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A Greenhouse Gas Data Dashboard

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Widening Reach

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SUMMARY (100 word abstract)

In 2021 the COP26 summit was held in Glasgow. To highlight the research done by an international team of researchers, we built a live data dashboard to display measurements from sensor networks across Glasgow and the surrounding area. Sensor networks were installed by teams of researchers from Berkeley, the University of Cambridge and the National Physical Laboratory. The sensors measured greenhouse gases such as carbon dioxide (CO_2) and methane (CH_4) alongside dangerous particulate matter ($PM_{2.5}$) emissions. This data was automatically uploaded to our cloud processing functions which then processed the data to be made available on our publicly accessible dashboard.

What did you do?

I built a live data dashboard to display measurements of the greenhouse gas emissions across the Glasgow area for the 2021 UN Climate Change Conference (COP26). I organized meetings with the three groups installing the sensor networks, ensured smooth automated data upload from the sensors and put in place cloud infrastructure to accept the data, process it and then make it available on the dashboard. The dashboard itself is hosted on GitHub and is open-source, and all data was published under the CC-BY-SA-4.0 licence.

Why did you do it?

To provide attendees the ability to see, in near real-time, the greenhouse gas emissions around them. Giving people data taken from sensors in their close vicinity makes the information more affecting, they might have been to the school which has a sensor on its roof, or walk down that road every day. I wanted to make the data easily accessible to the public and for it to be explained clearly. Publishing all of the data and processing scripts on GitHub hopefully makes the scientific process more transparent.

How did you do it?

As a Research Software Engineer based in the Atmospheric Chemistry Research Group (ACRG) I had some experience of simple web design and cloud technologies and leveraged this experience to create a system with a number of working parts. By designing the interface of the dashboard iteratively and asking a diverse range of people to give feedback on the accessibility of the page, I was able to create a site that was useful to both the public and researchers. I was also fortunate to be working with a team of academics that prize open science and were happy for all of the measurement data to be freely available.

What barriers / challenges did you have to overcome?

Organising meetings with busy groups who were installing instruments in a wide variety of locations meant that sometimes deadlines were tight. Each sensor network outputs data in a different format, so upload and processing scripts had to be customised and thoroughly tested to ensure the stable operation of the dashboard during COP26.
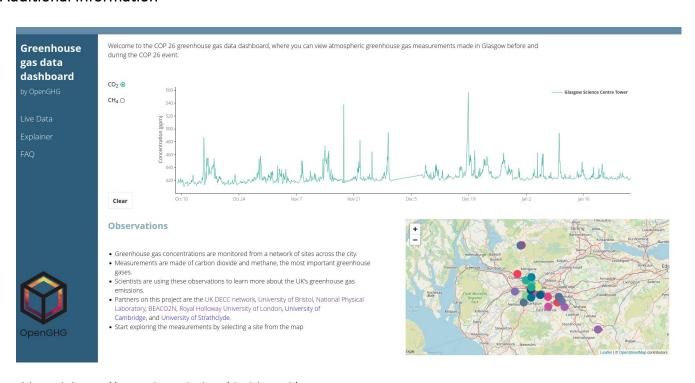
What does it mean for you and your research?

I gained a lot of experience organising a small project and ensuring it all came together in time. I've also developed valuable new relationships with the groups installing the sensors. After the success of the dashboard I'm now building one for the DECC (Deriving Emissions linked to Climate Change) network of tall telecommunication tower based sensors across the UK and Ireland.

How might your findings / approach help other researchers?

I built the dashboard in a way that should be easily customisable to others in case another group would like to build their own. I ensured the code was well documented and easy to read and get running. It is also completely open source under the Apache Licence, Version 2.0

Additional Information

Dashboard: https://openghg.github.io/dashboard/

Dashboard repository - https://github.com/openghg/dashboard

Dashboard data repository - https://github.com/openghg/dashboard_data

Dashboard data processing scripts repository - https://github.com/openghg/gather