

SCOTTISH ENVIRONMENT PROTECTION AGENCY

The European CleanAir@School Project

March 2020





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)

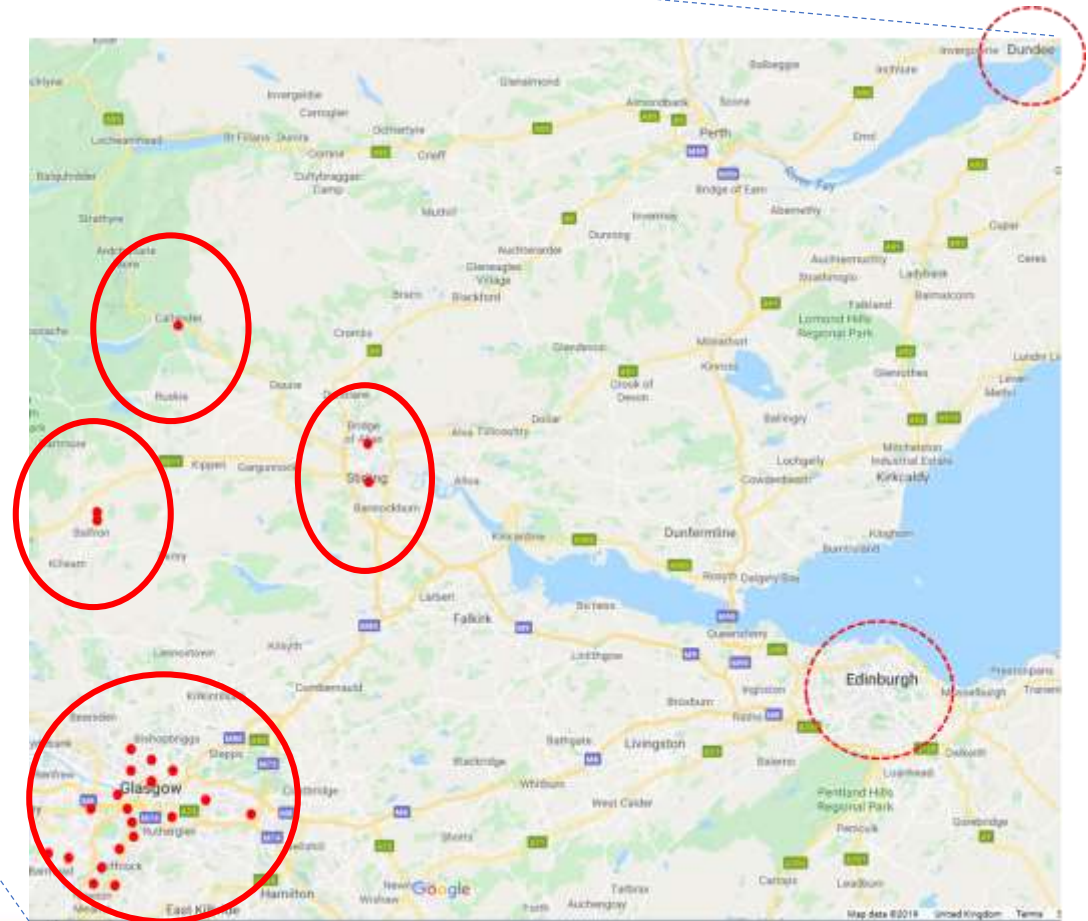
SEPA has teamed up with several local authorities offering a mix of both approaches to fit in with their activities





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

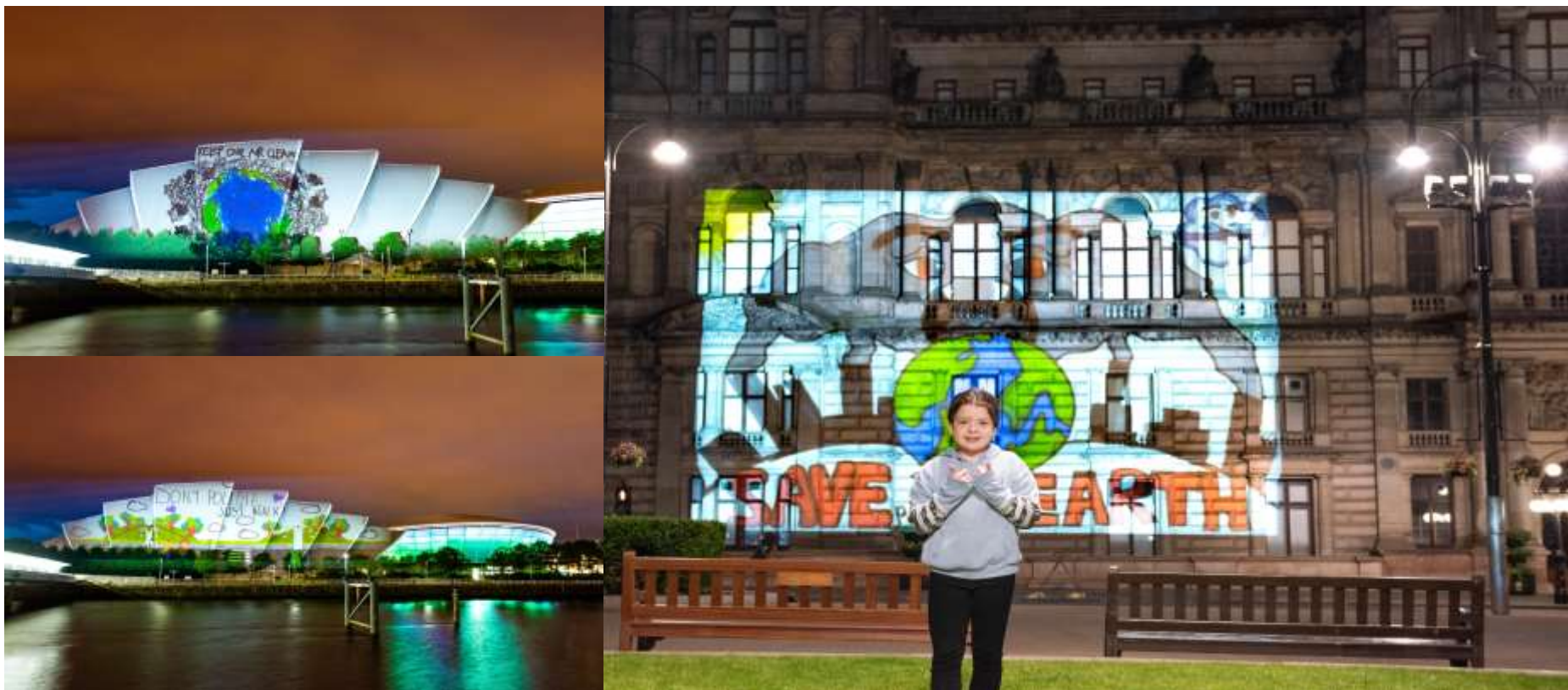
**Over 50
schools
involved,
more
interested
each
month**



Harnessing creativity to deliver the messages



National publicity



National publicity



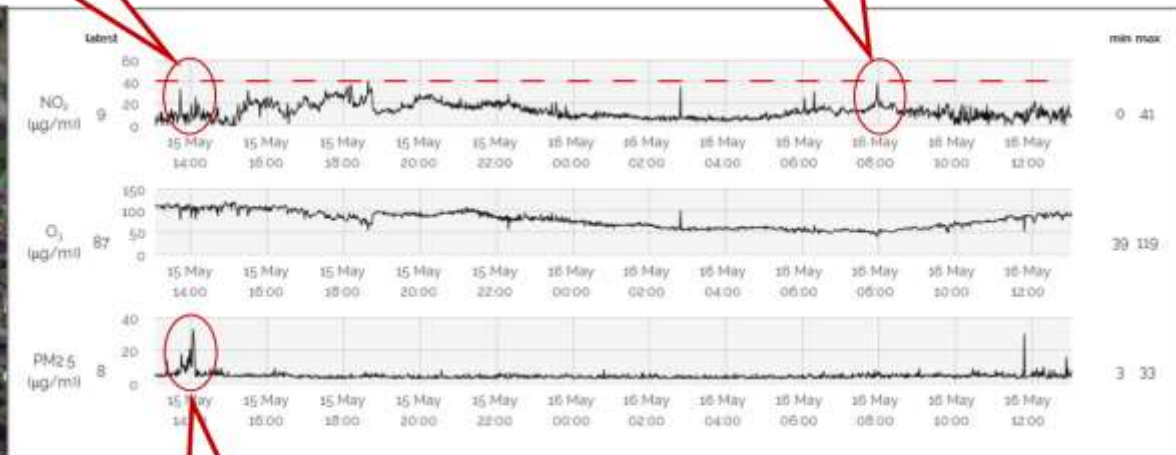
Linking with Health Issues around the school

St Bridget's Primary School, Glasgow

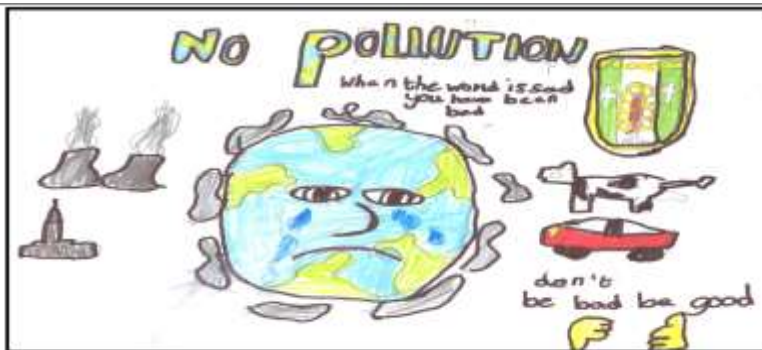
Time: 14:43 – 15:11
NO₂: 33 µg/m³ (max_

Date: 15 – 16 May 2019

Time: 8:55
NO₂: 38 µg/m³



Time: 15:03
PM2.5: 33 µg/m³



Combined with anti-idling and anti-smoking campaigns

Linking with individual School campaigns

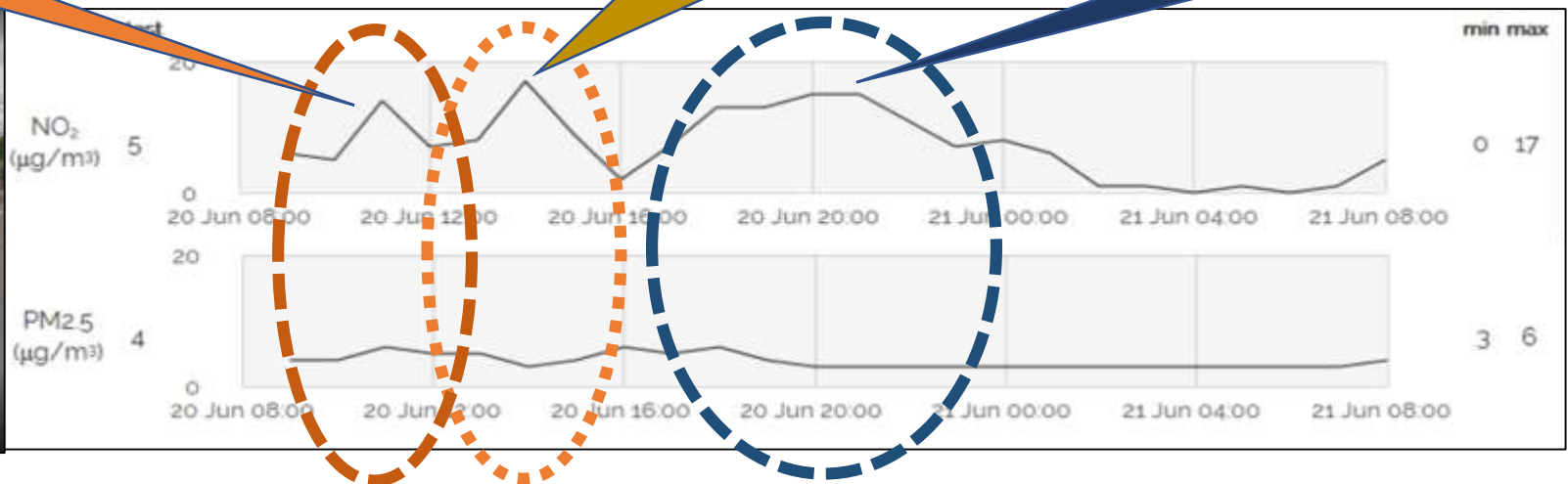
Morning drop off
Max: 17 $\mu\text{g}/\text{m}^3$

Afternoon pick-up
Max: 24 $\mu\text{g}/\text{m}^3$

School Prom Night
Max: 45 $\mu\text{g}/\text{m}^3$



St Monica's Primary School



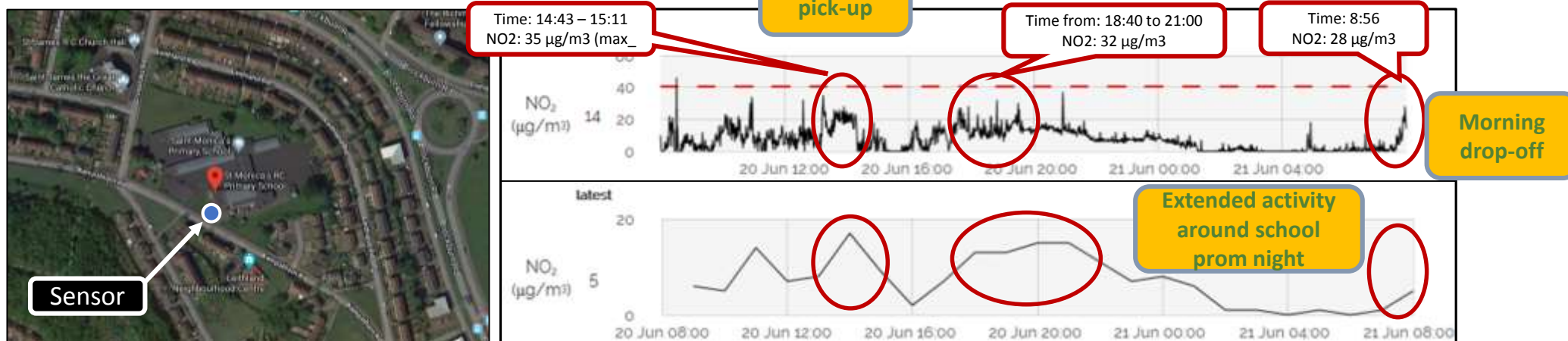
More parents in the morning turn off their engines and go into school

In the afternoon parents sometimes sit in the car with the engine still running



Data presentation is very important

St Monica's Primary School, Glasgow



Minute interval data

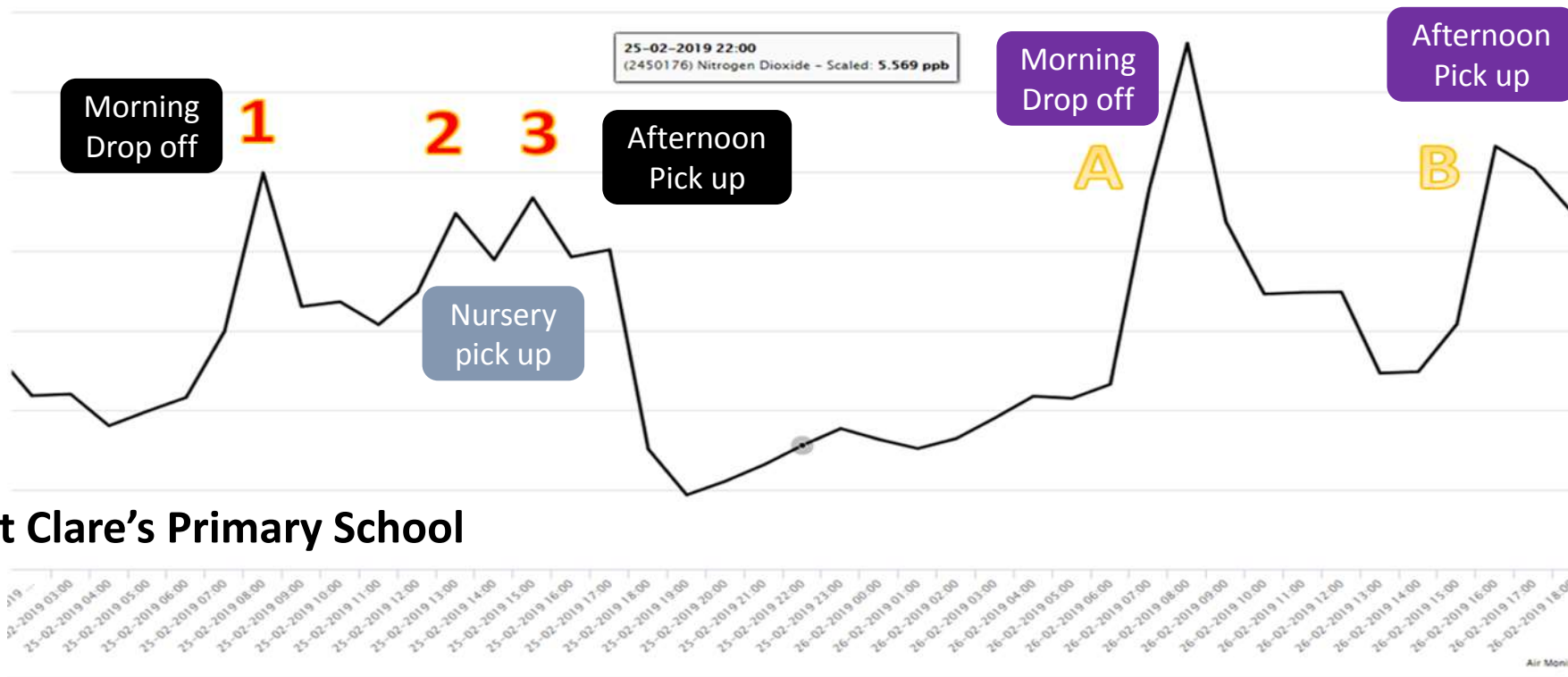
- Peaks around 14:15 (school bus)
- High activity from 18:30 – 21:00 (school prom night)

Hourly averages

- Maximum has dropped from 46 to 17 $\mu\text{g}/\text{m}^3$
- Observe trends in simple and clear way



Linking to local activities



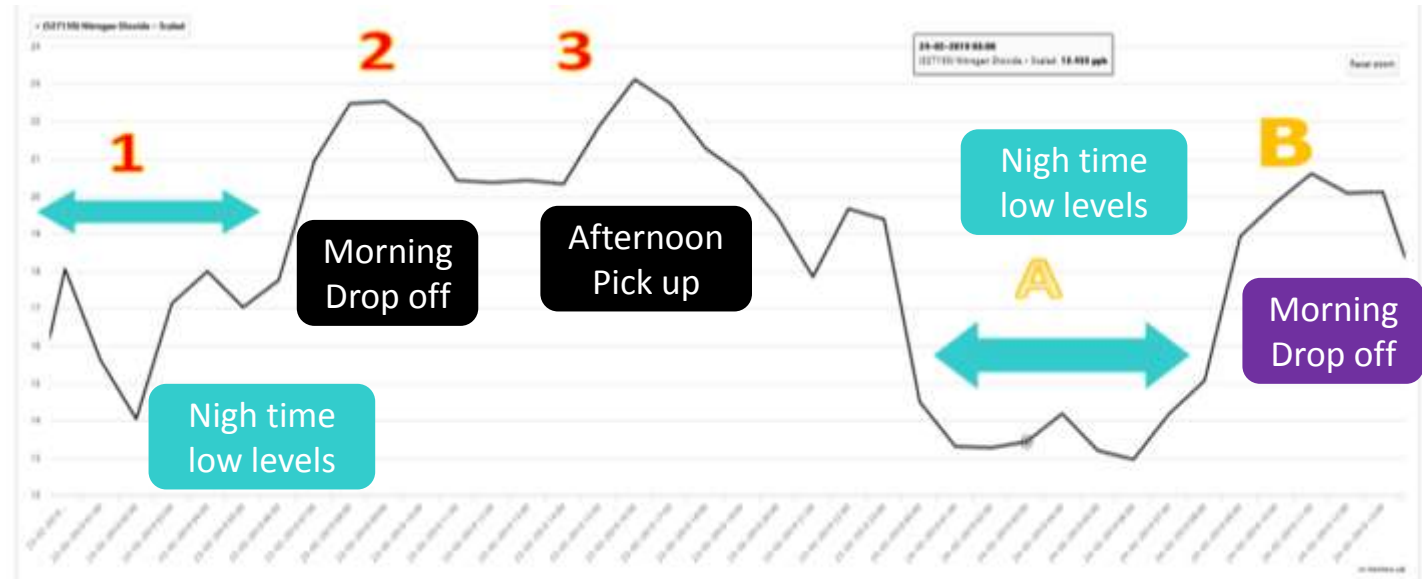
Linked to active travel
campaign Beat the
Street



Promoting active travel to school

Cross Arthurlie Primary

Linking to cycling
proficiency
Bikeability week



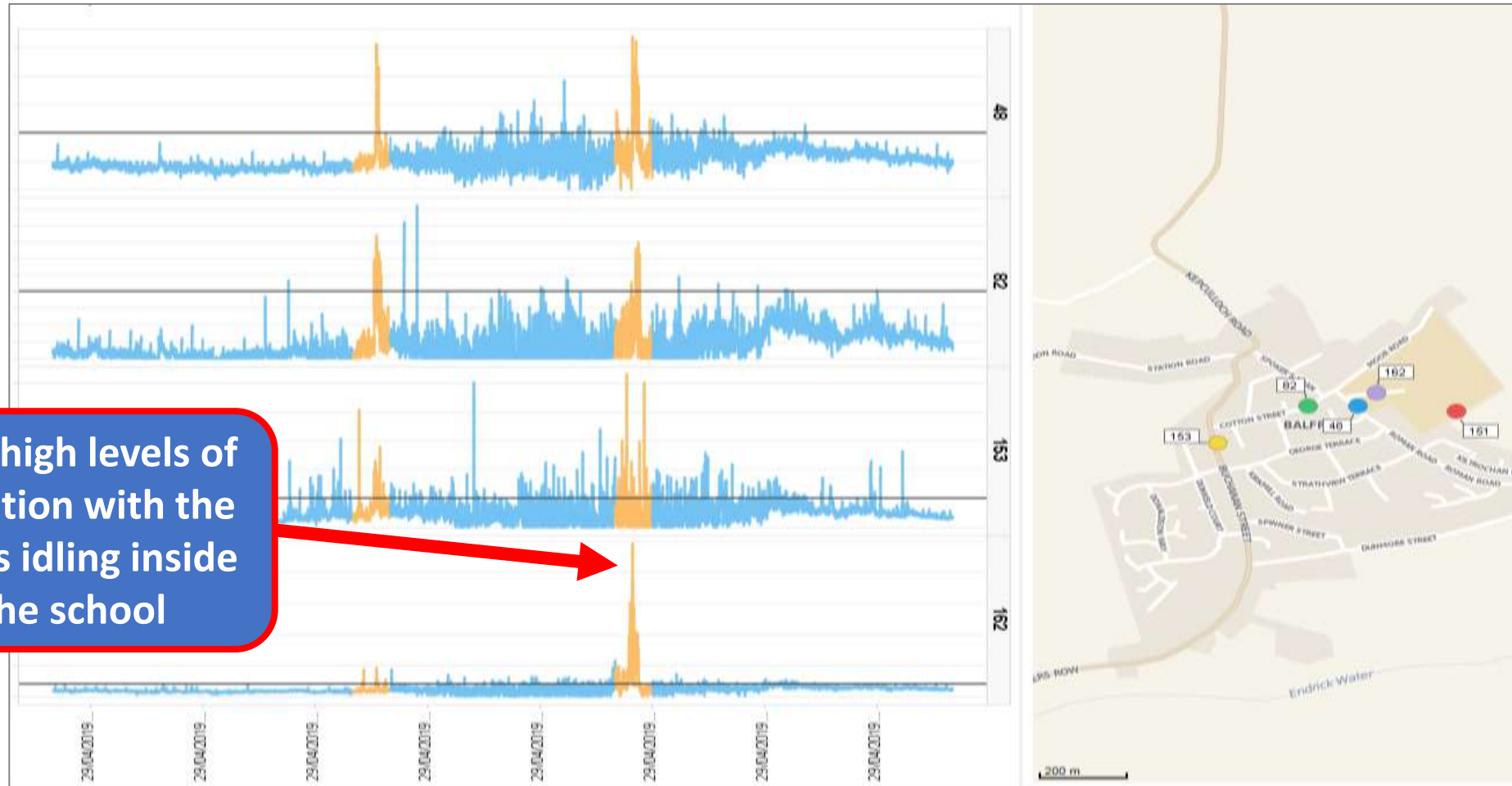
Multiple monitor exercises



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



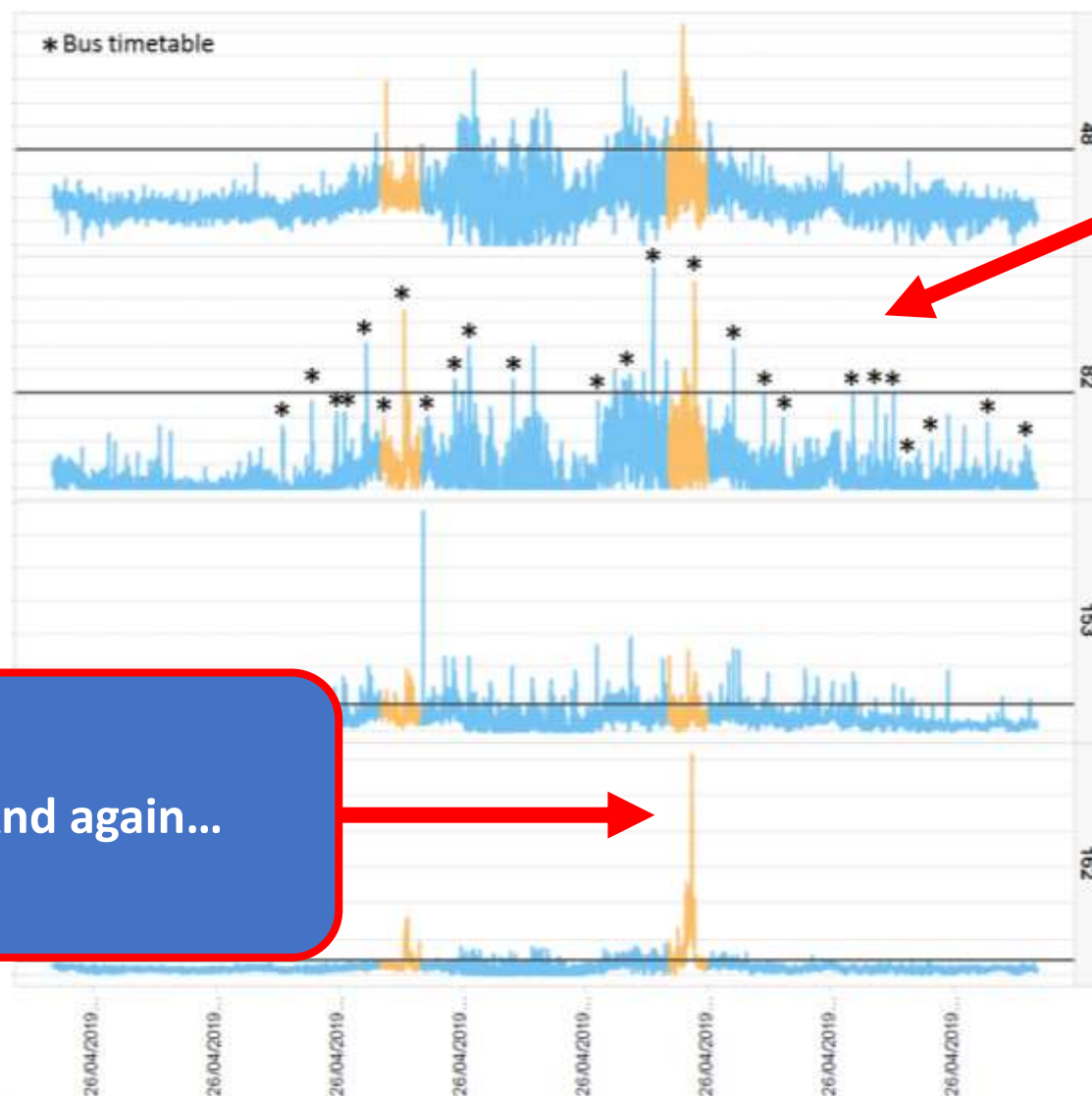
6th year Geography Project



Emissions on a typical school day

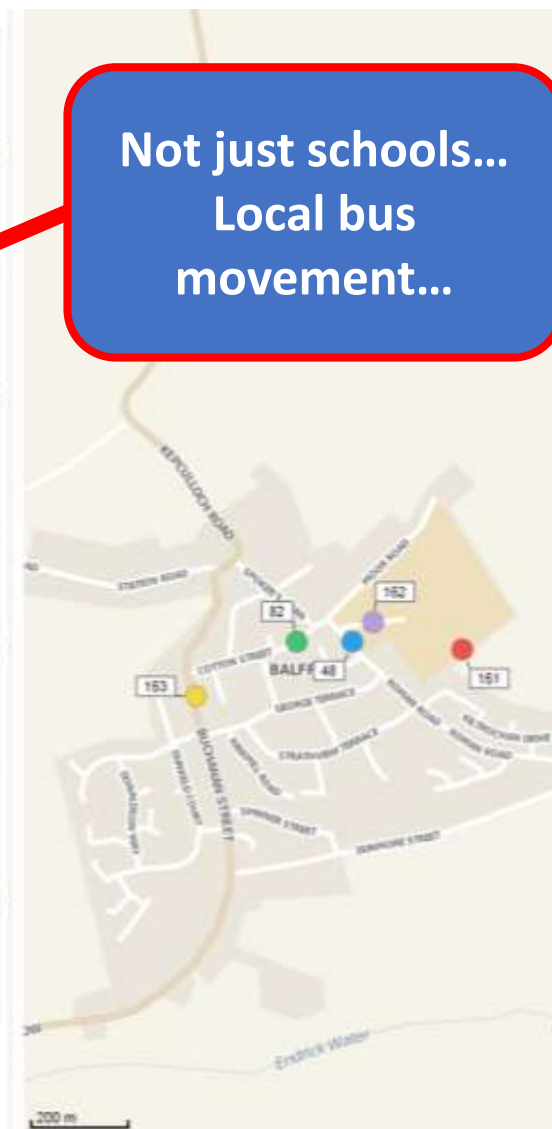
Pupils and local authority looking to solve the problem

6th year pupil studied bus movement



Not just schools...
Local bus
movement...

And again...



Challenges

Commitment

- Not easy to full commitment to the project, some scepticism about the value of the work

Resources

- Difficult to secure funding...
- We need more people on-the-ground to implement projects
- Interest is hugely oversubscribed
- This work is additional to day job

Technology

- Need something the kids can actually put up
- We are still waiting for the EDT delivery (over 2 years now)
- Some equipment hasn't worked
- Thinking of the challenges ahead...



Next steps

Work currently under development

- Schools banner competition running for the foreseeable future
- Learn About Air Quality 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  
65  
66 #initialise file to write data to  
67 f = open("enviroData.txt","w+")  
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:
```






Contact details

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