PrePEP conference short course on

Processing of opportunistic rainfall sensors data from CML, PWS and SML networks

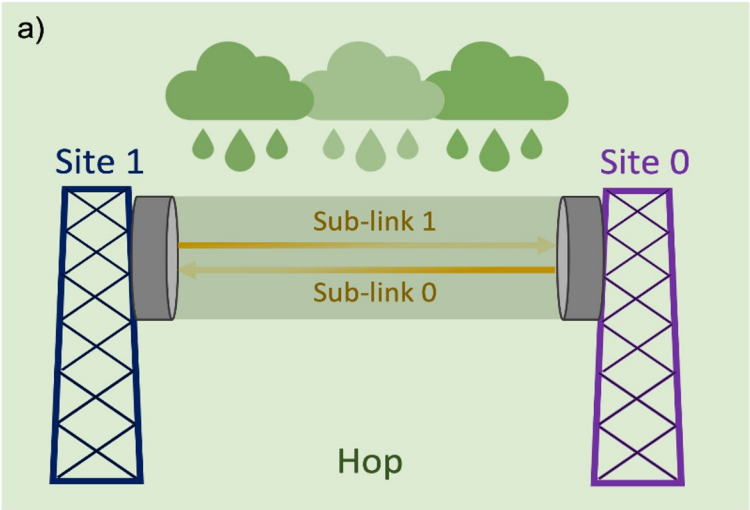
2025-03-15

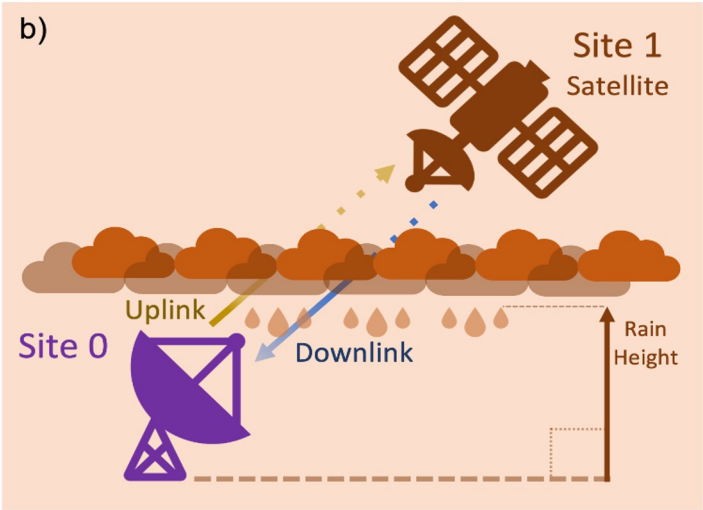
Univesity of Bonn (Institute for Meteorology)

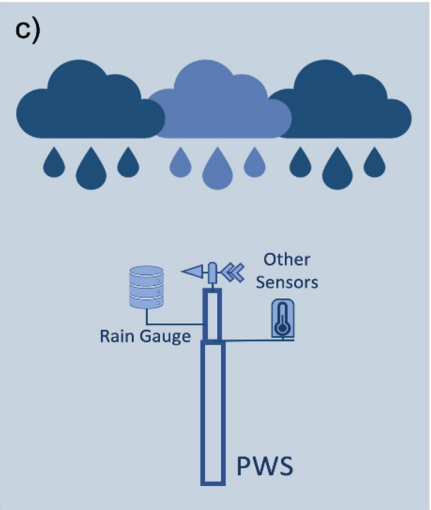
Schedule

09:00 – 09:15	Intro
	Block 1
10:30 - 10:50	Coffee break
	Block 2
12:30 - 13:30	Lunch break
	Block 3
15:15 - 15:35	Coffee break
	Block 4
17:00	End

Intro to
CML, SML and PWS







CML

Commercial microwave link

SML

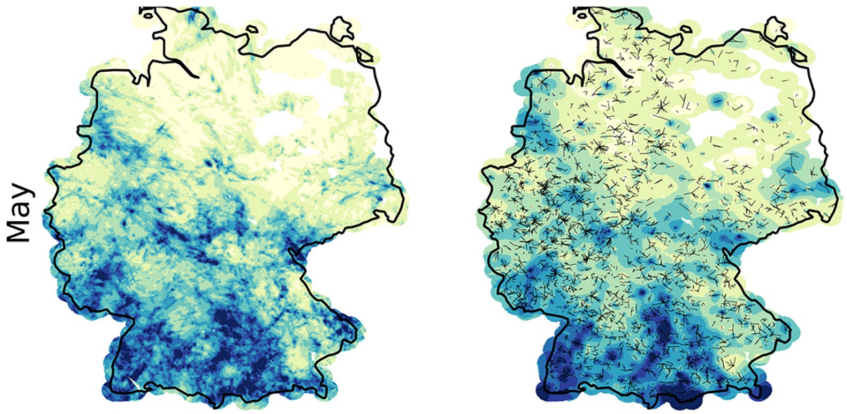
Satellite microwave link

PWS

Personal weather stations

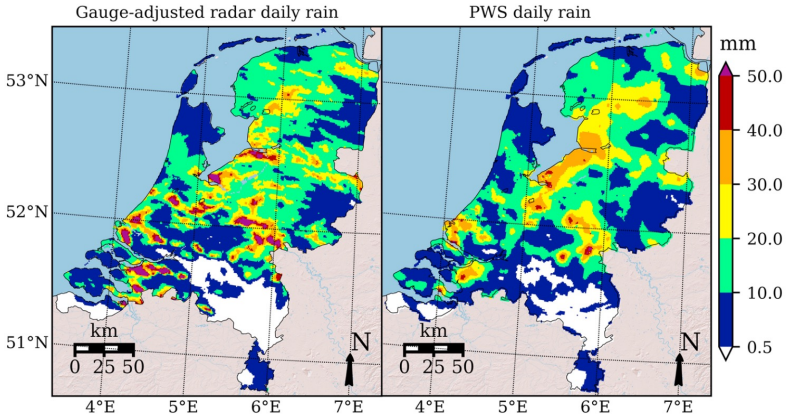
Selected research highlights

Country-wide CML rainfall maps

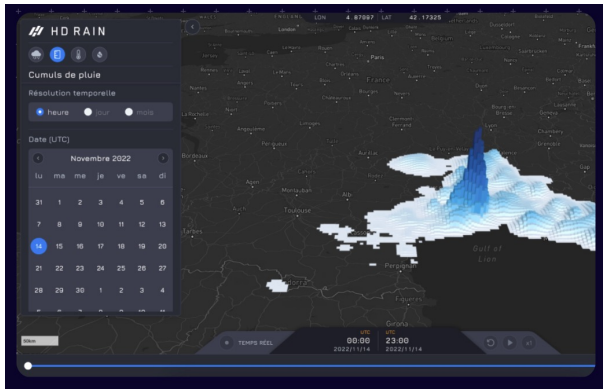


Gauge-adjusted radar CML

Country-wide PWS rainfall maps

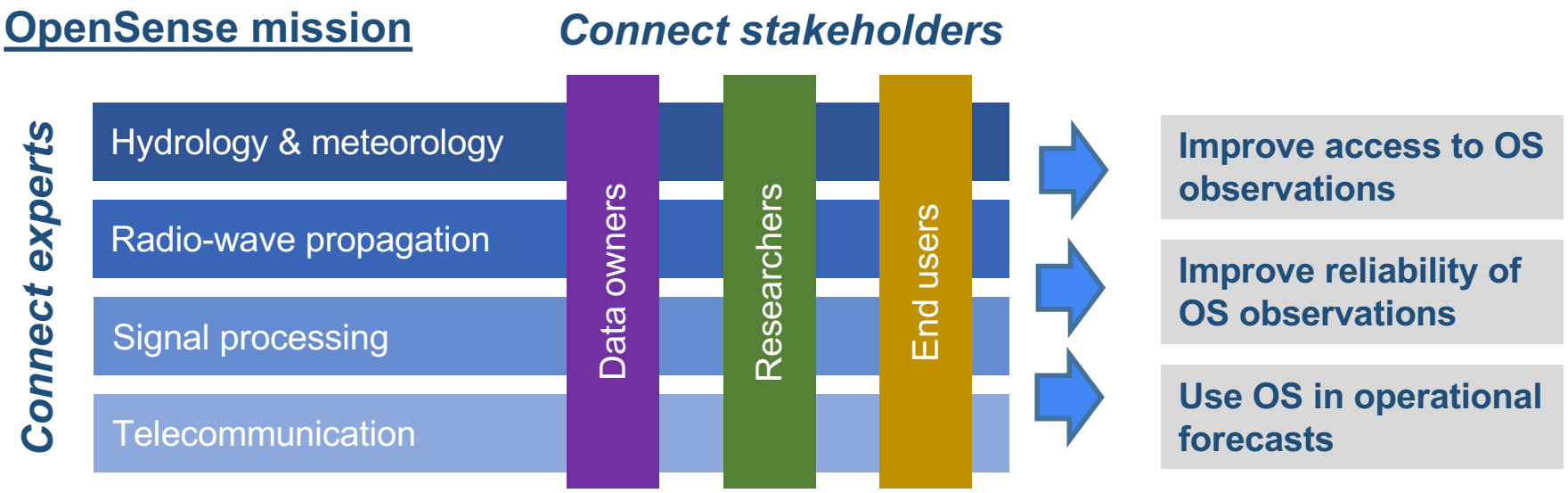


Rainfall maps from SML
(source: HDRain https://www.hd-rain.com)

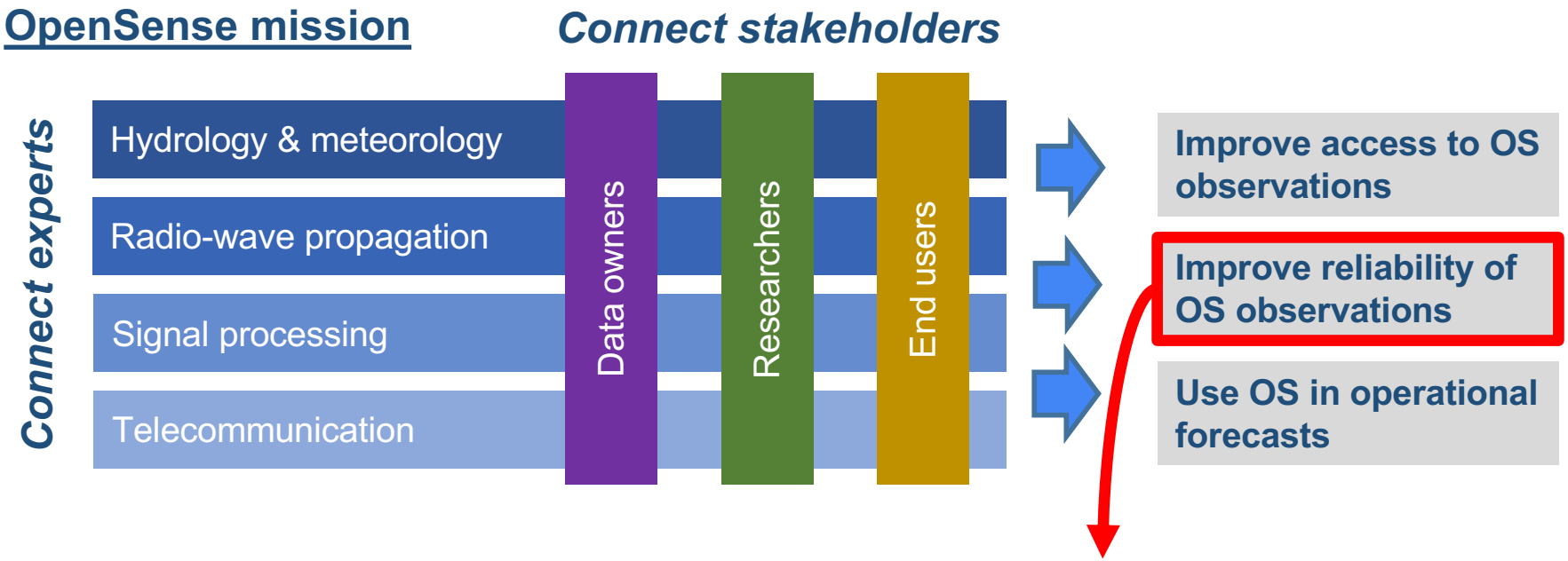


The COST Action OpenSense

OpenSense mission



OpenSense mission

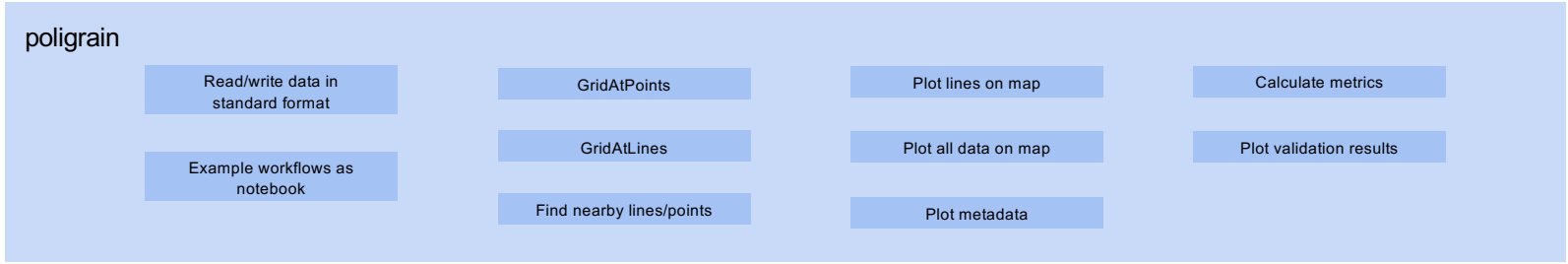


OpenSense works on joint open-source software to allow harmonization and intercomparison of methods

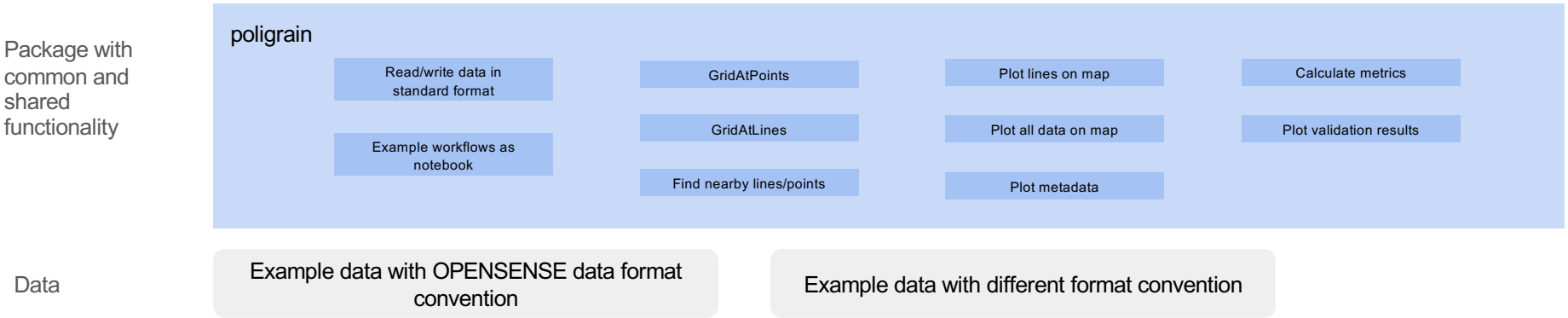
The OPENSENSE software ecosystem

We built a new package to combine common functionality

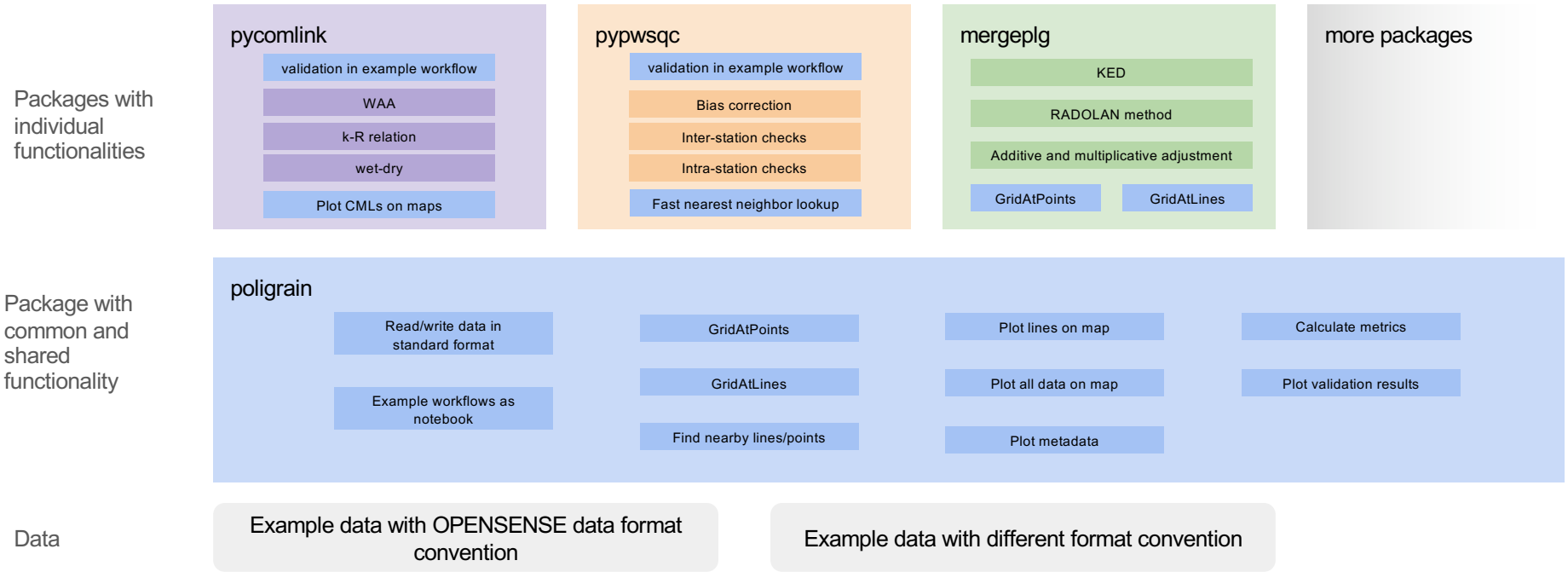
Package with common and shared functionality



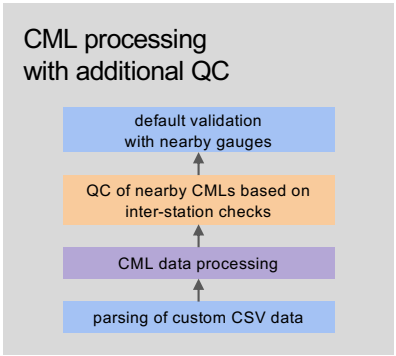
We built a new package to combine common functionality



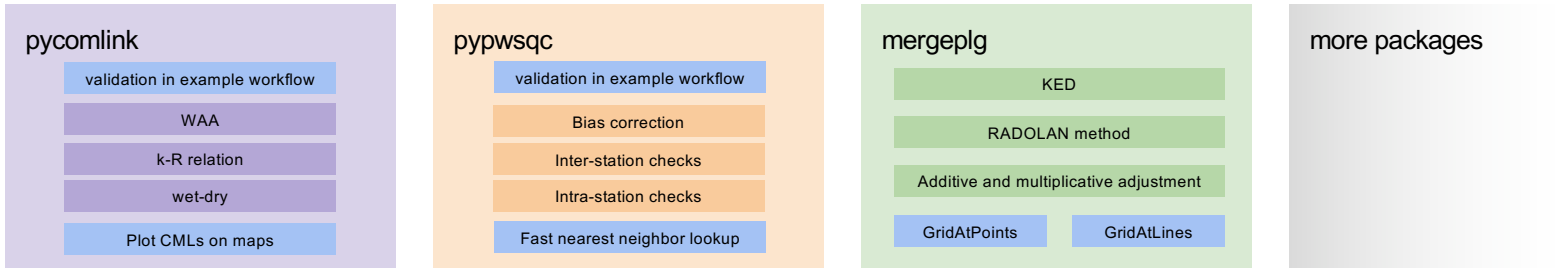
Processing packages and applications will be built on top



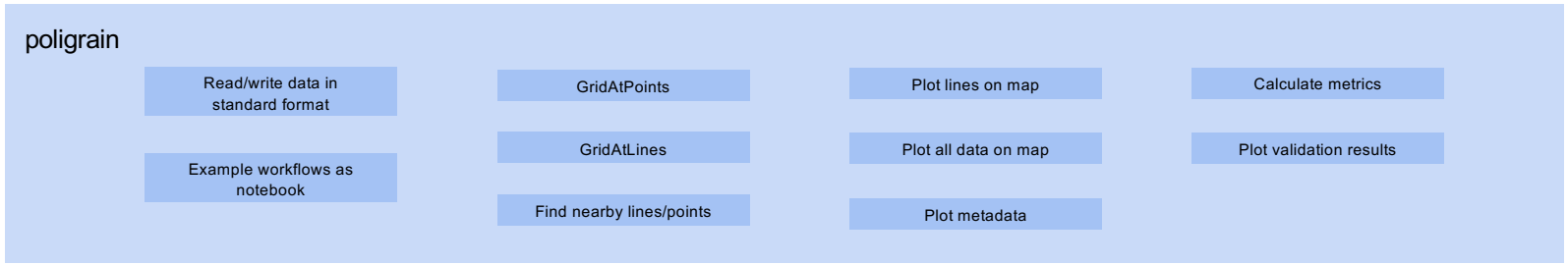
Example applications



Packages with individual functionalities



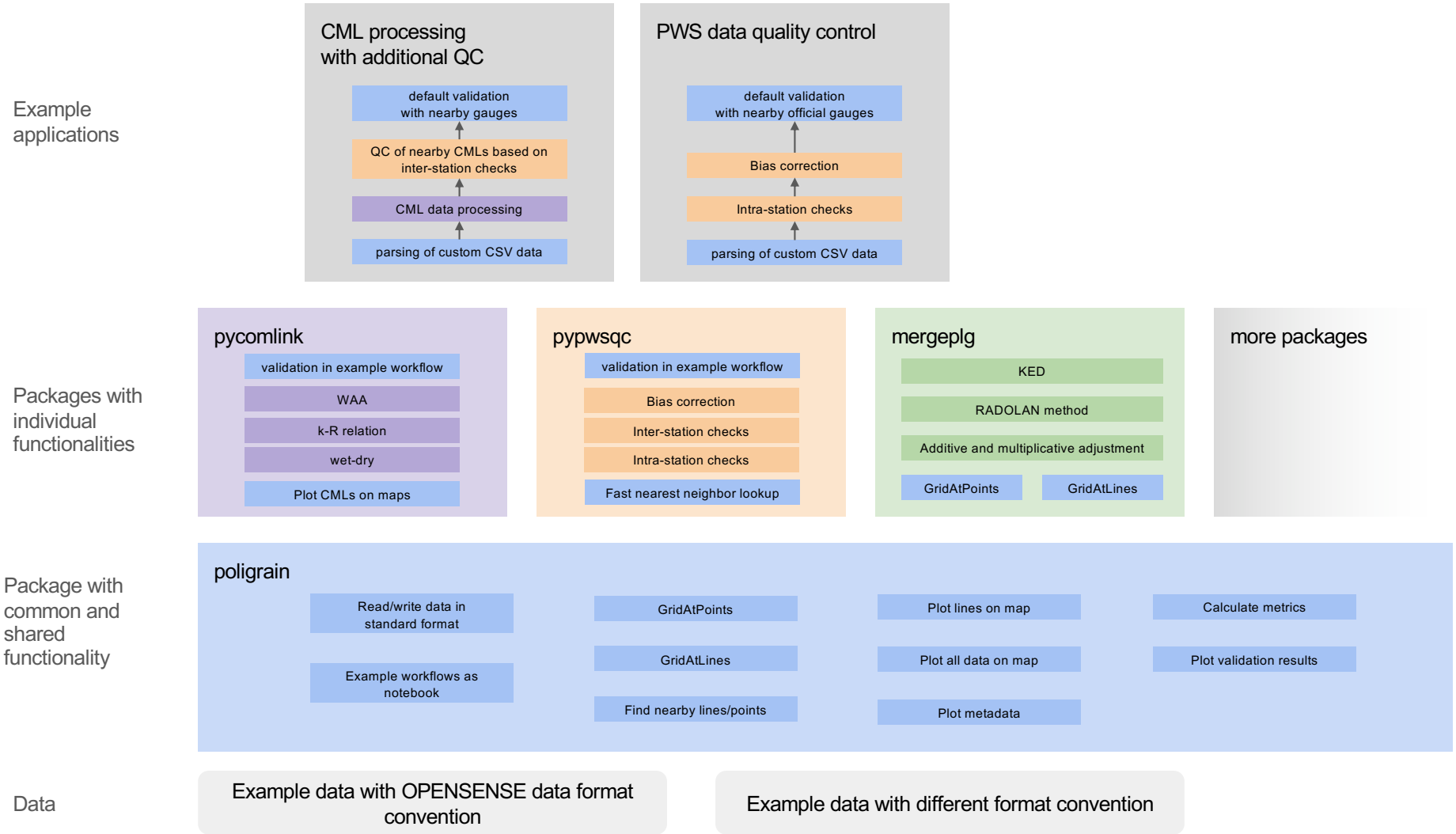
Package with common and shared functionality



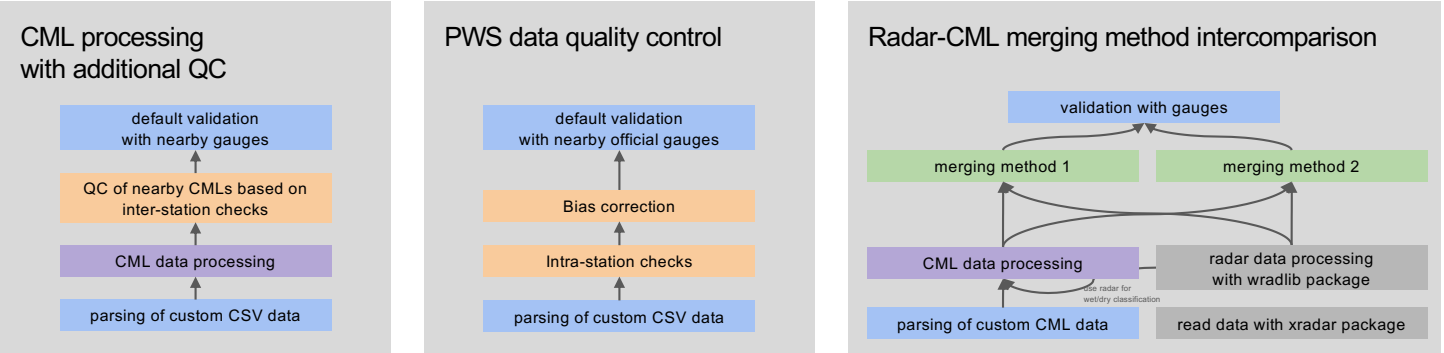
Data

Example data with OPENSENSE data format convention

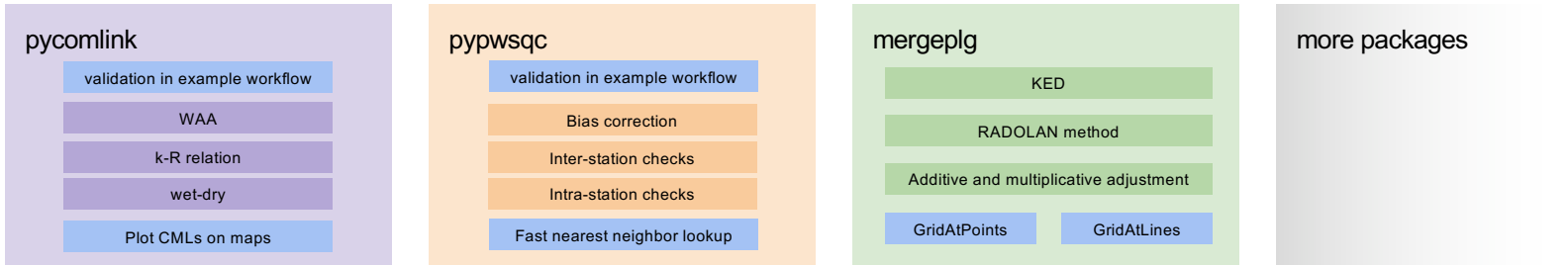
Example data with different format convention


Example applications
CML processing with additional QC
default validation with nearby gauges
QC of nearby CMLs based on inter-station checks
CML data processing
parsing of custom CSV data
PWS data quality control
default validation with nearby official gauges
Bias correction
Intra-station checks
parsing of custom CSV data
Packages with individual functionalities
pycomlink
validation in example workflow
WAA
k-R relation
wet-dry
Plot CMLs on maps
pypwsqc
validation in example workflow
Bias correction
Inter-station checks
Intra-station checks
Fast nearest neighbor lookup
mergeplg
KED
RADOLAN method
Additive and multiplicative adjustment
GridAtPoints
GridAtLines
more packages
Package with common and shared functionality
poligrain
Read/write data in standard format
Example workflows as notebook
GridAtPoints
GridAtLines
Find nearby lines/points
Plot lines on map
Plot all data on map
Plot metadata
Calculate metrics
Plot validation results
Data
Example data with OPENSENSE data format convention
Example data with different format convention

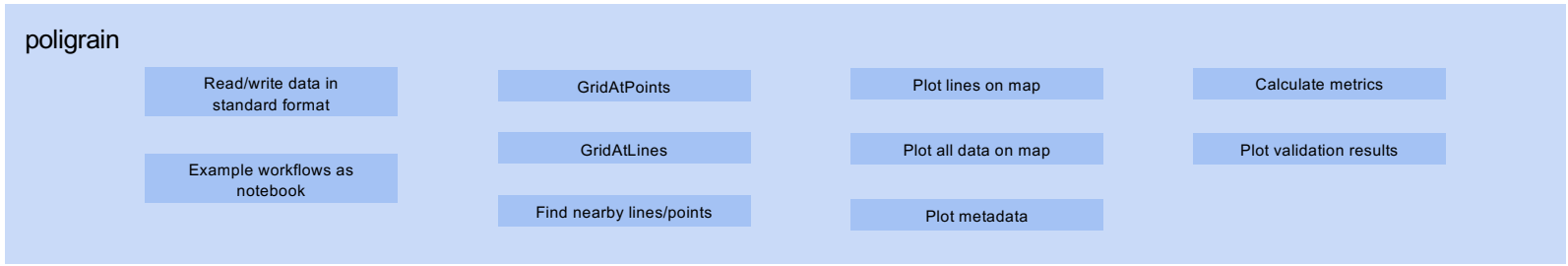
Example applications



Packages with individual functionalities



Package with common and shared functionality



Data

Example data with OPENSENSE data format convention

Example data with different format convention

Overview of the software packages covered today

	version	Level of maturity
poligrain	0.2.2	Quite stable, good test coverage, some polishing required
pycomlink	0.4.1	Stable, not so good test coverage, some parts where written when I was a Python beginner
pypwsqc	0.1.0	Limited content, but quite stable, API might change,
mergeplg	0.0.2	Moving forward fast…

Schedule

09:00 – 09:15	Intro
	Block 1: *poligrain* and a first look at CML data
10:30 - 10:50	Coffee break
	Block 2: CML data processing with *pycomlink*
12:30 - 13:30	Lunch break
	Block 3: PWS data quality control with *pypwsqc*
15:15 - 15:35	Coffee break
	Block 4: Quick overview of CML rainfall map interpolation, merging radar and CMLs and a short outlook
17:00	End

Intro round

your background
your motivation to participate
(2-3 sentences)