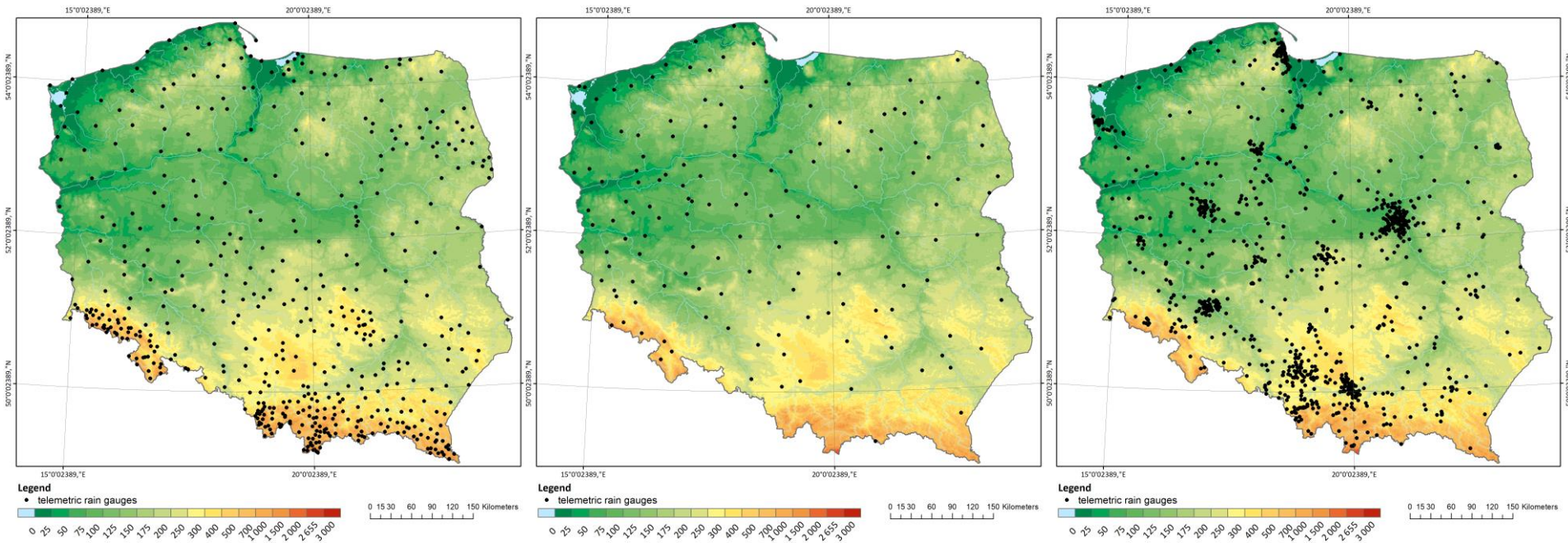


## Design and implementation of adaptation of the RainGaugeQC software for QC of unprofessional gauges (standard RainGaugeQC: Ośródka et al., AMT 2022)

Abbr.	Algorithm	Sub-algorithms	Standard RainGaugeQC	...version for unprofess. gauges
GEC	Gross Error Check		X	X
RC	Range Check		X	X
RCC	Radar Conformity Check	1) Detection of incorrect „no precipitation” data	X	X
		2) Detection of false precipitation reports	X	X
TCC	Temporal Consistency Check	1) Detection of blocked sensors	X	X
		2) Comparison of two sensors	X	
		3) Time series comparison with weather radar		X
		4) Bias correction with adjusted radar data		X
SCC	Spatial Consistency Check	1) Detection of outliers from the local vicinity	X	X
		2) Advanced detection of outliers taking into account additional percentiles	X	X

## Available data from rain gauge networks



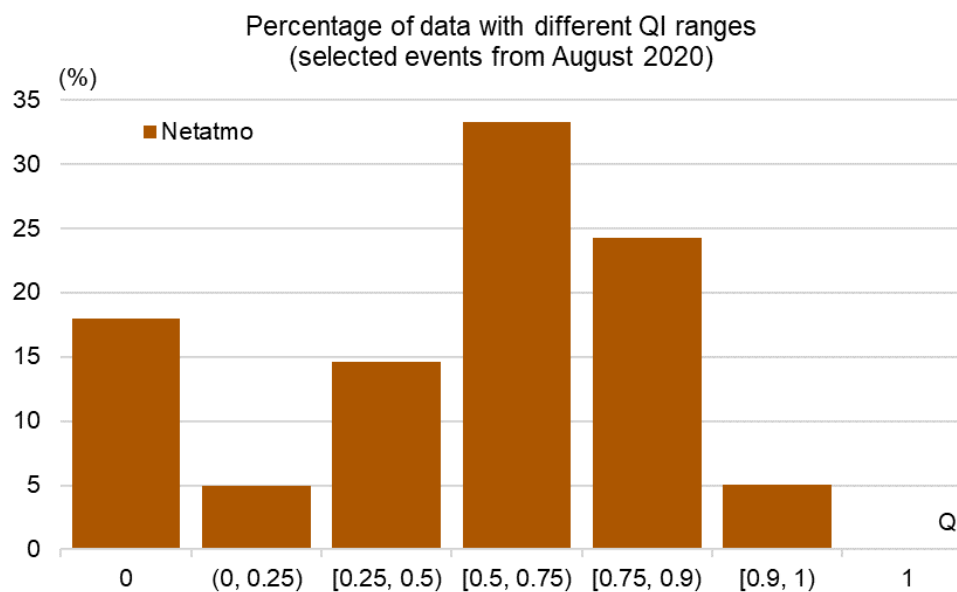
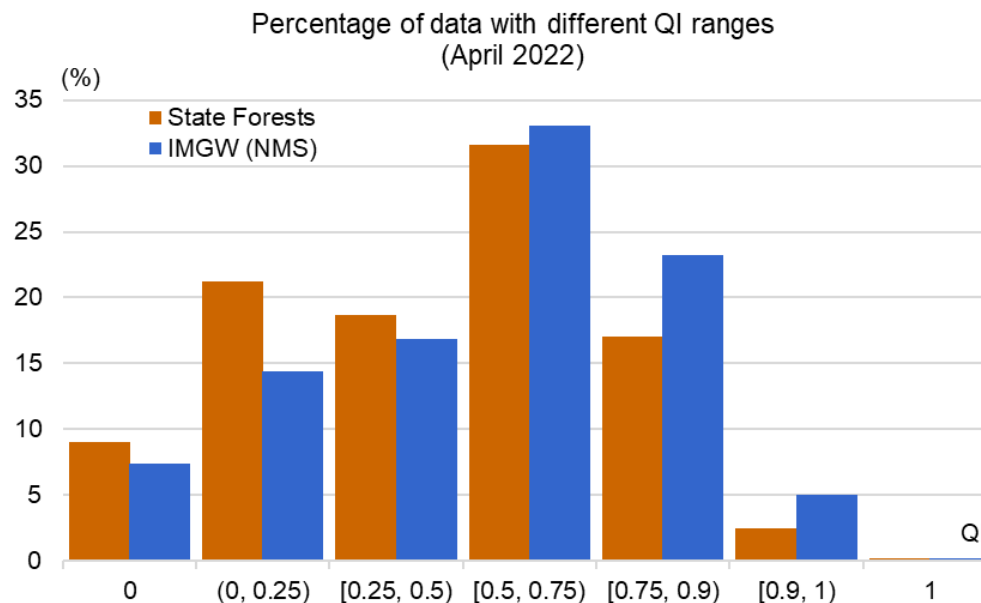
IMGW-PB  
– state network,  
professional

Board of the State Forests  
– state network,  
unprofessional

Netatmo  
– private,  
amateur gauges

# Subtask 2.1 Development and testing automatic QC methods based on the RainGaugeQC algorithms developed at IMGW-PIB

## Analysis of quality controlled data



### RainGRS+ model:

Quality-based combination of rain gauge, radar and satellite data (QPE)

### Input data:

- IMGW rain gauge network
- IMGW POLRAD radar network
- EUMETNET OPERA radar precipitation
- Meteosat (NWC-SAF) based precipitation estimates (algorithm: Jurczyk et al., 2020, Remote Sensing)
- PWS data sets

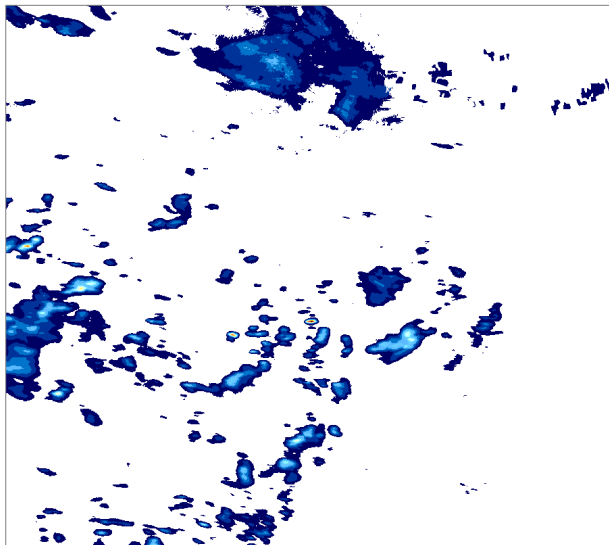
### Combination of estimates:

1. **RainGRS+** = RainGRS (rain gauges, radars PL, and satellite estimates) + satellite precipitation
2. **RainGRS+** = rain gauges + radars PL + OPERA + satellite precipitation

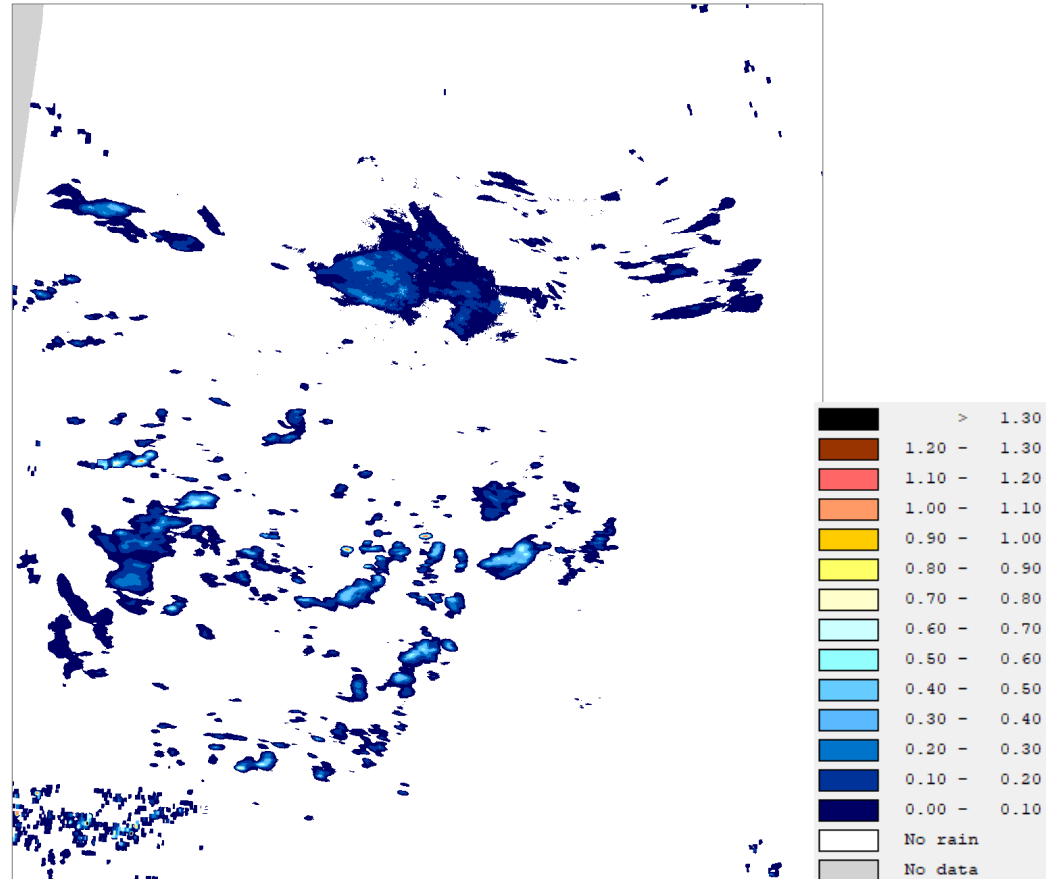
# Task 3.1 Processing different rainfall data sources (private rain gauges, commercial microwave links, sewer/water service stations, etc.)

Determination of QPE (quantitative precipitation estimation) for COSMO 2.8 km domain (1200 km x 1300 km) with extended RainGRS+ system

Example of QPE fields: RainGRS and RainGRS+ (mm / 10 min), 2019-03-05, 12:00 UTC. Version #1.



RainGRS (PL) domain



RainGRS+ (COSMO 2.8) domain

**Problem:** some data may be not available or of poorer quality outside the Poland domain