Sussex Air Quality Network - Air quality data validation process and status flags

A data validation process is a means by which confidence in data reported from air quality instruments to the Sussex-Air website can be gained by users. As the Sussex network provides data from both local authority (LA) owned air quality monitoring stations (AQMS's) and the UK national Automatic Urban and Rural Network (AURN) AQMS's, it is important to distinguish the differences in the quality of data provided by each type of station.

The process of data collection, review and verification (also termed as ratification) can be complex and has numerous influencing factors, on which ultimately the reporting of a final data set is dependent.

Data collection

All data collected from the AQMS instruments have the status flag of "raw" data and is stored independently from future corrected data sets. The LA AQMS data is checked and goes through a process of reviewing and invalidating suspect or erroneous data before dissemination onto the Sussex-air website. Data going through this process is therefore termed "provisional" data. It is only after the validation process does the data status changes from "provisional". The AURN data is collected, reviewed and disseminated separately to UK-AIR, these data are thereafter collected from UK-AIR and transferred to the Sussex-air website as "provisional data".

Quality Assurance and Quality Control (QA/QC)

For the Sussex-Air network there is also a need to recognise the two-tier QA/QC regimes that exist. These are:

- AURN sites reported to Sussex-air have a formal ISO 17025 QA/QC regime put in place.
- Sussex-air LA sites (non-AURN) do not have a formal QA/QC regime.

In the case of the AURN instruments data is taken through a process of verification (also termed ratification), which takes account of the evidence from the instrument and operator performance over a period of 3 months and the results of the service and audit round, which is undertaken every 6 months. The audit services implemented by an independent QA/QC unit for the AURN is done in accordance with UKAS ISO 17025 accreditation. For the AURN sites "provisional" data moves to "verified" data on a quarterly basis in arrears across an operating year. All AURN data and status are retrieved from UK-AIR https://uk-air.defra.gov.uk/ and should always be referenced as the source of AURN data.

The Sussex LA AQMS's currently have no QA/QC audits. Data checks are carried out on an ongoing basis to "tidy-up" initial "provisional data" which is provided in near real-time on the Sussex-air website. Quarterly reviews of the data are undertaken to identifying any short and long-term issues and trends. This is followed by an annual data review to provide the final annual "Approved" data set. The data are categorised as "provisional" through the year until the annual review is undertaken when the status is changed to "Approved" data. For Sussex LA AQMS, the annual validation process in undertaken at the end of each full operating year with "approved" data finalised annually in May in readiness for LAQM statutory reports.

Data status

Thus, for Sussex sites the following provides for a summary of the terminology to be used:

AQMS	Data provided in real-time on Sussex-air	Review period	Data status post reviews and updated on Sussex-air
AURN sites	"Provisional" data	Quarterly	"Verified" data
Sussex LA sites	"Provisional" data	Annual	"Approved" data