The Lidar Radar Open Software Environment (LROSE) Science Gateway: Introductory Data Processing in the Cloud

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LROSE Science Gateway

Introduction

The Lidar Radar Open Software Environment (LROSE) was developed to meet the challenges of complex lidar and radar processing problems faced by the research and education communities. Through support from NSF, CSU, and NCAR, LROSE contains core algorithms for processing steps that are well-understood and documented in the peer-reviewed literature. The tools include data conversion, data visualization, quality control, regridding, processing radar echoes, and single- and multi-Doppler wind analysis.

In the past, the LROSE community has had challenges with software installation, questions about optimal and appropriate parameter settings, and a need for expert advice on how to use the tools. The LROSE Science Gateway was developed to address those challenges. Tutorials guide users through standard LROSE workflows, with example data, parameter settings, and expected results.

JupyterHub

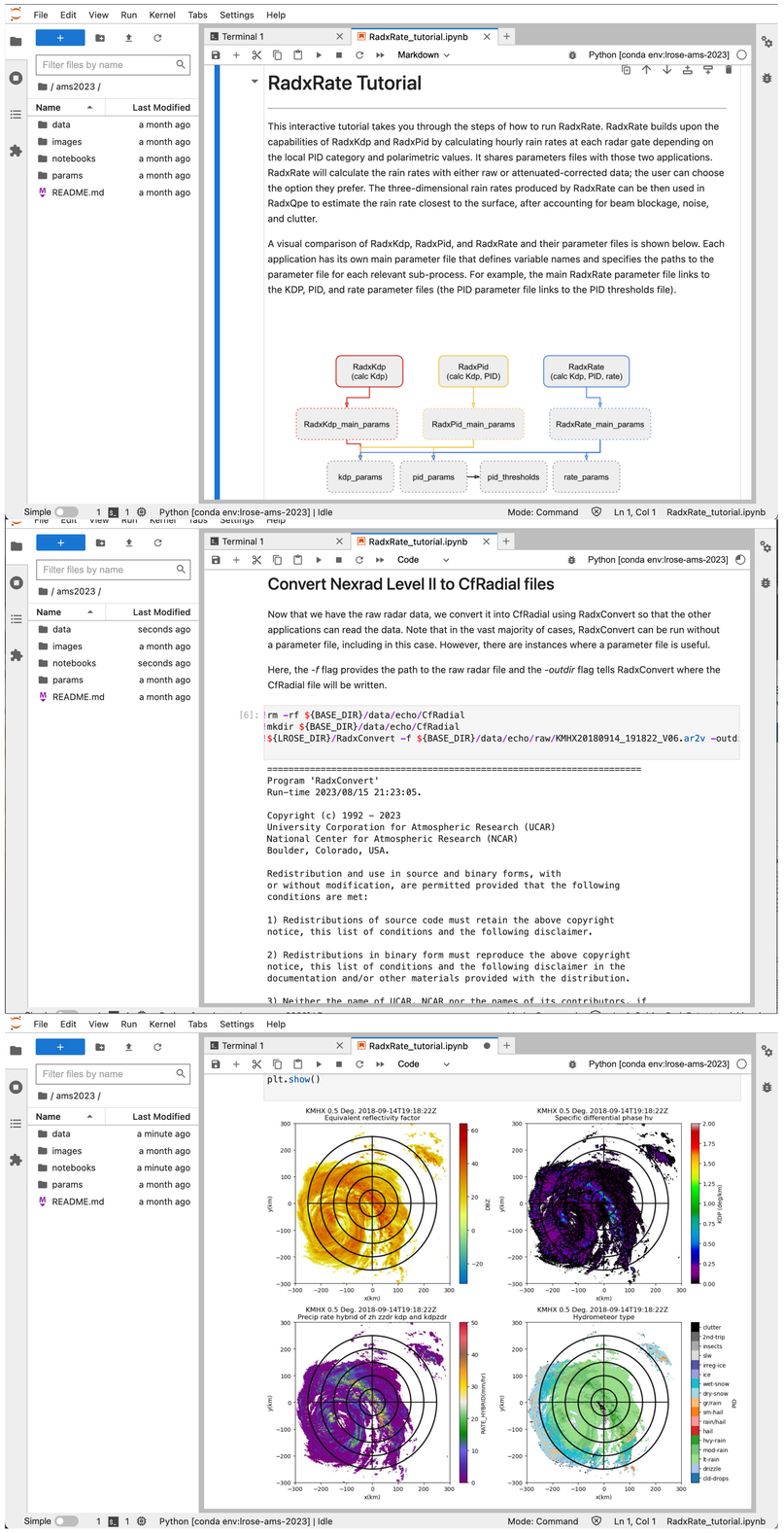
- JupyterHub server deployed on NSF's Jetstream2 supercomputer through an ACCESS allocation
- LROSE is installed, requiring no setup by the user, and all sample data and parameter files are included for each tutorial
- Tested a similar setup at the LROSE Workshop at AMS Denver, supported by Unidata's Science Gateway
- Notebooks and command line operations supported

Existing Resources

- Tutorials for QC, RadxRate (e.g., KDP, particle identification, precipitation rate), wind retrieval (FRACTL and SAMURAI), NEXRAD mosaic
- Open-source tools like Py-ART are installed and we can install other toolsets

How can people participate?

- Seeking users who want to join the Gateway
- We will accept community contributions through GitHub with full acknowledgement
- Soliciting educators who would be interested in using LROSE tutorials in their classroom



Top to Bottom: screenshots of the RadxRate tutorial within the LROSE Science Gateway showing the descriptive text, LROSE commands, and plots using other open-source tools like Py-ART.

Other LROSE updates

Installation

- Support for newer M1 and M2 Macs
- Qt libraries included
- Updates to cmake build system

LROSE Jade

- Newest Jade release is available on GitHub
- https://github.com/NCAR/lrose-core/releases/
- RadxClutter replaced RadxPersistentClutter
- RadxConvert can optionally apply georeference metadata, defining track-relative variables for use in HawkEdit
- A bug in the censoring capabilities of Radx2Grid was fixed
- A bug in RadxRate was fixed to properly load user-specific precipitation coefficients

SAMURAI

- 100x speed up thanks to efforts by CISL
  - Dennis JM, Baker AH, Dobbins B, et al. Enabling efficient execution of a variational data assimilation application. *The International Journal of High Performance Computing Applications*. 2022.
- SAMURAI-terrain now available for data near complex terrain: Ting-Yu Cha talk (8B.3)

Other Updates

- HawkEdit has undergone improvements with regards to navigation corrections: Brenda Javornik poster on Thursday (#135)

Ongoing and Future Work

- Continue Lidar support, RadxConvert support for Halo Photonics lidar coming soon
- LROSE manuscript coming soon
- Exploring attenuation-based rain rates

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