The "Weather Observation Website" (WOW) collects weather data obtained from private weather stations. This type of crowdsourcing is growing enormously in the last years. To know how reliable this data is, this study is investigating the quality of precipitation data from 22 WOW-stations situated in Belgium in the year 2017.

In order to examine the data quality, the WOW data of the amateur weather stations is compared with the "Quantitative Precipitation Estimate" (QPE) which is primarily based on radar data and which is intended to be the best spatial representation of precipitation in Belgium. Hourly and daily precipitation values are presented and compared with the QPE data at the station locations. Two statistical tests are applied on (daily and hourly) WOW data and the QPE data. The first test is a Spearman-Rang-Correlation, and this is followed by a Mann-Whitney-U-test which is investigating if the two samples (WOW and QPE) are similar distributed. Both tests are focusing on the total values of the year 2017 and on each month separately.
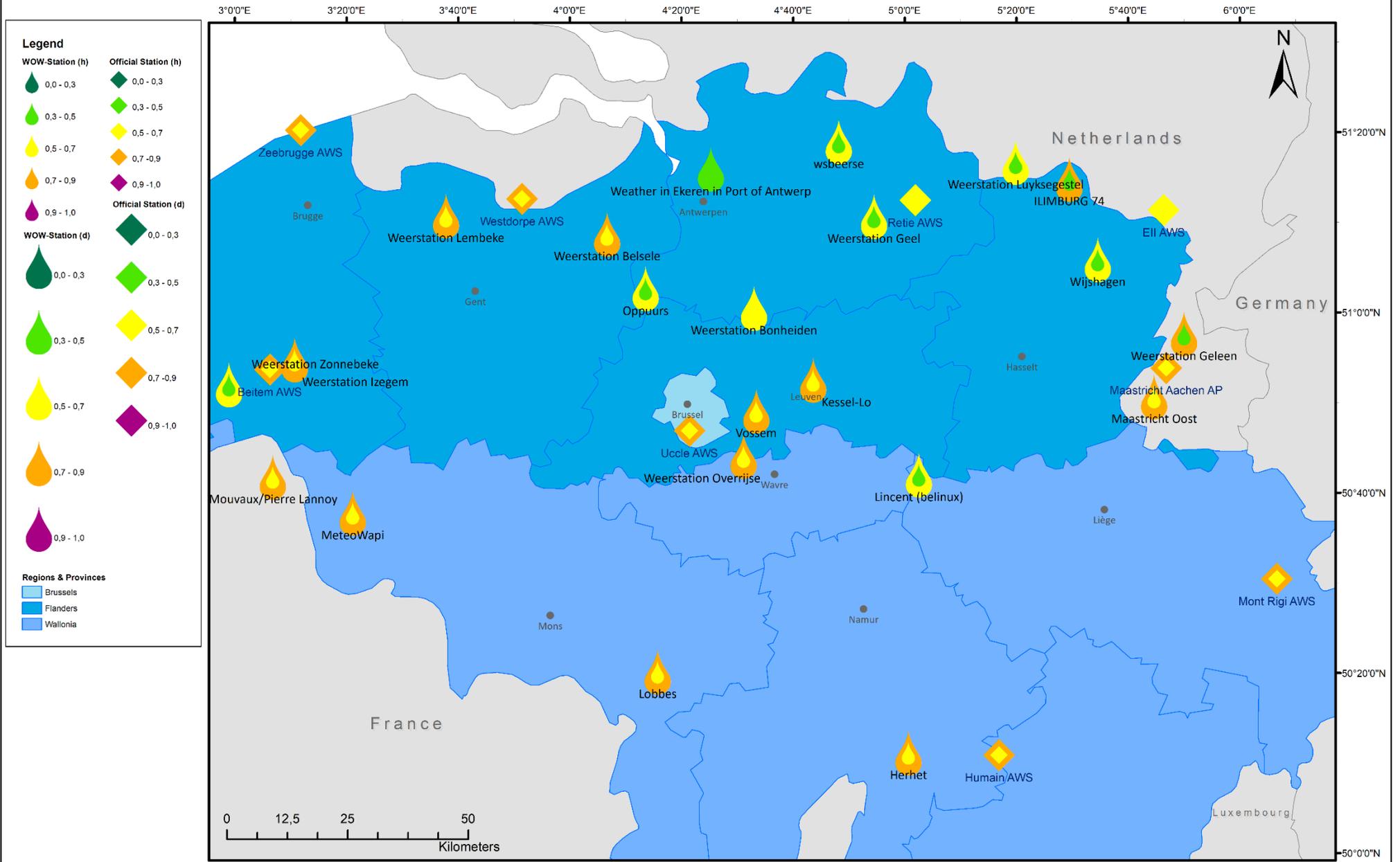
As the used QPE product is not representing the absolute ground truth and as it is based on recently developed calculations, a QPE verification is undertaken by analysing the QPE data with selected official stations of the national weather services with the same statistical tests. The results are compared with some studies from the United Kingdom, the Netherlands and Belgium.

The statistical analysis of the WOW stations showed high correlations in the daily correlation analysis using the total values of 2017 and moderate and high correlations for the individual months. All of the daily WOW data is similar distributed for the total values and also mostly for the values per month. Lower correlations are found in the statistical analysis with hourly values. They range from low to moderate. Contrary to the daily values, the hourly values show most of the time individual distributions in their samples (total values and individual months). Similar results are obtained in the QPE verification. The comparison with literature data confirms it with a likewise picture.

This study shows that for this sample of 22 amateur stations the daily values have a good quality which almost reaches the standard of professional stations and can thus be used in science and operations. The impact of measurement errors and weather phenomena influence the accuracy of the hourly values which is still too low to make them reliable enough for this purpose.

The result of the yearly correlation coefficients of the evaluated stations are presented on the following figure:

Correlation Coefficient 2017

Legend

WOW-Station (h)
- 0,0 - 0,3
- 0,3 - 0,5
- 0,5 - 0,7
- 0,7 - 0,9
- 0,9 - 1,0

Official Station (h)
- 0,0 - 0,3
- 0,3 - 0,5
- 0,5 - 0,7
- 0,7 - 0,9
- 0,9 -1,0

WOW-Station (d)
- 0,0 - 0,3
- 0,3 - 0,5
- 0,5 - 0,7
- 0,7 - 0,9
- 0,9 - 1,0

Official Station (d)
- 0,0 - 0,3
- 0,3 - 0,5
- 0,5 - 0,7
- 0,7 -0,9
- 0,9 -1,0

Regions & Provinces
- Brussels
- Flanders
- Wallonia

N

Netherlands

Germany

France

Luxembourg

Zeebrugge AWS
Brugge
Westdorpe AWS
Weerstation Lembeke
Weerstation Belsele
Weather in Ekeren in Port of Antwerp
Antwerpen
wsbeerse
Weerstation Luyksegestel
ILIMBURG 74
Retie AWS
Weerstation Geel
Ell AWS
Gent
Oppuurs
Weerstation Bonheiden
Wijshagen
Weerstation Zonnebeke
Weerstation Izegem
Beitem AWS
Brussel
Kessel-Lo
Leuven
Hasselt
Weerstation Geleen
Maastricht Aachen AP
Uccle AWS
Vossem
Maastricht Oost
Weerstation Overrijse
Wavre
Lincent (belinux)
Liège
Mouvaux/Pierre Lannoy
MeteoWapi
Namur
Mons
Mont Rigi AWS
Lobbes
Herhet
Humain AWS

0   12,5   25   50
Kilometers

Data: Karch, Ramm (2018), Sandvik (2018), The Met.Office WOW (2018);

25th April 2018, Svenja Wilfert

3°0'0"E 3°20'0"E 3°40'0"E 4°0'0"E 4°20'0"E 4°40'0"E 5°0'0"E 5°20'0"E 5°40'0"E 6°0'0"E

51°20'0"N 51°0'0"N 50°40'0"N 50°20'0"N 50°0'0"N