

The Franco-Belgian greenhouse gases monitoring program at La Réunion Island

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The location of Reunion Island (21°S, 55°E) presents a great interest for the monitoring of greenhouse gases concentrations due to the low density of the measurement network in the tropics and particularly in the southern hemisphere. Atmospheric measurements have been initiated in 1994 at the coastal site of Saint Denis mostly for the survey of tropospheric and stratospheric ozone and related key species as part of the NDSC/NDACC (Network for the Detection of Stratospheric/Atmospheric Composition Change). In 2012, a new observatory was inaugurated at Maïdo at 2200 m above sea level. The two sites are currently equipped with instruments dedicated to both surface and total column measurements of CO₂ and CH₄. The column measurements are solar absorption measurements performed with Fourier-transform Infrared (FTIR) spectrometers in the framework of TCCON (Total Carbon Column Observing Network); they started at St Denis in September 2011 and at Maïdo in March 2013. High precision measurements of the surface CO₂ and CH₄ mole fractions have been installed in compliance with the technical requirements and specifications of ICOS, in August 2010 at Saint Denis, and in December 2014 at Maïdo. The latter will be proposed for an ICOS-ERIC labelling in the coming months.

We will present a summary of the surface and total columns time series, with characterization of the diurnal and seasonal cycles as observed at the coastal and mountain sites. The differences between the two sites will also be discussed. Influence of long-range transport and possible contributions of African and South American biomass burning will be evaluated. Finally, comparison of the observations with Copernicus Atmospheric Monitoring Service (CAMS)-IFS model analyses, performed as part of the CAMS-84 project, will be discussed.