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Motivation: This sample data was collected in Valencia, Spain, in October 2023 to obtain data on the variation of meteorological parameters in an urban area and to draw conclusions on the correlations between the dimensions of buildings, green areas and other aspects of urban planning.

Device: The **senseBox home** by Reedu GmbH & Co. KG (<https://sensebox.shop/product/sensebox-home>) is a device that has been specially designed for flexible use in citizen science projects. As it is mainly developed for educational tasks, the focus is on the learning effect of assembling and programming the device yourself. This means that many different sensors, can be connected via a web-based dashboard platform and an active hobbyist community is constantly developing the platform and supporting the users. SenseBox has an easy to program microcontroller unit to which various sensors (e.g. air quality, air temperature, physical soil/air properties) can be connected.

Integrated Sensors: (1) The **environmental sensor BME680** is an air pressure, humidity, temperature and volatile gas sensor from Bosch with a digital I2C interface. The humidity sensor has a response time (t63%) of 8s and an accuracy tolerance $\pm 3\%$. The pressure sensor show a relative accuracy of ± 0.12 hPa, corresponds to ± 1 m (950 to 1050hPa @25°C) and an absolute accuracy of ± 1 hPa (950 to 1050 hPa, 0 to +40 °C). It is reported by the manufacturer Reedu GmbH & Co. KG that temperature sensor has a full accuracy in an operating range of 0°C to +65°C.

(2) With the **fine dust (PM10 & PM2.5) sensor SDS011** it is possible to determine the fine dust concentration in the air. The sensor outputs two values: the concentration of PM2.5 (particle $< 2.5\ \mu\text{m}$) and PM10 (particle $< 10\ \mu\text{m}$). This sensor is equipped with a small fan to suck in air. Inside is a laser that measures the number of particles together with a photodiode. The results of the measurements are given in $\mu\text{g} / \text{m}^3$ (micrograms per cubic meter). This sensor has a fast response time of less than 10 seconds and show a high resolution up to $0.3\mu\text{g}/\text{m}^3$.

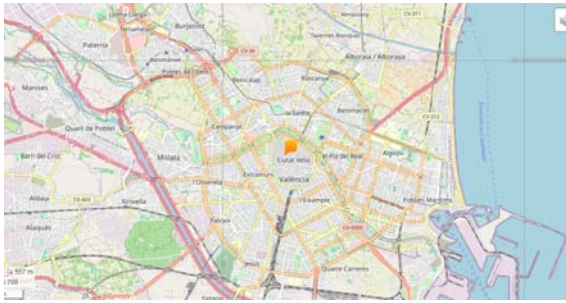
Measured parameter:

- Time in UTC,
- Lat (WGS64) in °(N)
- Lon (WGS64) in °(E)
- Temperature (T) in °C,
- relative humidity in %,
- atmospheric pressure_Pa,
- particle matter (pm25) in $\mu\text{g}/\text{cm}^3$,
- particle matter (pm10) in $\mu\text{g}/\text{cm}^3$

Measurement interval: 1 minute

METADATA to senseBox home data

Area: City of Valencia (Spain)



Date: October 7, 2023 9:41 (UTC) - 13:02 (UTC)

Weather:

(https://www.meteoblue.com/en/weather/historyclimate/weatherarchive/valencia_spain_2509954?fcstlength=-15&year=2023&month=10)

