-scan dual-Doppler



Parameter	Range
Operational Frequency Band	9.0-9.6 GHz
Tx Power	< 250 W
Antenna size	~1 m x 1m
Antenna beamwidth	~ 2° x 2°
Maximum Duty Cycle	25%
Pulse Repetition Frequency	Selectable, typical 1.2 – 4.0 kHz
Pulse Width	Selectable, typical 1 – 55 μs
Waveform Pulse Modulation	CW, LFM, NLFM
Tx/Rx Polarization Modes	HH, HV, VV, VH
Angular Coverage	±45°azimuth by ±15°elevation
Instrumented Range	40 km



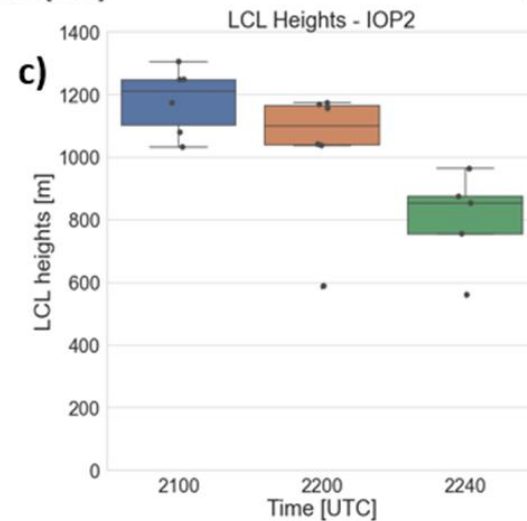
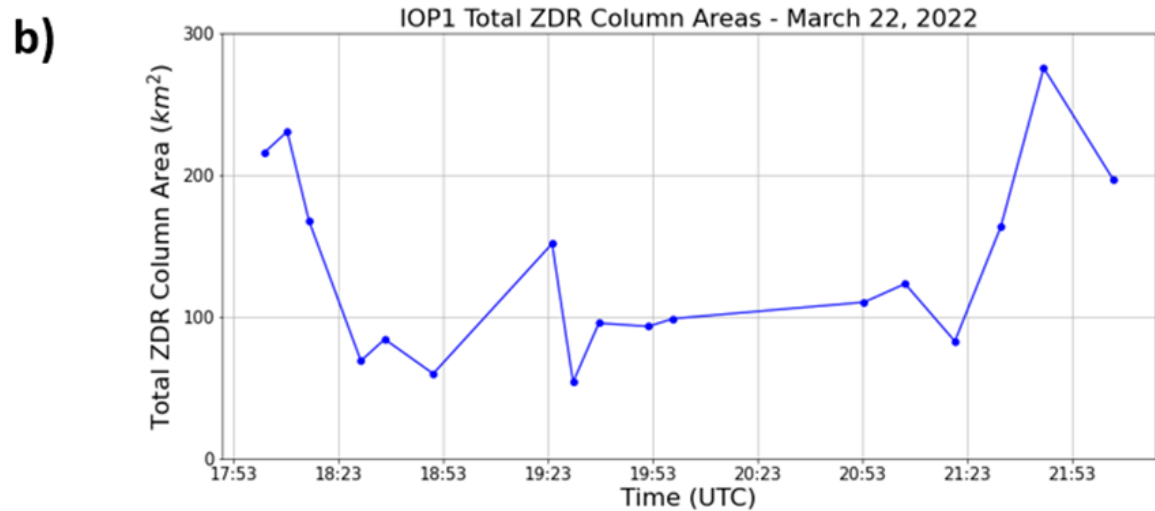
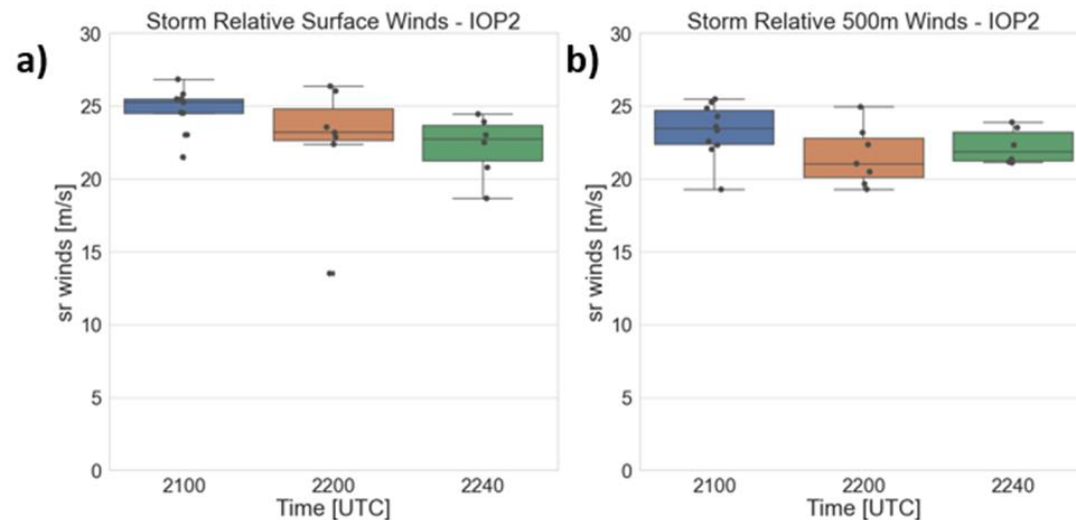
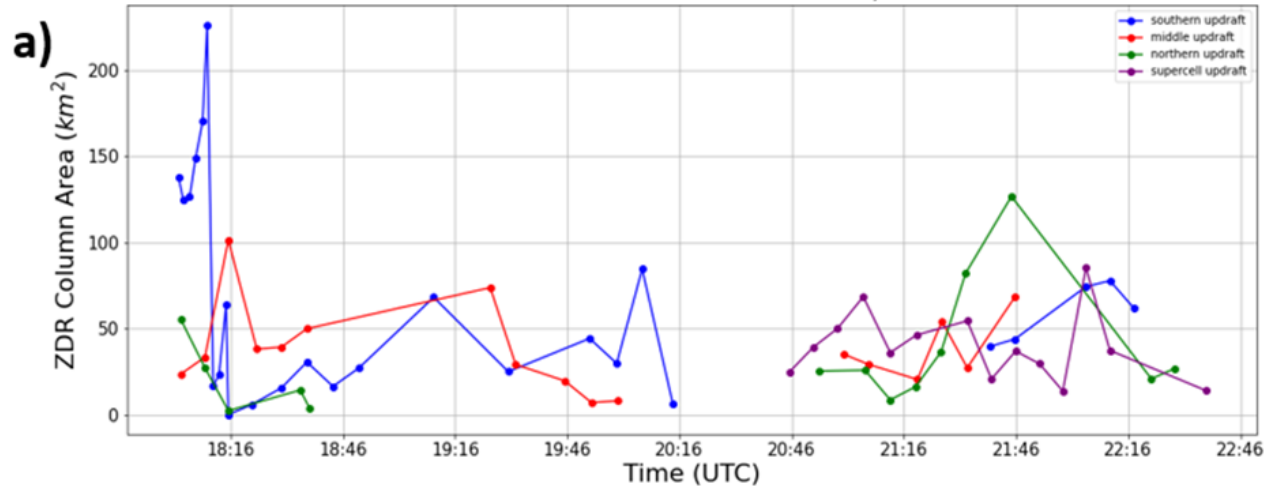
2022

- SKYLER-II not available owing to safety concerns from repairs made to the radar and truck internally at SBU
 - still launched windsonds in IOPs 1, 2, and 4 → stuck with “area of interest” approach to prepare for 2023 with radar → 6-12 launches per IOP spaced 5-10 min as line approached



2022

IOP1 ZDR Column Areas - March 22, 2022



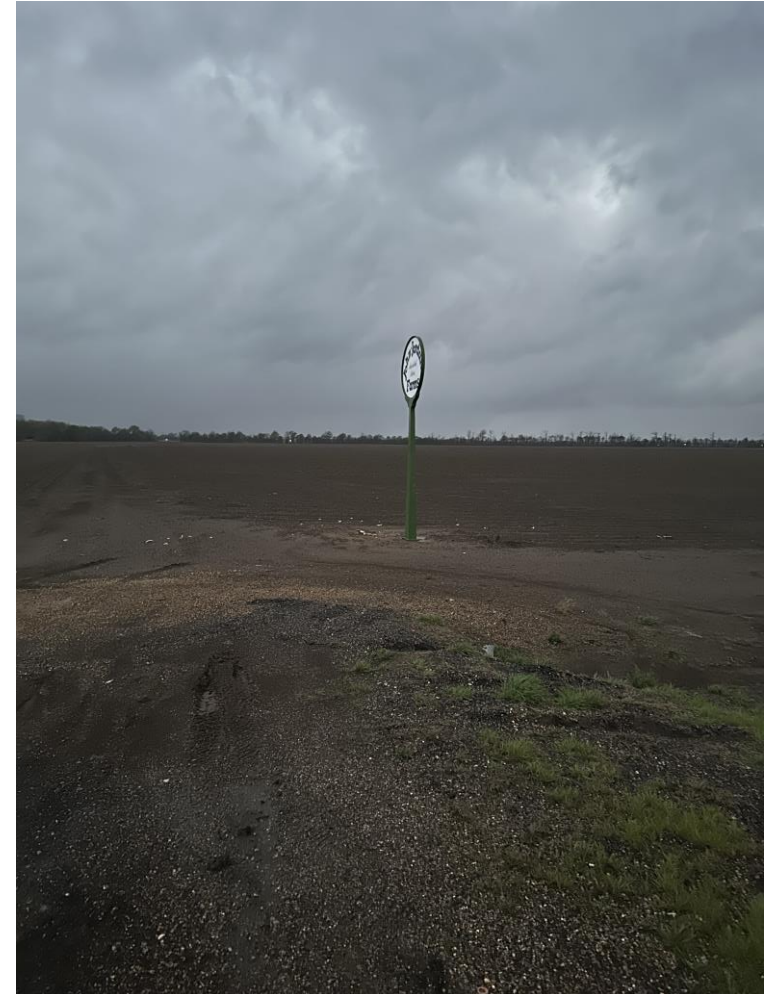
2023

- SKYLER-II underwent modifications and improvements at ProSensing in Nov./Dec. of 2022
- Was used in NASA IMPACTS snowstorm project Jan-Feb. 2023 to obtain data in winter storms on Long Island and upstate NY



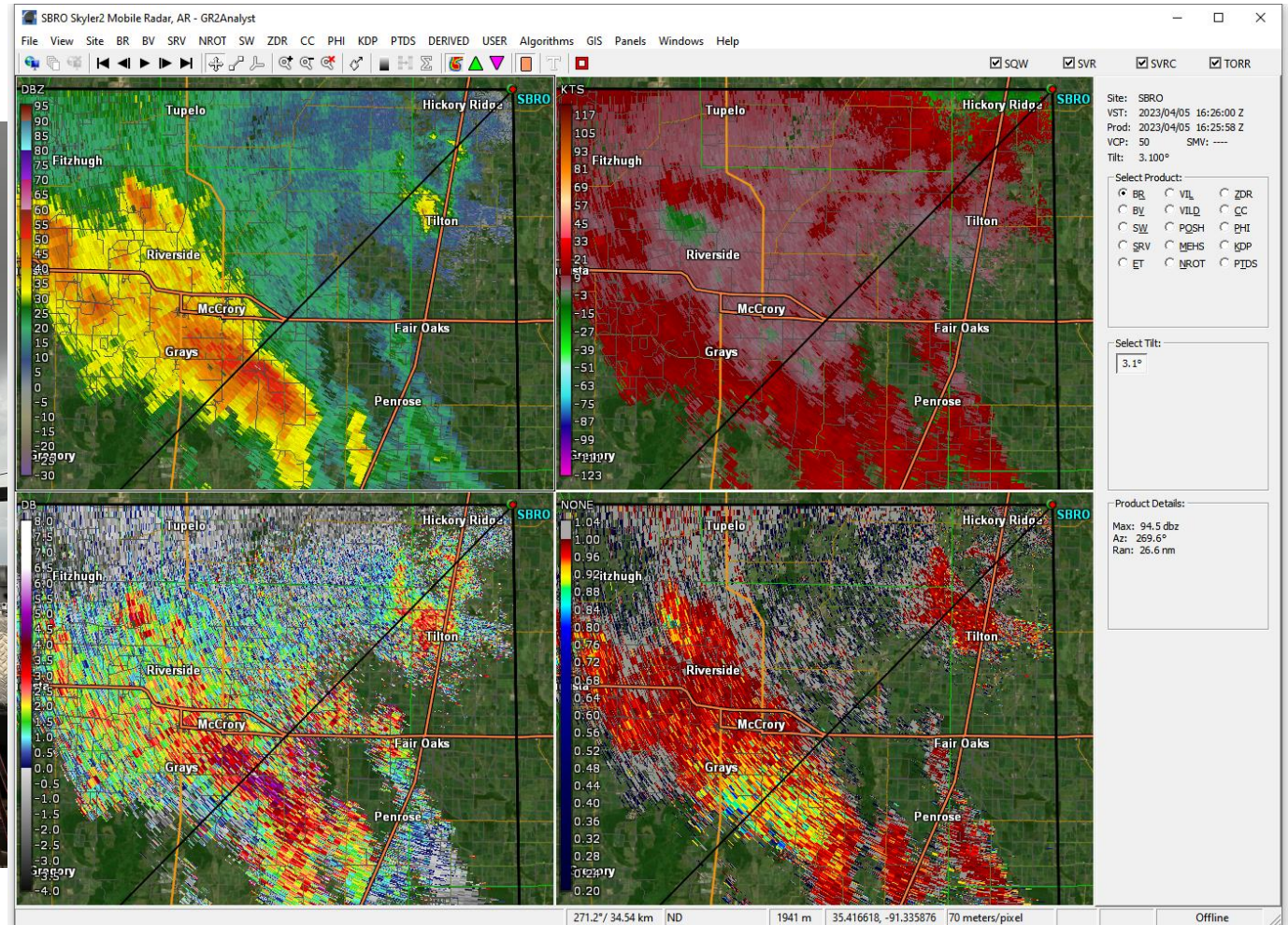
2023: IOP3

- Setup N-S dual-Doppler lobe with RaXPol on Highway 65 in AR
- Repeated failures in radiating and 90 min of troubleshooting, also intermittent but serious generator failures → serviced in Little Rock



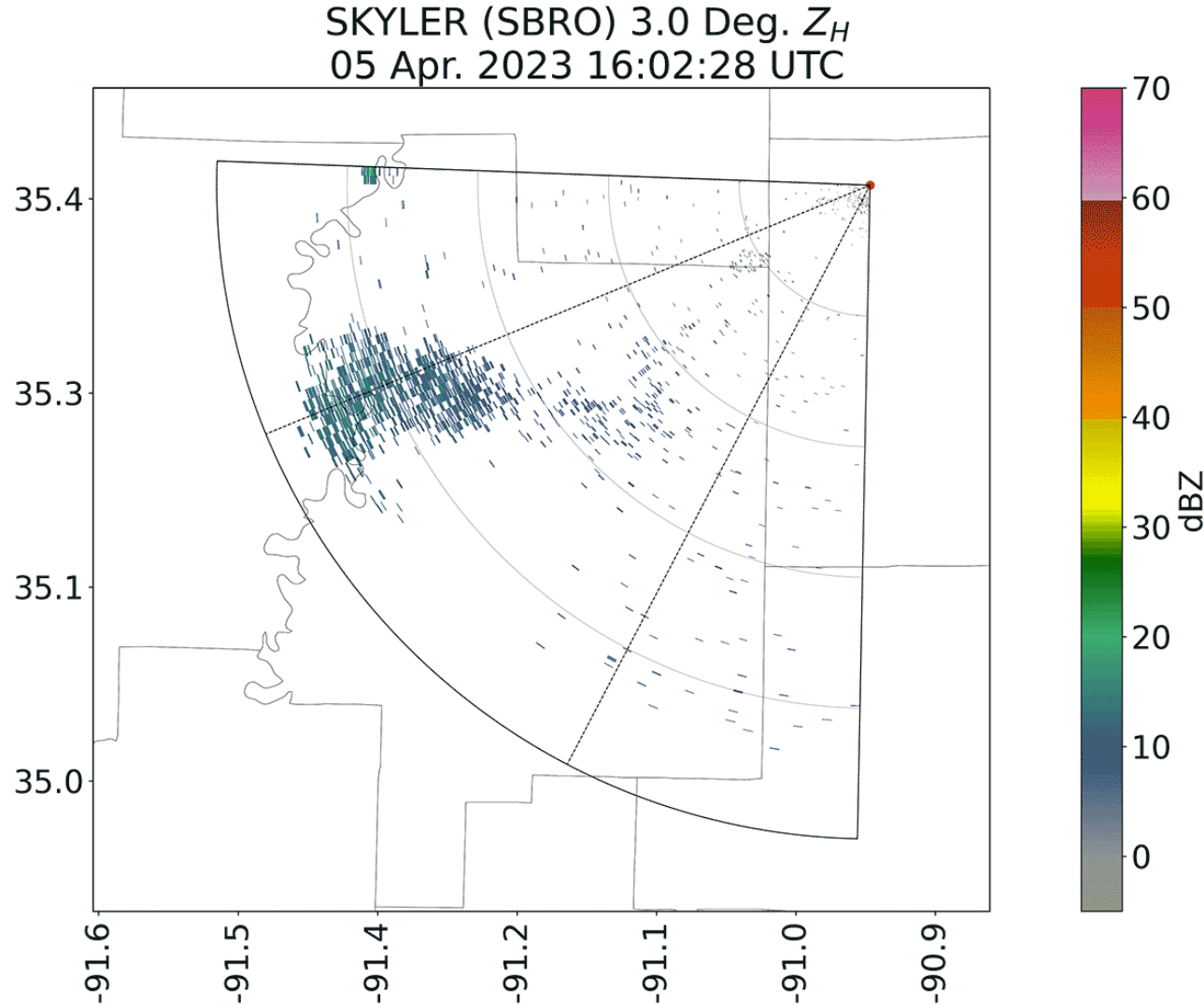
2023: IOP5

- Both generator and antenna issues fixed
- Goal: dual-Doppler with RaXPol → setup NW-SE baseline
- 1512-1757 UTC on warned cell and line segment



2023: IOP5

- 31 second volumes from 1-30° with 45° sector



- DDA challenges: not perfectly level
- Evaluate quality of dual-pol data with intercomparisons
- Dataset processed and QCing Windsond data