Atmospheric data Community Toolkit (ACT)

Adam Theisen[1], Nicki Hickmon[1], Scott Collis[1], Bobby Jackson[1], Zach Sherman[1], Kenneth Kehoe[2], Austin King[2], Corey Godine[2], Alyssa Sockol[2], Michael Giansiracusa[3] and Randy Peppler[2]
1 – Argonne National Laboratory   2 – ARM Data Quality Office, CIMMS, University of Oklahoma.   3 – Oak Ridge National Laboratory

PURPOSE

The Atmospheric data Community Toolkit (ACT) is an open source software package for reading, visualizing, and analyzing atmospheric and environmental data of varying dimensions with the goal of reducing redundant effort and increasing collaborations across the community. ACT was built using best practice methods for open source software in order to create a solid framework on which to advance.

Researchers tend to write their own code to perform basic functions for reading, visualizing, and analyzing the data. This strategy is unnecessarily time consuming, and potentially costly, for the individual researchers. Open source software disrupts that process and moves the development effort towards capabilities than can benefit the broader scientific community.

CURRENT CAPABILITIES

Discovery
- Download data from ARM Data Live Web Service
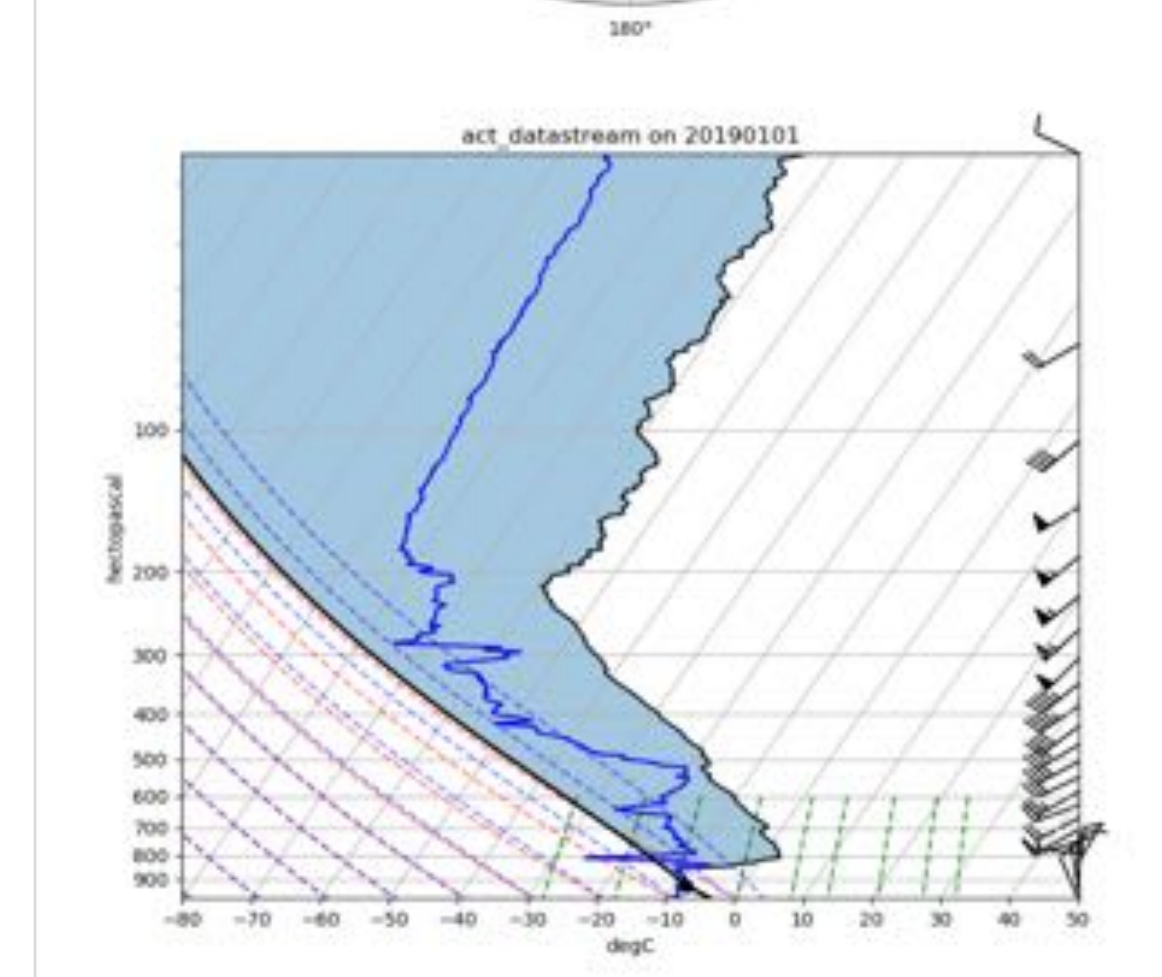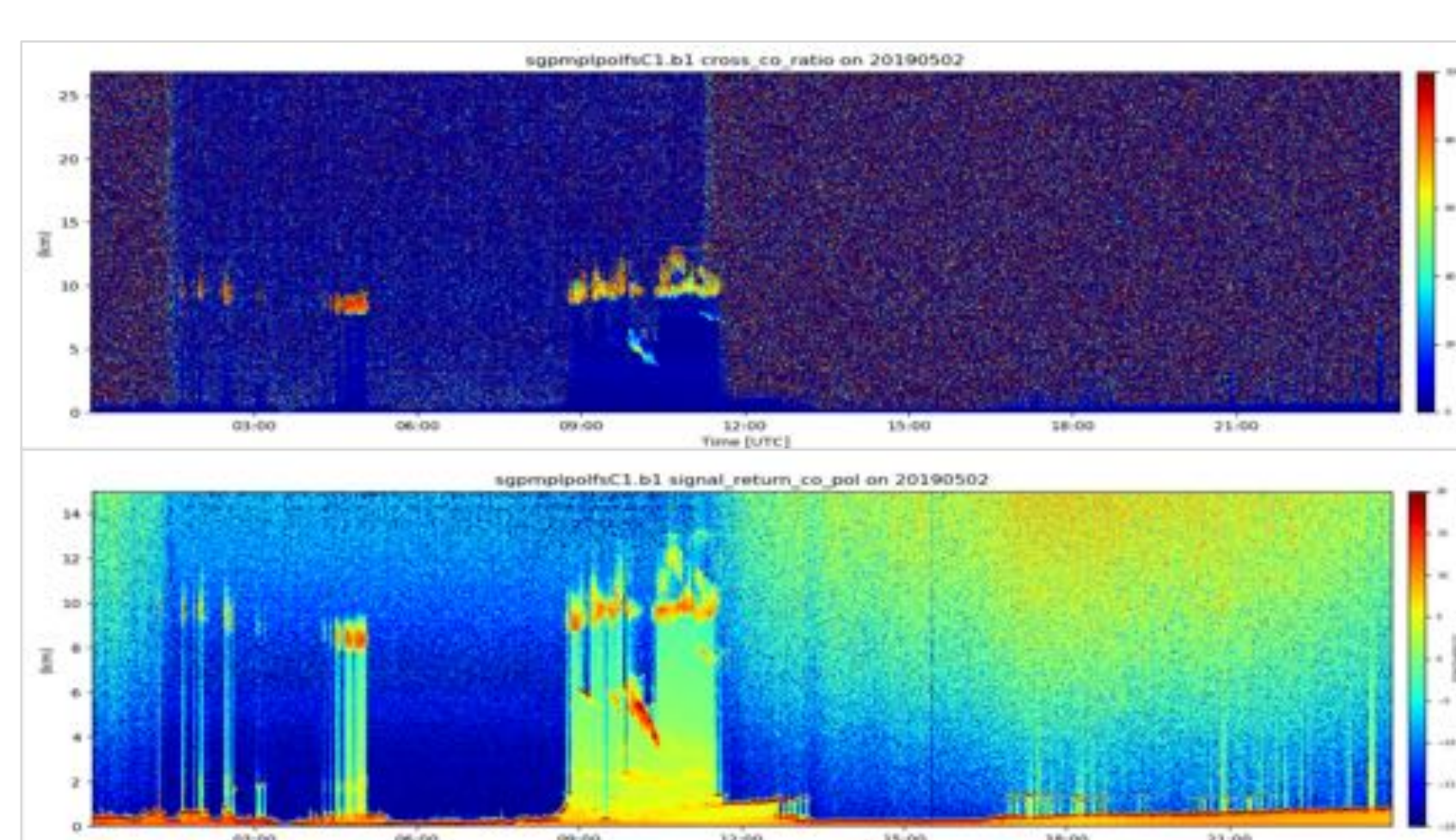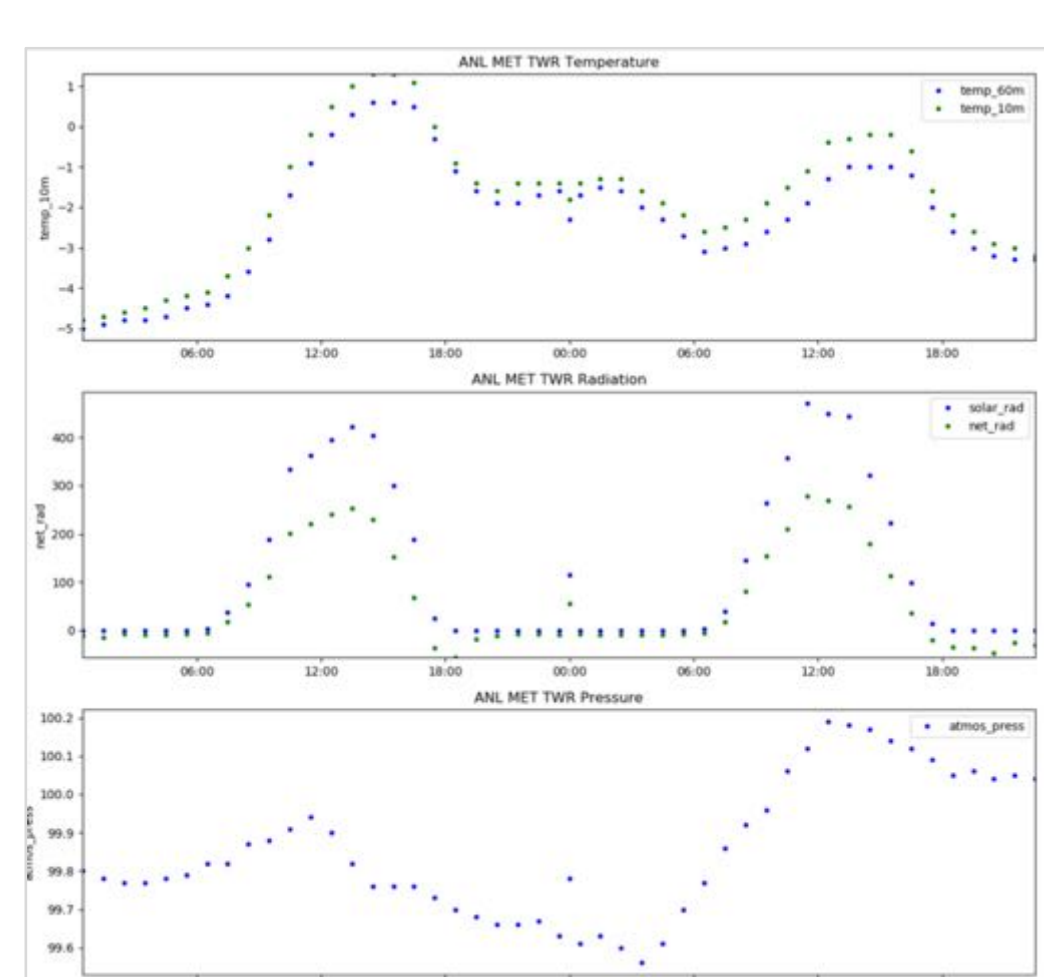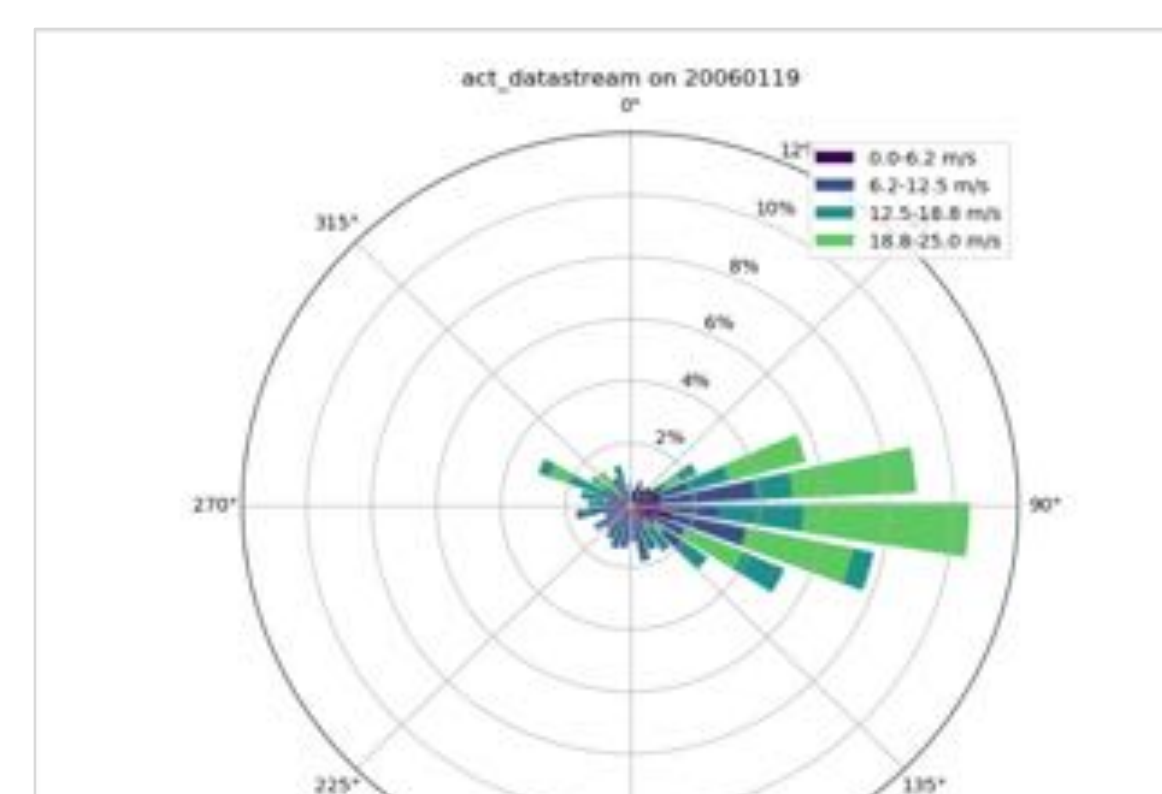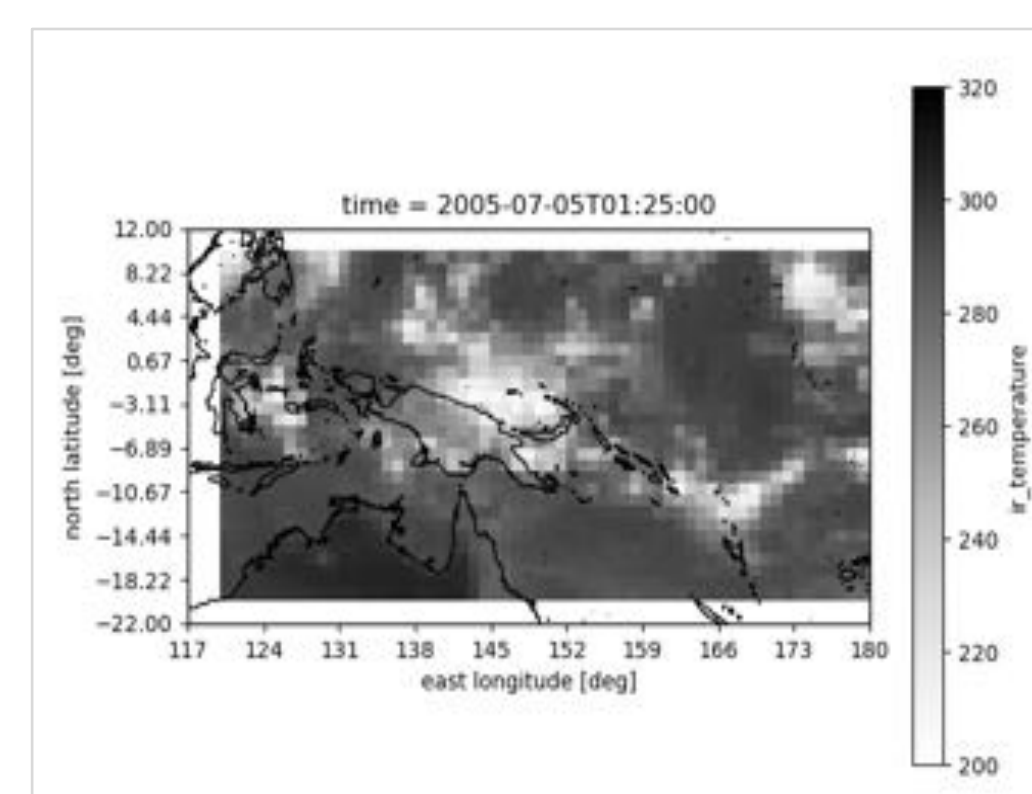
File Formats
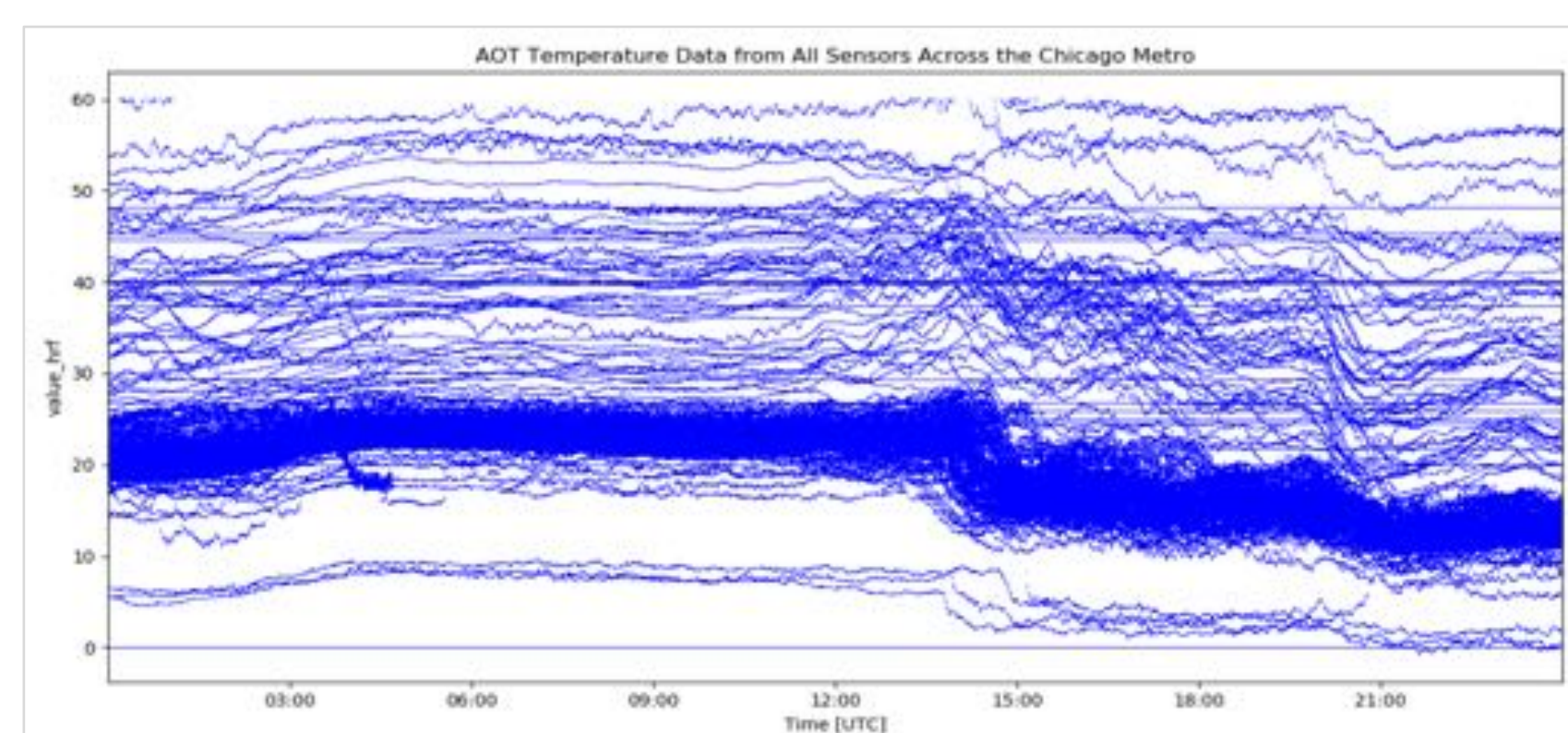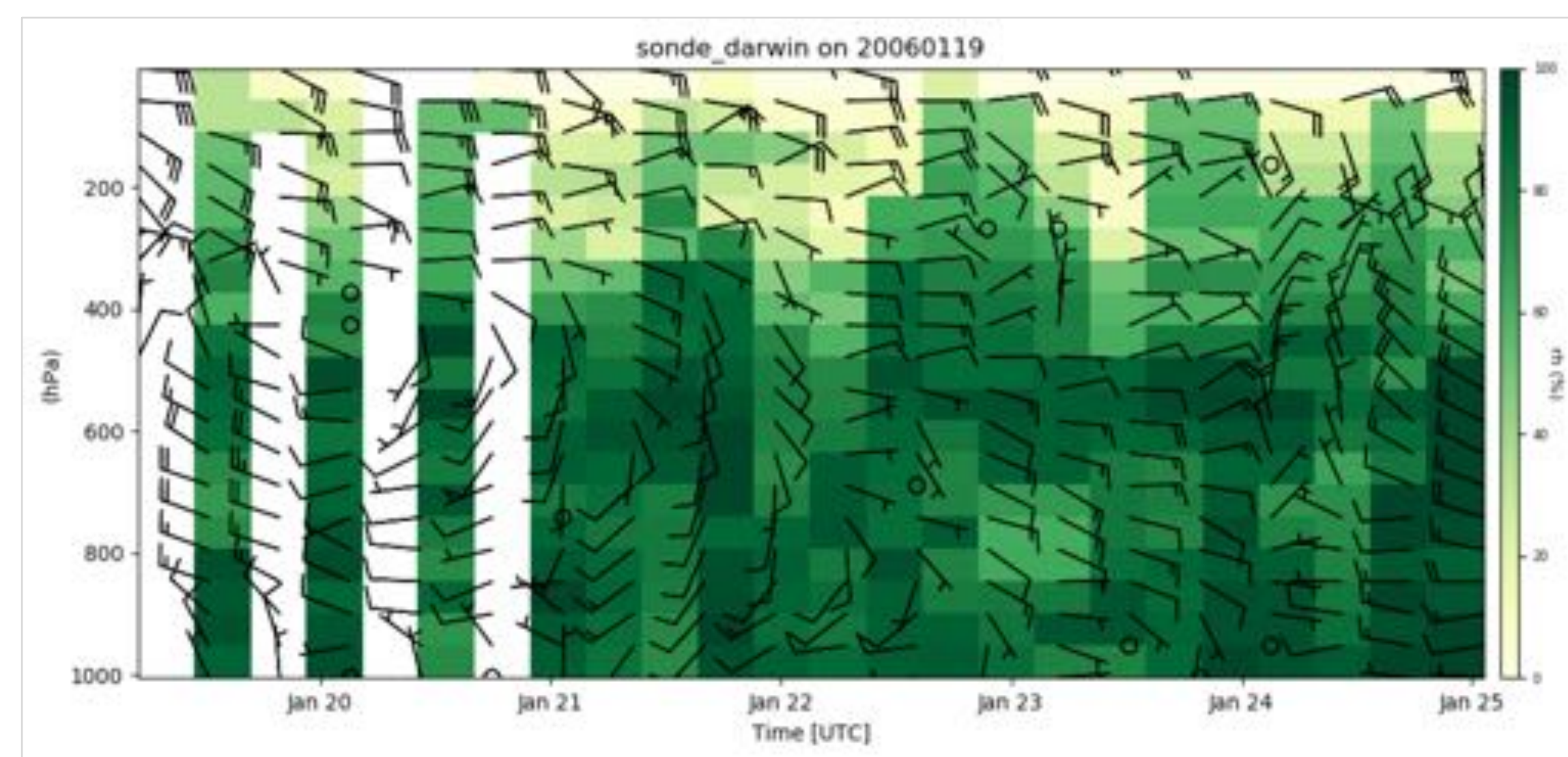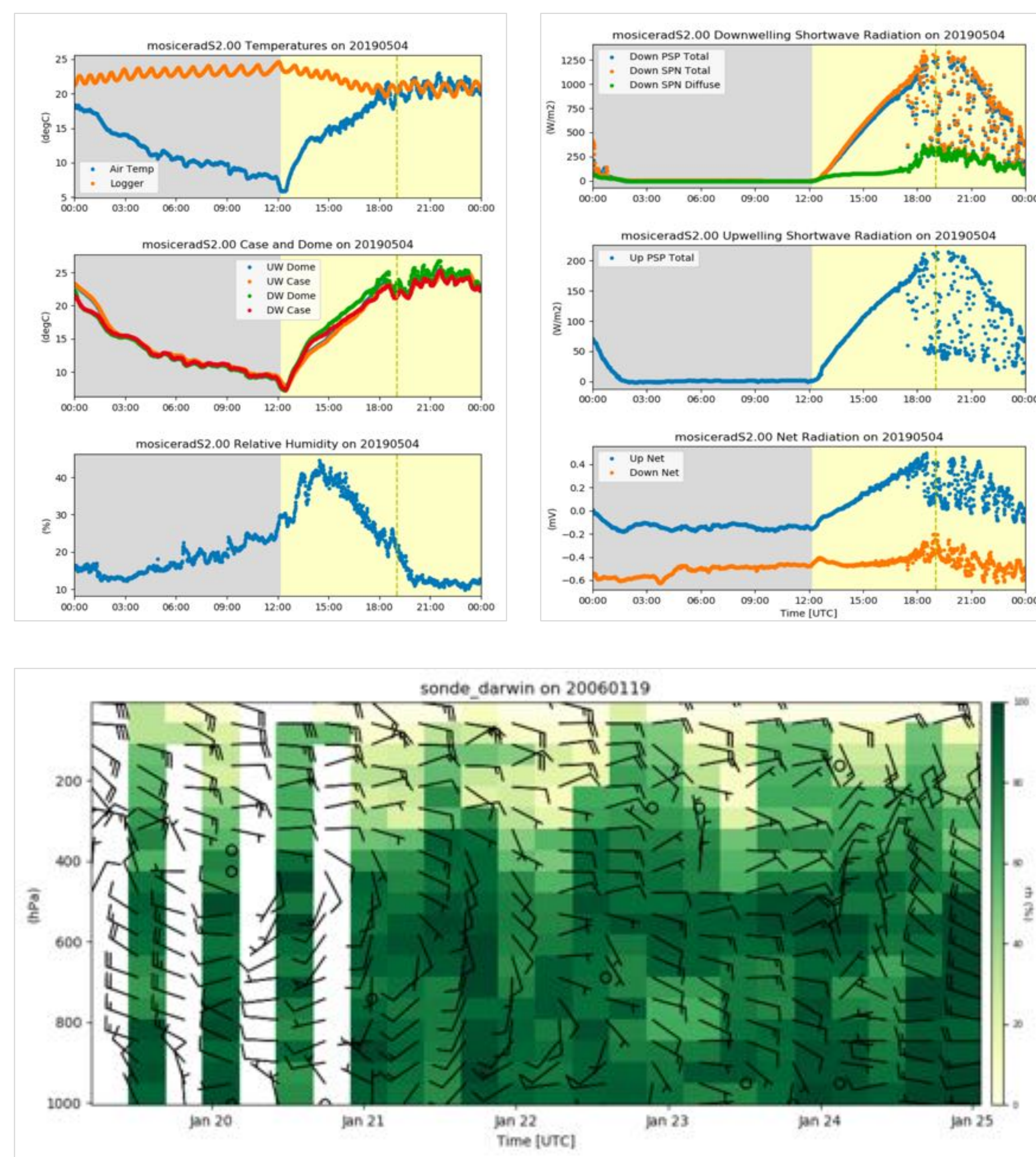- CSV, ASCII, NetCDF

Plotting
- 1D/2D Time Series
- Skew-T (METPy)
- Wind Rose
- Satellite Data
- Multidimensional Cross Sections

Corrections
- MPL Afterpulse and Overlap
- R-Squared Correction

Retrievals
- MPL Depolarization Ratio
- SONDE Stability Indices

FRAMEWORK

- Common data model based on xarray
- Any data format that has a reader could be ingested into the CDM and use the standard functions
- Enables consistency across groups
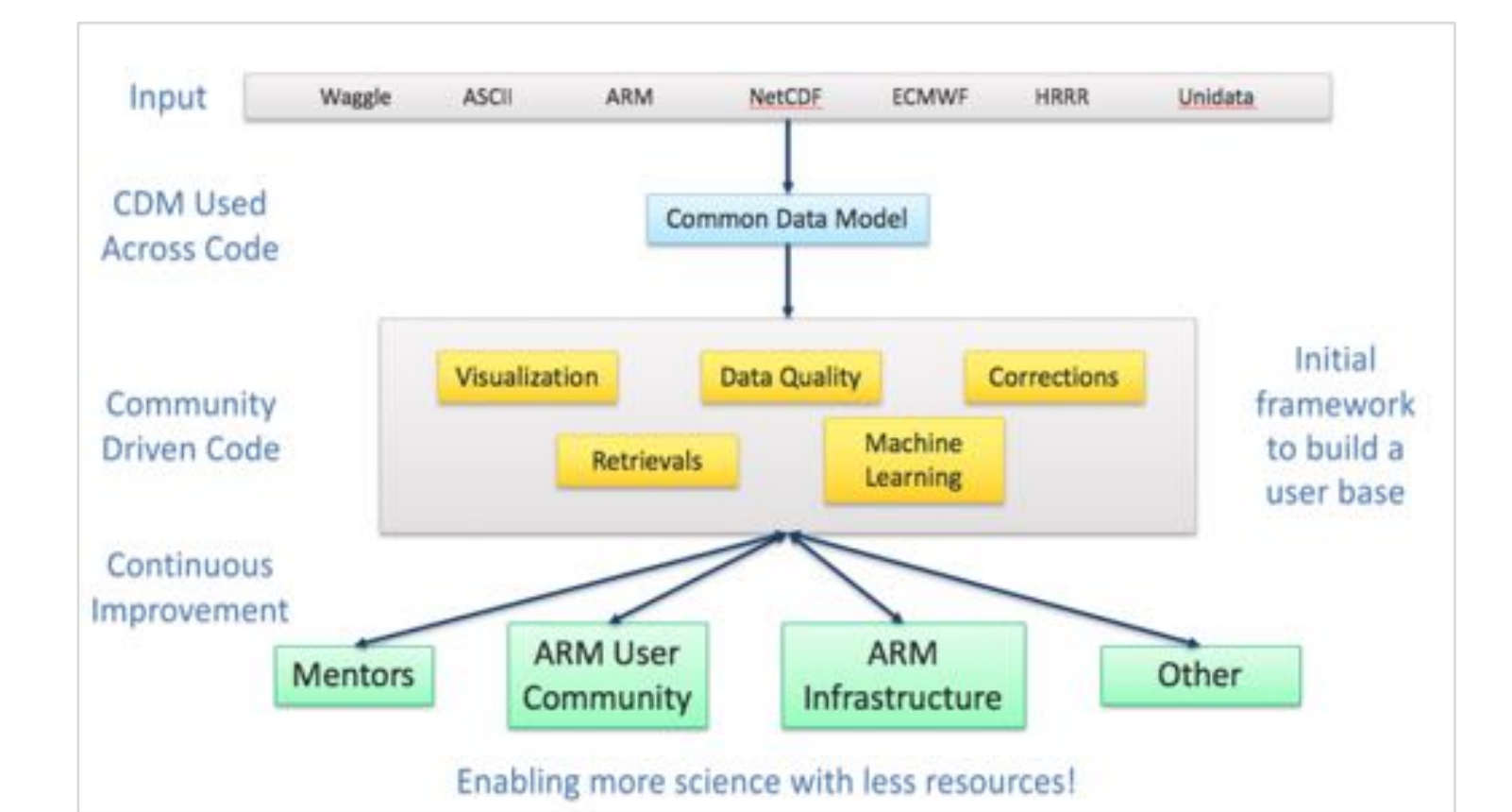
ONGOING EFFORTS

- ARM DQ Office is implementing into operational processing scripts including for the processing of the ICERAD data on the MOSAiC site data system
- ACT is being used to read and plot 10m, 30m, and soil measurements from the Argonne Meteorological Tower
- Array of Things (AOT) has deployed a number of waggle nodes all over Chicago for measuring meteorological and aerosol information. The data files are complicated, but ACT has been deployed to easily read and filter data

FUTURE CAPABILITIES

- Development of tools to help read and visualize model data
- Expansion of tools for accessing data in other formats and from web services
- Expansion of utilities to aid in interpolation and gridding to common time grids
- Incorporation of more retrievals such as calculation of aerosol profiles from MPL
- Development of notebooks to aid in education and outreach
- Development of scripts for easily visualizing data from both Py-ART and ACT
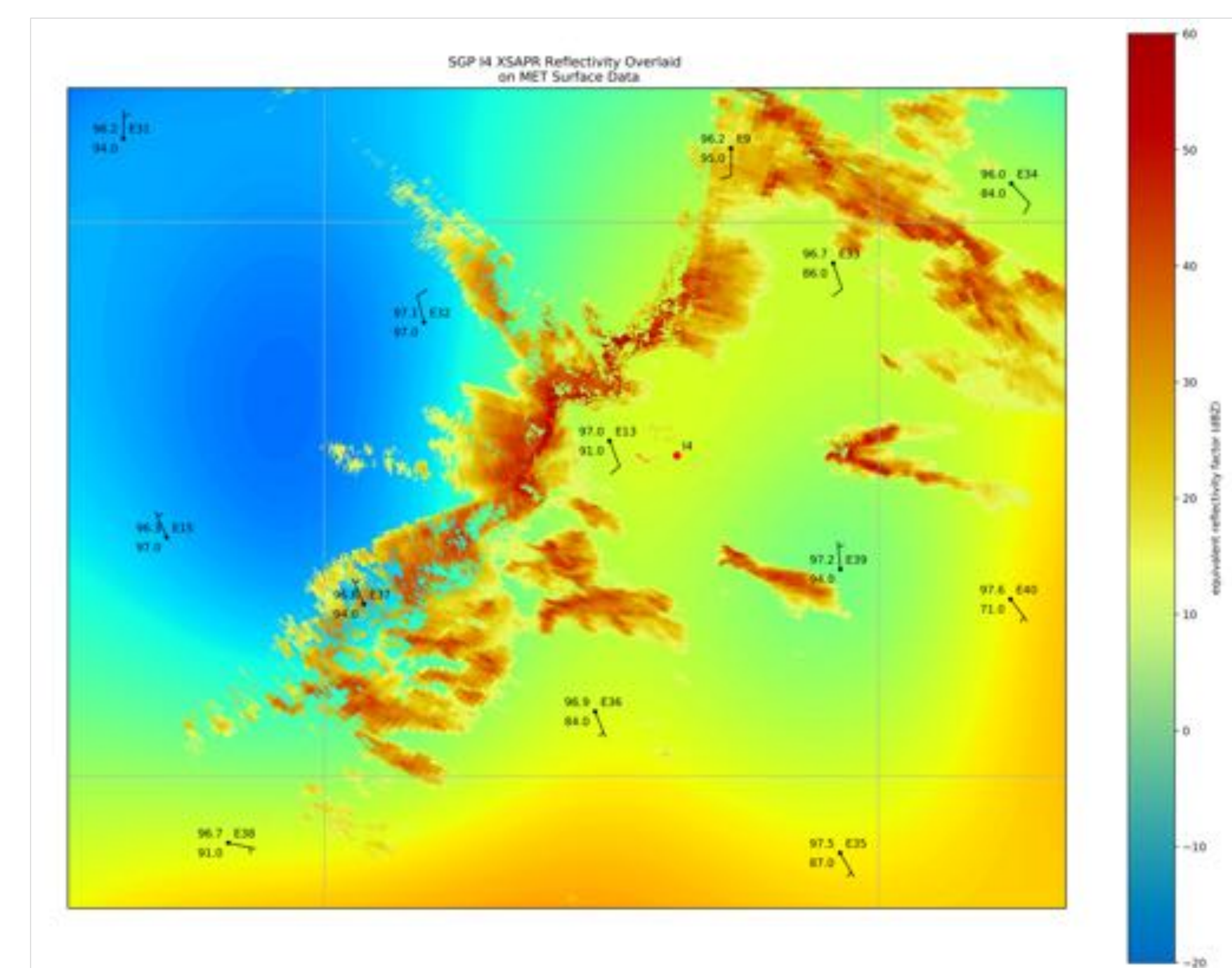
FEEDBACK

Help drive the development efforts and creation of an ACT roadmap by providing feedback through the google form

https://bit.ly/2YZqlRH