

SCOTTISH ENVIRONMENT PROTECTION AGENCY

A update presentation to the EEA
CleanAir@School Project

December 2019



CleanAir@School

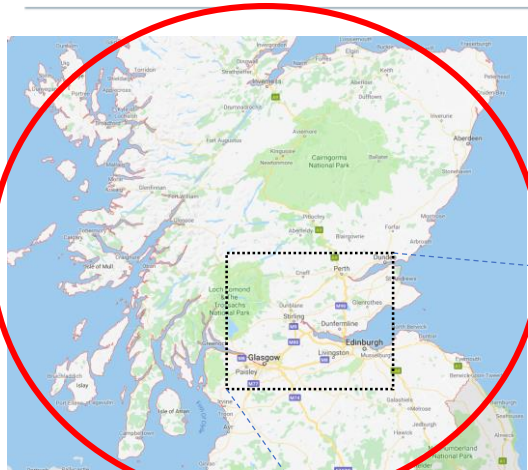
**European
Environment
Agency**

SEPA has taken three different approaches to the Citizen Science programme

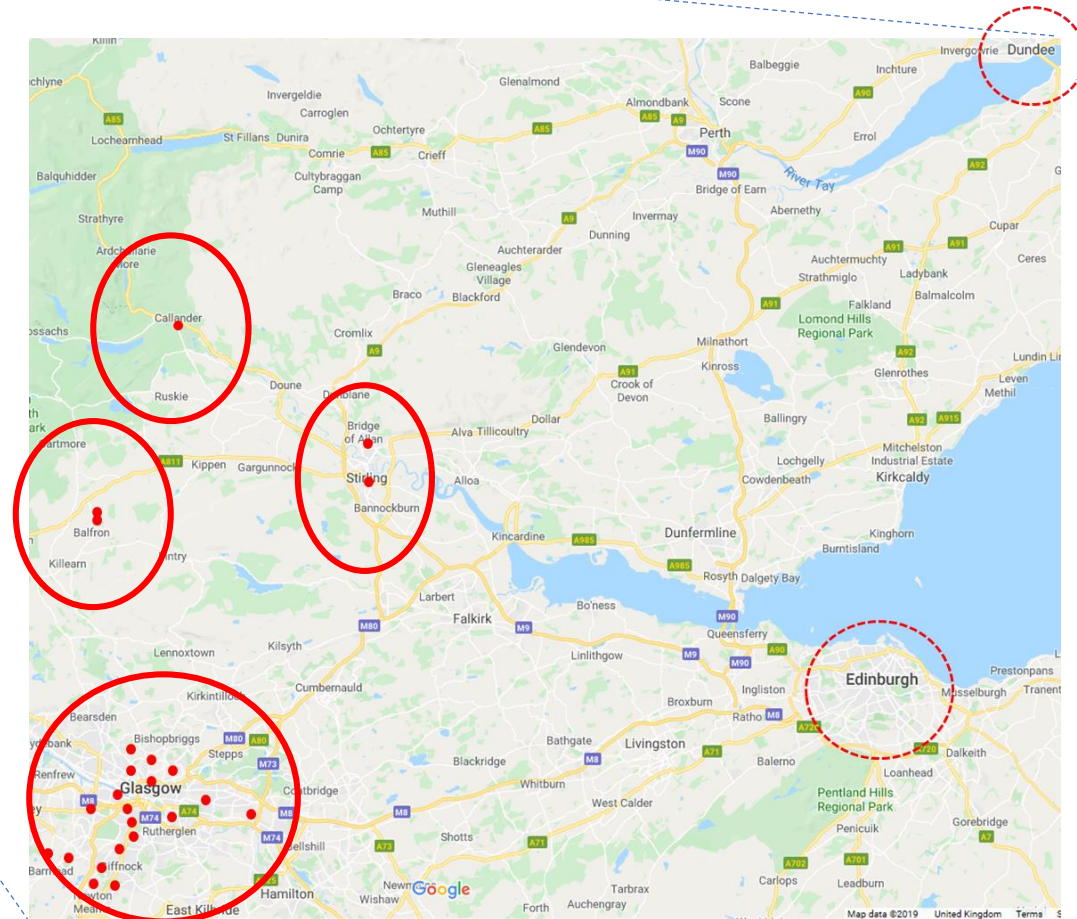
1. **Promotion** – Banner competitions to promote air quality issues and solutions
2. **Informing** – Monitoring at schools to inform of air quality issues and solutions
3. **Educating** – Promoting the use of our free teaching resource (combining promoting and informing)



**15 out of 32 Scottish local authorities
participating (metropolitan areas,
urban, rural, remote rural)**



**Over 50
schools
involved,
more
interested
each
month**



Harnessing creativity to deliver the messages



National publicity



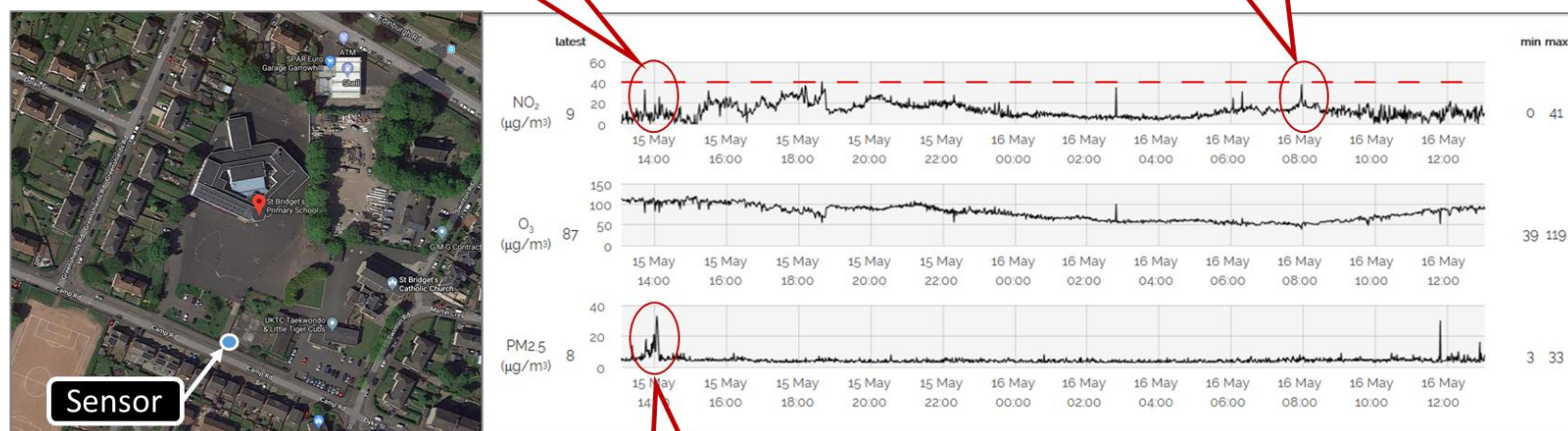
Single monitor exercises

St Bridget's Primary School, Glasgow

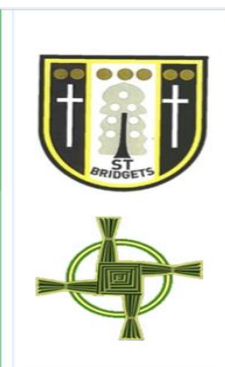
Time: 14:43 – 15:11
NO₂: 33 µg/m³ (max_

Date: 15 – 16 May 2019

Time: 8:55
NO₂: 38 µg/m³



Time: 15:03
PM_{2.5}: 33 µg/m³



Combined with anti-idling and anti-smoking campaigns

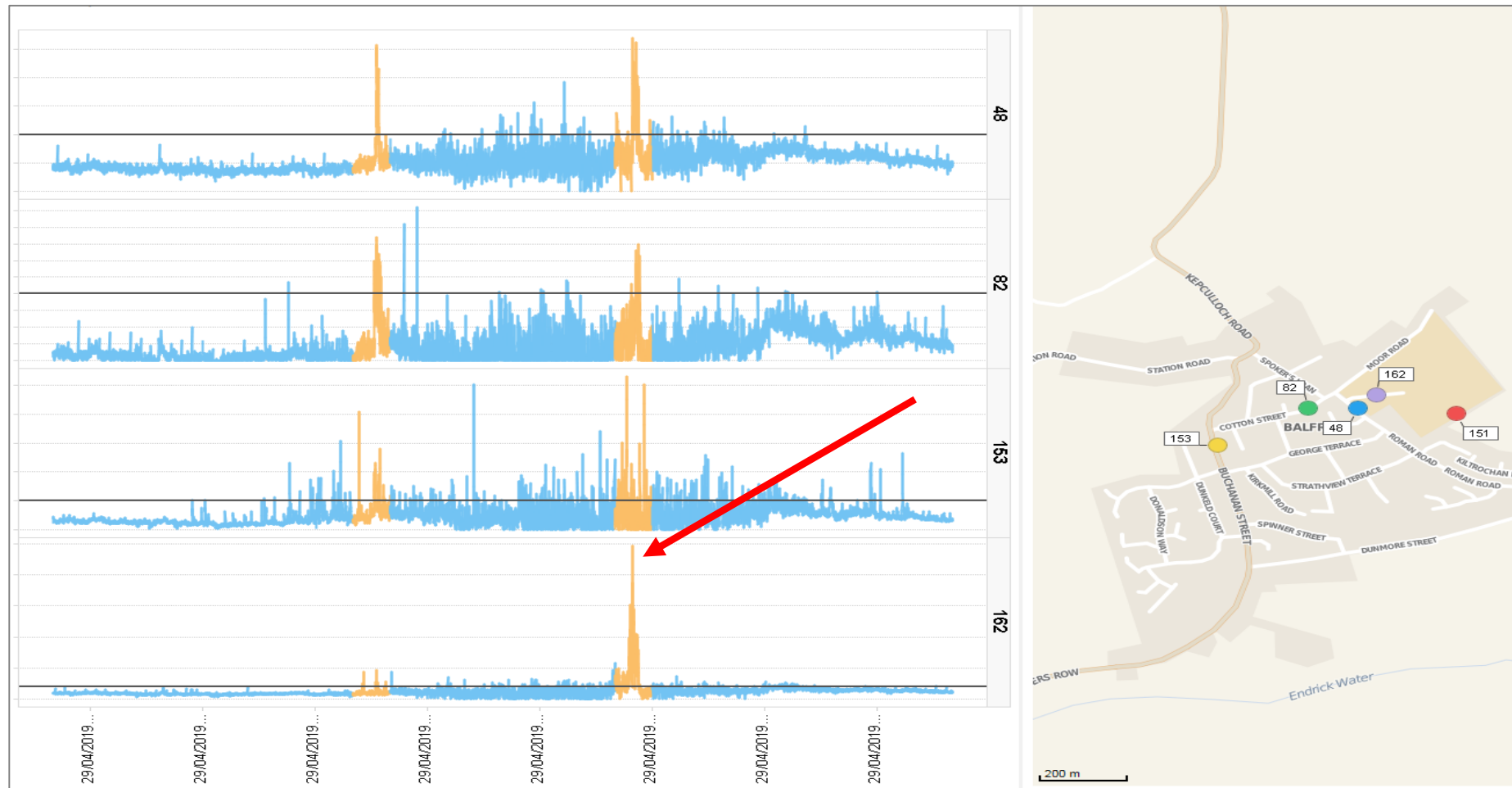
Multiple monitor exercises



- Rural school campus, high number of pupils bused
- 4 low cost sensors placed in school and on access roads/walking routes to school
- Monitoring for 1 month

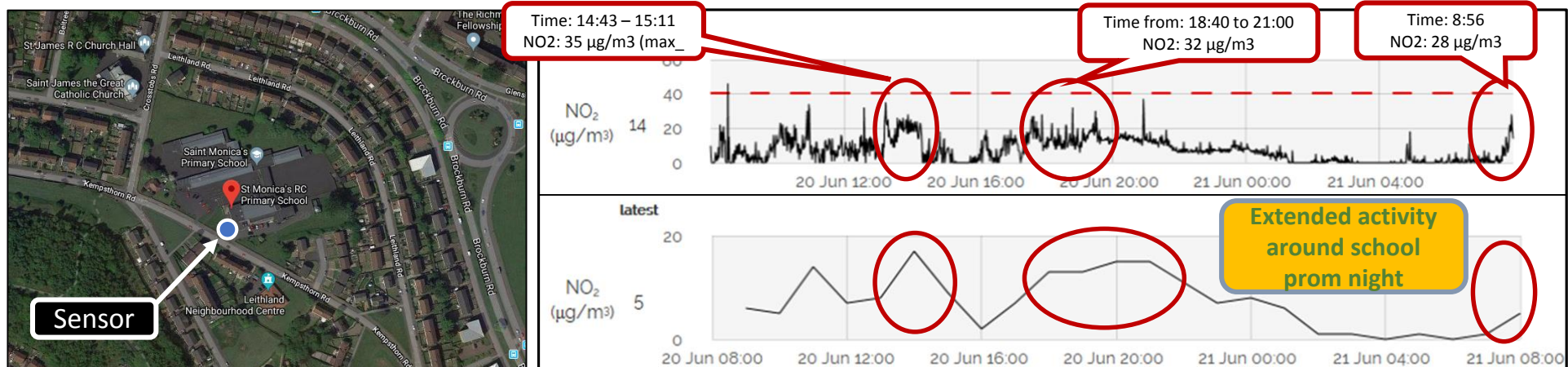


Emissions on a typical school day



Data presentation is very important

St Monica's Primary School, Glasgow

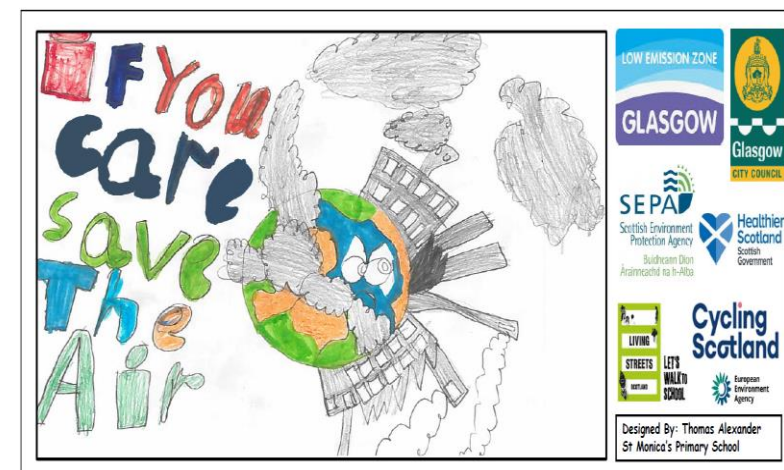


Minute interval data

- Peaks around 14:15 (school bus)
- High activity from 18:30 – 21:00 (school prom night)

Hourly averages

- Maximum has dropped from 46 to 17µg/m³
- Trends still observed in much clearer way



Challenges

Commitment

- SEPA has not fully committed to the project, scepticism about the value of the work

Resources

- Funding is in place, difficult to use it all
- Need more people on-the-ground to implement projects
- Interest is hugely oversubscribed
- This work is additional to day job

Technology

- We are still waiting for the EdT delivery (over 2 years now) – We will be switching supplier
- Some monitoring equipment has not worked (low light levels and solar panels)



Next steps

Work currently under development

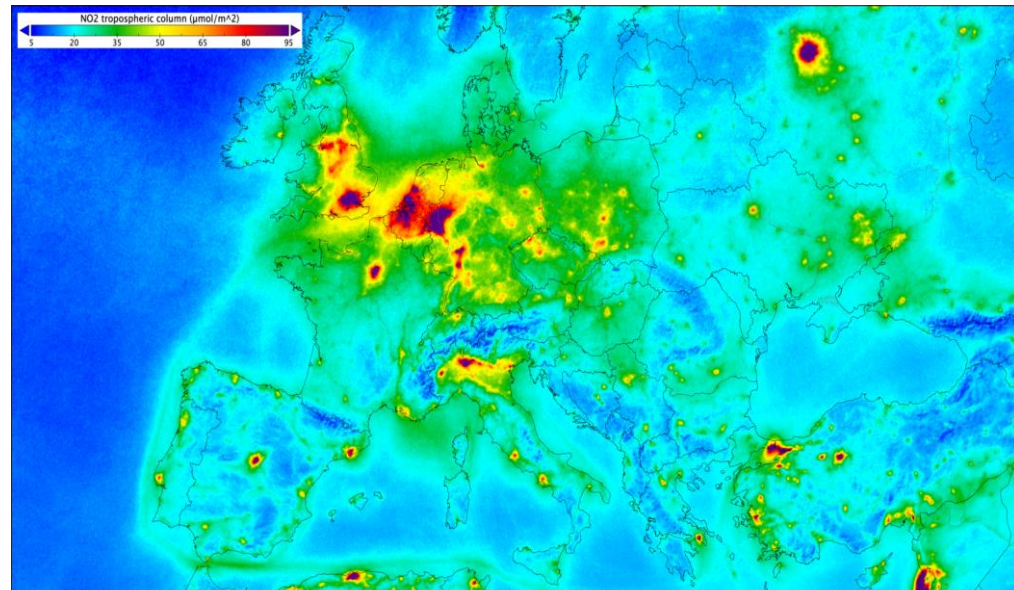
- Schools banner competition running for the foreseeable future
- SEPA's Learn About Air teaching package is being updated
- SEPA is in the process of purchasing a minimum of 5 low cost sensors for deployment at schools
- SEPA/EPA are in the process of developing a Raspberry PI air quality monitoring package (Sensors built and coded by pupils)

```
63 #####
64 # Here we start to collect the data and write it into a file.
65
66 #initialise file to write data to
67 f = open("enviroData.txt","wt")
68
69 # All of the below is inside a 'try' statement. This means all of it will be
70 # executed by the computer, and that will stop when there is an interruption
71 # from the keyboard i.e. CTRL and C will stop the computer doing everything
72 # under 'try', and instead start doing everything under 'except'.
73 try:
74     while True:
75         a=dt.datetime.now()
76         light = ltr559.get_lux()
77
78         temperature = bme280.get_temperature()
79         pressure = bme280.get_pressure()
80         humidity = bme280.get_humidity()
81
82         readings = gas.read_all()
83         carbmon = readings.reducing
84         nitrox = readings.oxidising
85         ammonia = readings.nh3
86
87         try:
88             pmreadings = pms5003.read()
89         except ReadTimeoutError:
90             pms5003 = PMS5003()
91             smallpm = pmreadings.pm_ug_per_m3(1.0)
92             mediumpm = pmreadings.pm_ug_per_m3(2.5)
93             largepm = pmreadings.pm_ug_per_m3(10)
94
95         f.write( str(a) + "\t" + str(light) + "\t" + str(temperature) + "\t" + str(pressure) +
96                 "\t" + str(humidity) + "\t" + str(carbmon) + "\t" + str(nitrox) + "\t" + str(ammonia) +
97                 "\t" + str(smallpm) + "\t" + str(mediumpm) + "\t" + str(largepm) + "\n")
98         time.sleep(30)
99     except KeyboardInterrupt:
100         pass
101 finally:
102     f.close()
```

Next steps

Other major developments in 2020

- Scottish Government are reviewing their clean air strategy. New version to be published in November 2020 – hoping citizen science work will play a key role
- 3rd National Clean Air Day in June 2020
- LEZs in Scotland four largest cities by the end of 2020 (Glasgow, Edinburgh, Aberdeen and Dundee)
- Projected compliance with EU NO₂ limit value
- Entry into force of WHO PM_{2.5} limit value



 Air Quality Guidelines World Health Organization µg/m³ = micrograms per cubic meter	
PM _{2.5}	PM ₁₀
10 µg/m ³ annual mean	20 µg/m ³ annual mean
25 µg/m ³ 24-hour mean	50 µg/m ³ 24-hour mean



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 ScottishEnvironmentProtectionAgency

 ScottishEPA

