

Radar Tracking of Quality Toolkit (RadTraQ)

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- ▶ RadTraQ is a Python library housing routines related to assessing and monitoring the quality and calibration of a radar
- ▶ Background
 - Many of these scripts were developed in IDL and run in ARM's DQ Office for routine monitoring of ARM's radars
 - DQ Office has shifted to Python so we've been working on porting them over, adding to it, and making it open source
- ▶ Grass roots effort right now in our free time so collaborations and contributions are greatly appreciated!
 - Any contributions can also easily feed into the DQ Office processing and help monitor and QA/QC ARMs radars

What's Currently Included?

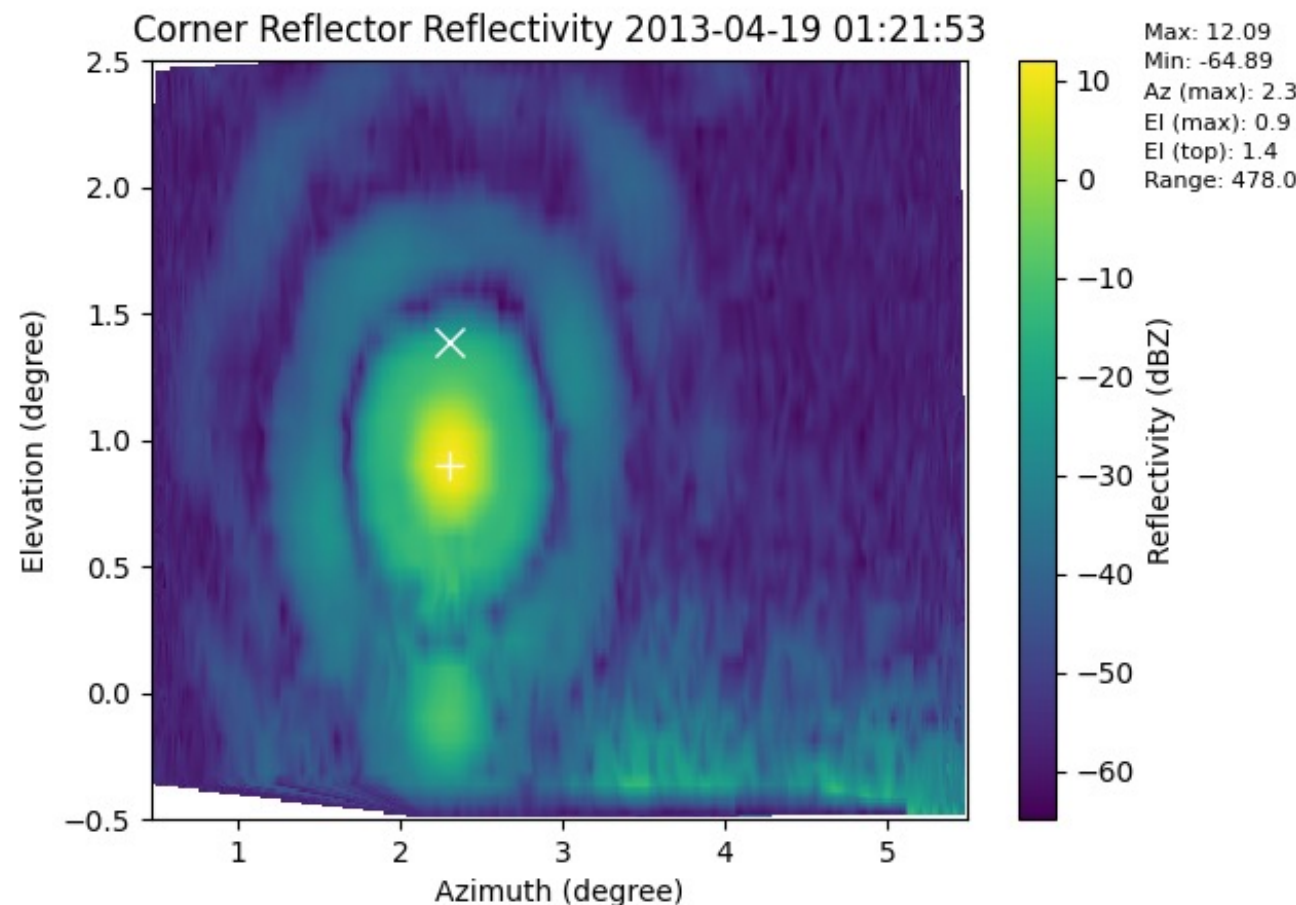
Corner Reflector Scan Plotting and Analysis

- ▶ Plots up corner reflector raster scans
- ▶ Analyzes the data to determine
 - Elevation/Azimuth of the Center (max)
 - Elevation/Azimuth of the Top

```
import radtraq
from act.io.armfiles import read_netcdf
import matplotlib.pyplot as plt

# Read in sample data using ACT
obj = read_netcdf(radtraq.tests.sample_files.EXAMPLE_RASTER)

# Process and plot raster file
data = radtraq.plotting.corner_reflector.plot_cr_raster(obj,
    target_range=478., el_limits=[-0.5, 2.5], noplot=False)
plt.show()
obj.close()
```



Contour Frequency by Altitude Diagram (CFAD)

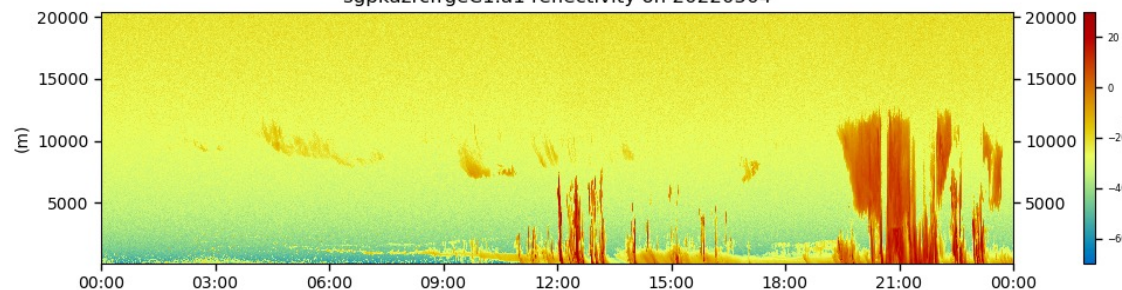
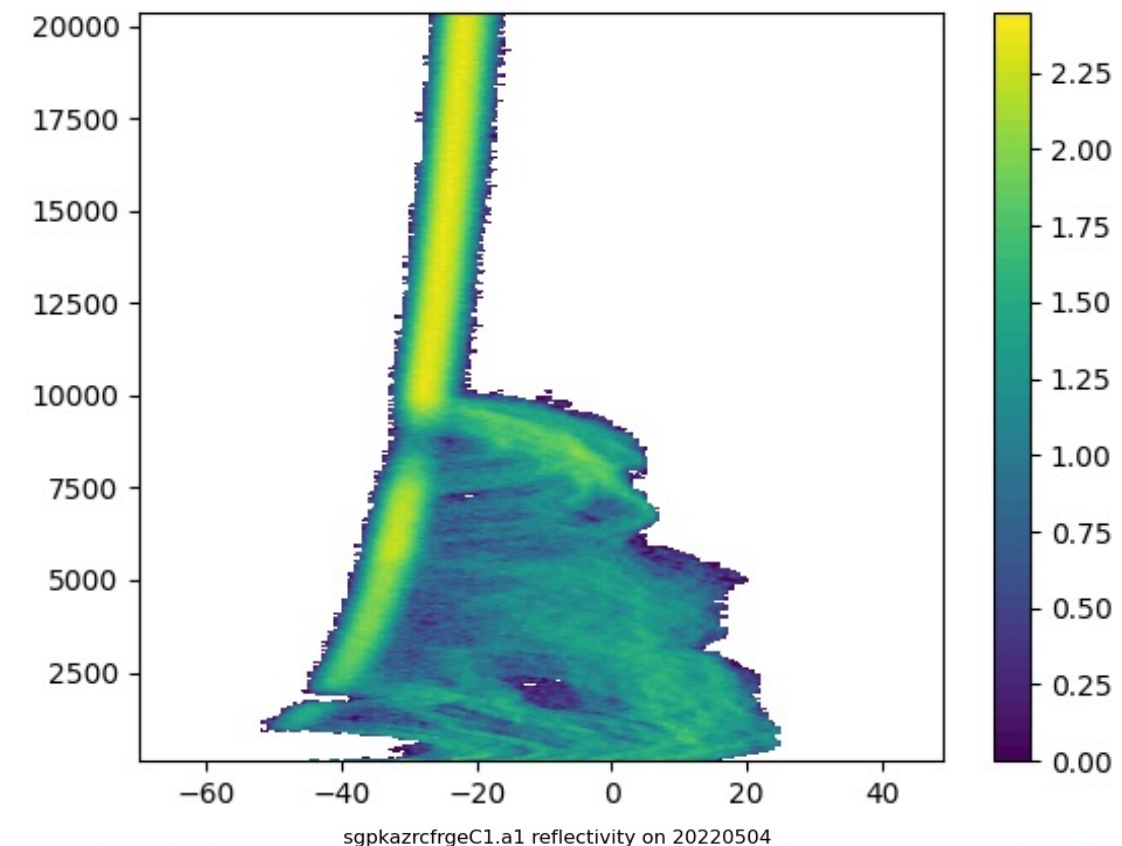
```
import radtraq
from act.io.armfiles import read_netcdf
import matplotlib.pyplot as plt

# Read in example data
obj = read_netcdf(radtraq.tests.sample_files.EXAMPLE_KAZR)

# Calculate CFAD histogram
data_array = radtraq.plotting.cfad.calc_cfad(obj, 'reflectivity_copol')

# Plot CFAD histogram
dims = data_array.dims
display = radtraq.plotting.cfad.plot_cfad(data_array,
data_array[dims[1]],
data_array[dims[0]])

plt.show()
```



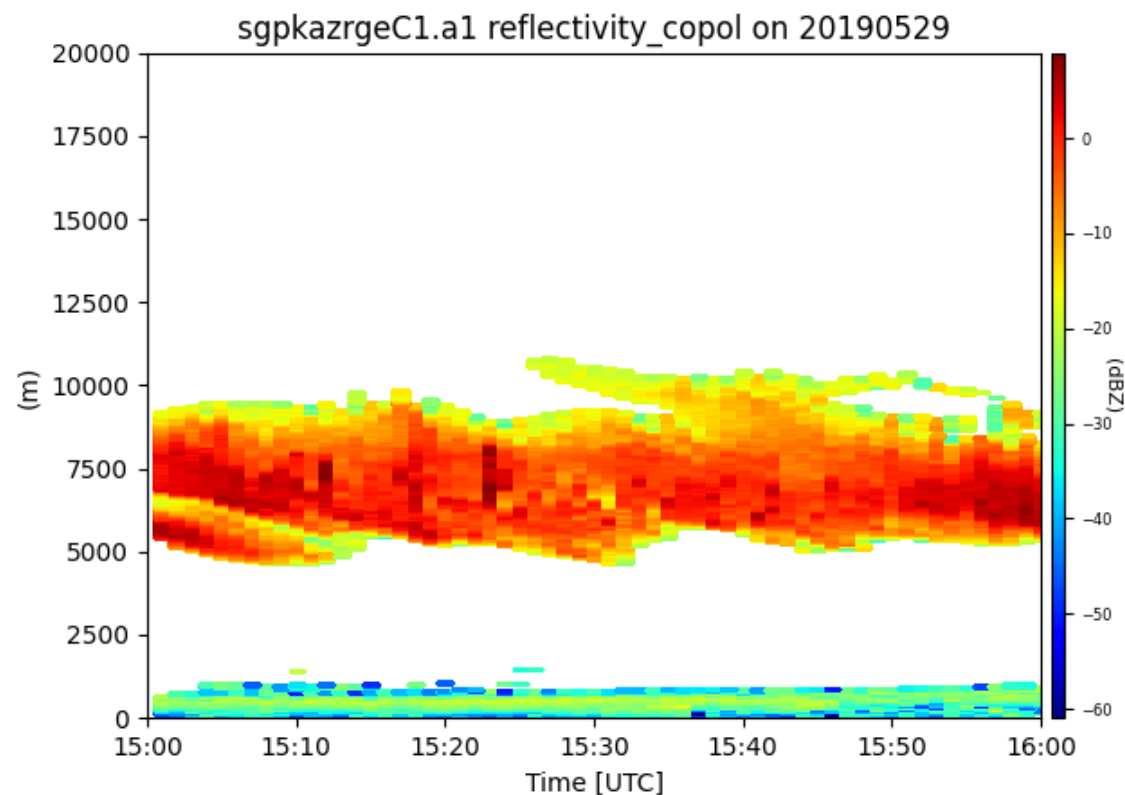
Cloud Masks



- Processes set up to calculate and apply cloud masks based on Kollias et al. 2014

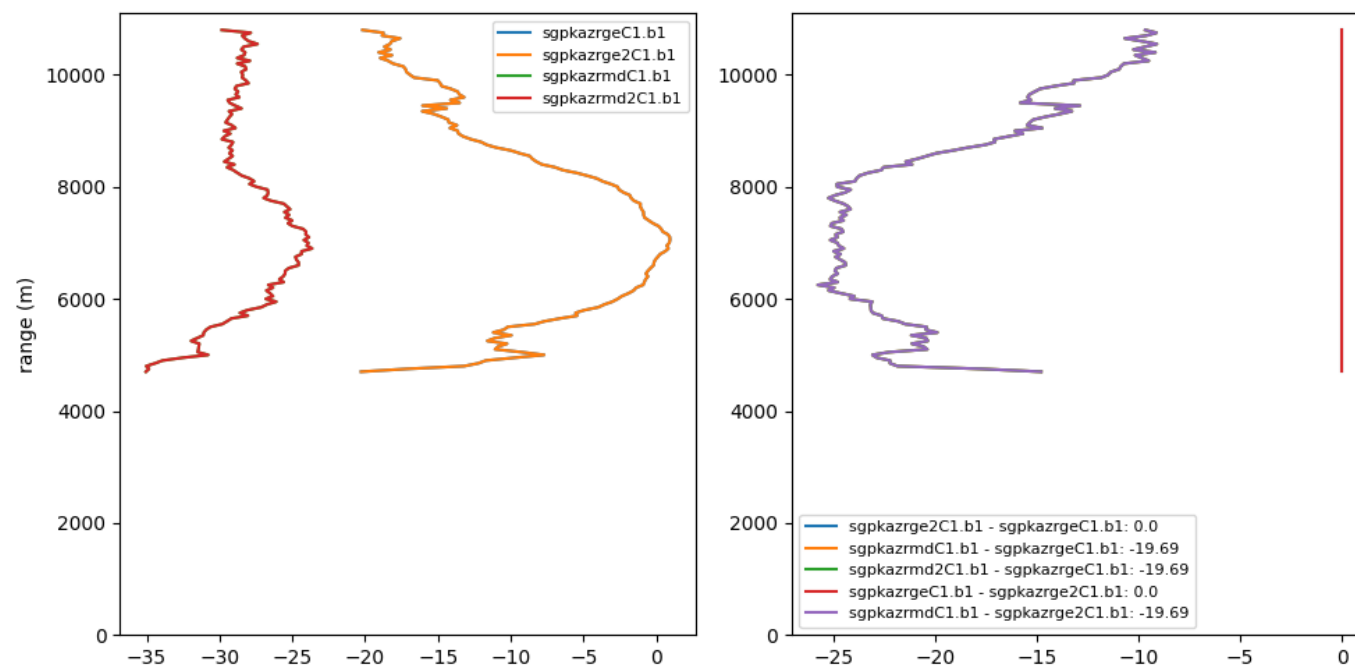
References

Kollias, P., I. Jo, P. Borque, A. Tatarevic, K. Lamer, N. Bharadwaj, K. Widener, K. Johnson, and E.E. Clothiaux, 2014: Scanning ARM **Cloud** Radars. Part II: Data Quality Control and Processing. J. Atmos. Oceanic Technol., 31, 583–598, <https://doi.org/10.1175/JTECH-D-13-00045.1>



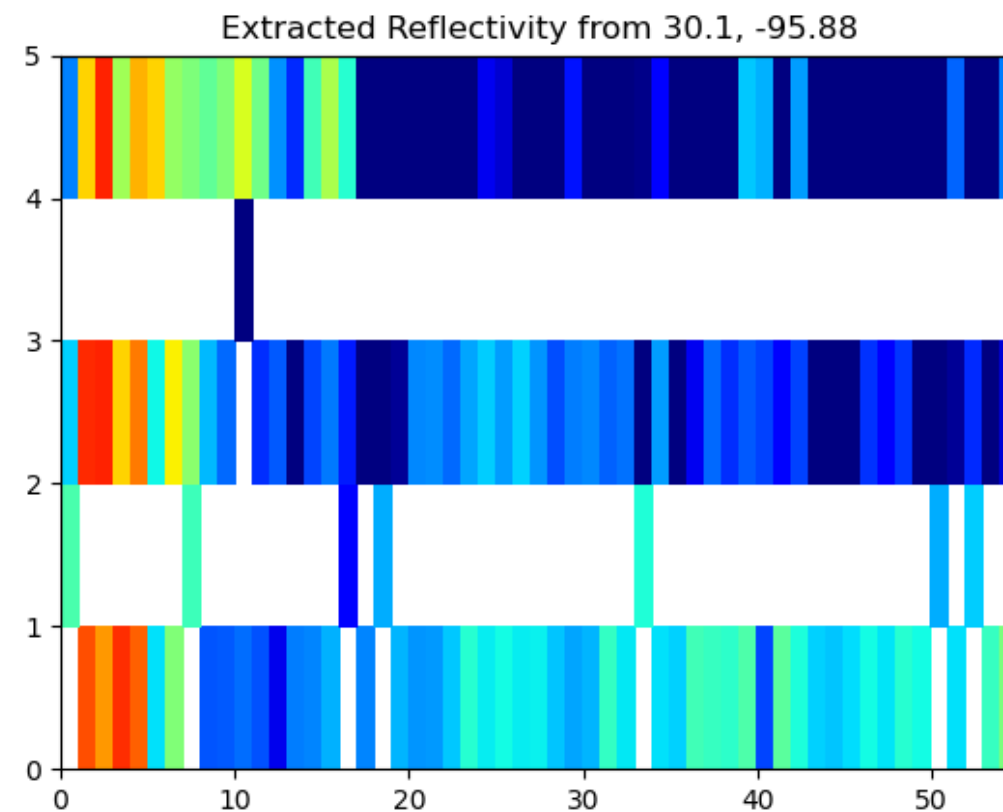
Profile Comparisons

- ▶ Using the cloud masks, profile comparisons can be created to determine average offsets.
- ▶ In this example, 2 of the radar profiles are clones of the original ge/md modes to show how to use this for multiple radars
 - GE vs MD KAZR mode



Other/Work in Progress

- ▶ Self-consistency plots
- ▶ Zdr Offset Calculations (VPT/Birdbath)
- ▶ Multi-doppler lobe calculations
- ▶ Profile Extraction from Volumes



- ▶ Continue to add to it as time permits
- ▶ Look to the community for additions as it will directly impact and aid in the monitoring of ARM's radars
- ▶ If you have ideas, please add to the issues on GitHub
 - Currently have point target analysis and vertical point velocity dealiasing on the list
 - <https://github.com/ARM-Development/RadTraQ/issues>