



The Python ARM Radar Toolkit (Py-ART)

THE LATEST AND GREATEST WITH PY-ART

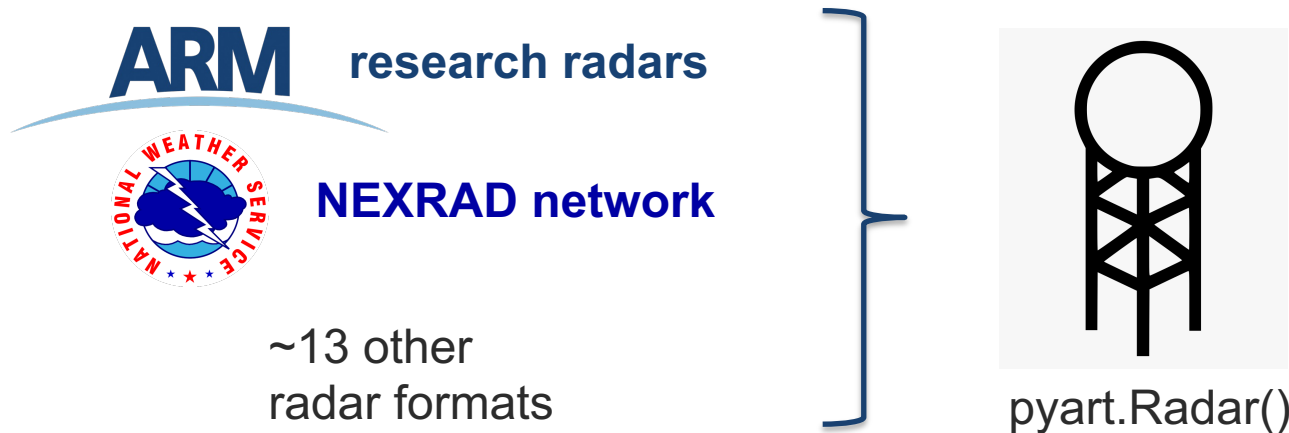
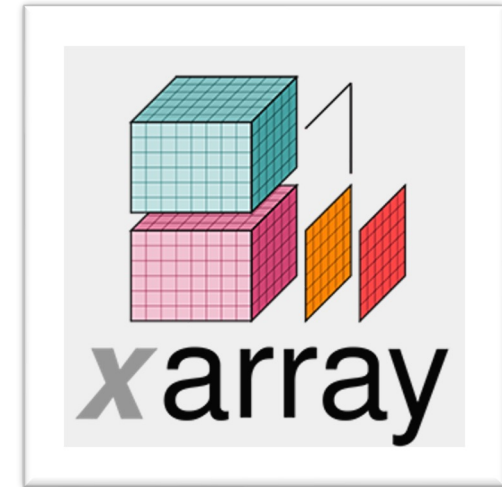
Max Grover, Zach Sherman, Scott Collis, Bobby Jackson, Joe O'Brien – Argonne National Laboratory

ARM Open Science Team

A Decade of Open Radar Science with the Python ARM Radar Toolkit (Py-ART)

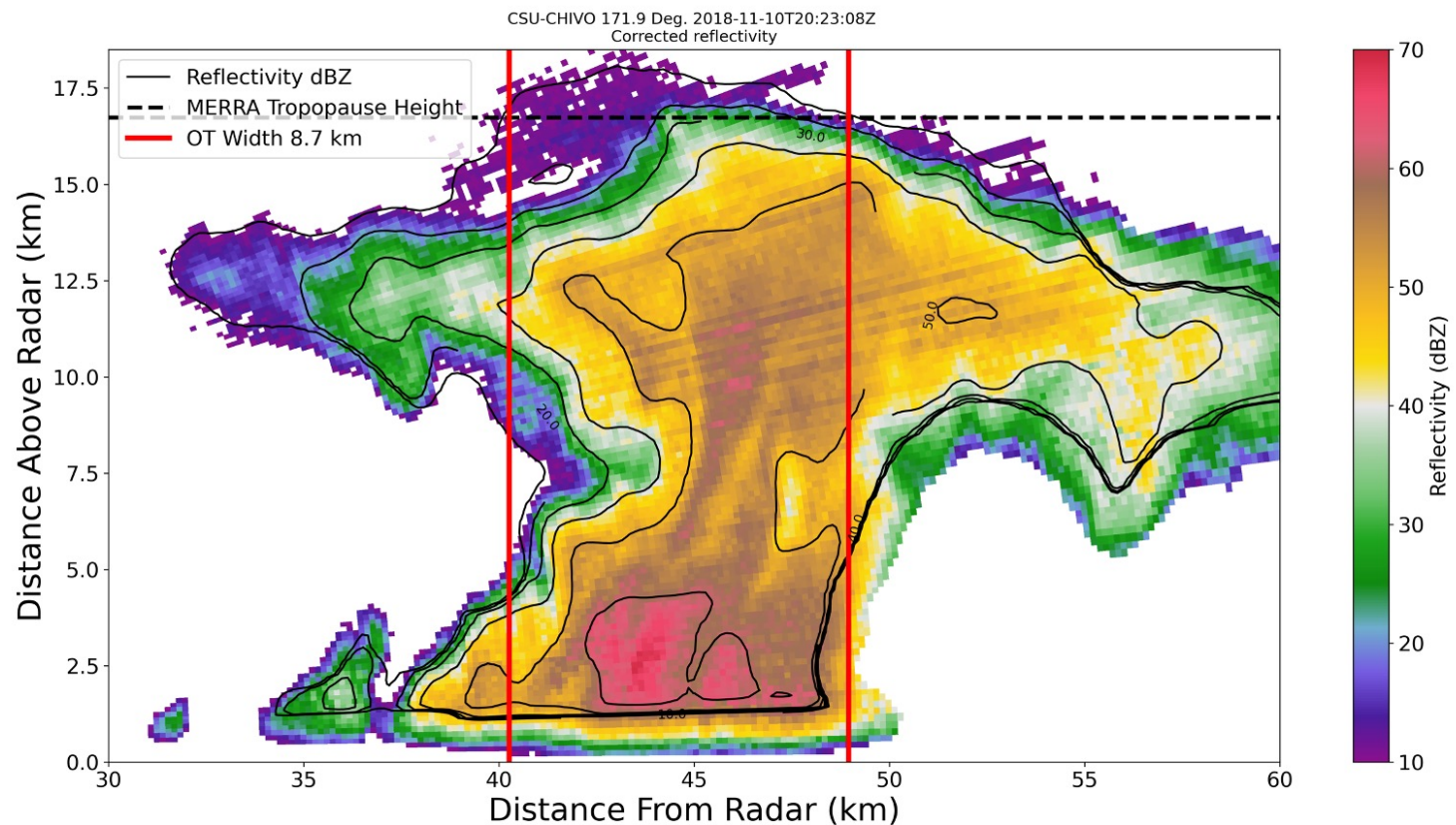


- ▶ Initially created by Scott Collis and Jonathan Helmus (2013), funded by ARM, built to work with weather radar data
- ▶ Over 340 citations of the package (peer-reviewed publications), 1000 monthly users
- ▶ >600,000 package downloads
- ▶ Recent development with array integration, moving to a standard IO library maintained by the broader community



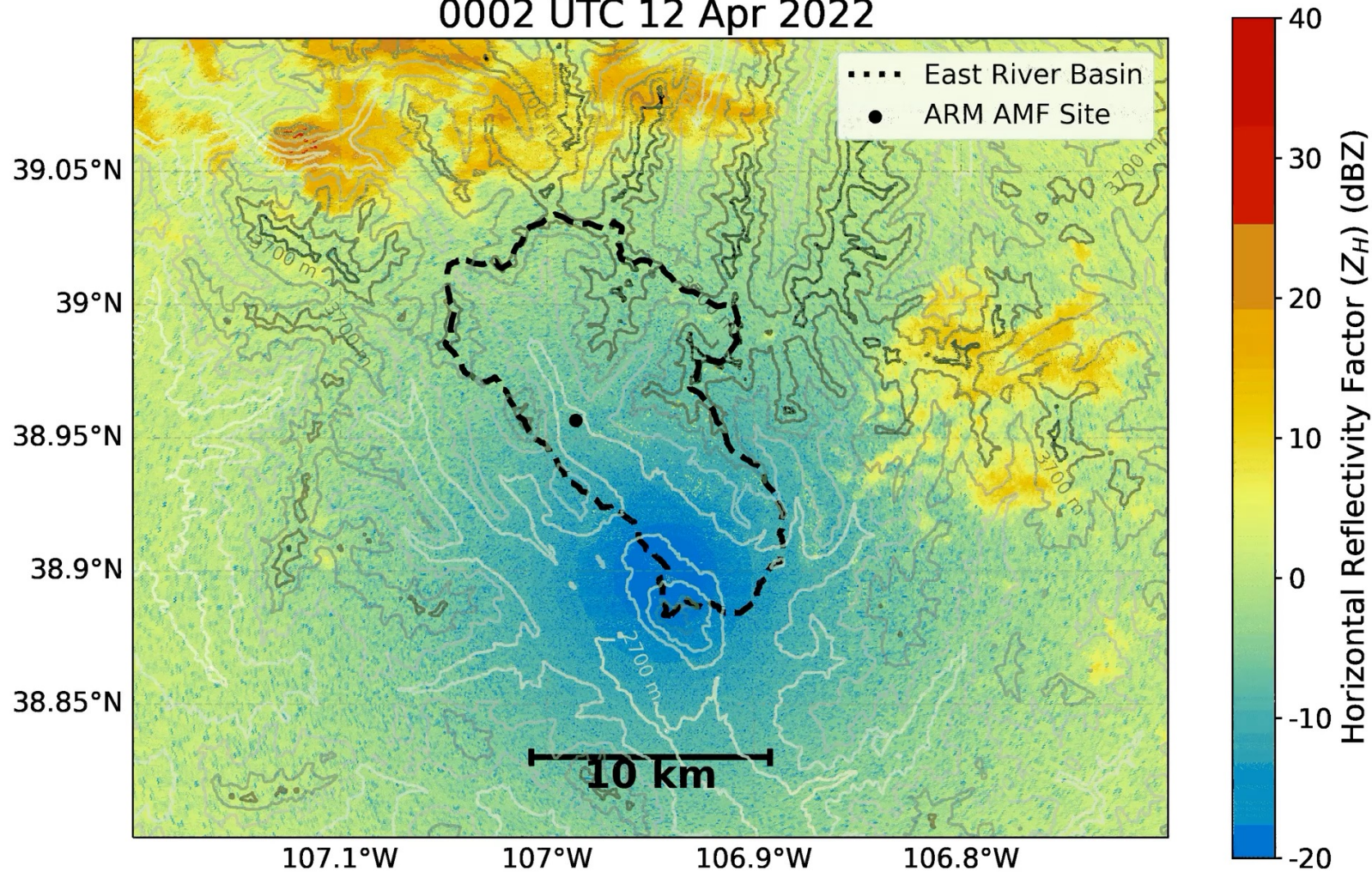
corrections
retrievals
gridding
graph (viz)
pointers to other libraries

An Overshooting Top: Deep Convection in Argentina



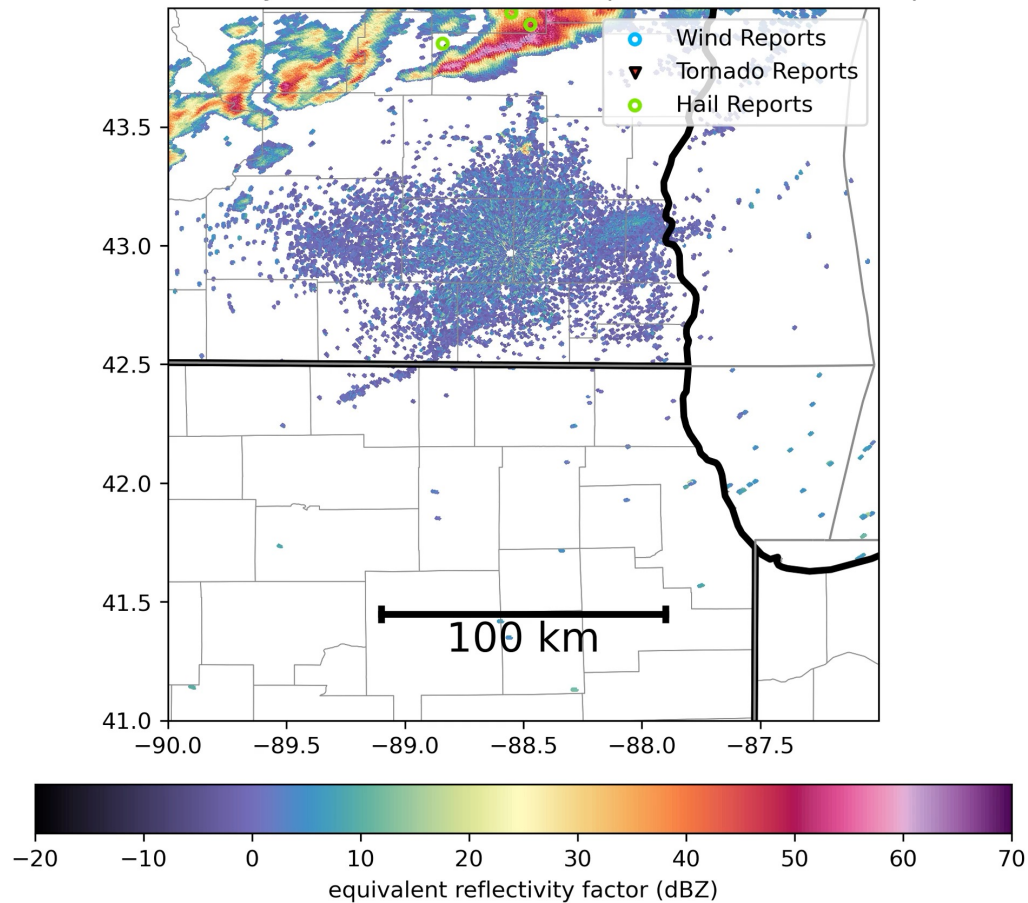
Snow in the Rockies: A SAIL Perspective

Horizontal Reflectivity at 6° Elevation
0002 UTC 12 Apr 2022



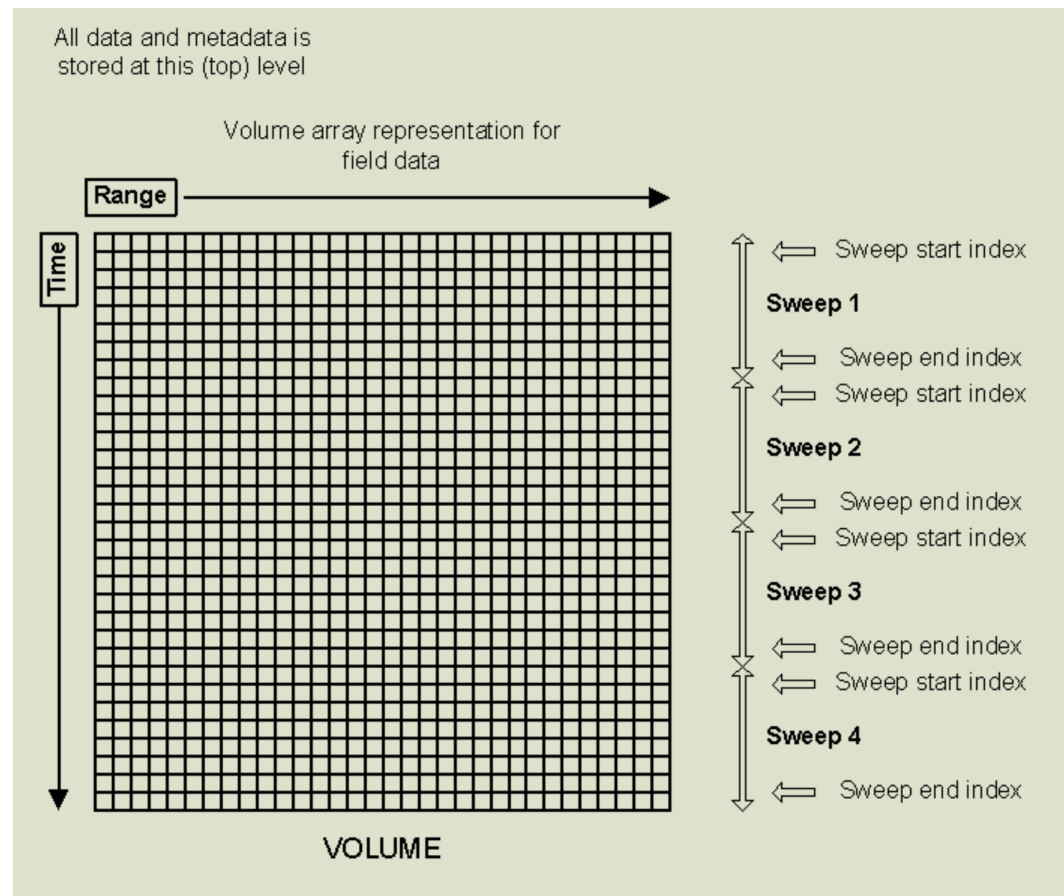
Tracking Severe Storms in the Midwest

KMKX Reflectivity and Severe Weather Reports, 1501 UTC 07 Sep 2021

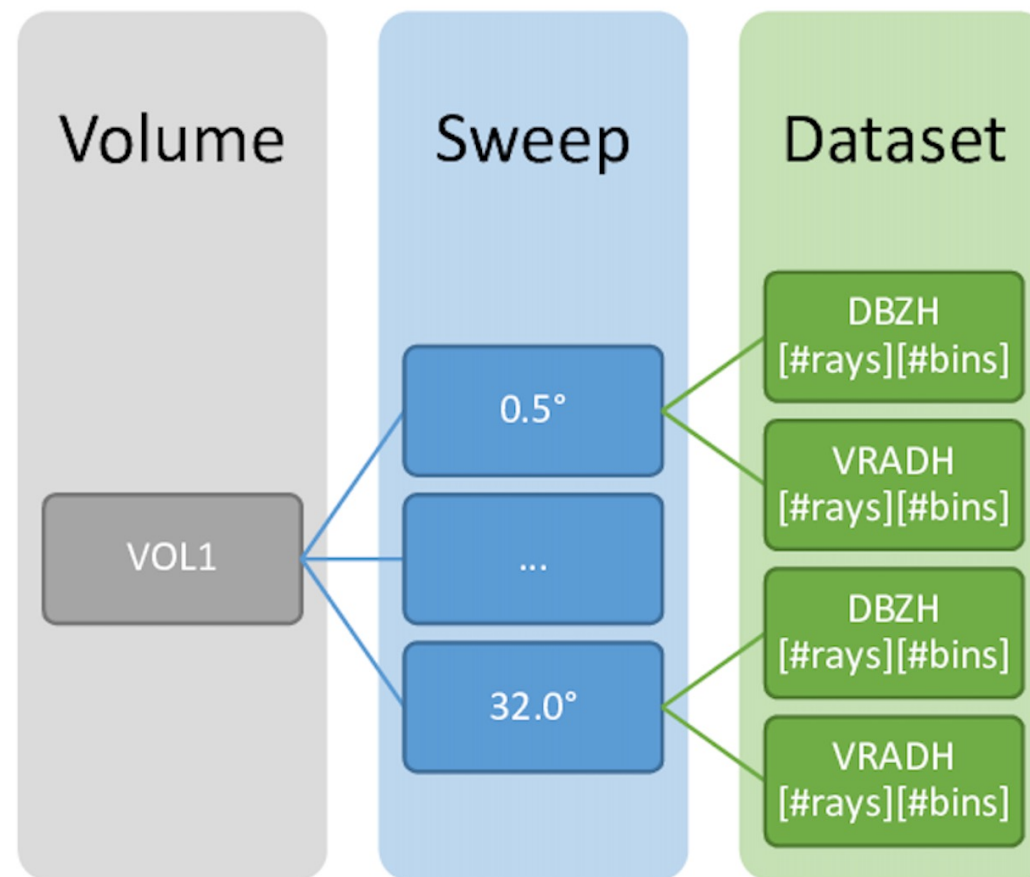


Next in the Roadmap: Supporting FM-301/Cfradial2

cfradial1



cfradial1



Xradar as the Core IO Library



Installation User Guide Contributing Credits History More ▾

Release: 0.3.0

Date: 2023-07-11

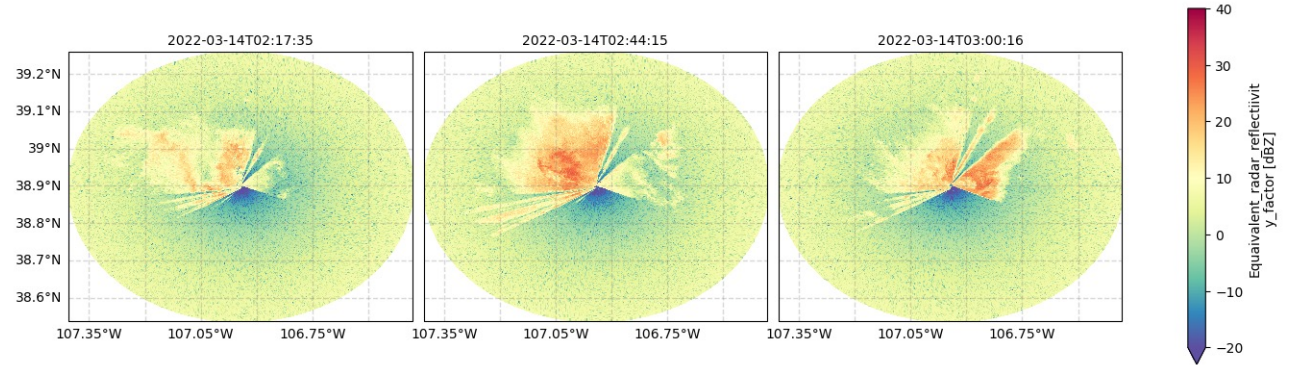
xradar

pip v0.3.0 conda-forge v0.3.0 DOI 10.5281/zenodo.7767521

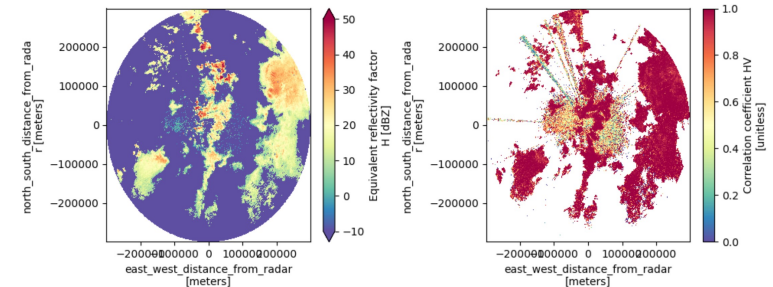
CI passing Build distribution passing docs passing

Xradar includes all the tools to get your weather radar into the xarray data model.

- Free software: MIT license
- Documentation: <https://docs.openradarscience.org/projects/xradar>



```
[10]: fig, (ax, ax1) = plt.subplots(1, 2, figsize=(10, 4))
ds.DBZH.plot(x="x", y="y", cmap="Spectral_r", vmin=-10, vmax=50, ax=ax)
ds.RHOHV.plot(x="x", y="y", cmap="Spectral_r", vmin=0, vmax=1, ax=ax1)
ax.set_title("")
ax1.set_title("")
fig.tight_layout()
```



The Python ARM Radar Toolkit - Py-ART



Radar Cookbook

The cookbook provides in-depth information on how to use Py-ART (and other open radar packages), including how to get started. This is where to look for general conceptual descriptions on how to use parts of Py-ART, like its support for corrections and gridding.



Reference Guide

The reference guide contains detailed descriptions on every function and class within Py-ART. This is where to turn to understand how to use a particular feature or where to search for a specific tool



Developer Guide

Want to help make Py-ART better? Found something that's not working quite right? You can find instructions on how to contribute to Py-ART here. You can also find detailed descriptions on tools useful for developing Py-ART.



Example Gallery

Check out Py-ART's gallery of examples which contains sample code demonstrating various parts of Py-ART's functionality.

☰ On this page

- [What is Py-ART?](#)
- [Citing Py-ART](#)
- [What can Py-ART do?](#)
- [Short Courses](#)
- [Install](#)
- [Dependencies](#)
- [Optional Dependences](#)
- [Getting help](#)
- [Contributing](#)

[Show Source](#)

Radar Cookbooks: Educating the Open Radar Community



PROJECT PYTHIA Home Foundations Cookbooks Resources Community

Search the docs ...

Radar Cookbook

PREAMBLE

How to Cite This Cookbook

WEATHER RADAR FOUNDATIONS

The Basics of Weather Radar

RADAR SOFTWARE FOUNDATIONS

Py-ART Basics
Py-ART Corrections
Py-ART Gridding
Interactive Radar Visualization

EXAMPLE WORKFLOWS

Looking at NEXRAD Data from Moore, Oklahoma
Plotting Data from a Field Campaign (TRACER)
Specific Differential Phase (K_{DP}) retrieval methods comparison

ARM Radar Cookbook

nightly-build passing launch binder DOI 10.5281/zenodo.8075855

This Project Pythia Cookbook covers the basics of working with weather radar data in Python.

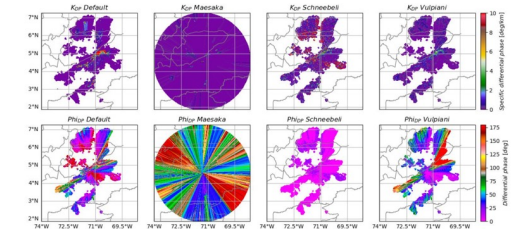
Motivation

This cookbook provides the essential materials to learning how to work with weather radar data using Python.

Most of the curriculum is focused around the Python ARM Toolkit, which is defined as:

“a Python module containing a collection of weather radar algorithms and utilities. Py-ART is used by the Atmospheric Radiation Measurement (ARM) user facility for working with data from a number of its precipitation and cloud radars, but has been designed so that it can be used by others in the radar and atmospheric communities to examine, processes, and analyze data from many types of weather radars.”

Once you go through this material, you will have the skills to read in radar data, apply data corrections,

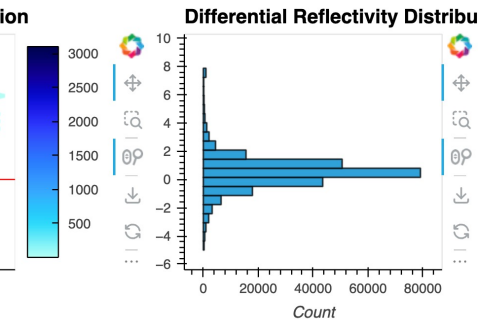
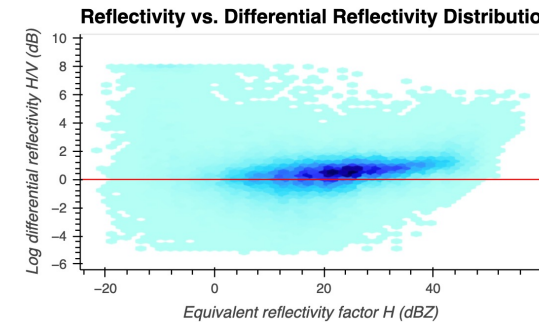
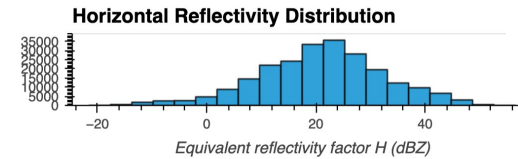


Specific Differential Phase (K_{DP}) retrieval methods comparison

Overview

Within this notebook, we will cover:

1. How to access Colombian national weather radar network data from AWS
2. How to read and create a multipanel plot
3. How to retrieve and compare three different methods



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Topic	Replies	Activity
<input checked="" type="checkbox"/> Magnitudes in retrieved Vertical Velocities PyDDA Retrievals pydda	10	1d
<input checked="" type="checkbox"/> Radar Grid Weighting - PyDDA Retrievals	2	12d
<input type="checkbox"/> PyDDA 1.3.1 released today with several bugfixes General pydda	0	12d
<input type="checkbox"/> Introduce yourself to the community! General education	18	19d