Current and future CML-rainfall estimation in Germany:

- Improved data processing,
- real-time rainfall maps
- and fusion with weather radar data

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No update on this topic today
Improved data processing
Our recently improved CML data processing shows good results for a 1-year comparison with radar.

- Improved wet-dry classification
- Improved wet antenna compensation
- Still using IDW for spatial interpolation (different variants of Kriging that we tried did not give us better results)

There is still room for improvement

Get rid of as many false positives as possible…

…but also reduce false negatives

Improve spatial interpolation

Monthly sum of hourly rainfall maps

RADOLAN-RW

CML

map-based (pixel-by-pixel)

Link-based (path-average along CML)

Upcoming work

- Detailed study of wet antenna effect with a dedicated field experiment (6 CML antennas, 6 frequencies, dual-pol) Moroder et al., 2019, IEEE TIM

- Improvement of rain event detection in noisy CML-time series using a deep convolutional neural network to reduce false-positive and false-negative rainfall (EGU2020 display, AMTD Discussion Paper)

- Get more CML data in Burkina Faso and do country-wide CML rainfall maps there (BMBF project AgRAIN)
Fusion of CML and weather radar data
We are currently working towards adding CML data to the real-time radar-gauge adjustment RADOLAN

- Project goals: Build a continuously running demonstrator for RADOLAN-CML adjustment to improve QPE and subsequently improve hydrological modeling of flooding events

- Info on project: [https://www.howa-innovativ.sachsen.de/](https://www.howa-innovativ.sachsen.de/)
The idea is simple: We “just” add the CML rainfall estimate as additional rainfall information to the RADOLAN adjustment procedure.
First results: 24h sums of hourly rainfall on 13.04.2018

RADOLAN-RW:
- Processed data from DWD archive

Own implementation of RADOLAN-RW
- Using uncorrected RADOLAN + Gauges
- Python implementation using wradlib and xarray

Hourly RADOLAN adjustment only with CMLs
- Using uncorrected RADOLAN + preprocessed CML QPE
Conclusion from first hourly RADOLAN-CML results

• Results from own Python-RADOLAN-RW implementation are very close to existing RADOLAN-RW

• Results from RADOLAN with only CMLs are very similar to RADOLAN with gauges

Next steps:
1. Combined adjustment with gauges and CMLs at the same time
2. Study improvements for selected rain/flood events
3. Try 5-minute RADOLAN adjustment with CMLs (which should work better than with gauges, because CMLs already provide "integrated rainfall observations")
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References


