First columnar greenhouse gases in the Eastern Mediterranean and Middle East region by TCCON Nicosia

2021 CLIMATE CHANGE in the Mediterranean and Middle East 2nd INTERNATIONAL CONFERENCE

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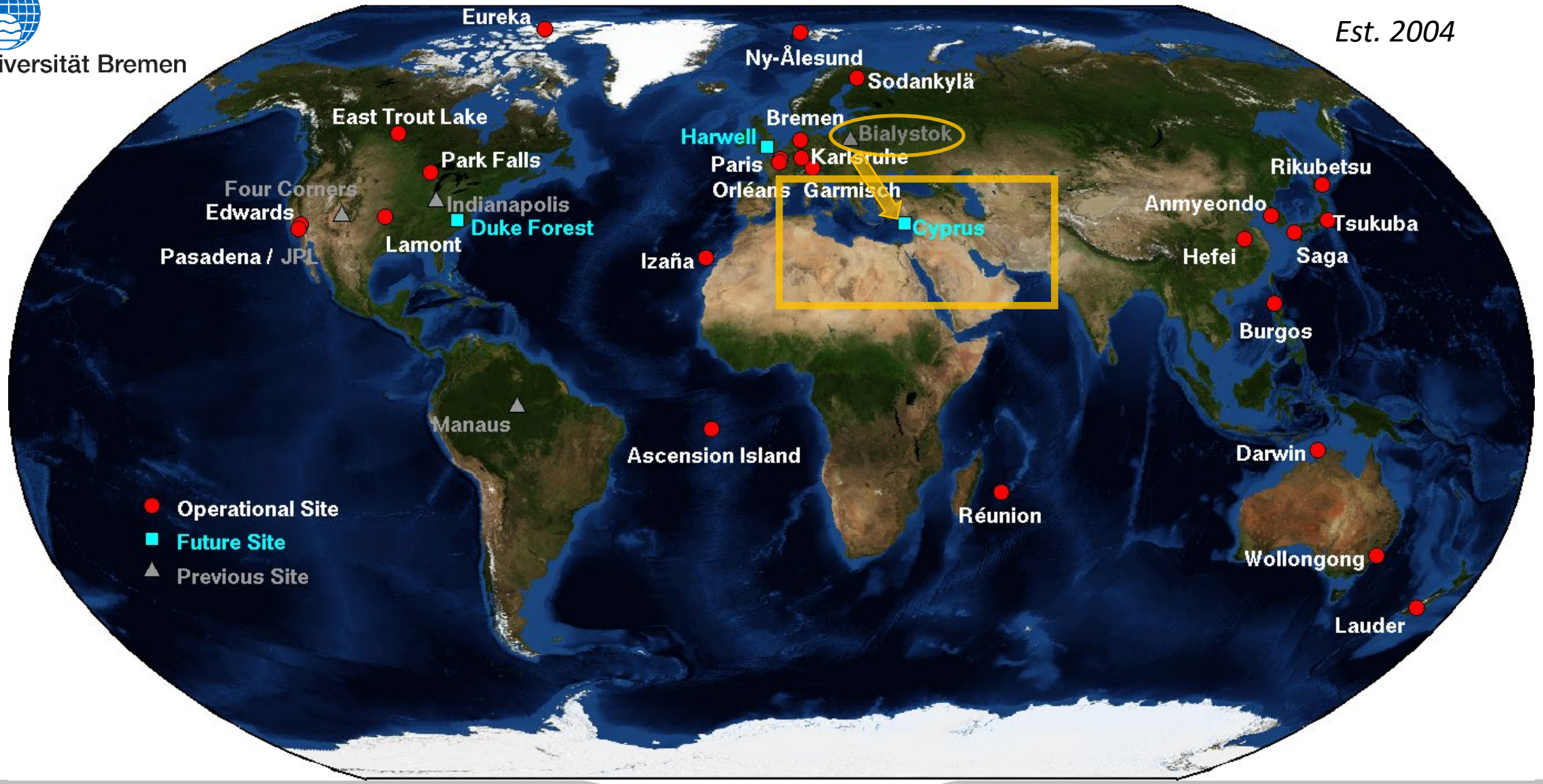
The Total Carbon Column Observing Network

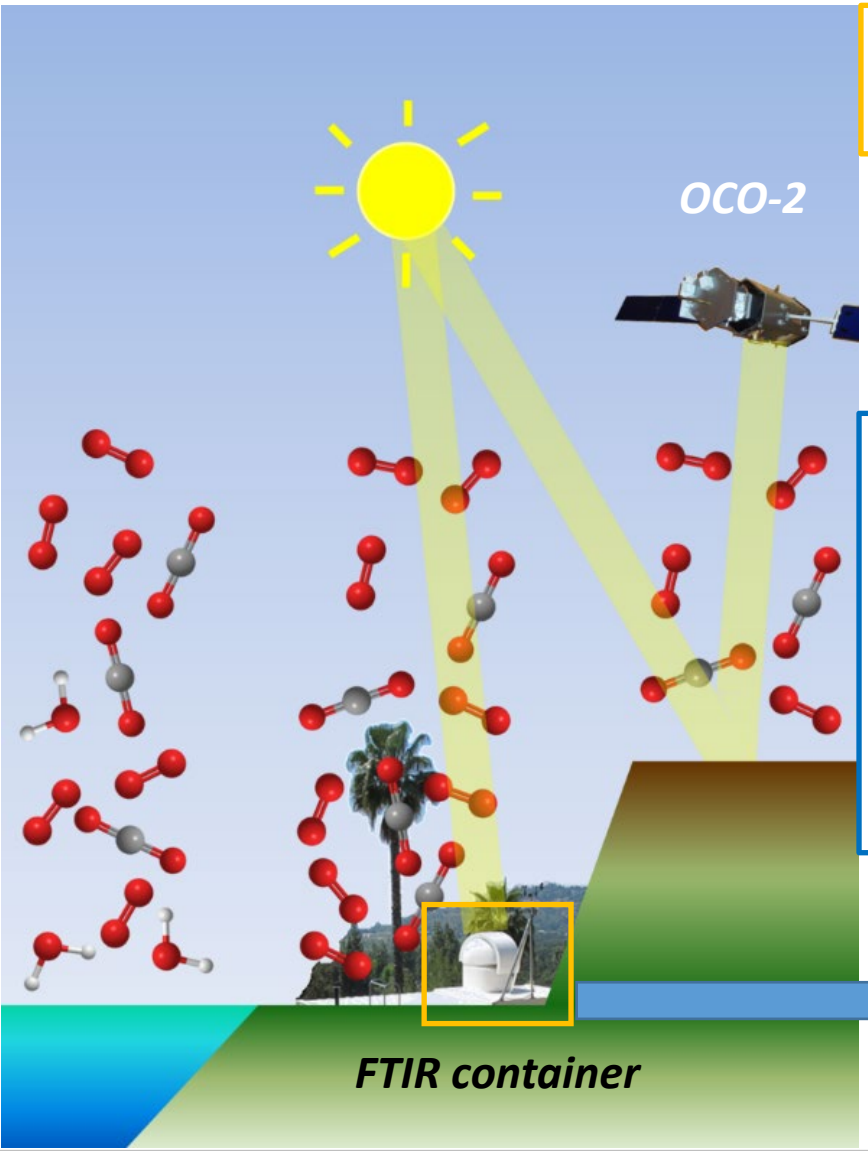
Universität Bremen

Est. 2004



Wunch et al., 2010

The Total Carbon Column Observing Network



How does it work?

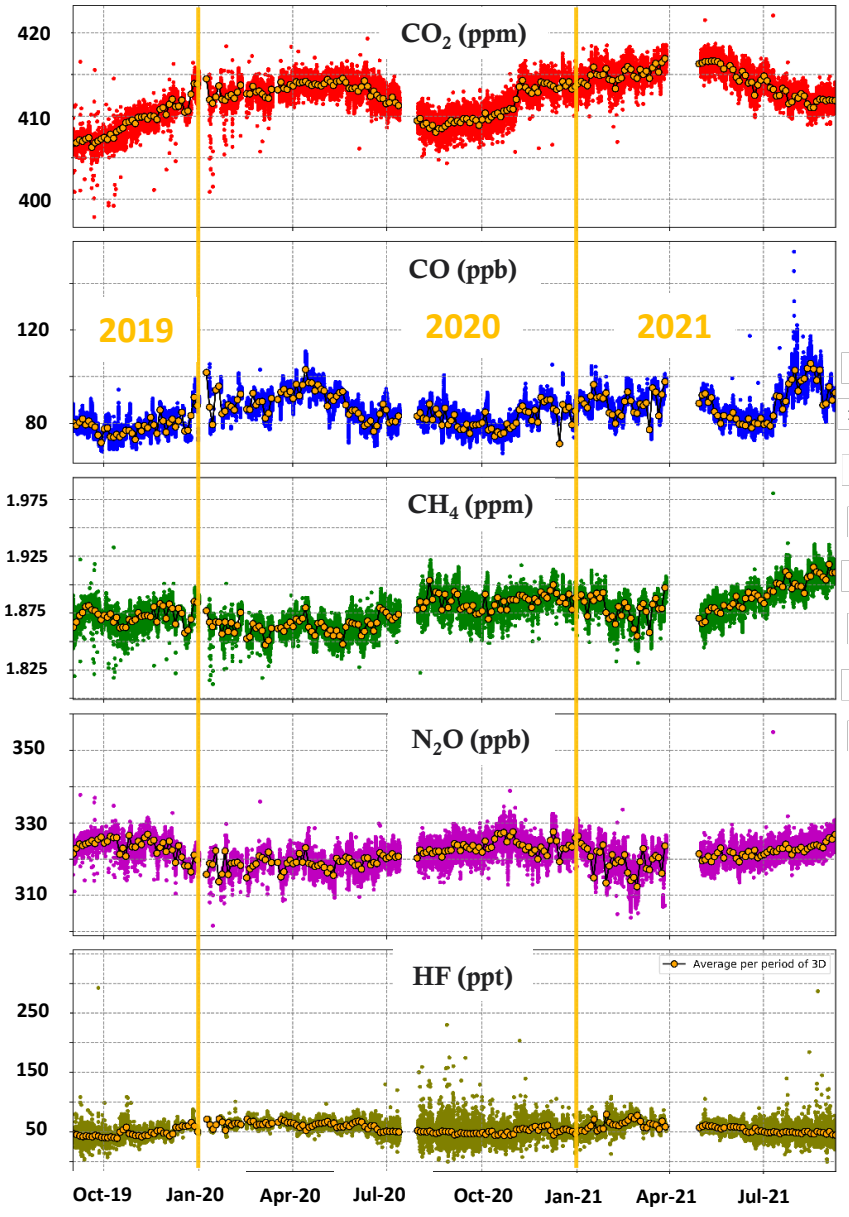
Ground-based Fourier Transform Spectrometers

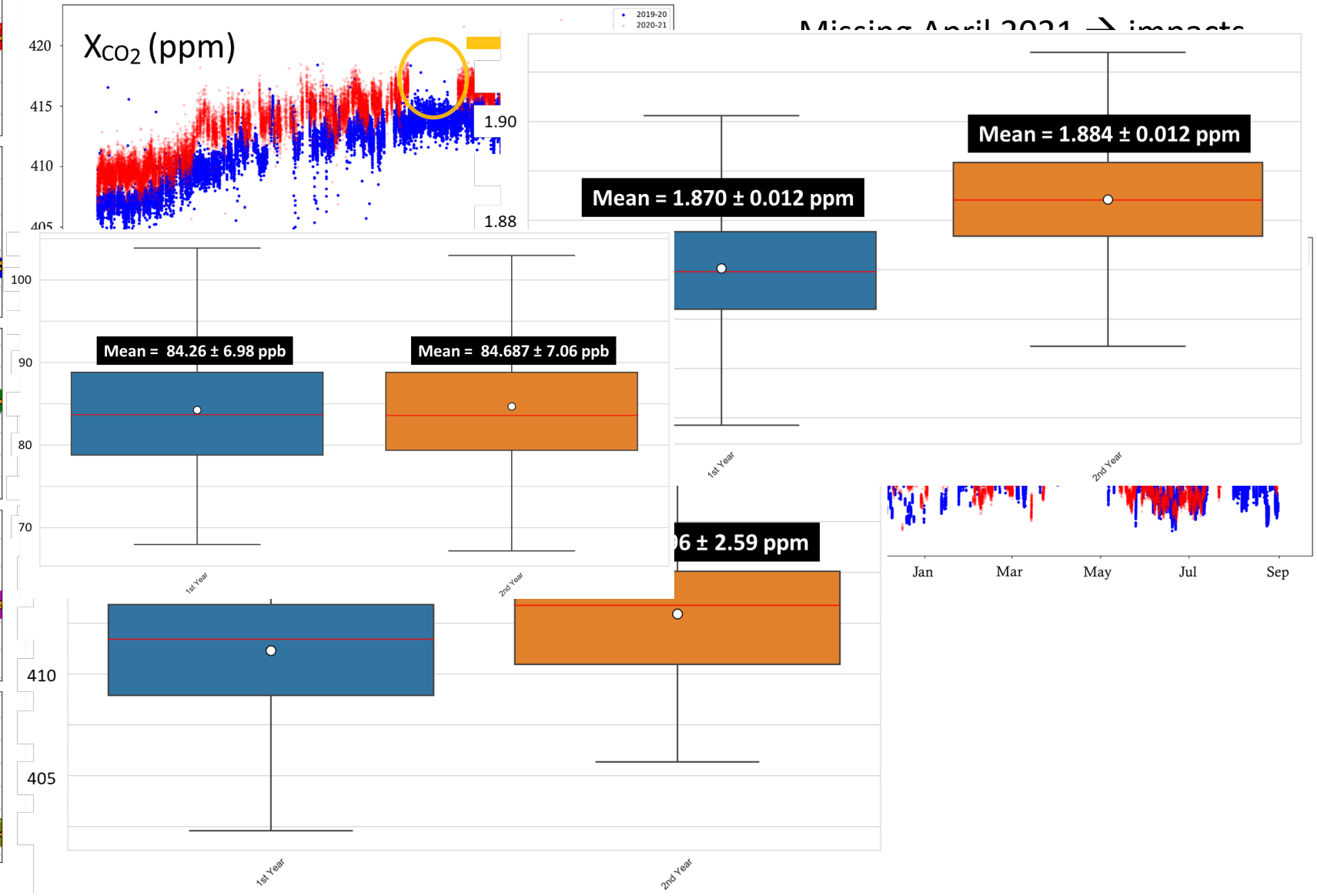
Michelson – type interferometer

Column-averaged dry-air mole fractions (**DMFs**) of main Greenhouse gases, X_G for gas G

CO_2, CH_4, N_2O, HF, CO, H_2O, HDO

Time Series of Columnar GHGs





The Summer Mediterranean

Boundary Layer
Mid Troposphere
Upper Troposphere

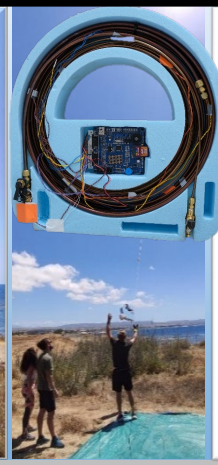
Nicosia, Cyprus

Asian Summer Monsoon Anticyclone

Source: Center for International Earth Science Information Network - CIESIN - Columbia University. 2016. Gridded Population of the World, Version 4 (GPWv4): Population Count Adjusted to Match 2015 Revision of UN WPP Country Totals. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/H4SF2T42. Access date: May 2021

Inspiration: Lelieveld et al., 2002

Launching from the west coast



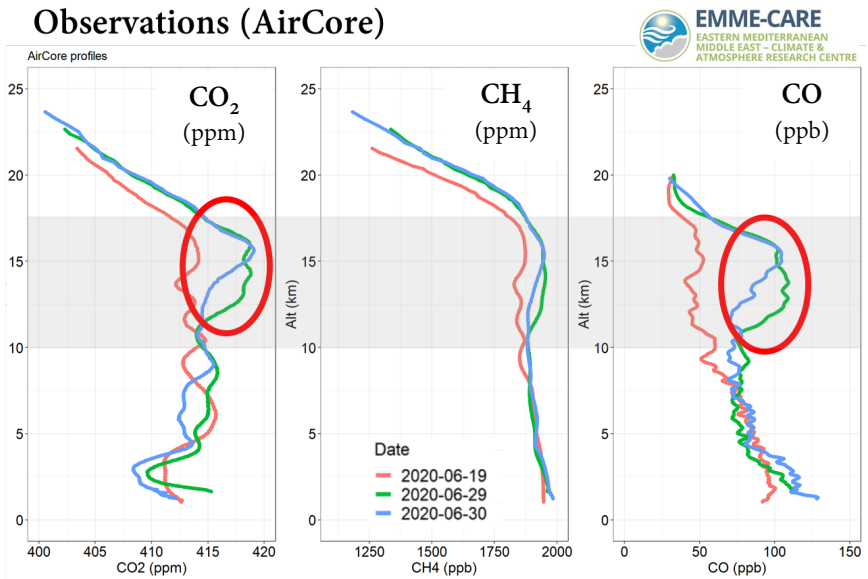
Recovering in the middle of the island

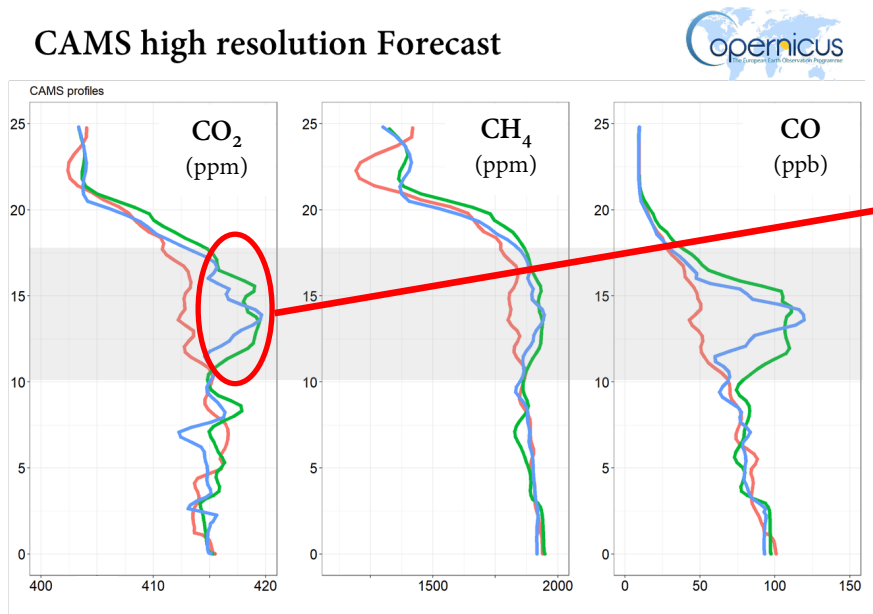
Source: Lelieveld et al., 2002, Karion et al., 2010, Kleanthous et al., 2014

CARE-C

The Cyprus Institute

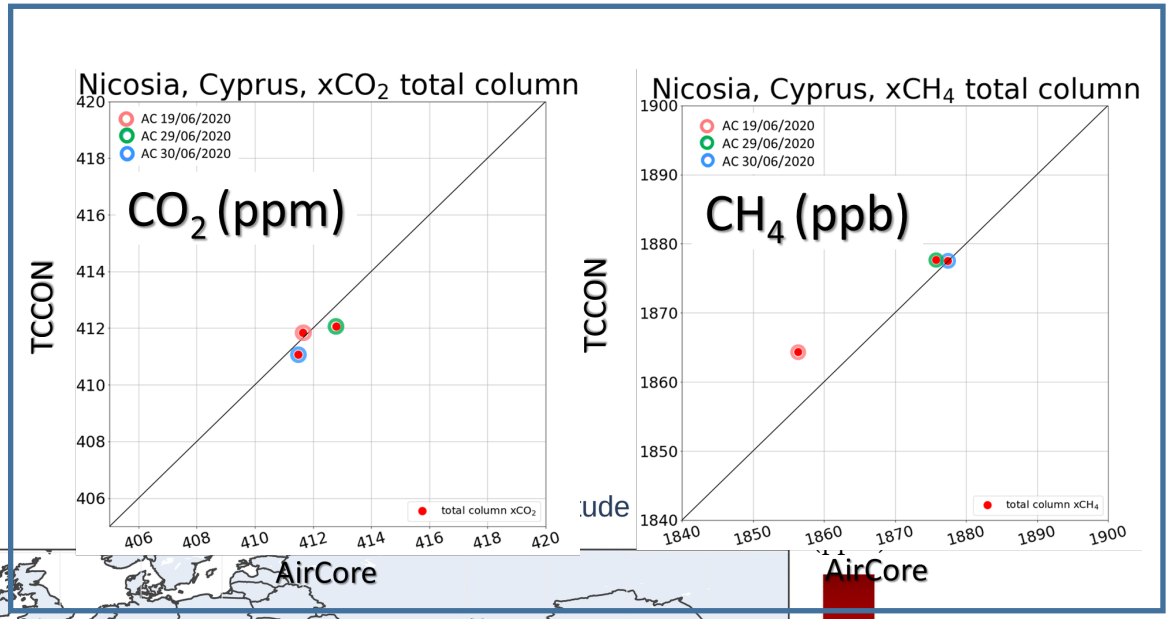
First AirCore Profiles for Cyprus & Comparison with CAMS Models

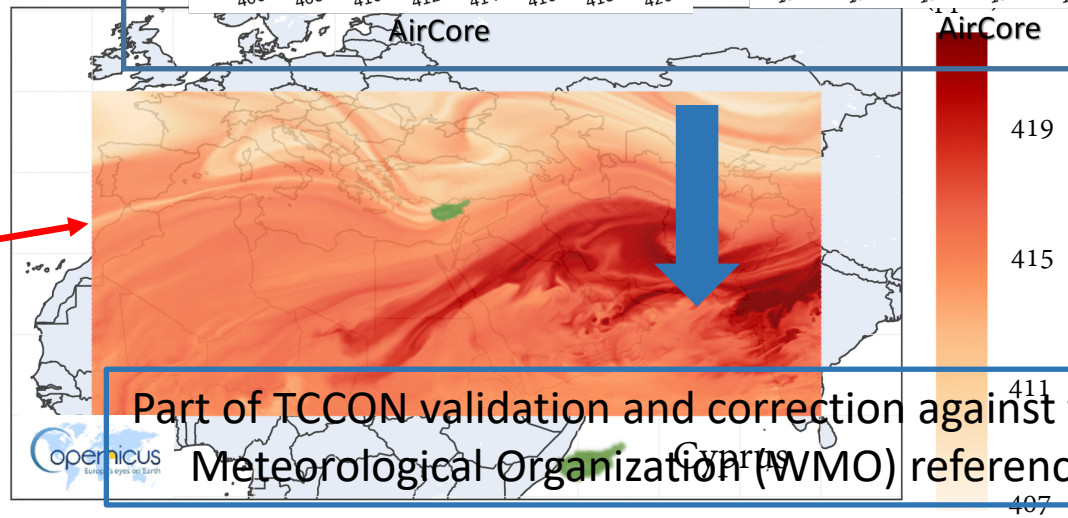




Profile Integrated

To compare to X_{CO_2}





Part of TCCON validation and correction against the World Meteorological Organization (WMO) reference scale

Asian Summer Monsoon: ***Transport of constituents to the tropopause level from intense convection and large scale circulation.***

Conclusions

- A New TCCON site is set up in Cyprus that was missing from the EMME region
- Important GHGs columnar information in the region
- The seasonal variability of X_{GAS} is well captured throughout these measurements
- First AirCore launches show the very good agreement between TCCON and the WMO referenced in-situ (AC). More validation campaigns are planned
- Future plans: extensive investigation on the variability and the sources of GHGs

Thank you!
Questions?
☺

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