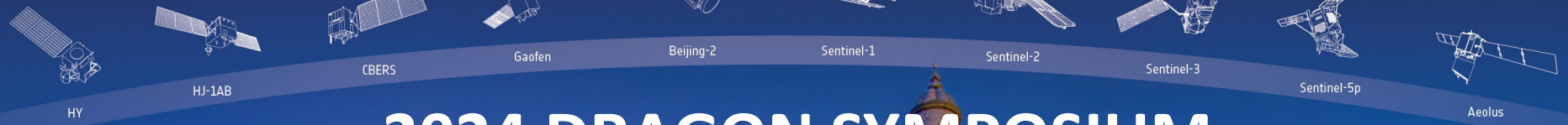


2024 DRAGON SYMPOSIUM

DRAGON 5 FINAL RESULTS REPORTING

24-26 JUNE 2024

ATMOSPHERE

Results Highlights
ATMOSPHERE

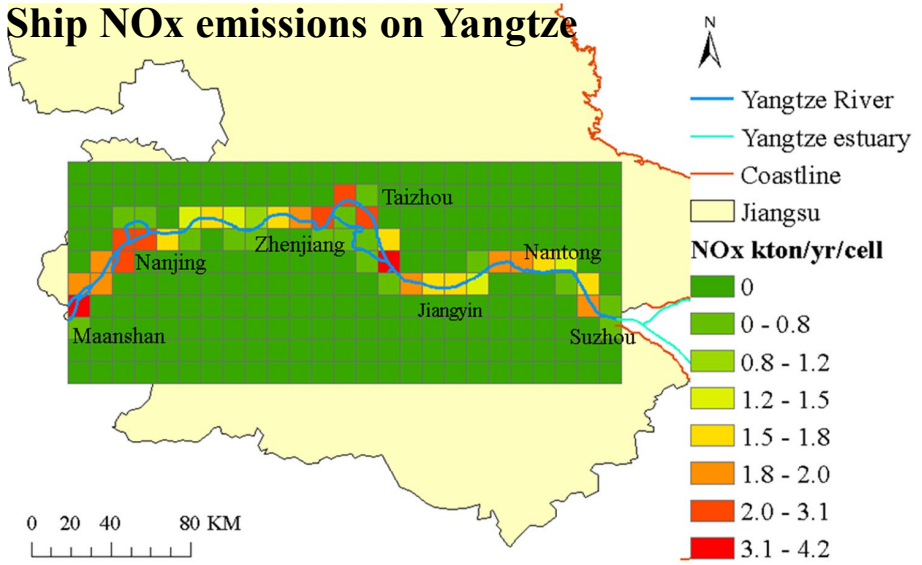
ID 59013 : HIGHLIGHTS EMPAC

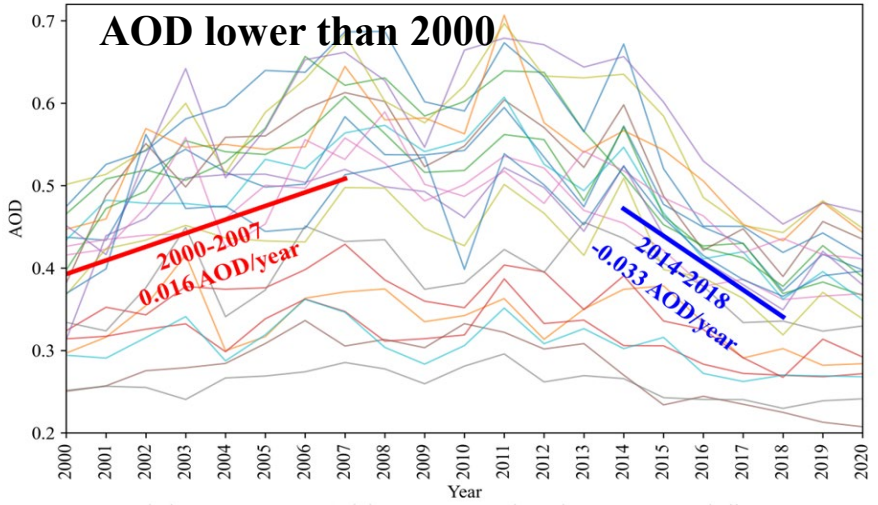
Results after 4 years of activity:

- Trends of CO, AOD, NO_2 in China
- Trace gas removal in ice particles and solid particles
- NOx emissions derived from TROPOMI (S5p)

Young scientist results:

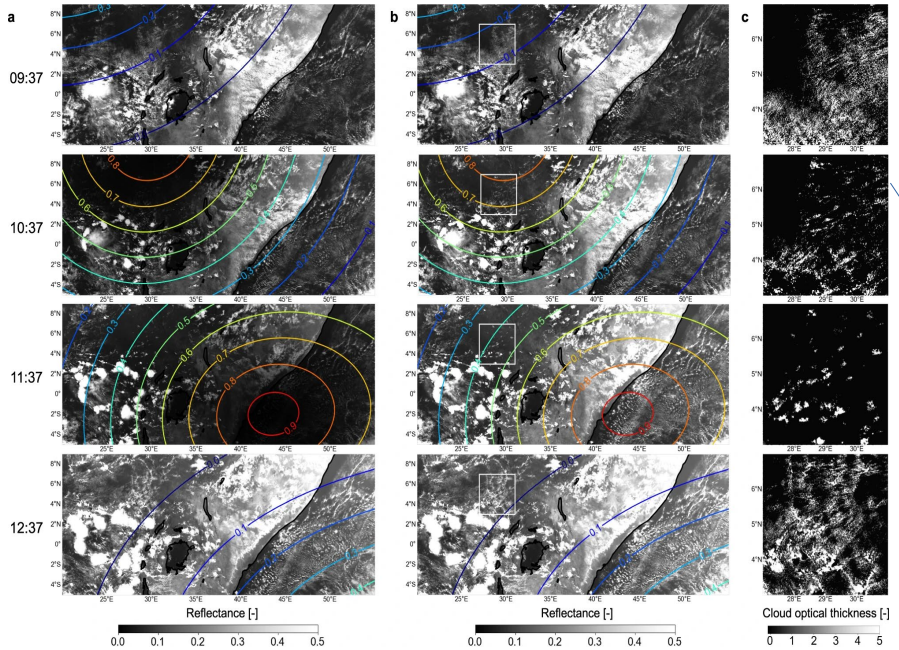
- Analysis of drone observations of NO2 in the boundary layer.
- Ship emissions on inland rivers
- Arctic lightning NOx





Results Highlights
Atmosphere

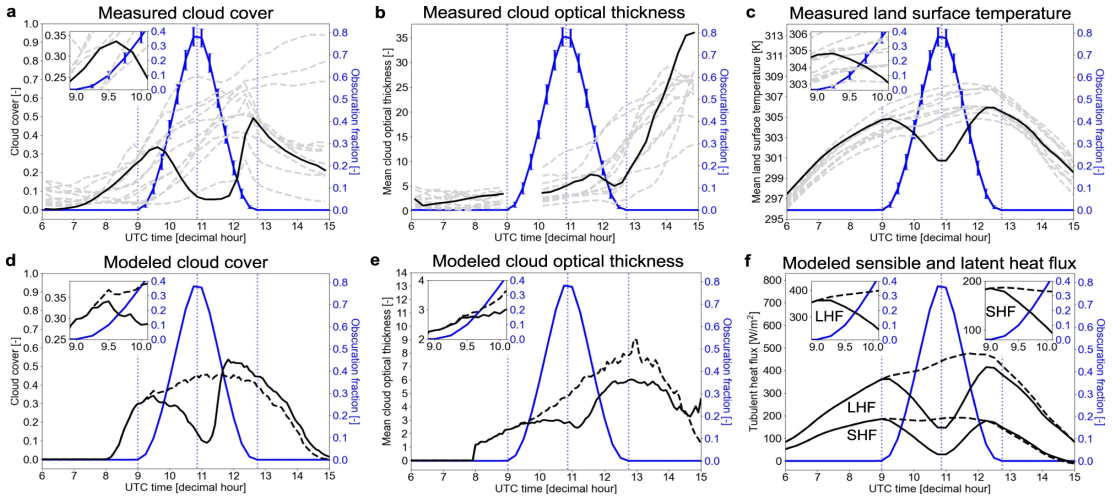
ID58573: 3D CLOUDS & ATMOSPHERIC COMPOSITION



before

during

after



Derived cloud optical thickness from SEVIRI/MSG during solar eclipse and simulated cloud evolution during solar eclipse using LES model.

Trees et al., Nature Communications, Earth & Environment, 2024

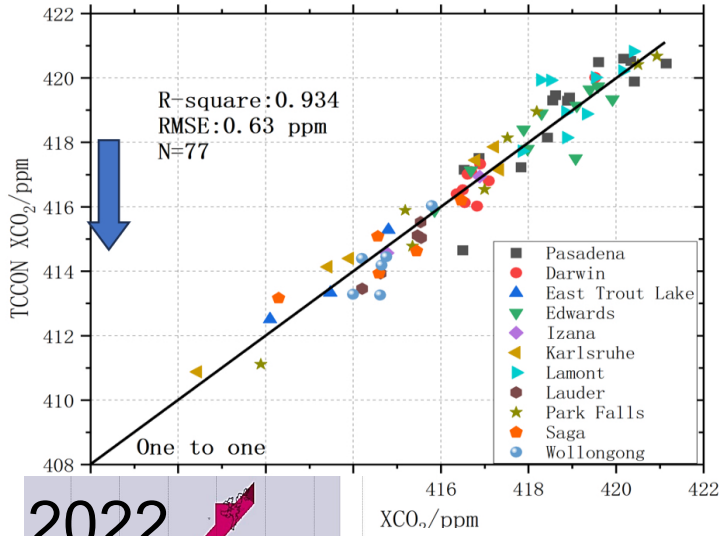
Results Highlights
Atmosphere

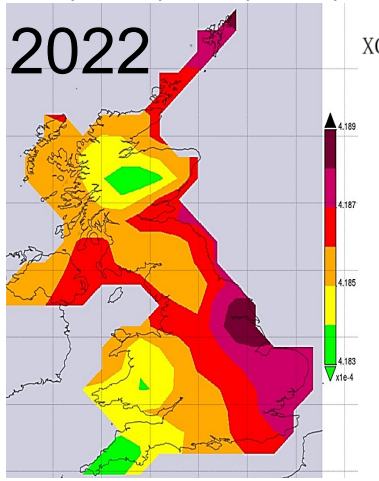
ID58894: CO_2 emission reduction 4 urban

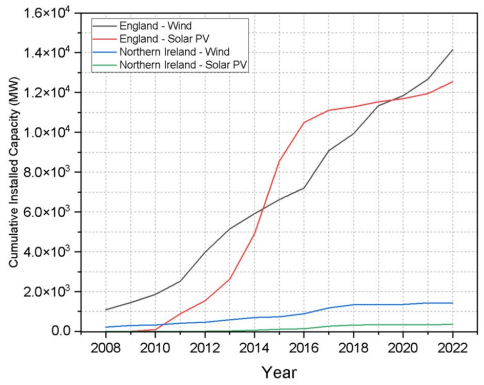
Solution towards NZE (Net Zero Emission) by implement Renewable Energy by 2050

Develop Sustainability Energy with energy security; equity; and environmental sustainability

- *Identify a suitable method for **CO_2 retrieval accurately** from satellites data:* **ACDL**
- *Estimate the effect of different types of Renewable Energy Implementation and phase out fossil fuel power generation in Urban areas through long term EO monitoring. Combined REs will be a solution for the CO_2 reduction in selected region.*



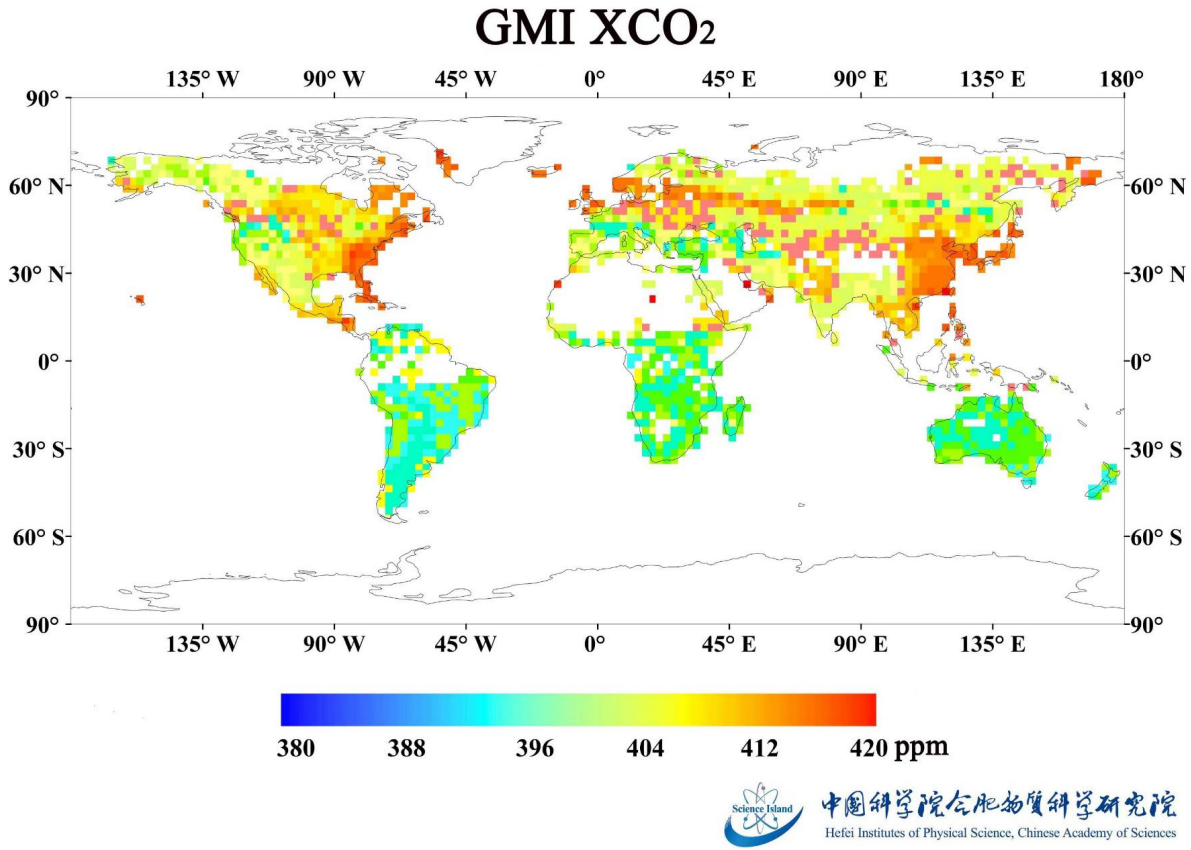


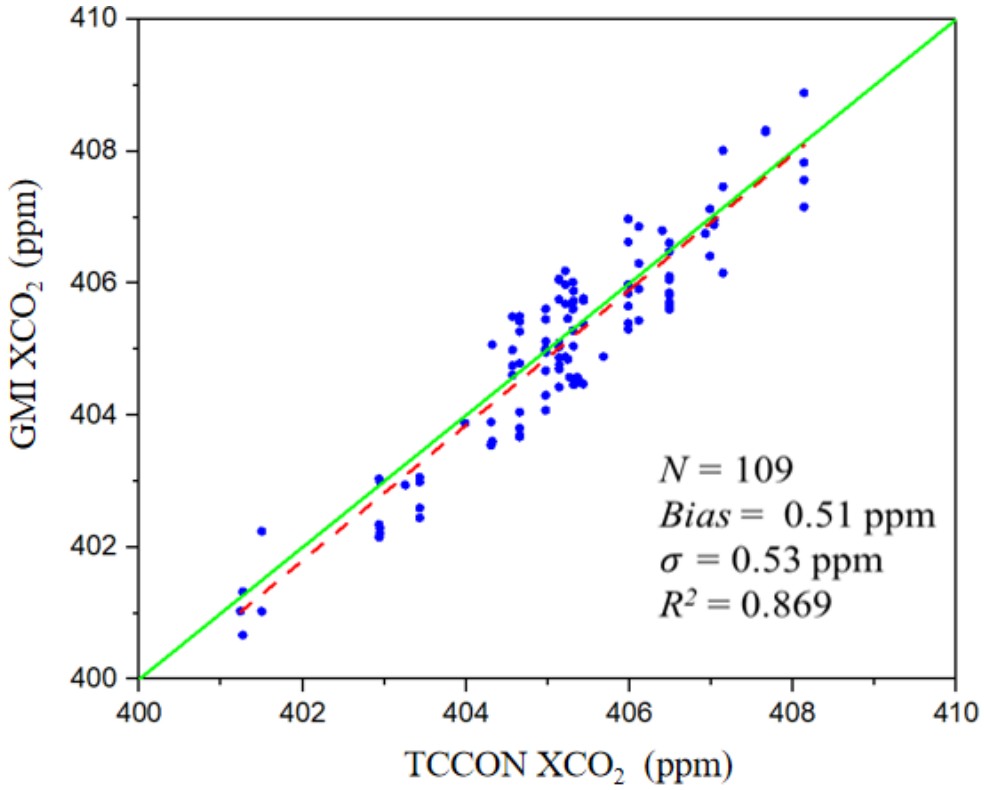


- Island of Ireland and N.Ireland are selected for the further investigation with the impact of different Renewable Energies for the CO_2 reduction due to the limited types of RE installed in the region. GHG production from agriculture needs to be investigated.

Results Highlights
Atmosphere

ID58873-GHGs Advanced Techniques: The initial retrieval results show that GMI Level 1 data products have excellent retrieval capability, and the column concentration information has good consistency with the TCCON station data .



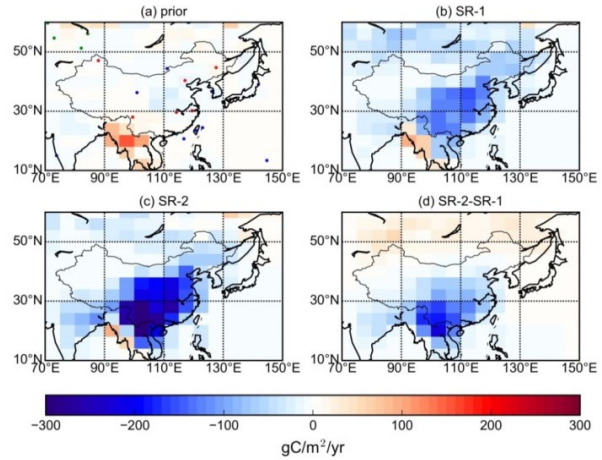


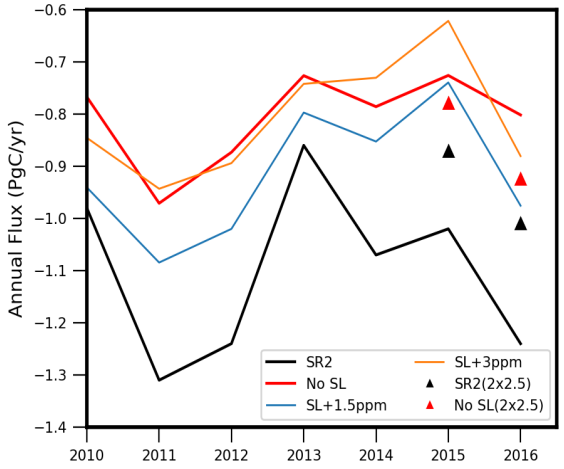
Results Highlights
Atmosphere

ID9355 Monitoring GHGs

The large carbon sink capablity in China founded

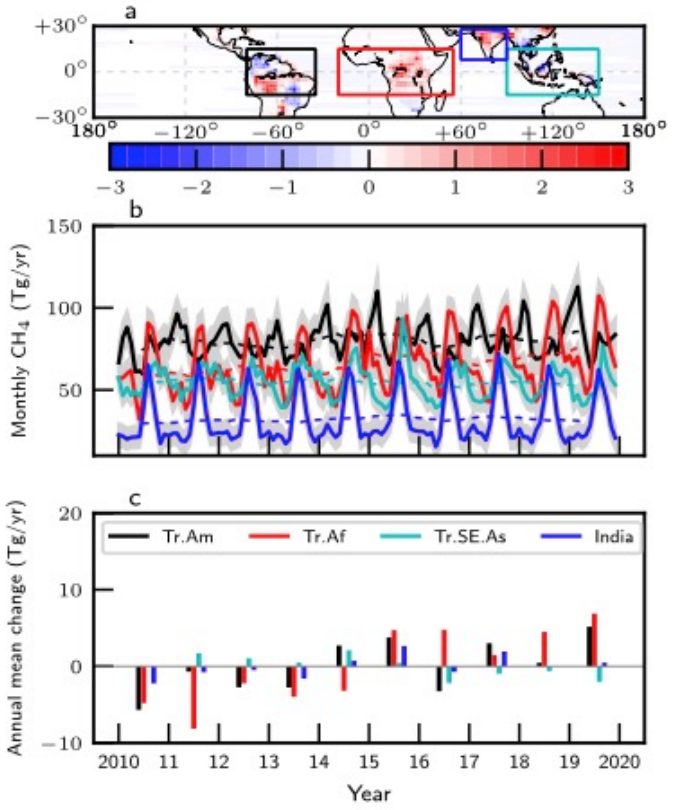
Nature



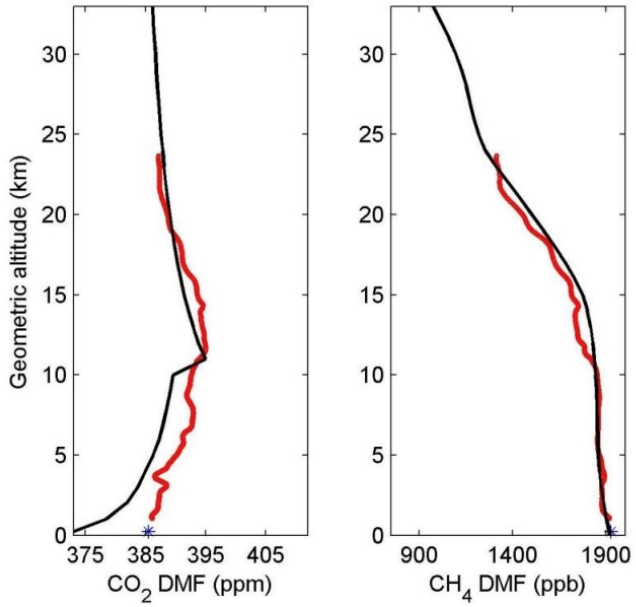


Tropical wet contribute most of global CH4 growth (>80%)

Nature communications



Aircore system: monitoring vertical CO2 and CH4 distribution



Seed questions: Science & Application
ATMOSPHERE

What are the remaining issues concerning the exploitation of current mission data?

Satellite data exchange from China to Europe is still difficult (slow connection), with limitations on the amount of data that can be downloaded per day. Mirror sites with each others satellite data can help a lot.

What are the new science findings in the domain?

Example: Derived cloud optical thickness during solar eclipse and interpreted the shallow cumulous clouds dissipation during solar eclipse due to decreased surface temperature.

What is the general performance and what are the limitations of geophysical parameters retrieval?

For the high spatial resolution measurements of the atmosphere, 3D radiative transfer models are needed .

EO data synergy: is there scope for data synergy and if so which EO missions/sensors are required?

- For several application data synergy between different satellite instruments has already started. For example in the Earthcare mission, but also in the emission estimates using S5p and CrIS/IASI.
- Joint use of GNSS, Atmospheric, and SAR Interferometric data is recommended to retrieve water vapours at local scales. Better decoupling of the deformation and atmospheric signals will lead to improvement of geophysical and atmospheric products at the same time.

Validation : Have the necessary validation data been collected and shared?

We hope that the ground-based data measured in China can become publicly available after publications in the future.

Seed questions: New EO Mission Exploitation
ATMOSPHERE

What complementarity in the operational use of the current / future missions (planning, observations, etc.) could be improved to allow better data exploitation?

- Cooperation between ESA and China on satellite missions for sensor data quality and mission complementarity (optimize accuracy / coverage).
- Plan similar missions but at different orbits (overpass time) to get diurnal cycle using LEO.
- The European and Chinese instruments can be placed on each other platform.
- Using GOSAT(-2), OCO-2(-3), S5P data further in global CO2 and CH4 emissions.