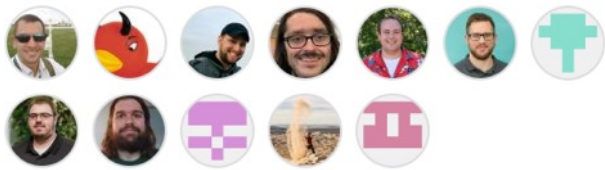


Bridging Communities with Open-Source Software

Contributors 12



Background

SAIL and SPLASH

- ▶ Successful campaigns from ARM, NOAA, and many other groups
- ▶ Data collection is over so analysis is in full swing
- ▶ Problem!
 - All these datasets are hosted in different areas with different formats!
 - Very unlikely to move everyone towards a common data format and data warehouse, but....
 - Software can make this easy for users to navigate



Photo by David Inouye, RMBL;
Image courtesy of the U.S. Department of Energy Atmospheric Radiation Measurement (ARM) user facility.

Atmospheric data Community Toolkit (ACT)

► Python library for working with time-series data from atmospheric research instrumentation

Discovery

IO

ACT

Plotting

Utilities

Corrections

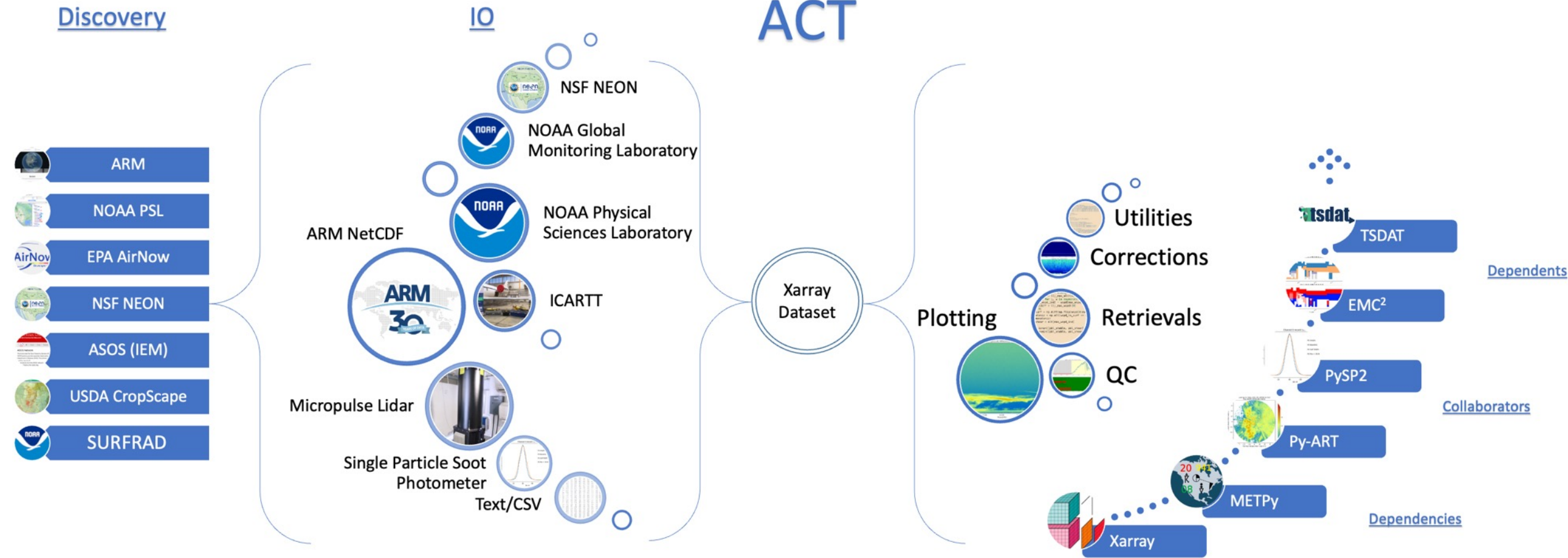
Retrievals

QC

Dependents

Collaborators

Dependencies



Comparison of ARM KAZR and NOAA Kettle Ponds FMCW Radar



ARM M1 KAZR

► Download Data

```
ds = 'guckazrcfrgeM1.a1'  
startdate = '2022-08-15'  
enddate = '2022-08-20'  
files = act.discovery.download_data(  
    username, token, ds, startdate, enddate  
)
```

► Read Data

```
ds_kazr = act.io.armfiles.read_netcdf(files)
```

NOAA Kettle Ponds Radar

► Download Data

```
files = act.discovery.download_noaa_psl_data(  
    site='bck', instrument='Radar FMCW Moment',  
    startdate='20220815', enddate='20220820'  
)
```

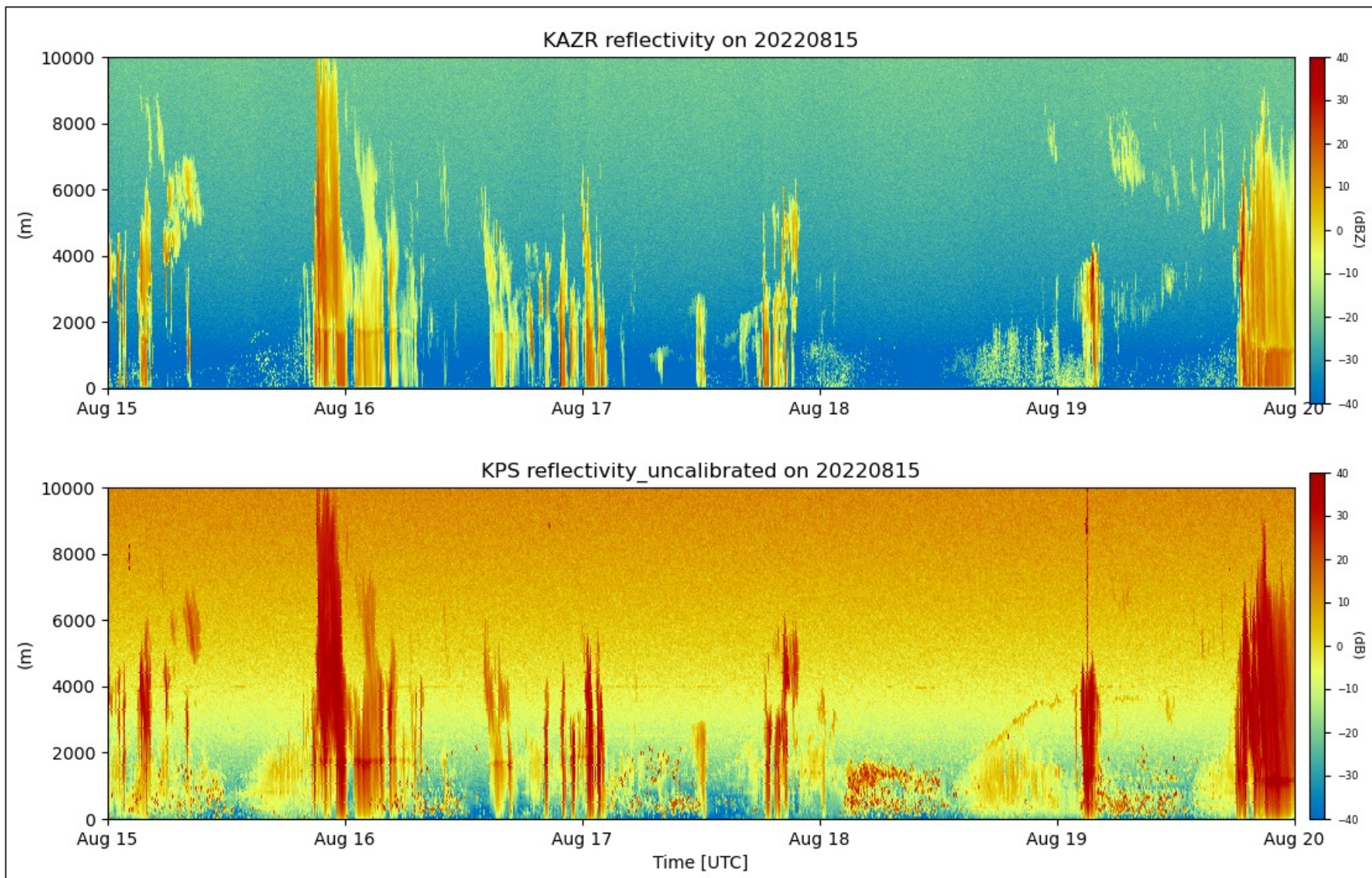
► Read Data

```
files = [f for f in files if f.split('/')[-1][0:3] == 'kps'  
        and f.split('.')[1] == 'raw']  
ds_kps = act.io.noaapsl.read_psl_radar_fmcw_moment(files)
```

► Plot Data

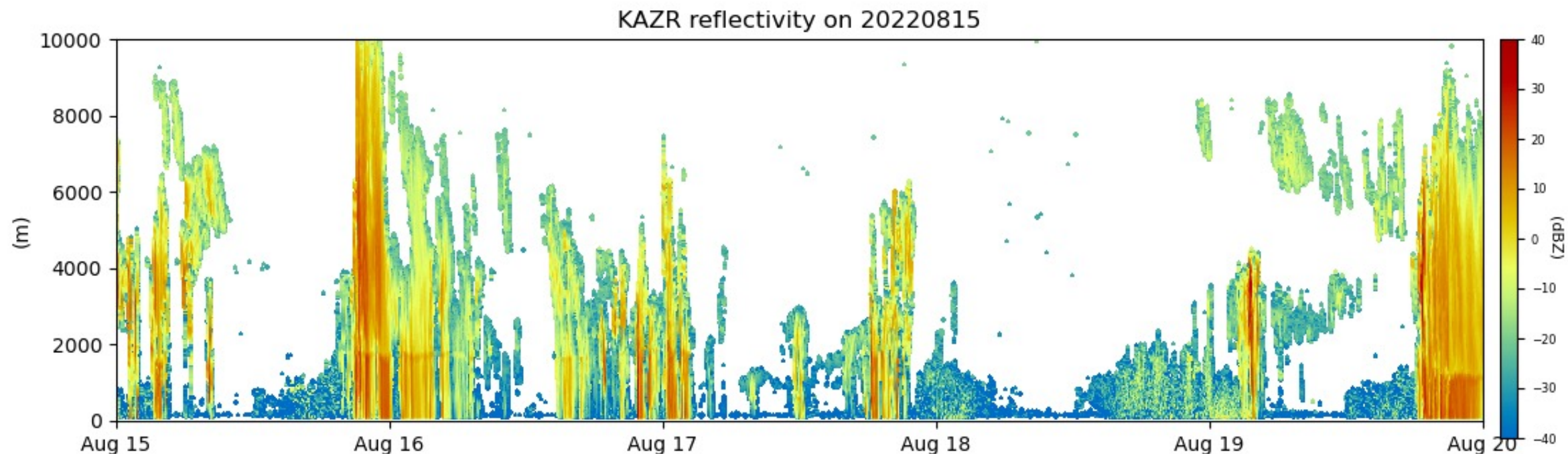
```
display = act.plotting.TimeSeriesDisplay({'KPS': ds_kps, 'KAZR': ds_kazr}, subplot_shape=(1,2), figsize=(12,8))  
display.plot('reflectivity', dsname='KAZR', subplot_index=(0,1), vmin=-40, vmax=40, cb_friendly=True)  
display.set_yrng([0,10000.], subplot_index=(0,1))  
display.plot('reflectivity_uncalibrated', dsname='KPS', subplot_index=(1,1), vmin=-40, vmax=40, cb_friendly=True)  
display.set_yrng([0,10000.], subplot_index=(1,1))  
plt.subplots_adjust(hspace=0.3, left=0.1)  
plt.savefig('./images/arm_noaa_comparison.png')
```

ARM KAZR and NOAA Kettle Ponds FMCW Radar



Easily Use Other Python Libraries

+RadTraQ

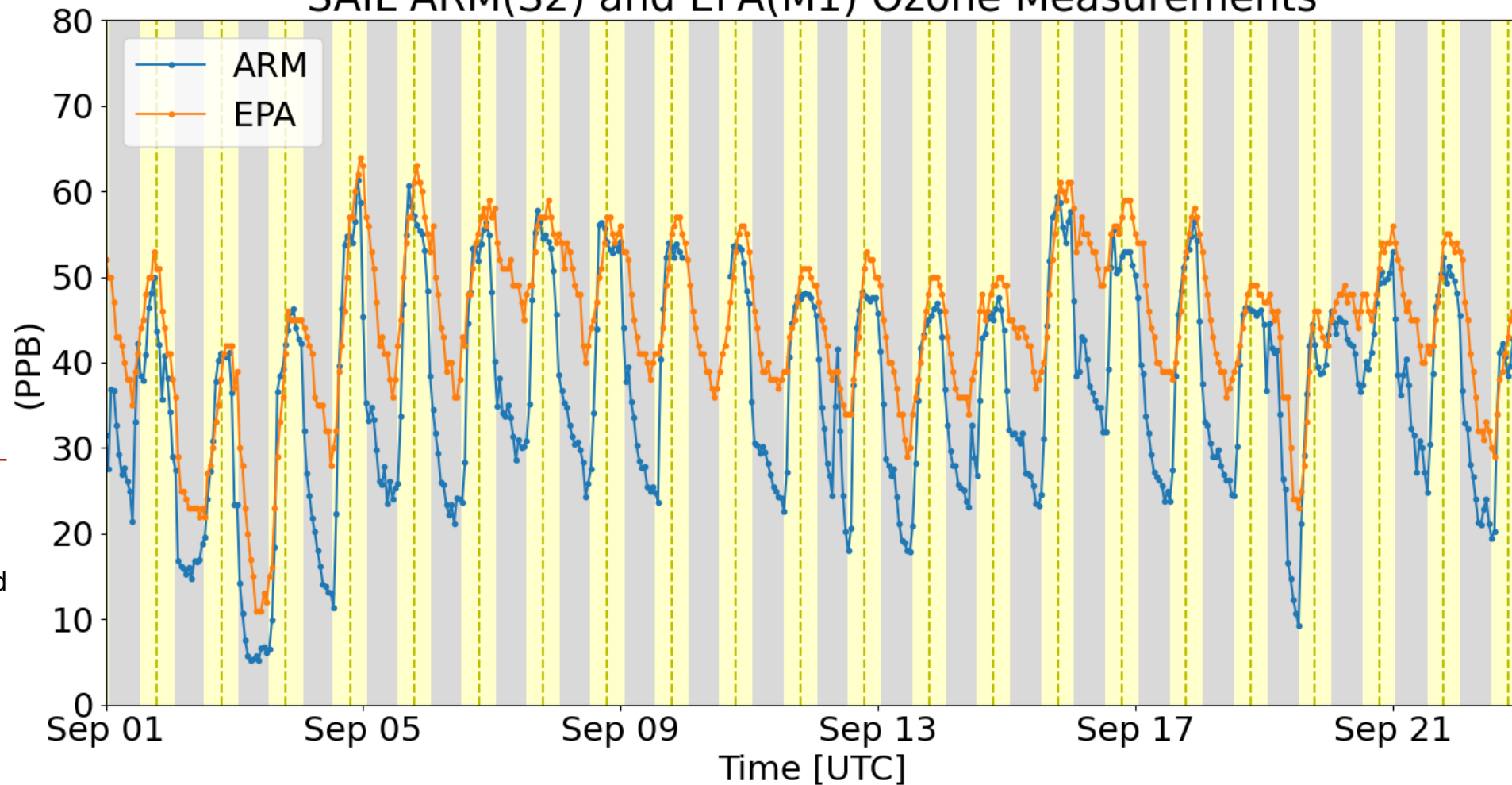


<https://github.com/ARM-Development/RadTraQ>

ARM and EPA Ozone Data

Achieve a better understanding of measurement performance

SAIL ARM(S2) and EPA(M1) Ozone Measurements



```
lat_lon = '-106.994245,38.9504,-106.959845,38.97245'
```

```
results =
act.discovery.get_airnow_bounded_obs(
    token, '2021-09-01T00',
    '2021-09-23T23', lat_lon,
    'OZONE,PM25', data_type='B'
)
```

Used by 41

+ 33

Questions

<https://github.com/ARM-DOE/ACT>

