Geophysical Research Abstracts
Vol. 21, EGU2019-17462, 2019
EGU General Assembly 2019

Study on different strategies for greenhouse gas dry mole fraction measurement with Cavity Enhanced Spectrometer : water vapor correction vs Nafion dryer.

Olivier Laurent, Carole Philippon, Camille Yver Kwok, Leonard Rivier, and Michel Ramonet

Laboratoire des Sciences du Climat et l'Environnement (LSCE/IPSL), UMR CNRS-CEA-UVSQ, Université Paris Saclay, 91191 Gif-sur-Yvette, France (olivier.laurent@lsce.ipsl.fr)

Due to the high variability of the water vapor content in the atmosphere, the mole fraction of trace gas such as greenhouse gas (GHG) in the atmosphere is usually presented as mole fraction in dry air. In consequence, the first technology used for GHG measurement, gas chromatography or non-dispersive infra-red spectroscopy, required to dry the air sample prior to analysis at a dew point lower than -50°C. The emergence of new GHG analyzers using infrared Enhanced Cavity Spectroscopy which measure the water vapor content in the air sample, allows providing the dry mole fraction of GHG without any drying system upstream by applying appropriate correction of the water vapor effects (dilution, pressure broadening...).
This presentation presents the results of the tests conducted at the Metrology Lab of the ICOS Atmosphere Thematic Centre (ATC) located at LSCE in France. The tests focus on the performance of the water vapor correction on Cavity Enhanced Spectrometer, in particular its stability over time, compared to the use of Nafion dryer which induces bias on the measurement of few species. It attempts to propose the most appropriate strategy to fulfil the WMO and ICOS requirements in term of compatibility goals.