

Ile de la Réunion (21° S, 55° E) – ICOS site

An unique atmospheric observatory in the Indian Ocean

Mahesh Kumar Sha, **Martine De Mazière (PI)**, Christian Hermans
Royal Belgian Institute for Space Aeronomy (BIRA-IASB)

Michel Ramonet
Le Laboratoire des Sciences du Climat et de l'Environnement (LSCE)

Jean-Marc Metzger, Jean-Pierre Cammas
Université de la Réunion (OSU-Réunion)



Site description

An unique atmospheric observatory situated in the Indian Ocean, about 700 km east of Madagascar and 170 km southwest of Mauritius providing the background state. In addition, we see the influence of biomass burning in Madagascar, South Africa, South America

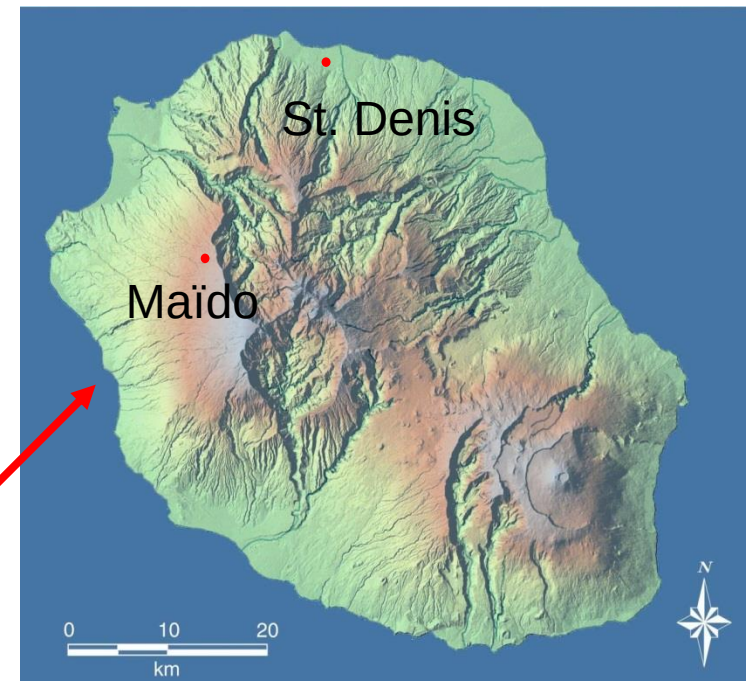
One of the very few atmospheric observation stations proving both in-situ and remote sensing greenhouse gas (GHG) data of atmospheric components in the southern hemisphere

Two dedicated sites – St. Denis (87 m.a.s.l) and Maïdo (2200 m.a.s.l)



Google Earth

Ile de la Réunion



Remote sensing: Ground based Fourier Transform Spectrometer of the type Bruker IFS 125HR

- Solar absorption measurements in the near-infrared (4000 to 8000 cm^{-1} , or 1.25 to $2.5\text{ }\mu\text{m}$)
- Target gases measured are CO_2 , CH_4 , CO , N_2O , O_2 , HF , H_2O and HDO
- Measurements conducted since September 2011 in the frame of the Total Carbon Column Observing Network (TCCON)
- Essential validation resource for satellite measuring GHGs, like the Orbiting Carbon Observatory – 2 (OCO-2) and GOSAT

In-situ: Both sites at Ile de la Réunion have in-situ trace gas analyzers

- Maïdo (RUN), PICARRO G2401, measuring CO_2 , CH_4 , CO , H_2O (Owner: BIRA-IASB)
- St. Denis (STD), PICARRO G2301, measuring CO_2 , CH_4 , H_2O (Owner: LSCE)
- At St. Denis the CO is measured using a Horiba APMA 370

Both in-situ (in collaboration with LSCE) and remote sensing GHG data from Ile de la Réunion is being delivered to the ICOS Thematic Data Center



Sun tracker for the Bruker IFS 125HR

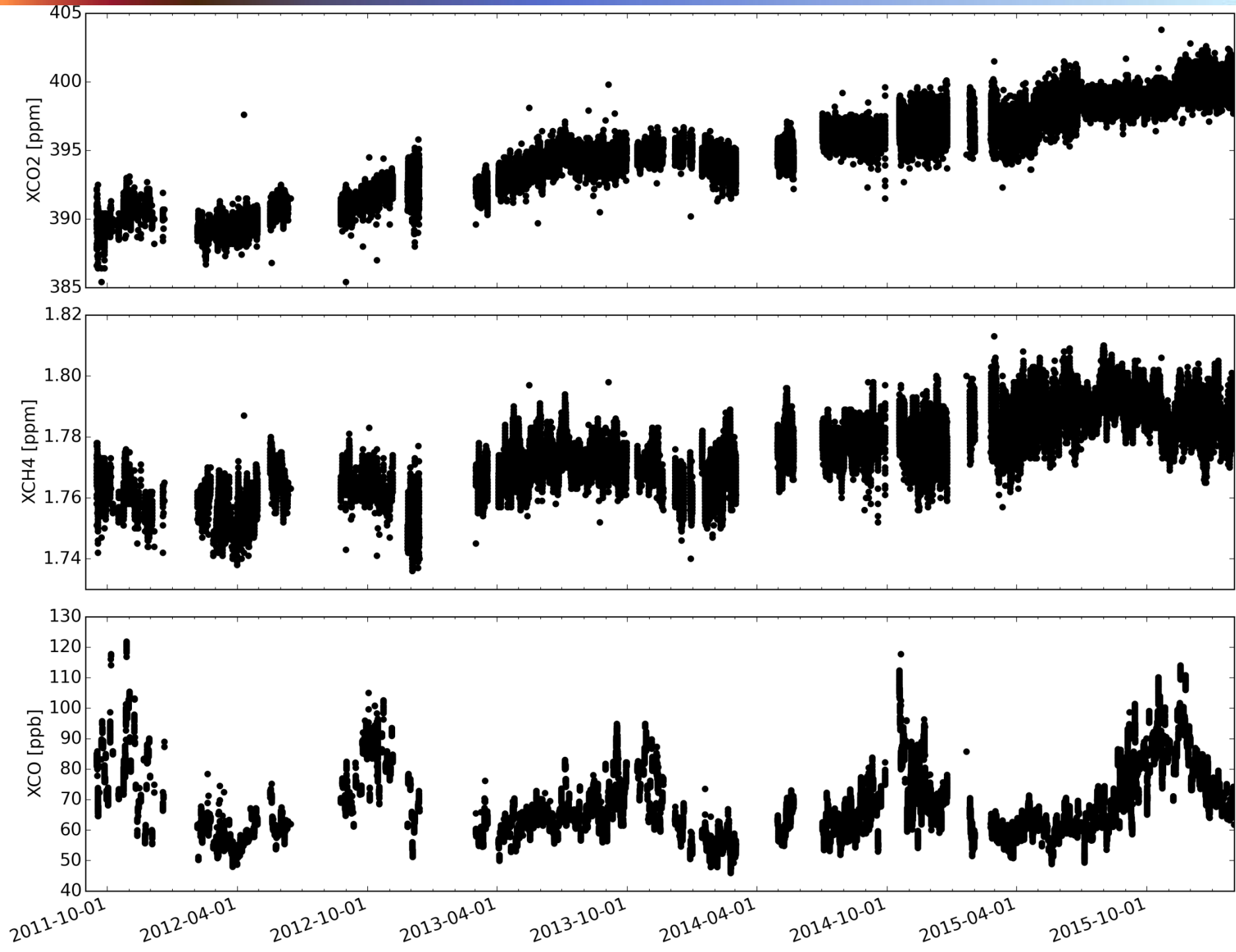


FTIR spectrometer – Bruker IFS 125HR

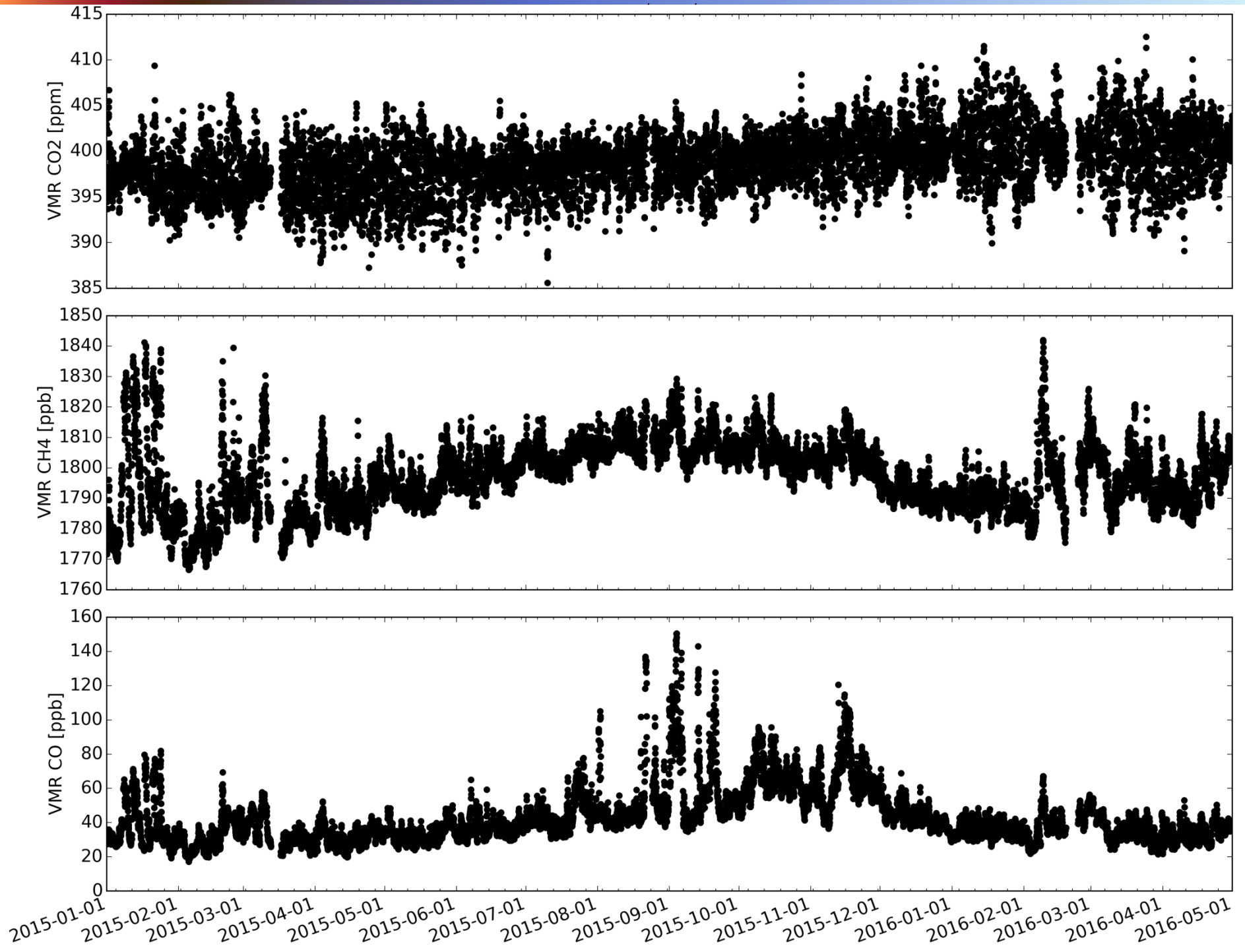


PICARRO G2401 at Maïdo

St. Denis TCCON time series of GHGs



Maïdo PICARRO time series of GHGs



Station goals



Perform continuous PICARRO and quasi-continuous FTIR measurements under clear sky conditions.

- Over 4 years of operation and continuing, one of the very few (5) TCCON stations in the Southern Hemisphere
- Data is made publicly available via the TCCON network page (<http://tccon.ornl.gov/>)
- Rapid TCCON data delivery is made available via the ICOS Thematic Data Center
- Data is used for satellite validation: GOSAT, OCO-2, SCIAMACHY, future – S5P, Sentinels and Merlin, ...

Compare remote sensing IR GHG data with in-situ vertical profile of the same gases obtained at the same time – calibration of the Ile de la Réunion TCCON data to the WMO standards

Perform regular data quality checks of the measured spectra followed by trace gas retrievals and data archiving to the database

Work towards a more elaborated and consolidated integration of TCCON in ICOS;
Perform the ICOS labelling process for Ile de la Réunion

Contribute to the validation of satellite data and numerical models of atmospheric composition

Visualize our data: <http://infrared-data.aeronomie.be>

Thank you for your attention

