**Details on Openair Datasets:**

Authors: Andy Bean and Monika Roznere

Links to Map Locations of Data:

1. Location 1: Berlin
   1. Met Site: Schonefeld (near new airport) [link](https://www.google.com/maps/place/52%C2%B022'48.0%22N+13%C2%B031'21.0%22E/@52.3857618,13.5026137,13.29z/data=!4m5!3m4!1s0x0:0x30caca28a24b8496!8m2!3d52.38!4d13.5225)
   2. Site 1: Blankenfelde-Mahlow (background suburban, near new airport) [link](https://www.google.com/maps/place/52%C2%B020'58.9%22N+13%C2%B025'27.5%22E/@52.354551,13.3949327,13.46z/data=!4m5!3m4!1s0x0:0x13cdde92e3f43f42!8m2!3d52.3497!4d13.4243)
   3. Site 2: Wedding-Amrumer (background urban, near old airport) [link](https://www.google.com/maps/place/52%C2%B032'34.9%22N+13%C2%B020'57.6%22E/@52.5603844,13.2742953,13.47z/data=!4m5!3m4!1s0x0:0x60286a9a30470202!8m2!3d52.54304!4d13.34933)
   4. Site 3: Schöneberg-Belziger Straße (background urban) [link](https://www.google.com/maps/place/52%C2%B029'08.9%22N+13%C2%B020'55.6%22E/@52.4861952,13.3440974,15.89z/data=!4m5!3m4!1s0x0:0x5315ef716afade4a!8m2!3d52.48581!4d13.34877)
   5. Site 4: Neukölln-Silbersteinstr. (traffic urban) [link](https://www.google.com/maps/place/52%C2%B028'03.1%22N+13%C2%B026'29.9%22E/@52.4675332,13.4394613,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0xd1d5e0d0d81e6fad!8m2!3d52.46753!4d13.44165)
   6. Site 5: Friedrichshain-Frankfurter Allee (traffic urban) [link](https://www.google.com/maps/place/52%C2%B030'50.7%22N+13%C2%B028'11.8%22E/@52.5139612,13.4681867,17.36z/data=!4m5!3m4!1s0x0:0xd41f992b9eac3ba6!8m2!3d52.51407!4d13.46993)
2. Location 2: Hannover
   1. Met Site: Hannover Airport [link](https://www.google.com/maps/place/Hannover+Airport/@52.3797932,9.6213879,11z/data=!4m13!1m7!3m6!1s0x47b00b514d494f85:0x425ac6d94ac4720!2sHanover,+Germany!3b1!8m2!3d52.3758916!4d9.7320104!3m4!1s0x47b07217509056b1:0xe4434b844c73d0e5!8m2!3d52.4630116!4d9.6846184)
   2. Site 1: Hannover Main (background) [link](https://www.google.com/maps/place/52%C2%B021'46.5%22N+9%C2%B042'22.0%22E/@52.3629233,9.7039313,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0xeb0d0c882a27b119!8m2!3d52.36292!4d9.70612)
   3. Site 2: Verkehr (traffic) [link](https://www.google.com/maps/place/52%C2%B021'34.1%22N+9%C2%B042'55.8%22E/@52.3596264,9.715017,18.82z/data=!4m5!3m4!1s0x0:0xc23108e4ee8fcfad!8m2!3d52.35948!4d9.7155)
3. Location 3: Leipzig
   1. Met Site: Leipzig/Halle Airport [link](https://www.google.com/maps/place/Leipzig%2FHalle+Airport/@51.3419134,12.2535512,11z/data=!4m13!1m7!3m6!1s0x47a6f818200f2c73:0x93df80d2b9b4f552!2sLeipzig,+Germany!3b1!8m2!3d51.3396955!4d12.3730747!3m4!1s0x47a65f0295220967:0x292eff13b429f145!8m2!3d51.4185595!4d12.2340488)
   2. Site 1: West (background) [link](https://www.google.com/maps/place/51%C2%B019'04.5%22N+12%C2%B017'50.7%22E/@51.3195866,12.2498545,12.69z/data=!4m5!3m4!1s0x0:0x63350795ff4be6f3!8m2!3d51.31791!4d12.29741)
   3. Site 2: Mitte (traffic) [link](https://www.google.com/maps/place/51%C2%B020'39.0%22N+12%C2%B022'37.8%22E/@51.3441633,12.3749713,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0xb3e72a1d83e69957!8m2!3d51.34416!4d12.37716)
4. Location 4: Munich
   1. Met Site: Oberpfaffenhofen Airport [link](https://www.google.com/maps/place/Oberpfaffenhofen+Airport/@48.1039312,11.2858073,12.29z/data=!4m13!1m7!3m6!1s0x479e75f9a38c5fd9:0x10cb84a7db1987d!2sMunich,+Germany!3b1!8m2!3d48.1351253!4d11.5819805!3m4!1s0x479dd38a2be1608d:0xb253ffe4cb381a08!8m2!3d48.0841031!4d11.2868978)
   2. Site 1: Lothstraße (background) [link](https://www.google.com/maps/place/48%C2%B009'16.3%22N+11%C2%B033'16.8%22E/@48.1544667,11.5520582,16z/data=!4m5!3m4!1s0x0:0x28c49b8ea6e08ab2!8m2!3d48.15453!4d11.55467)
   3. Site 2: Stachus (traffic) [link](https://www.google.com/maps/place/48%C2%B008'14.1%22N+11%C2%B033'53.7%22E/@48.1372536,11.5627313,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0x562500081659385e!8m2!3d48.13725!4d11.56492)
5. Location 5: Hamburg
   1. Met Site: Hamburg Airport [link](https://www.google.com/maps/place/Hamburg+Airport/@53.6463157,9.8705234,11.14z/data=!4m5!3m4!1s0x47b188641ccfa657:0x734626331c275824!8m2!3d53.633622!4d9.9974128)
   2. Site 1: Sternschanze (background) [link](https://www.google.com/maps/place/53%C2%B033'50.9%22N+9%C2%B058'04.4%22E/@53.5641432,9.9656933,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0x8001e18d7646fdce!8m2!3d53.56414!4d9.967882)
   3. Site 2: Stresemannstraße (traffic) [link](https://www.google.com/maps/place/53%C2%B033'38.3%22N+9%C2%B057'26.1%22E/@53.5606332,9.9550473,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0x11993c72db13efad!8m2!3d53.56063!4d9.957236)
   4. Site 3: Veddel (industrial) [link](https://www.google.com/maps/place/53%C2%B031'23.7%22N+10%C2%B001'16.4%22E/@53.5246049,10.0155244,15.58z/data=!4m5!3m4!1s0x0:0xa2344fb90ce1b352!8m2!3d53.52326!4d10.021227)
6. Location 6: Cologne
   1. Met Site: Cologne Bonn Airport [link](https://www.google.com/maps/place/Cologne+Bonn+Airport/@50.8883624,6.8007287,10.54z/data=!4m13!1m7!3m6!1s0x47bf259169ab2fe5:0x42760fc4a2a77f0!2sCologne,+Germany!3b1!8m2!3d50.937531!4d6.9602786!3m4!1s0x47beded752e8c6ef:0x64972536cb454bc8!8m2!3d50.8666228!4d7.1412431)
   2. Site 1: Rodenkirchen (background) [link](https://www.google.com/maps/place/50%C2%B053'23.5%22N+6%C2%B059'06.3%22E/@50.8898734,6.9828853,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0x2f4ee8f7f12cd6!8m2!3d50.88987!4d6.985074)
   3. Site 2: Turiner Straße (traffic) [link](https://www.google.com/maps/place/50%C2%B056'50.2%22N+6%C2%B057'27.5%22E/@50.9472734,6.9554603,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0xc3ac55343b5b6895!8m2!3d50.94727!4d6.957649)
7. Location 7: Düsseldorf
   1. Met Site: Dusseldorf Airport [link](https://www.google.com/maps/place/D%C3%BCsseldorf+International+Airport/@51.247029,6.7455184,12.13z/data=!4m13!1m7!3m6!1s0x0:0xc3ac55343b5b6895!2zNTDCsDU2JzUwLjIiTiA2wrA1NycyNy41IkU!3b1!8m2!3d50.94727!4d6.957649!3m4!1s0x47b8c82e37d91253:0x5b56f56996d4f455!8m2!3d51.2876146!4d6.7667912)
   2. Site 1: Lörick (urban background) [link](https://www.google.com/maps/place/51%C2%B014'57.2%22N+6%C2%B043'56.5%22E/@51.2492133,6.7301643,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0xf580bc366296451c!8m2!3d51.24921!4d6.732353)
   3. Site 2: Ratingen (suburban background) [link](https://www.google.com/maps/place/51%C2%B018'12.2%22N+6%C2%B049'11.6%22E/@51.2998656,6.794758,13.65z/data=!4m5!3m4!1s0x0:0xbc34227a54367c29!8m2!3d51.30339!4d6.819887)
8. Location 8: Rural Germany Near Berlin
   1. Met Site: ​​Holzdorf Airport [link](https://www.google.com/maps/place/Holzdorf+Air+Base,+Germany/@51.7679112,13.1426543,12.95z/data=!4m13!1m7!3m6!1s0x0:0xbc34227a54367c29!2zNTHCsDE4JzEyLjIiTiA2wrA0OScxMS42IkU!3b1!8m2!3d51.30339!4d6.819887!3m4!1s0x47a7c3611f47b8f1:0x441cff5abb1e6e81!8m2!3d51.7683312!4d13.1660414)
   2. Site 1: Remote Collemburg [link](https://www.google.com/maps/place/51%C2%B018'13.6%22N+13%C2%B000'33.9%22E/@51.2994911,12.3998508,8.64z/data=!4m5!3m4!1s0x0:0xe43de63e5ff5855b!8m2!3d51.30377!4d13.00941)
   3. Site 2: Wittenberg Background [link](https://www.google.com/maps/place/51%C2%B052'15.1%22N+12%C2%B039'49.2%22E/@51.8774303,12.6440197,13.54z/data=!4m5!3m4!1s0x0:0x58feaab8cc69a0cd!8m2!3d51.87085!4d12.66366)
   4. Site 3: Wittenberg Traffic [link](https://www.google.com/maps/place/51%C2%B052'02.9%22N+12%C2%B035'53.8%22E/@51.8666463,12.5934753,14.89z/data=!4m5!3m4!1s0x0:0xf071fca2d4a3426a!8m2!3d51.86747!4d12.59827)

List of Variable Names and Units

* “air\_temp” - the temperature reading, in degrees Celsius
* “benzene” - Benzene Level, in μg/m3
* “co” - Carbon Monoxide Level, in mg/m3
* “code” - the site code for the aq data station
* “date” - The date and time of the reading, as yyyy-mm-dd hh:mm:ss
* “date\_end” - the date and time of the end of the reading, as yyyy-mm-dd hh:mm:ss
* “elev” - the elevation of the meteorological site
* “latitude” - The latitude of the met site, in decimal degrees
* “longitude” - The longitude of the met site, in decimal degrees
* “no” - Nitrous Oxide Level, in μg/m3
* “no2” - Nitrogen Dioxide Level, in μg/m3
* “nox” - Other Nitrous Oxides Level, in μg/m3
* “o3” - Ozone Level, in μg/m3
* “pm10” - Level of 10 micron particulate matter, in μg/m3
* “pm2.5” - Level of 2.5 micron particulate matter, in μg/m3
* “so2” - Sulphur Dioxide Level, in μg/m3
* “station” - the name of the meteorological data station
* “toluene” - Level of toluene, in μg/m3
* “wd” - wind direction, in compass degrees (0º north, clockwise around)
* “ws” - wind speed, in m/s
* “X1” - the entry number (unitless), created when importing the csv

List of Variables for Each Site

\*(default set: X1, station, date, latitude, longitude, elev, ws, wd, air\_temp, date\_end, site)

* Site 1: Berlin Blankenfelde-Mahlow (background suburban, near new airport)
  + Default, co, no, no2, nox, o3, pm10, pm2.5
  + No gaps!
* Site 2: Berlin Wedding-Amrumer (background urban, near old airport)
  + Default, no, no2, nox, o3, pm10
  + No gaps!
* Site 3: Berlin Schöneberg-Belziger Straße (background urban)
  + Default, no, no2, nox
  + No gaps!
* Site 4: Berlin Neukölln-Silbersteinstr. (traffic urban)
  + Default, no, no2, nox, pm10
  + No gaps!
* Site 5: Berlin Friedrichshain-Frankfurter Allee (traffic urban)
  + Default, benzene, co, no, no2, nox, pm10, so2
  + Missing so2 after early 2020
* Site 6: Hannover Main (background)
  + Default, no, no2, nox, o3, pm10, pm2.5
  + Gaps in nox beginning 2020
* Site 7: Hannover Verkehr (traffic)
  + Default, co, no, no2, nox, pm10, pm2.5
  + Gap in nox beginning 2020
* Site 8: Leipzig West (background)
  + Default, no, no2, nox, o3, pm10
  + Gaps in nox in 2020 and 2021
* Site 9: Leipzig Mitte (traffic)
  + Default, benzene, no, no2, nox, pm10, so2, toluene
  + Gaps in nox in 2020 and 2021, no toluene after 2020
* Site 10: Munich Lothstraße (background)
  + Default, co, no, no2, nox, o3, pm10, pm2.5
  + Nox stops in 2020, co stops in 2018
* Site 11: Munich Stachus (traffic)
  + Default, co, no, no2, nox, o3, pm10, pm2.5, so2
  + Nox stops in 2020, slight o3 gap in 2017, so2 stops mid-2018
* Site 12: Hamburg Sternschanze (background)
  + Default, no, no2, nox, o3, pm10, pm2.5, so2
  + Gaps in nox in late 2021
* Site 13: Hamburg Stresemannstraße (traffic)
  + Default, no, no2, nox, pm10
  + Gaps in nox in late 2021
* Site 14: Hamburg Veddel (industrial)
  + Default, no, no2, nox, pm10, pm2.5, so2
  + Gaps in nox in late 2021
* Site 15: Cologne Rodenkirchen (background)
  + Default, no, no2, nox, o3, pm10, so2
  + Gaps in nox in 2020 and 2021, so2 gone after 2019
* Site 16: Cologne Turiner Straße (traffic)
  + Default, no, no2, nox, pm10, pm2.5
  + Gaps in nox in 2020 and 2021
* Site 17: Dusseldorf Lörick (urban background)
  + Default, no, no2, nox, o3, pm10, pm2.5
  + Gaps in nox in 2020 and 2021
* Site 18: Dusseldorf Ratingen (suburban background)
  + Default, no, no2, nox, o3, pm10, pm2.5
  + Gaps in nox in 2020 and 2021
* Site 19: Remote Collemburg (rural background, on top of a tower in a forest)
  + Default, no, no2, nox, o3, pm10
  + Gaps in nox in 2020 and 2021
* Site 20: Wittenberg Background (smaller urban background)
  + Default, no, no2, nox, o3, pm10
  + Gaps in nox in 2021
* Site 21: Wittenberg Traffic (smaller urban traffic)
  + Default, co, no, no2, nox, pm10, toluene
  + Gaps in nox and toluene in 2021