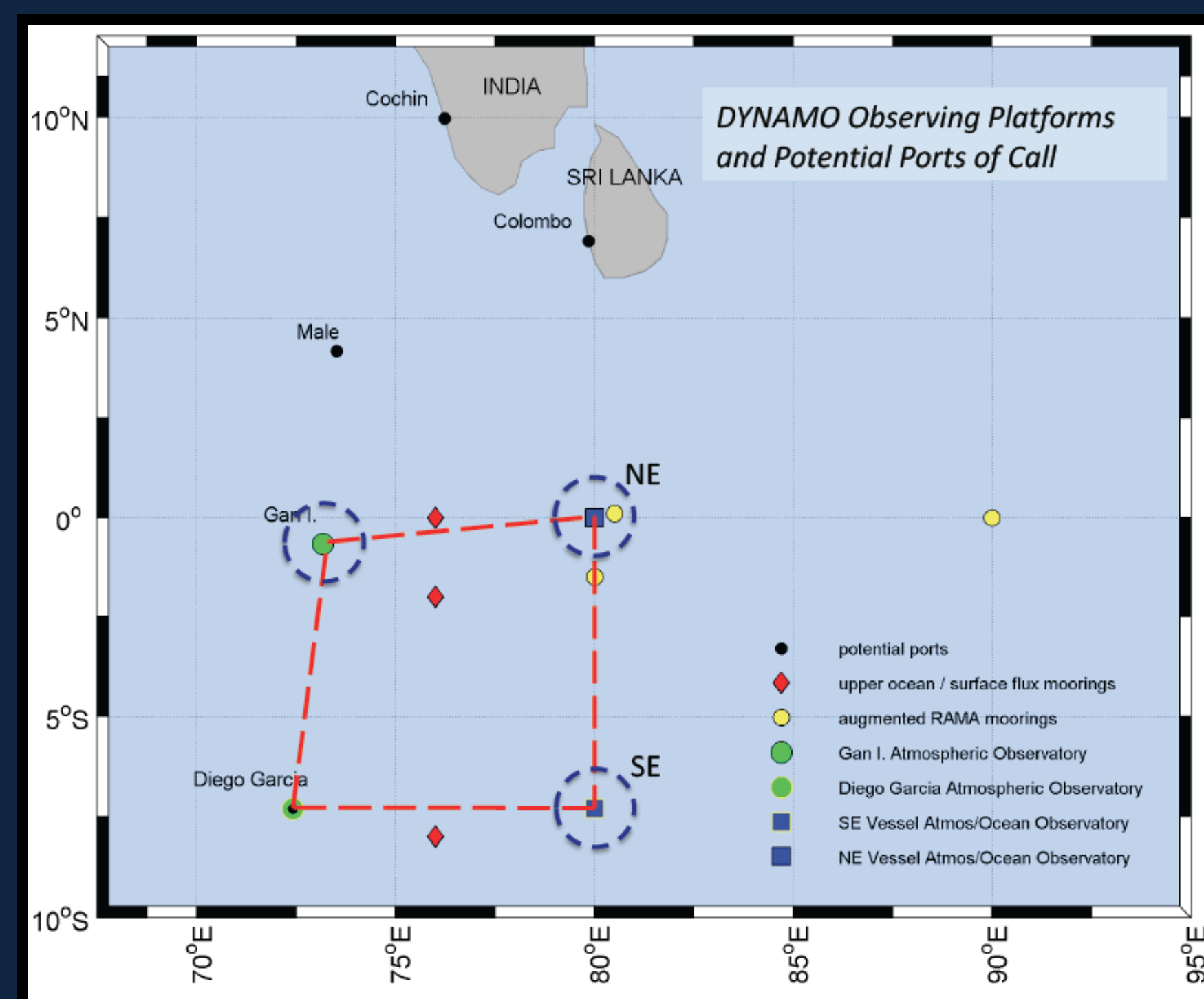


## INTRODUCTION TO DYNAMO

The goal of the DYNAMics of the MJO (DYNAMO) experiment (Oct 2011 – March 2012) was to improve simulation and prediction of the Madden-Julian Oscillation (MJO) by understanding the coupling between convection and the large-scale environment over the Indian Ocean. Observations were concentrated in four locations: Gan Island, Diego Garcia, the R/V Revelle at point NE, and the R/V Mirai at the SE location. Instrument platforms included an extensive sounding array, air-sea measurements, research aircraft, and a radar network.



The radar network consisted of C- and W-band radars on each research vessel, and a radar “supersite” on Gan Island, including Ka- and W-band radars at the AMF2 site, a C-band radar (SMART-R), and an S-band (S-PolKa). The objective of the radar network was to fully characterize the ensemble of convection associated with each stage of MJO initiation. A variety of wavelengths were used to observe the entire cloud spectrum, and scanning strategies were designed to obtain statistics of the cloud population.



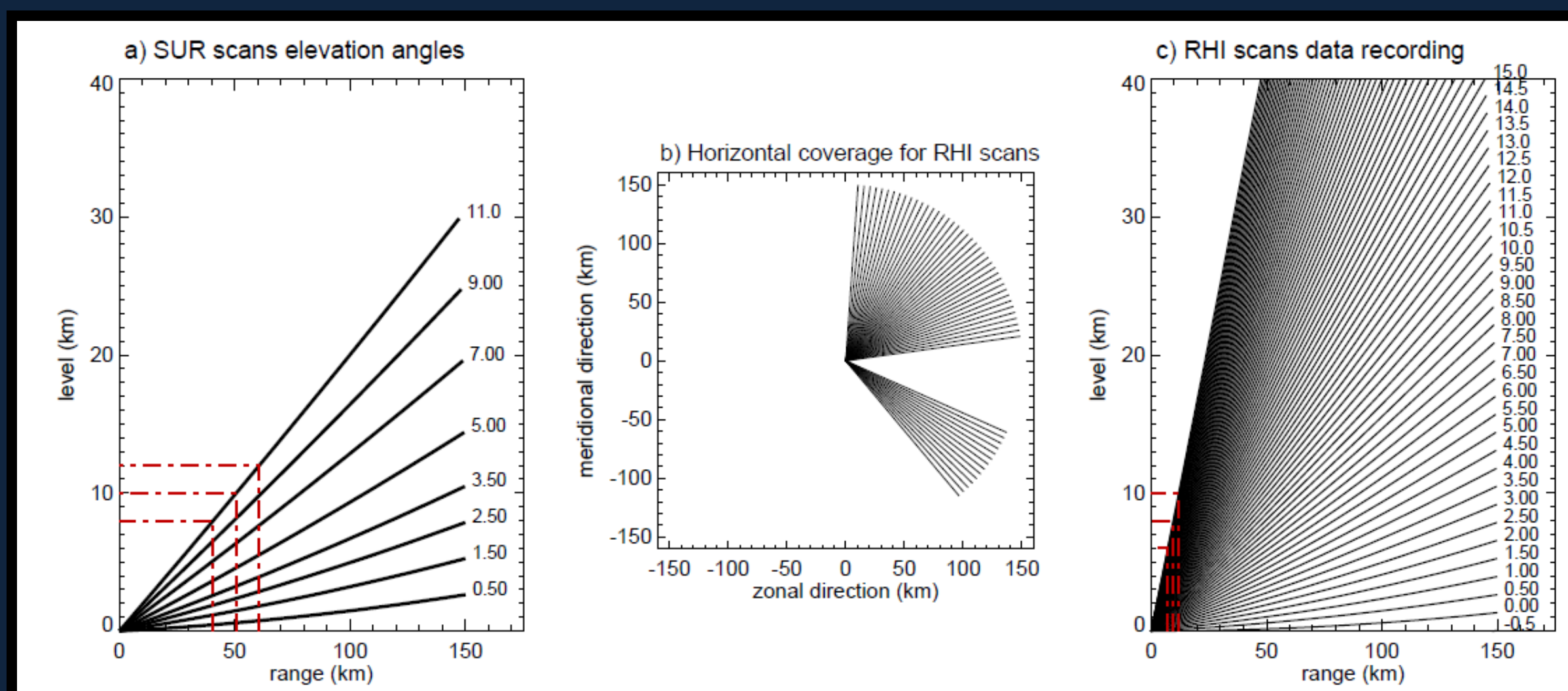
## S-PolKa IN THE FIELD

### Goals of S-band:

- Observe the convective population and transition from shallow to deep (MCSs)
- Provide details on airflow within the storm
- Provide highly resolved hydrometeors information
- Provide high-quality precipitation estimates

### Goals of Ka-band:

- Document structure and evolution of small non-precipitating cumulus clouds
- Combined with S-band:
- Estimate vertical profiles of lower tropospheric humidity
- Estimate total LWC
- Investigate rapid onset of precipitation



### Up time:

96.21% (S-band), 82.55% (Ka-band)

The NCAR support team efficiently and seamlessly managed the radar calibration and operations.

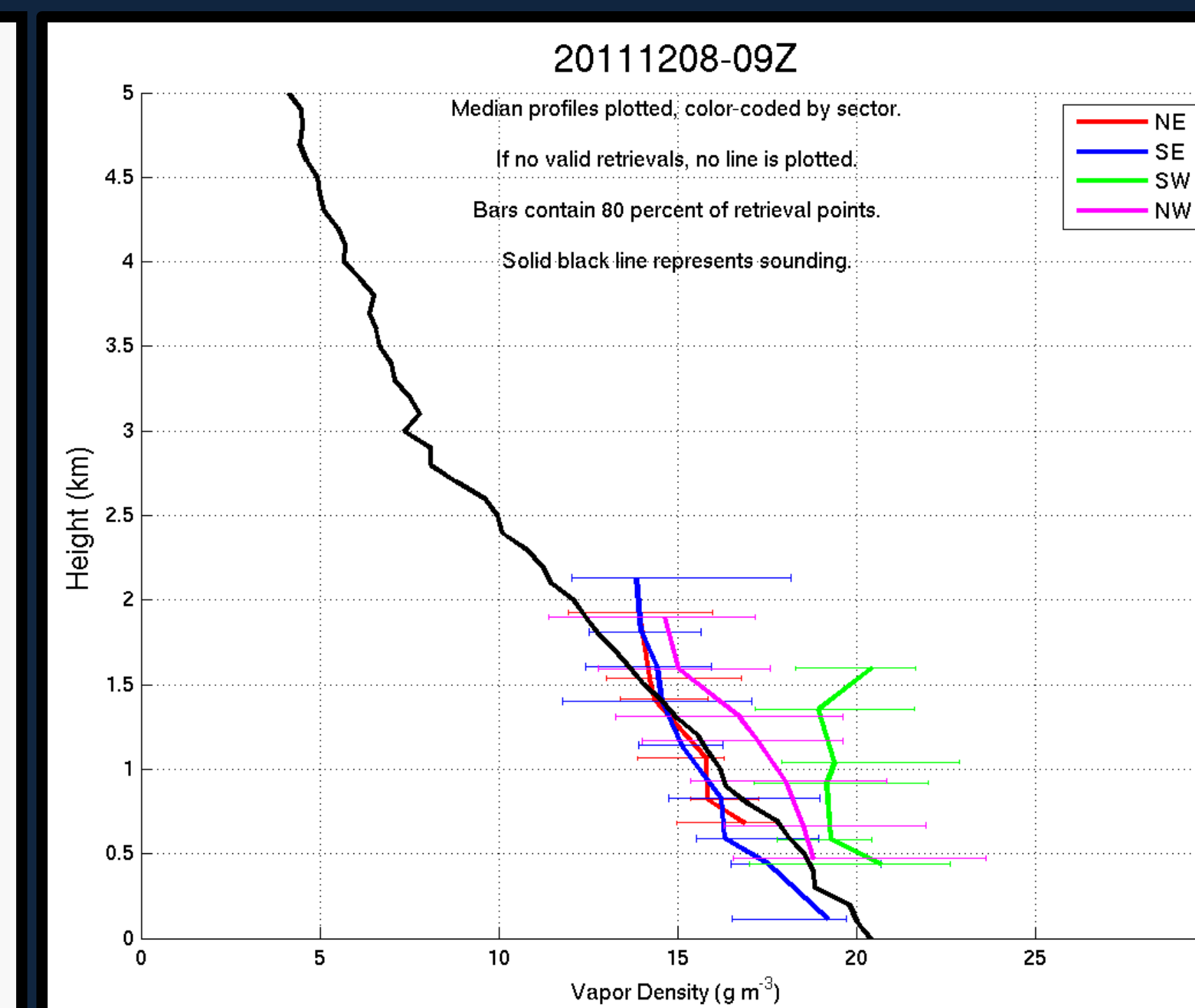
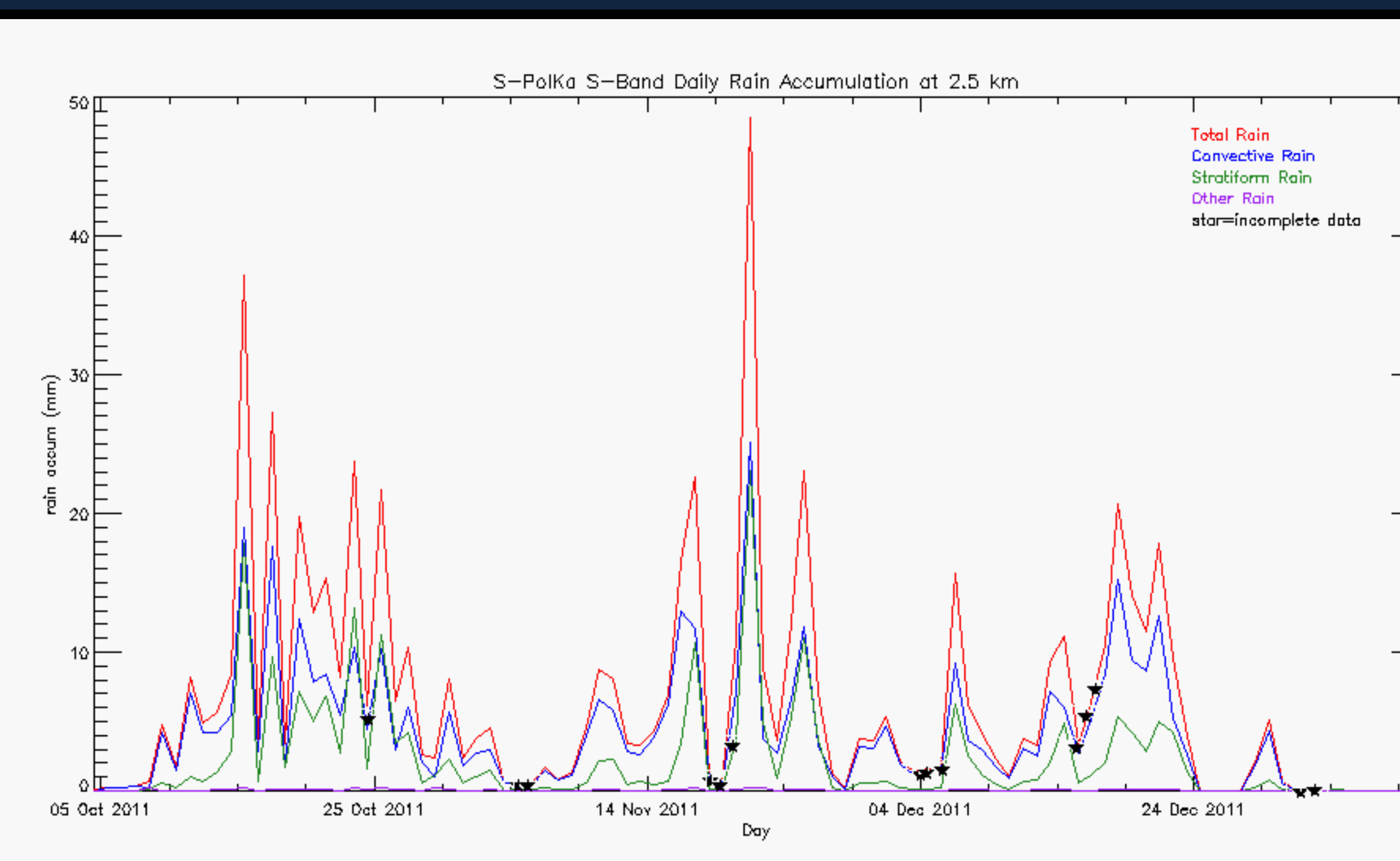
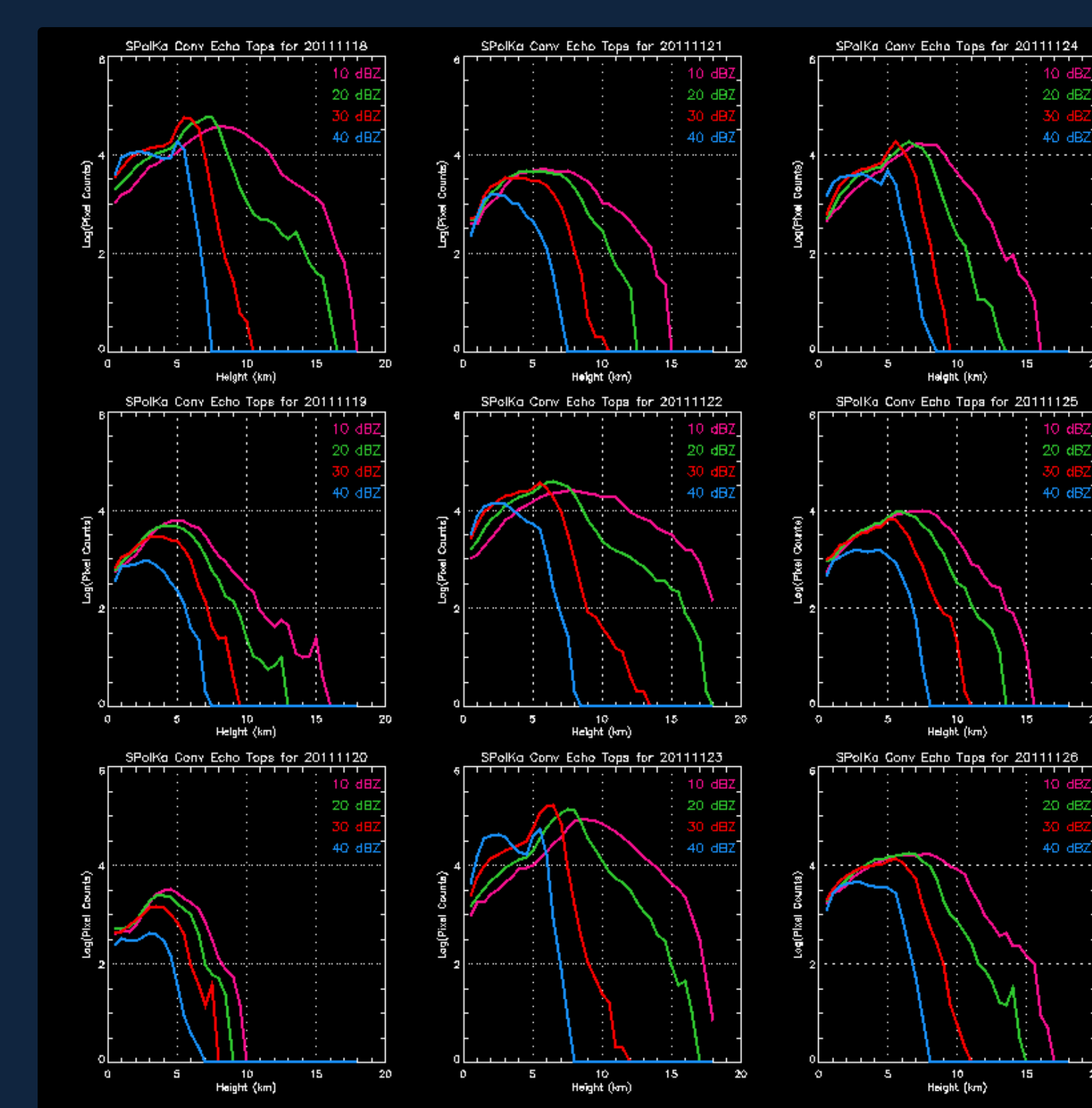
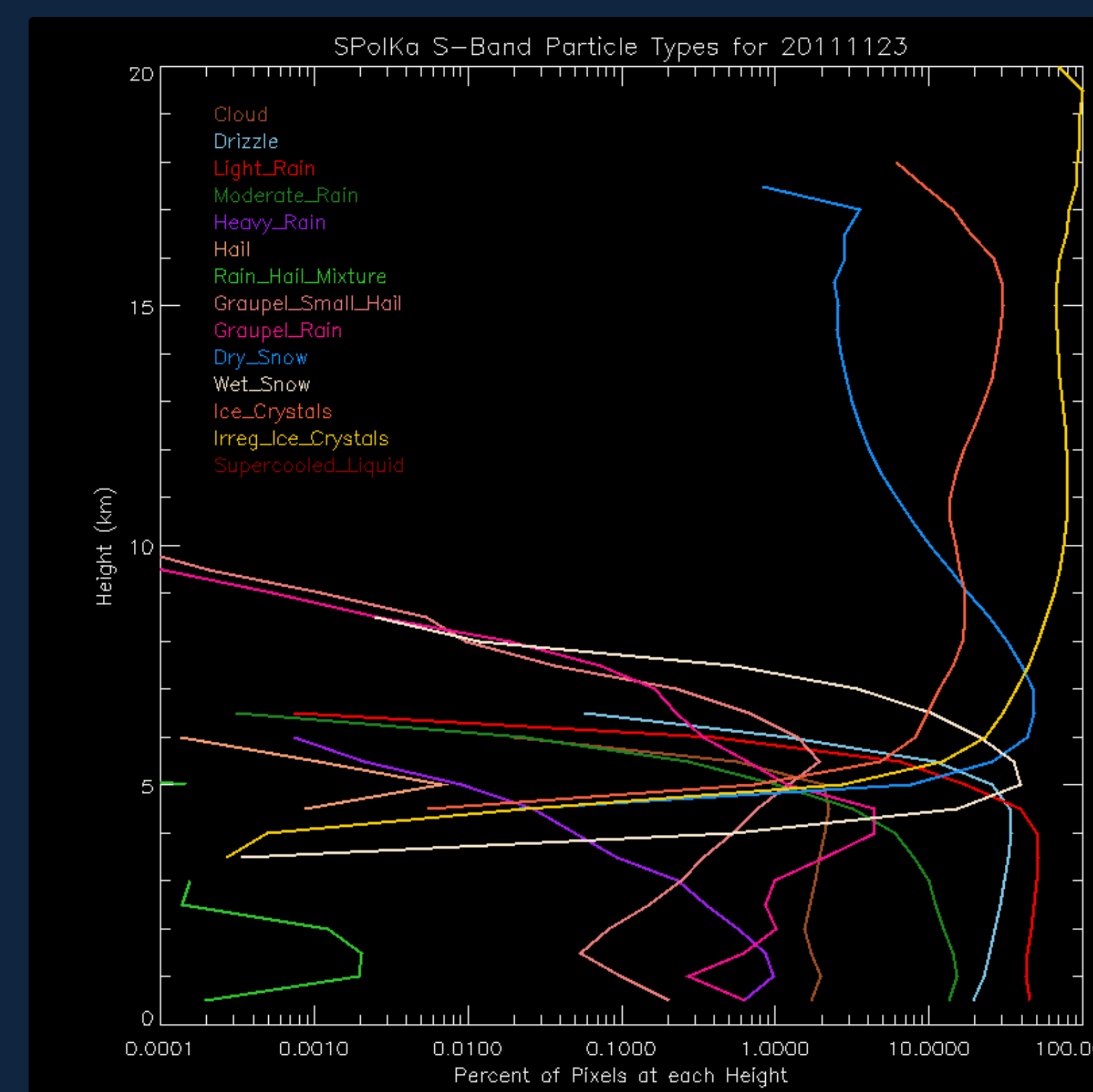
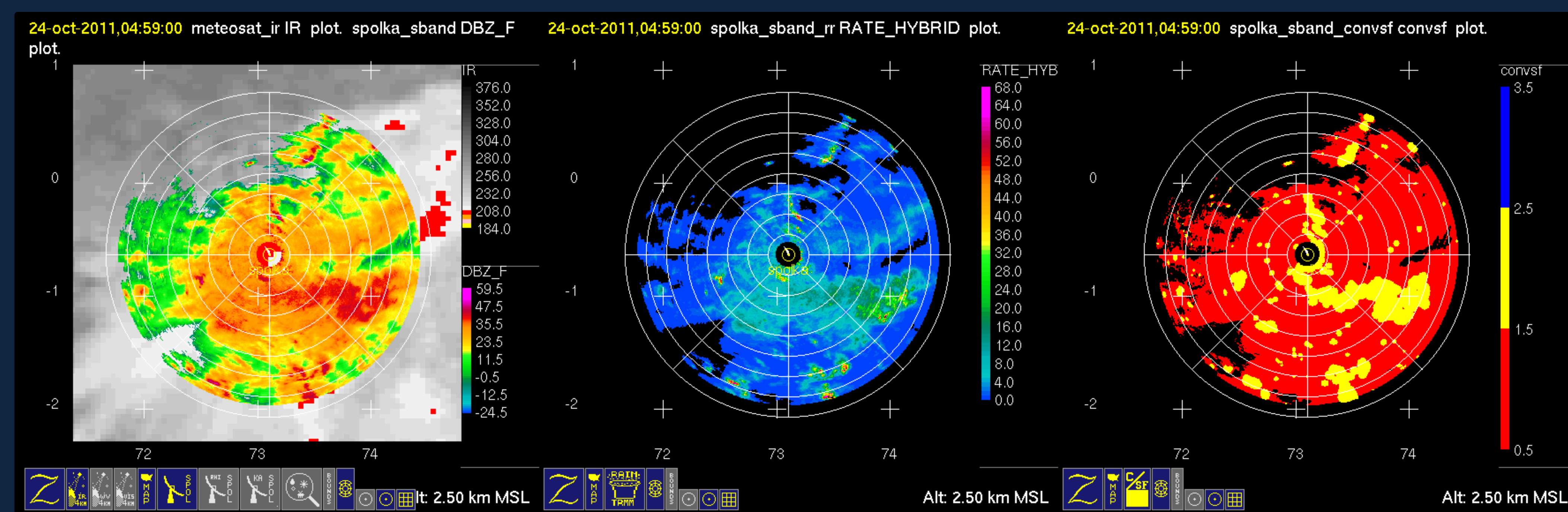
### Utility of SpolKa in the Field

- Excellent calibrated radar data available in real-time for use in the field
- Enabled research product generation in real-time to support decision-making and operations of other platforms (e.g. aircraft flights based on echo top heights, convective/stratiform, etc.)
- Very high “up time” percentage results in a comprehensive dataset for the project
- Allowed for preparation of research-quality products for in-field and post-field research

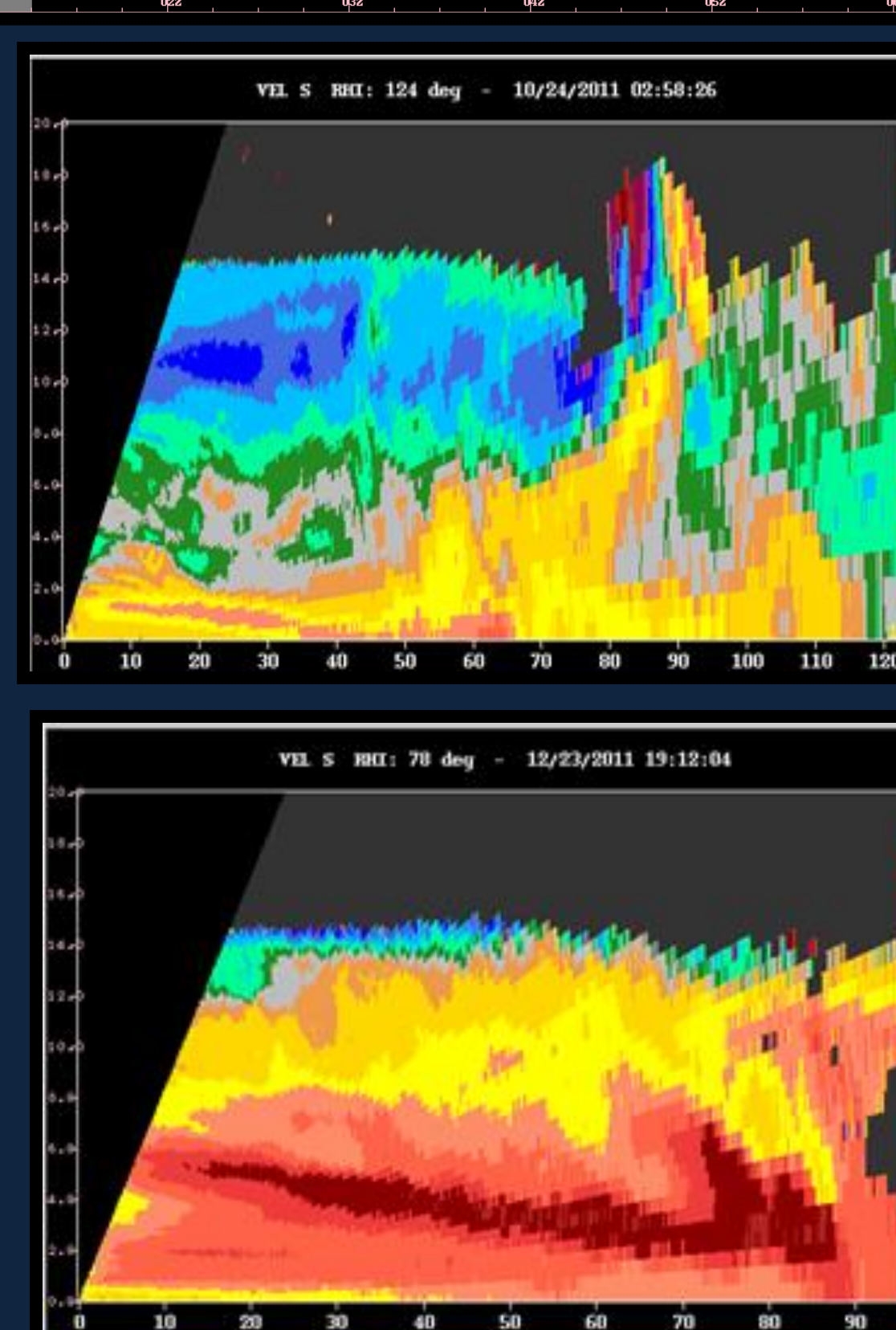
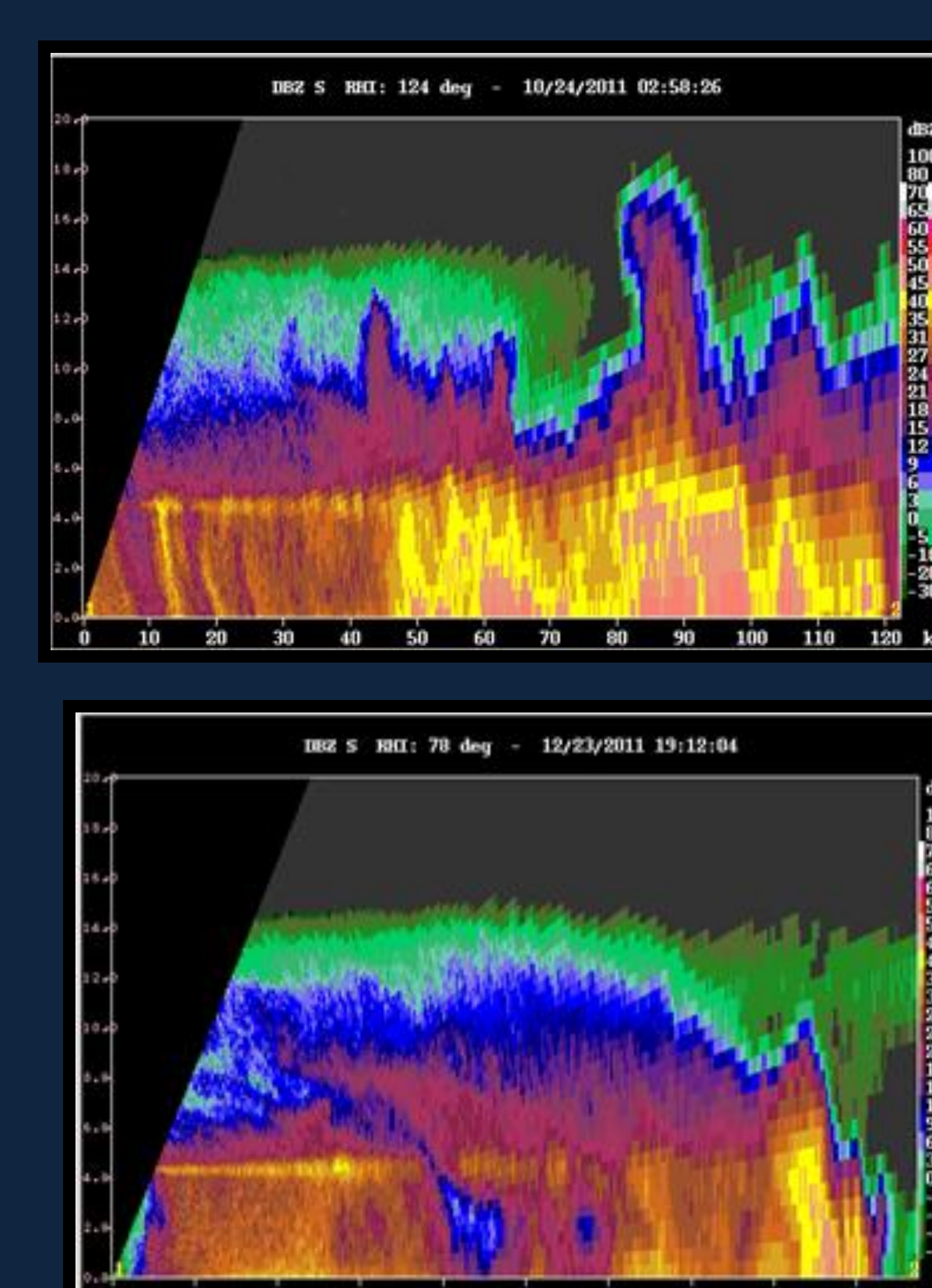
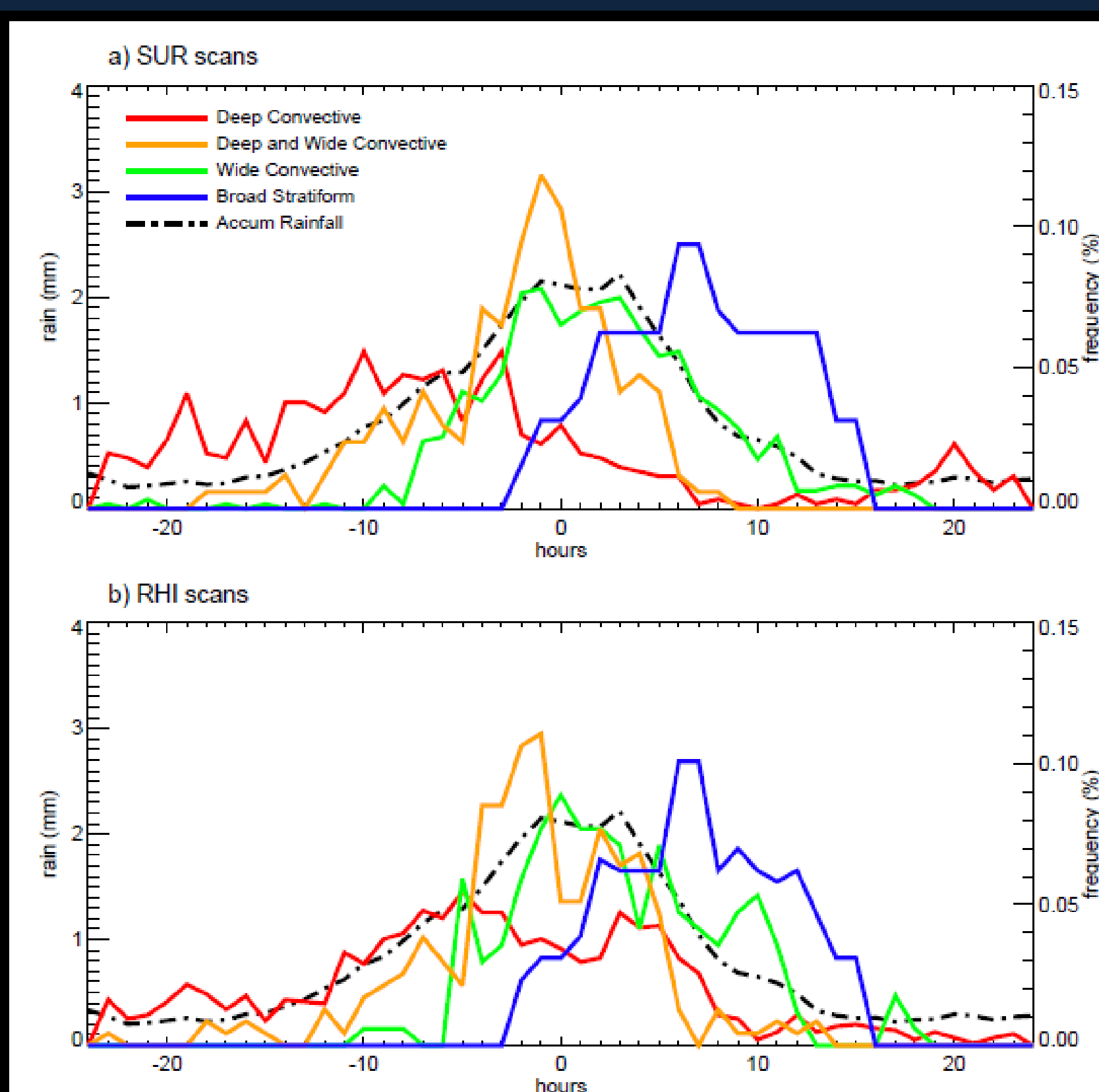
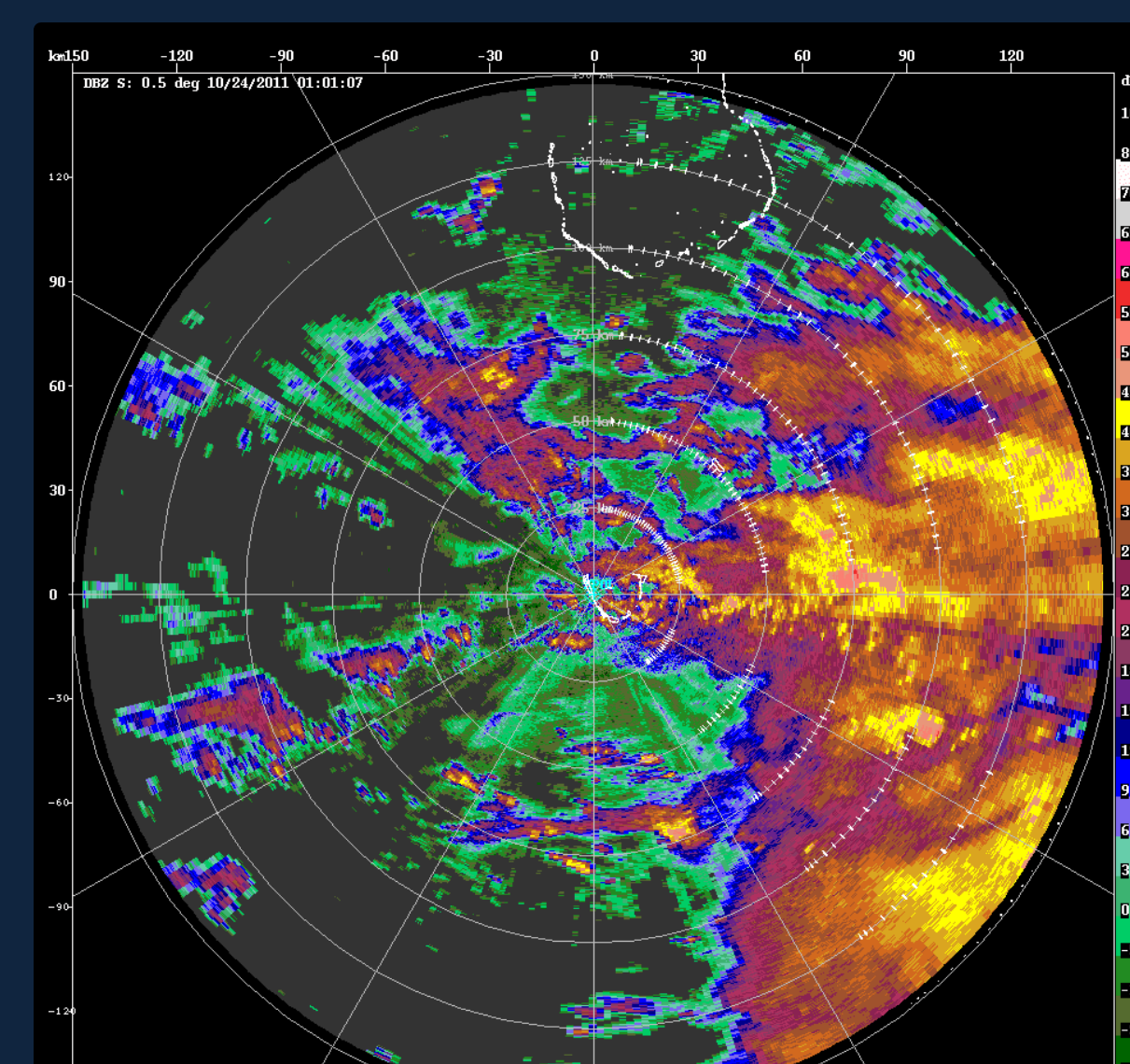
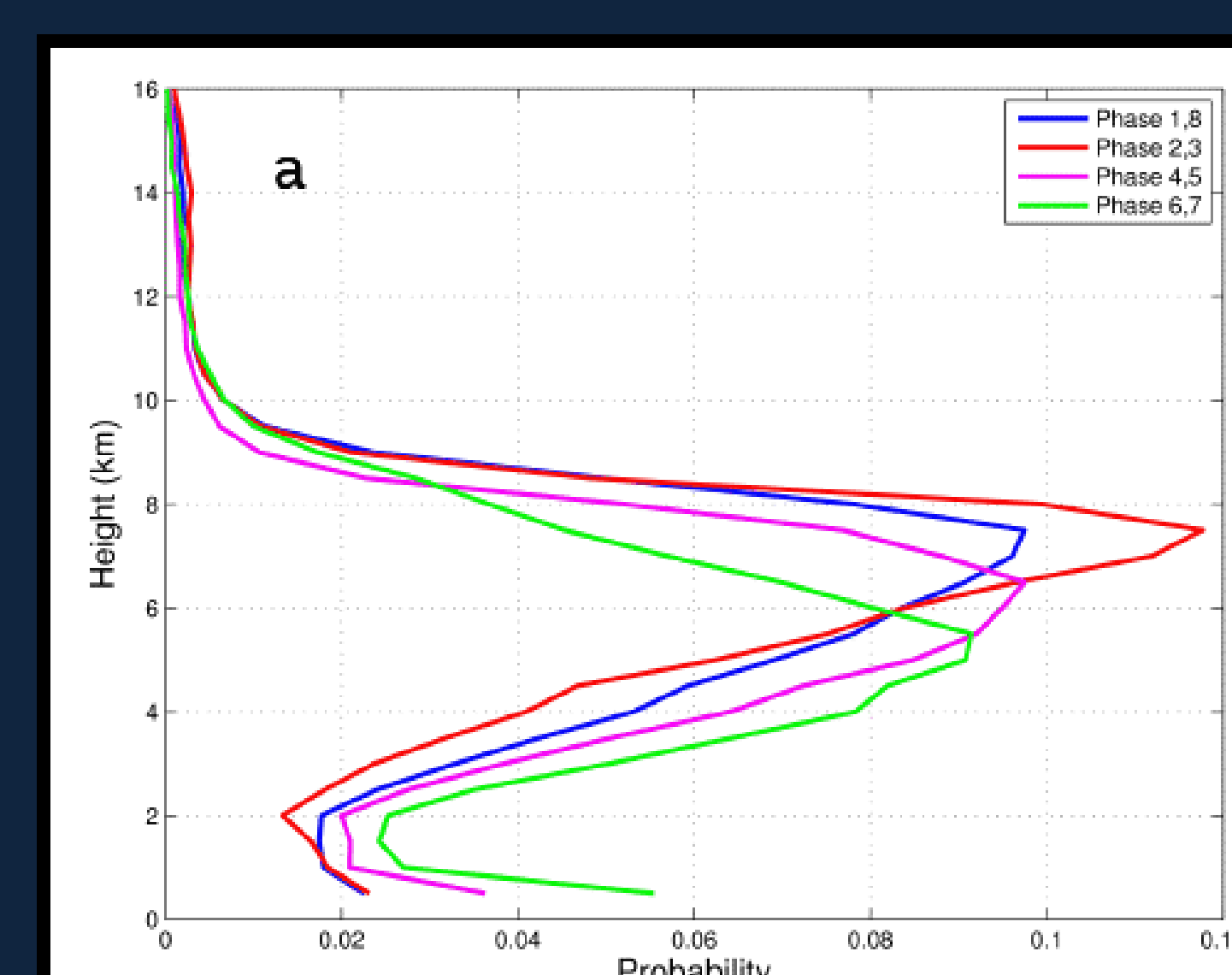
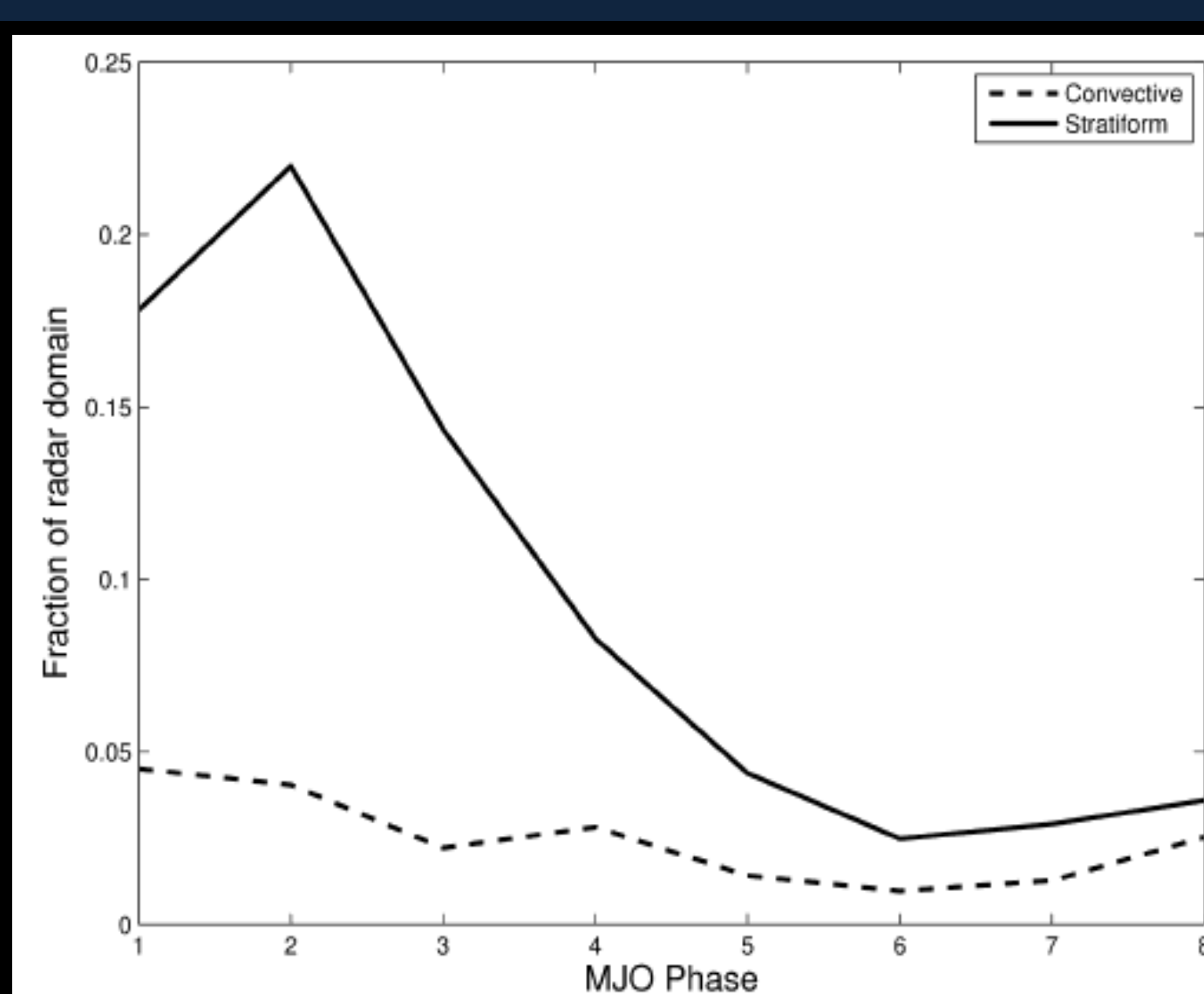


- “By running flawlessly for 4 months, doing an unusual scan strategy, S-PolKa provided unprecedented knowledge of the oceanic tropical cloud population, and the NCAR operation made it possible to do extensive, detailed real-time analysis.” ~Robert Houze, Jr.
- DYNAMO would not have been the success it was without the high quality of both the S-PolKa radar data and its superb science and engineering support team. The S-PolKa team also provided other much-appreciated technical support to those of us in the field, which greatly aided us in our research efforts” ~Stacy Brodzik

## PRODUCTS



## ONGOING RESEARCH



## FINAL THOUGHTS

The combination of the NCAR team and the SpolKa platform leads to an excellent tool and high-quality data for scientific research and was essential to the Houze group’s in-field and post-field analysis of the cloud population during DYNAMO (Funded by AGS-1059611).