

# OpenGHG

A platform for greenhouse gas analysis

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**Conference:** *derSE25 – Karlsruher Institut für Technologie*

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# The Air We Breathe: Insights from a Data-Rich Planet



Sensor Networks

.nc .txt .xlsx .xml .



Data Storage?



Embargo on data?



Licensed data?



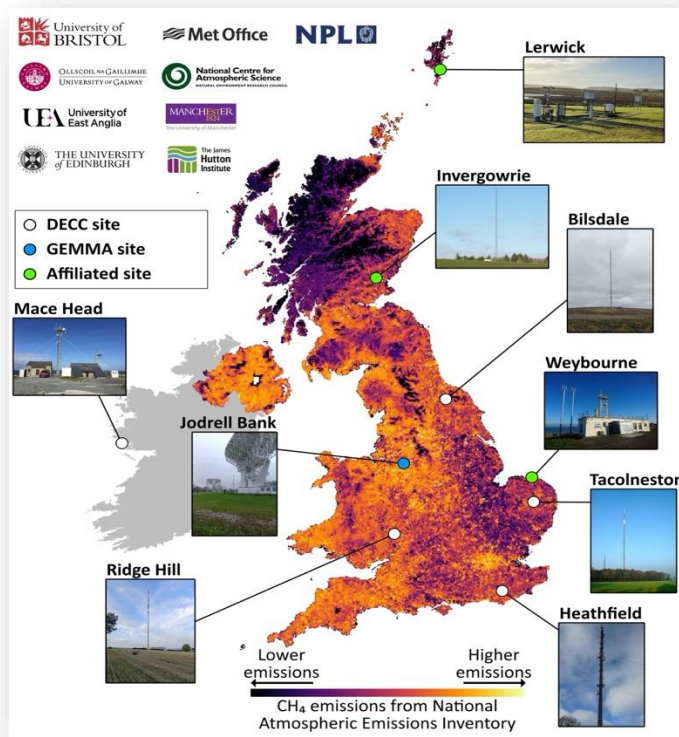
# Sensor Network



Different calibration, Complex data



Local storage



Conventional Data sharing



High frequency,  
Higher Size

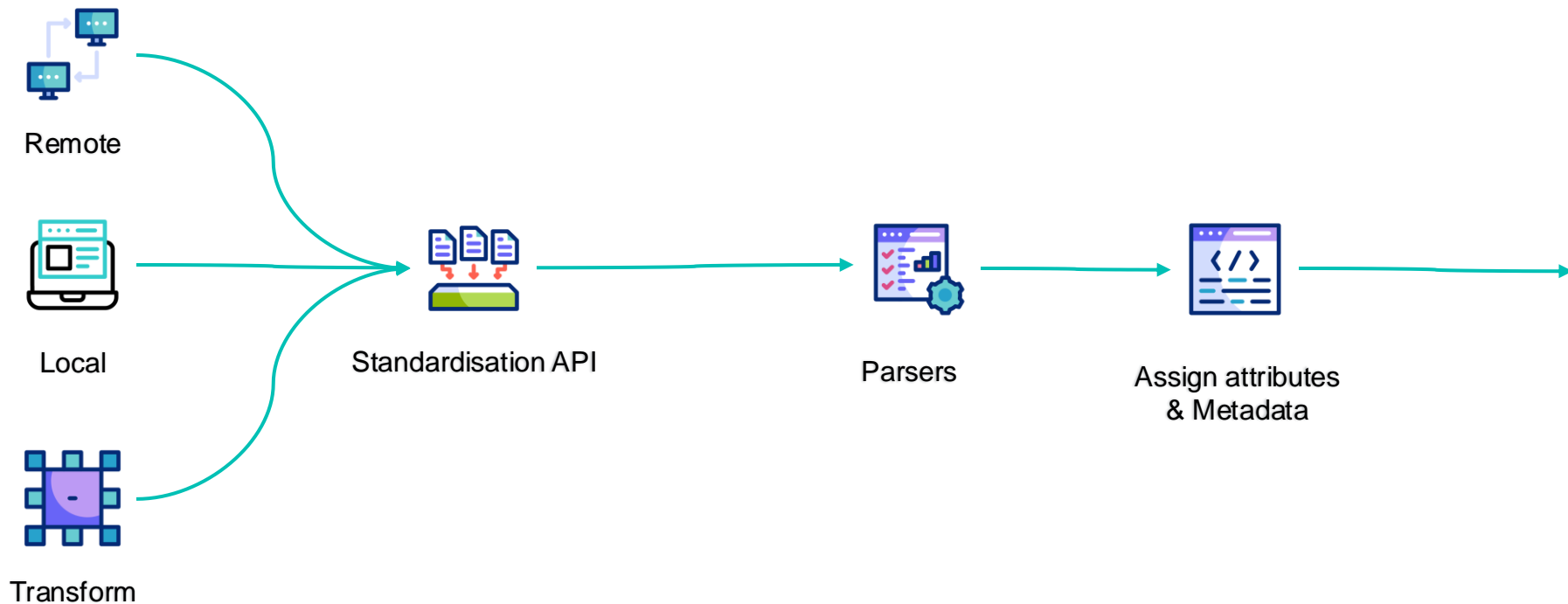
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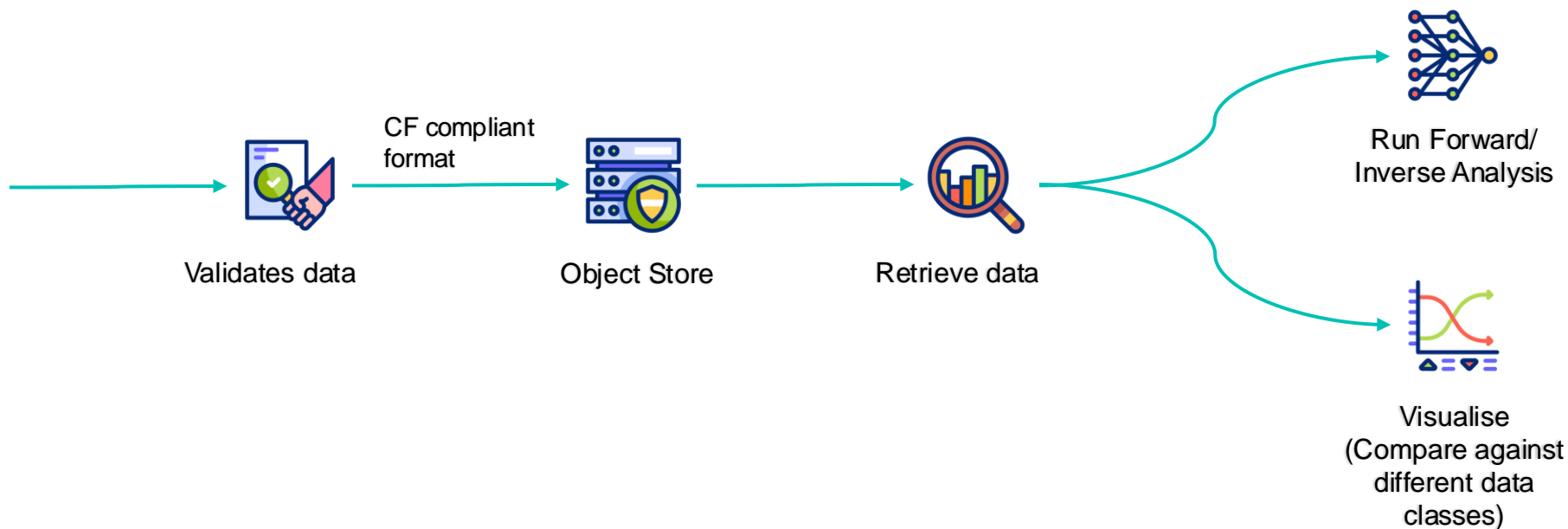
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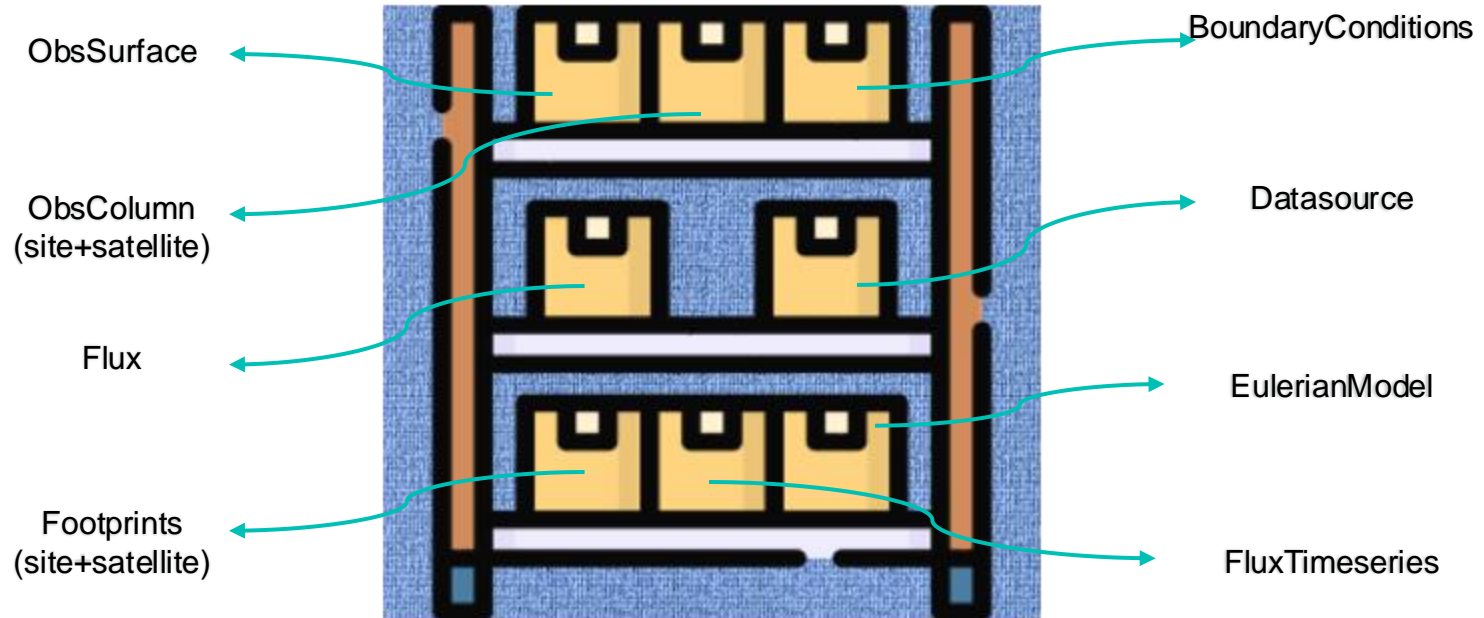
# What is OpenGHG



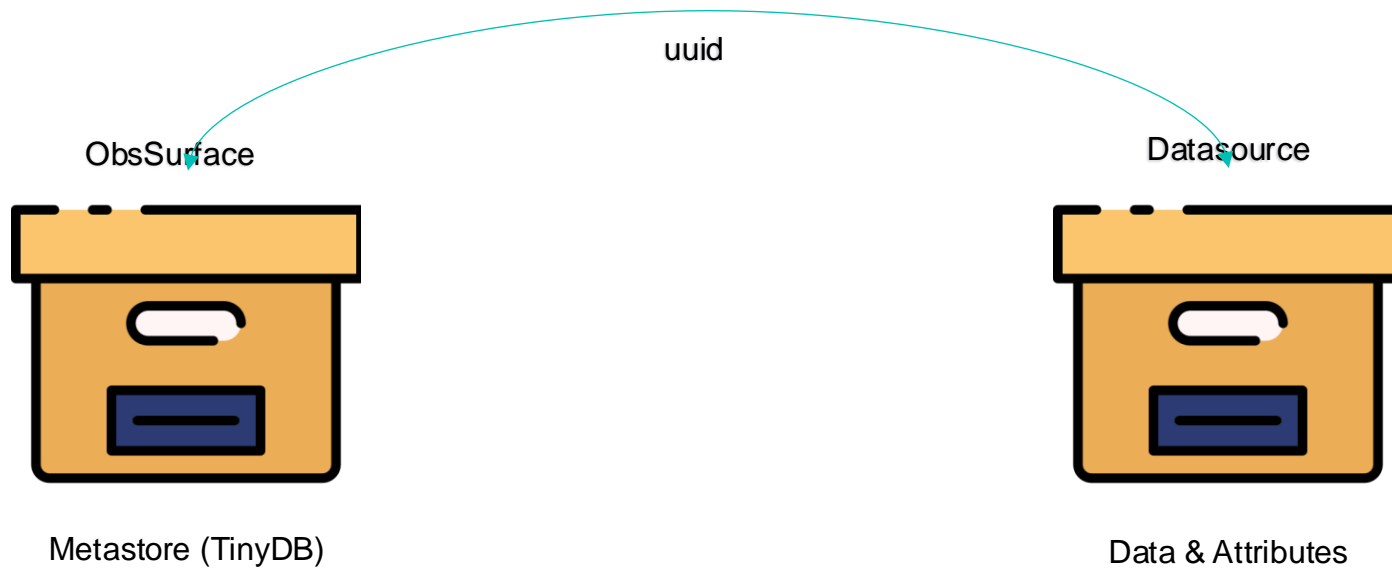
# What is OpenGHG



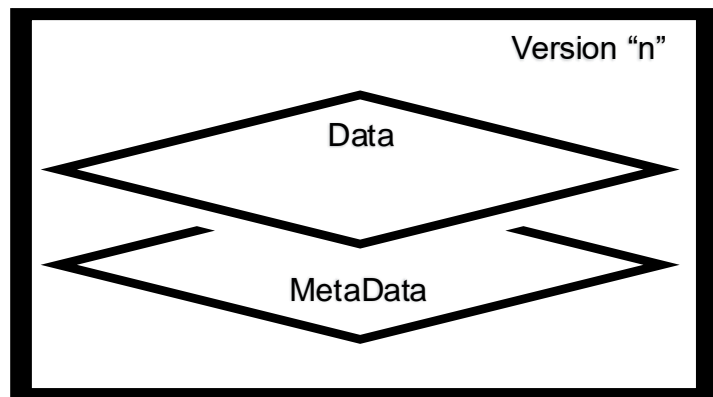
# Lets look at ObectStore



# Lets look at ObectStore



# Lets Look at Datasources

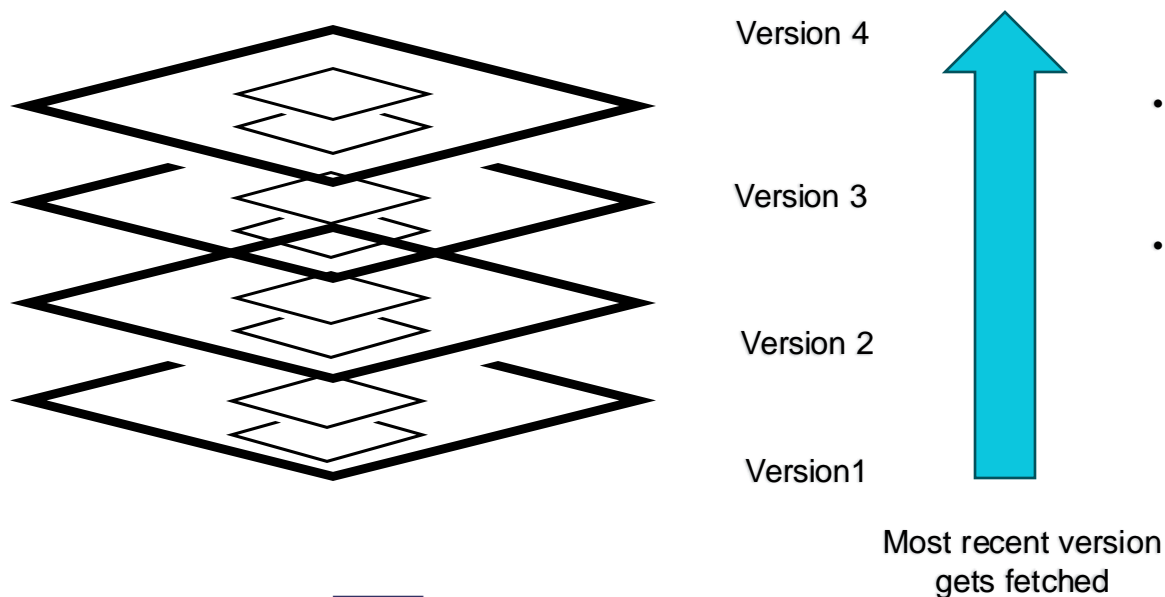


site="mhd"  
species="ch4"  
inlet="10m" ...

- OpenGHG stores individual data sources using keywords
  - Categorised and searchable
- This can be directly output to netcdf containing appropriate data variables and attributes
- Stored internally in CF-compliant format



# Lets Look at Datasources

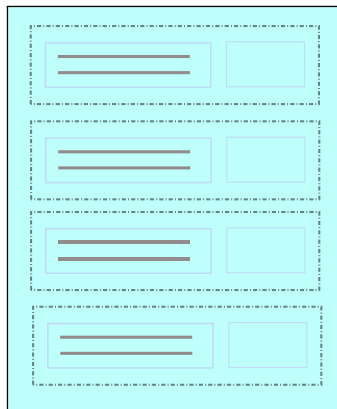


- Versions can be created for each of these data sources.
- Most recent will be accessed by default when retrieving the data.

# ObsPacks

## *OpenGHG object store*

All associated data files standardised and stored.



Output data files  
.netCDF  
CF-compliant



## **ObsPack**

- Product description
  - NetCDF files
    - Data
    - Attributes
- Naming convention
- Sub-categorised by observation type (surface-insitu, surface-flask, column)

# Zarr's Impact: Faster, Smarter, and More Efficient Data Storage

## Before

Memray run stats ✕

Command line: /opt/anaconda3/envs/openghg\_conda\_env/lib/python3.11/site-packages/ipykernel\_launcher.py --f=/Users/vq21425/Library/Jupyter/runtime/kernel-v2-1562Ju0AnMpMA1RI.json

Start time: Sun Jul 14 2024 22:33:54 GMT+0100 (British Summer Time)

End time: Sun Jul 14 2024 22:33:58 GMT+0100 (British Summer Time)

Total number of allocations: 3066

Total number of frames seen: 4328

Peak memory usage: 7.5 GiB

Python allocator: pymalloc

Close

99.93% Decrease  
(Memory Usage)

## After

Memray run stats ✕

Command line: /opt/anaconda3/envs/openghg\_conda\_env/lib/python3.11/site-packages/ipykernel\_launcher.py --f=/Users/vq21425/Library/Jupyter/runtime/kernel-v2-1562iYN0v5FjbmN3.json

Start time: Sun Jul 14 2024 22:43:36 GMT+0100 (British Summer Time)

End time: Sun Jul 14 2024 22:43:37 GMT+0100 (British Summer Time)

Total number of allocations: 3362

Total number of frames seen: 4595

Peak memory usage: 5.0 MiB

Python allocator: pymalloc

Close

# OpenGHG in Ongoing Research



## **AGAGE**

The ACRG runs three of the world's nine AGAGE (Advanced Global Atmospheric Gases Experiment) global background stations.



## **PARIS**

PARIS is a 4-year Horizon Europe research project that aims to improve estimates of greenhouse gas emissions from a selection of European countries



## **CORSO**

The CORSO project directly contributes to the implementation of the new European anthropogenic carbon dioxide emissions Monitoring and Verification Support capacity (CO2MVS) in the Copernicus Atmosphere Monitoring Service (CAMS).



## **UK DECC Network**

The UK DECC (Deriving Emissions linked to Climate Change) Network consists of four sites in the UK and Ireland measuring greenhouse and ozone depleting gases.



## **GEMMA**

GEMMA is a programme to enhance the UK's measurement and modelling capability for greenhouse gas emission estimation.

# Data Visualisation

## DECC Network Dashboard

by OpenGHG

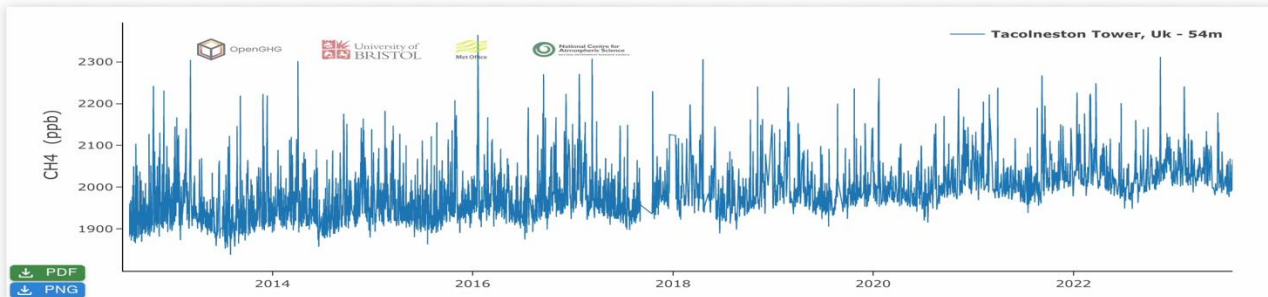
Live Data

FAQ

Background



[VISIT DECC PUBLIC DATA](#)



CLEAR

Select Species  
CH4

### Atmospheric Monitoring & Verification of the UK's GHG Inventory

- The UK DECC (Deriving Emissions linked to Climate Change) Network consists of four sites in the UK and Ireland measuring greenhouse and ozone depleting gases from tall telecommunication towers.
- High-frequency measurements of all major greenhouse gases (including carbon dioxide, methane, nitrous oxide, sulfur hexafluoride and a suite of halocarbons) are made at these sites.
- Start exploring the measurements by selecting a site from the map



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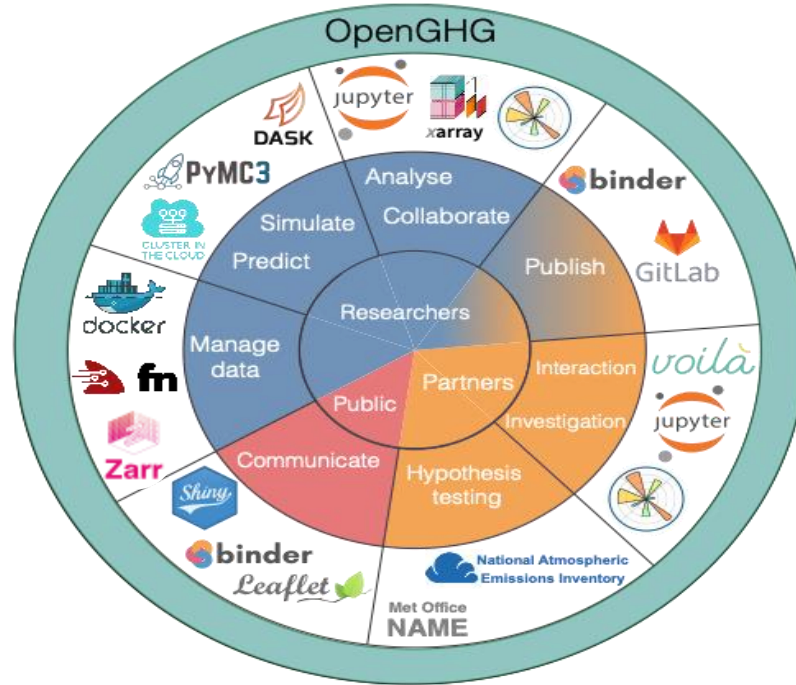
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# Ongoing Research

- Adding capabilities to handle more variants of satellite data.
- Developing dashboard for the GEMMA project, plans to roll out to public.
- Allow more labelling of data sources.
- Allow users to define custom parsers.
- Increase Inverse modelling capabilities for added satellite data.

# Building Blocks



# Connect with us:

**Web:** [openghg.org](https://openghg.org)

**Docs:** [docs.openghg.org](https://docs.openghg.org)

**Dashboard:** [https://openghg.github.io/decc\\_dashboard/](https://openghg.github.io/decc_dashboard/)

**Tutorials:** [Youtube](#)

**Contribute:** [github.com/openghg](https://github.com/openghg)

**Emails:** [matt.rigby@bristol.ac.uk](mailto:matt.rigby@bristol.ac.uk), [prasad.sutar@bristol.ac.uk](mailto:prasad.sutar@bristol.ac.uk), [rachel.tunncliffe@bristol.ac.uk](mailto:rachel.tunncliffe@bristol.ac.uk),  
[brendan.murphy@bristol.ac.uk](mailto:brendan.murphy@bristol.ac.uk)

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