

# Guide for operational procedure

- Spatial Data

Version 2

By Simone Kotthaus

Reviewed and updated by Duick Young 11<sup>th</sup> July 2010

Version 1 created 02/06/2009 – located in instrument archive

## Web

### Meteorological Observations in Greater London

A

<http://weather.noaa.gov/index.html>

B

<http://www.wunderground.com>

C

<http://weather.lgfl.org.uk>

D

<http://www.londonair.org.uk>

## OTAGO

I:\YYYY\London\ALL\

### SpatialGetA [half hourly task: hh:17, hh:47]

AGeneral.m:

- Grab 30min A-data, appends to daily file
- Check for missing values
- Extract one specified parameter, interpolates to 15 min resolution (+ standard deviation and quality flag)
- Write to an external file including all stations

```
\spatial_V2\A\A#code\codeYYYYDOY.txt  
\spatial_V2\parameter\A\ave\AYYYYDOY_15.txt  
\spatial_V2\parameter\A\std\AYYYYDOY_15.txt  
\spatial_V2\parameter\A\flag\AYYYYDOY_15.txt
```

### SpatialGetBC [daily task: 00:40]

1. BGeneral.m, CGeneral.m, DGeneral.m:

- Save raw data for source B and D
- Write formatted daily files for sources B, C, D
- Check data from source C for missing values
- Extract one specified parameter, interpolates/averages to 15 min resolution (+ standard deviation and quality flag)

```
\spatial_V2\source\source#\codeYYYYDOY.txt  
\spatial_V2\source\source#\codeYYYYDOY_raw.txt  
\spatial_V2\parameter\source\ave\sourceYYYYDOY_15.txt  
\spatial_V2\parameter\source\std\sourceYYYYDOY_15.txt  
\spatial_V2\parameter\source\flag\sourceYYYYDOY_15.txt
```

2. dailyplotspatial.m:

- Temporal [QCQA](#)
  - Temporal daily plot
  - Spatial plots for each 15 min period
- a) Yesterday's data from sources A, B, C  
b) Data from today-14 from all sources

```
\spatial_V2\Diagnostics\QCQAinfoYYYYDOY_a.txt  
\spatial_V2\Diagnostics\QCQAinfoYYYYDOY_b.txt  
\spatial_V2\parameter\plots\SpatailYYYYDOY_a.jpg  
\spatial_V2\parameter\plots\SpatailYYYYDOY_b.jpg  
\spatial_V2\parameter\plots\MM\SpatailYYYYDOYHH_a.jpg  
\spatial_V2\parameter\plots\MM\SpatailYYYYDOYHH_b.jpg
```

## Collected Parameters

- Wind Direction [ °]
- Wind Speed [m/s]
- Air Temperature [°C]
- Dew Point [°C]
- Relative Humidity [%]
- Barometric Pressure [hPa]
- Precipitation [mm/h]
- Incoming Solar Radiation [W/m<sup>2</sup>]

WMO – certified weather stations, gathered on NOAA website



Current Weather Conditions:  
Biggin Hill , United Kingdom

(EGKB) 51-19N 000-02E

Conditions at May 28, 2009 - 08:50 AM EDT

2009.05.28 1250 UTC

**Wind** from the WNW (300 degrees) at 7 MPH (6 KT) (direction variable)

**Visibility** greater than 7 mile(s)

**Sky conditions** partly cloudy

**Temperature** 68 F (20 C)

**Dew Point** 55 F (13 C)

**Relative Humidity** 64%

**Pressure (altimeter)** 30.45 in. Hg (1031 hPa)

ol EGKB 281250Z 30006KT 250V330 9999 SCT030 20/13 Q1031

data



- 7 stations
- Webpage updated every 30min
- One page per station including all available parameters

## Private weather stations provide data to “Weather Underground”

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Welcome to Weather Underground! [Sign In](#) or [Create an Account](#). Edit my [Page Preferences](#).

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```
Time, TemperatureC, DewpointC, PressurehPa, WindDirection, WindDirectionDegrees, WindSpeedKMH, WindSpeedGustKMH, Humidity, F
2009-04-19 00:05:00, 6.9, 4.0, 1021.2, ESE, 123, 6.4, 9.7, 82, 0.0, 0.0, 0.0, Wunderground v. 1.15,
2009-04-19 00:15:00, 6.7, 4.1, 1021.2, SE, 124, 4.8, 6.4, 83, 0.0, 0.0, 0.0, Wunderground v. 1.15,
2009-04-19 00:25:00, 6.6, 3.9, 1021.2, SE, 124, 3.2, 9.7, 83, 0.0, 0.0, 0.0, Wunderground v. 1.15,
2009-04-19 00:30:00, 6.5, 3.8, 1021.2, SE, 124, 3.2, 3.2, 83, 0.0, 0.0, 0.0, Wunderground v. 1.15,
2009-04-19 00:40:00, 6.3, 3.8, 1021.2, North, 359, 3.2, 3.2, 84, 0.0, 0.0, 0.0, Wunderground v. 1.15,
2009-04-19 00:45:00, 6.2, 3.7, 1021.2, North, 359, 4.8, 6.4, 84, 0.0, 0.0, 0.0, Wunderground v. 1.15,
2009-04-19 00:55:00, 6.2, 3.8, 1021.2, North, 359, 3.2, 9.7, 85, 0.0, 0.0, 0.0, Wunderground v. 1.15,
2009-04-19 01:00:00, 6.1, 3.8, 1021.2, North, 359, 3.2, 3.2, 85, 0.0, 0.0, 0.0, Wunderground v. 1.15,
2009-04-19 01:10:00, 6.0, 3.7, 1021.2, North, 359, 4.8, 4.8, 85, 0.0, 0.0, 0.0, Wunderground v. 1.15,
```

Important information

- 64 stations
- Webpage with daily data of all parameters in CSV-format

# Private weather stations provide data to “London Grid for Learning”

[back](#)



## Weather Monitoring System



- Real-time monitoring
- Historic data
- Teaching resources
- Satellite imagery
- Login
- Help

Parameter (hold down CTRL to select more than one):

- Barometric Pressure
- Evapotranspiration (day)
- Evapotranspiration (month)
- Evapotranspiration (year)
- Inside Humidity
- Inside Temperature
- Outside Humidity
- Outside Temperature
- Rain Rate
- Rainfall (day)
- Rainfall (month)
- Rainfall (year)
- Solar Radiation
- Storm Rain
- Ultra-Violet Index
- Wind Direction
- Wind Speed (10 minute average)

Sites:

- Ascot, Berkshire
- Ashford, Kent
- Aylesbury, Buckinghamshire
- Bedfont, W London [TESTING]
- Belmont, S London

Period of archive data to show:

- ☐ 24 hours
- ☒ 3 days
- ☐ 1 week
- ☐ 1 month

Select “3 days”  
and read second  
day

Refresh

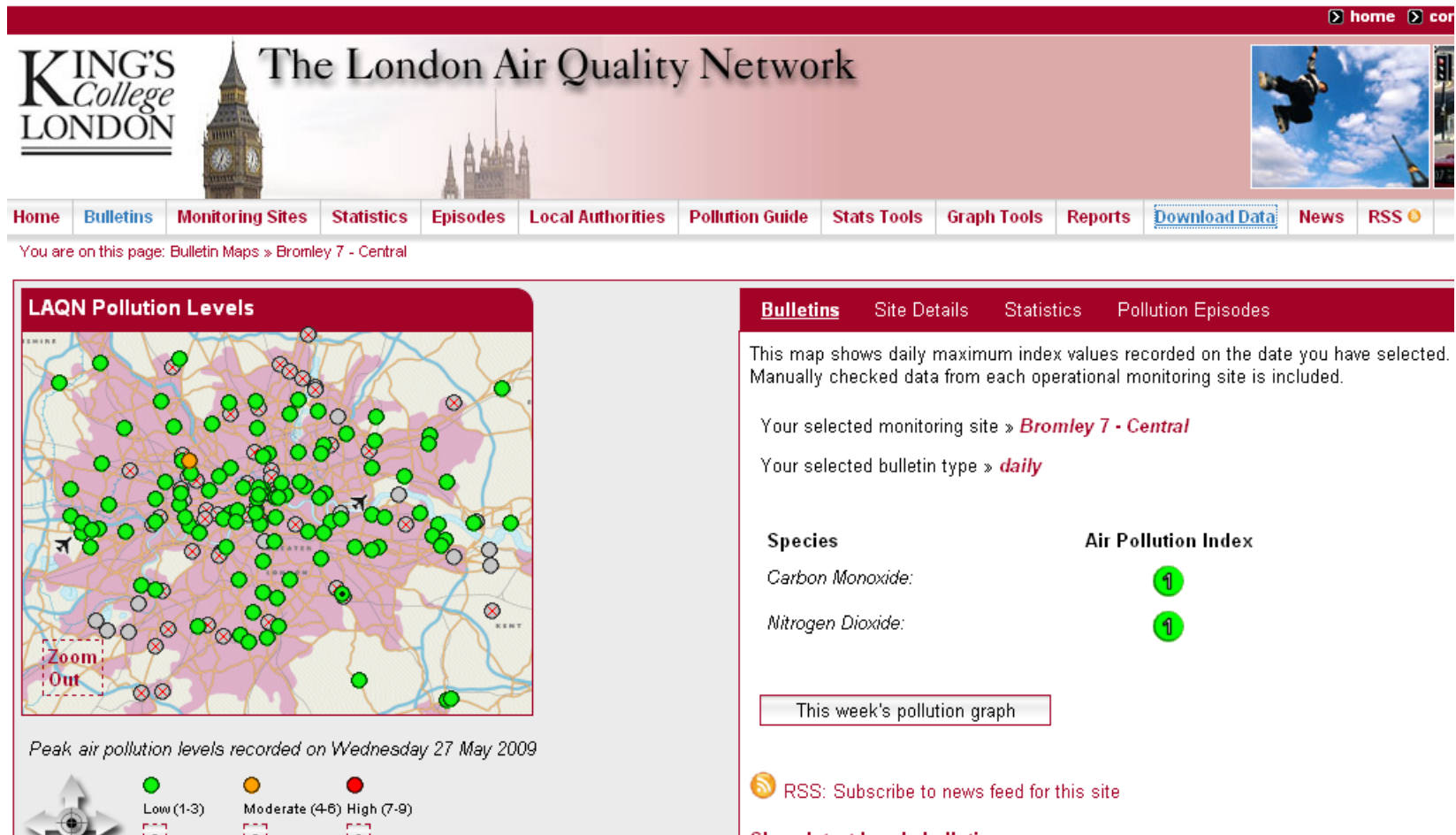
You can access this report directly via <http://weather.lgfl.org.uk/qtables.aspx?sid=31&pid=388&day=3>

data

| Date/Time           | Avg Wind (m/s) |
|---------------------|----------------|
| 25/05/2009 14:27:00 | 0              |
| 25/05/2009 14:28:00 | 0              |
| 25/05/2009 14:29:00 | 0              |
| 25/05/2009 14:30:00 | 0              |
| 25/05/2009 14:31:00 | 0              |
| 25/05/2009 14:32:00 | 0              |
| 25/05/2009 14:33:00 | 0              |

- 25 stations
- Webpage updated every min

# Quality controlled automatic weather stations, operated by The London Air Quality Network



- 51 stations
- Daily file including all parameters of one station can be downloaded directly ('wget')
- Due to quality control performed by LAQN, data are available with delay of 14 days

File convention for data files stored in

I:\YYYY\London\ALL\spatial\_V2\*\$source*\*\$source**\$sitenumber*\

File name structure ***\$CODEYYYYDDD.txt***

Missing Value: -99

Three header lines:

%*sitename*File Created: *\$time*

%Created by *programname*Source: *webpage*

%yr|mo|d|hr|min|DOY|dectime|dir(°)|U(m/s)|U10(m/s)|Tair(°C)|Tdew(°C)|RH(%)|p(hPa)|precip(mm/h)|Kdn(W/m^2)

| Column | Variable                  | Units             |
|--------|---------------------------|-------------------|
| 1      | Year                      |                   |
| 2      | Month                     |                   |
| 3      | Day                       |                   |
| 4      | Hour                      |                   |
| 5      | Minute                    |                   |
| 6      | DOY                       |                   |
| 7      | Decimal Time              |                   |
| 8      | Wind Direction            | °                 |
| 9      | Wind Speed                | m s <sup>-1</sup> |
| 10     | Wind Speed 10min average  | m s <sup>-1</sup> |
| 11     | Air Temperature           | °C                |
| 12     | Dew Point Temperature     | °C                |
| 13     | Relative Humidity         | %                 |
| 14     | Air Pressure              | hPa               |
| 15     | Precipitation             | mm/h              |
| 16     | Incoming Solar Radiatioon | W/m^2             |

File convention for data files stored in

I:\YYYY\London\ALL\spatial\_V2\***\$parameter***\***\$source***\ave\***\$source***YYYYDDD\_15.txt

I:\YYYY\London\ALL\spatial\_V2\***\$parameter***\***\$source***\std\***\$source***YYYYDDD\_std.txt

I:\YYYY\London\ALL\spatial\_V2\***\$parameter***\***\$source***\flag\***\$source***YYYYDDD\_flag.txt

File name structure

Missing Value: -99

Temporal resolution: 15 min

Three header lines:

%***\$parameter*** for ***\$number-of-stations*** stations (for station-info see siteDetails)

%File Created:***\$time*** by ***\$programname***

%yr|mo|d|hr|min|dectime|

| Column | Variable                  |
|--------|---------------------------|
| 1      | Year                      |
| 2      | Month                     |
| 3      | Day                       |
| 4      | Hour                      |
| 5      | Minute                    |
| 6      | Decimal Time              |
| 7      | <b><i>\$parameter</i></b> |

...

...

***\$number-of-stations***

Flag

|   |         |                                      |
|---|---------|--------------------------------------|
| 1 | 100 %   | data availability for 15 min average |
| 2 | >= 50 % | data availability for 15 min average |
| 3 | <50 %   | data availability for 15 min average |
| 4 | 0%      | data availability for 15 min average |
| 5 |         | Inactive site                        |

## Quality Control / Quality Assurance (temporal)

1. Physically reasonable? Fixed barriers specified for each parameter in parameterDetails.m
2. Calculate average and standard deviation of all stations for each time step, value is neglected if it exceeds  $2.4 \times \text{std}$
3. Comparison of values of consecutive time steps to delete constant values or too sharply increasing/decreasing values (physically reasonable gradient is given in parameterDetails.m)
4. Interpolation for data gaps of single 15min period
5. Calculate mean daily value of all stations and standard deviation between stations averaged over all time steps as well as absolute minimum and maximum values

## Quality Control / Quality Assurance (spatial)

1. Identify areas with scarce coverage
2. Evaluate importance of individual stations
3. ...