**Pyrad: a Real-Time Weather Radar Data Processing Framework Based on Py-ART**

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**Summary**

Pyrad is a real-time data processing framework developed by MeteoSwiss aimed at processing and visualizing data from individual Swiss weather radars both off-line and in real-time. The signal processing and part of the data visualization is performed by a MeteoSwiss developed version of the Py-ART toolkit which contains enhanced features. Various processing techniques from literature as well as MeteoSwiss own developments are implemented. The framework is built around the concept of datasets and products. Multiple levels of processing can be performed. At each level multiple new datasets can be generated from input data (i.e. hydrometeor classification fields can be generated from Zh, ZDR, KDP, RhHV and temperature fields) and for each dataset multiple products can be created (i.e. PPIs at different altitudes, CAPPIs, RHIs etc. from the hydrometeor classification field). The datasets generated in previous processing levels can be kept in memory and used in higher processing levels (i.e. using the hydrometeor classification in a hydrometeor based QPE algorithm).

**Characteristics**

- Python-based, open source, version controlled (github)
- 3 simple configuration files control the entire processing
- Ingests polarimetric and Doppler moments, secondary radar products and auxiliary data (NWP temperature, DEM-based visibility, etc.)
- Possibility to ingest multiple radars
- Multiple levels of processing. Intermediate data can be saved
- Automatic documentation based on doc-strings

**Software architecture**

**Volumetric data images (examples)**

**Quality control, monitoring, etc. (examples)**

**Conclusion and Future work**

- (Continuous) Transfer of the MCH Py-ART capabilities to ARM-DOE Py-ART
- Implementation of IQ and spectral processing
- Implementation of new products (Quasi vertical profiles, etc.)
- Collaboration with external partners is desired and encouraged!