Title of the course:

Open Radar – Open Source Software Tools for Radar Data Processing

Duration: Full Day

Availability to have on-line attendees: Yes, we can manage approx. 30 participants (online and on-site)

Presenter's name: Kai Mühlbauer et.al. (see below)
Affiliation: Rheinische Friedrich-Wilhelms-Universität Bonn
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Abstract:
The course will discuss the principles of open science and provide an overview of the most mature and exciting software packages available for radar data processing (ex. LROSE, Py-ART, pyrad, BALTRAD, wradlib) and how they connect with the scientific software stack.

The course will be built with Jupyter Notebooks as hands-on approach for interactive user experience. The main course programming language is Python, but also Command Line Tools are used.

The course will also highlight the "xradar" package, implementing the newly adopted FM301/CfRadial2 WMO standard, as well as the gpm-api software, which facilitates the download and analysis of TRMM PR and GPM DPR spaceborne radars data. These two tools will be used to showcase how to harness the power of xarray and dask for efficient, distributed radar data processing.

The course will cover operational use (e.g. in HPC environments or Cloud Infrastructure) as well as algorithm development, enabling the participants to implement their own algorithms.

The course will also show how to create workflows for different aspects of weather radar data processing, using open datasets relevant to the attendees and ERAD 2024.

Goals of the course:
- Overview of principles of open science
- Overview of software packages for radar data processing (eg. xradar, gpm-api, LROSE, Py-ART, pyrad, BALTRAD, wradlib) and the scientific software stack
- Insight into different aspects of weather radar data processing using open datasets
- Handling radar data from different sources and formats (including analysis-ready cloud datasets)
- Insight into operational use and algorithm development
- Introduction into efficient distributed data processing using xarray and dask

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Expected background of trainees:

- Basic or intermediate knowledge of Python
- Basic skills with Jupyter Notebooks would be fine
- Basic or intermediate knowledge of radar meteorology
- Laptop (middle-class is sufficient) to follow the course connected to cloud infrastructure
- Link to community information

Presenters/Instructors/Course Collaborators:

Alfonso Ladino, University of Illinois at Urbana-Champaign (UIUC)
Anna del Moral Méndez, National Center for Atmospheric Research (NCAR)
Brenda Javornik, National Center for Atmospheric Research (NCAR)
Daniel Michelson, Environment and Climate Change Canada (ECCC)
Daniel Wolfensberger, MeteoSwiss
Gionata Ghiggi, Ecole polytechnique fédérale de Lausanne (EPFL)
Jen DeHart, Colorado State University (CSU)
Jordi Figueras i Ventura, independent radar scientist
Julian Giles, University of Bonn
Kai Mühlbauer, University of Bonn
Maxwell Grover, Argonne National Laboratory
Mike Dixon, National Center for Atmospheric Research (NCAR)
Robert Jackson, Argonne National Laboratory
Scott Collis, Argonne National Laboratory
Tung-Yu Cha, National Center for Atmospheric Research (NCAR)

The list of instructors will be finalized shortly before the course.