First AirCore campaign at Traînou tower to measure greenhouse gases vertical profiles

Céline Lett*†[1], François Danis[2], Olivier Membrive[2], Marc Delmotte[1], Delphine Combaz[1], Joyce Marais[1], Cyril Crevoisier[2], and Michel Ramonet[1]

[1]Laboratoire des Sciences du Climat et de l'Environnement (LSCE/IPSL) – CEA, CNRS : UMR8212, Université de Versailles Saint-Quentin-en-Yvelines (UVSQ) – Université Paris Saclay, 91191 Gif sur Yvette, France

[2]Laboratoire de Météorologie Dynamique (LMD/IPSL) – Polytechnique - X, CNRS : UMR8539 – Université Paris Saclay, 91128, Palaiseau, France, France

Résumé

An AirCore is a new and innovative way of sampling the atmospheric column. It is a tube coil closed at one end and opened at the other one. Carried by a weather balloon filled with Helium, it can reach an altitude of 30km. By pressure difference the tube empties out on the ascending phase and samples the ambient air on the descending phase. The flight lasts for about 2 hours, and results into an "Air Core" sample. Once at ground level the sample is analyzed to measure CO2, CH4 and CO concentrations using a Cavity Ring Down Spectrometer (CRDS). The first balloon campaign at the ICOS Traînou tall tower took place in October 2016. At the same site a TCCON instrument was continuously measuring the CO2 and CH4 total column, and a CRDS analyzer was fitted into an airplane flying between 100 and 3000m above the Orleans forest. The dataset obtained from this campaign merges observations from surface, aircraft, and balloon measurements. Some observations made by satellites overpassing: OCO-2, GOSAT or IASI/MetOp will also be available. This campaign aims to investigate the dataset gathered to characterize the vertical distribution of CO2 and CH4 at Traînou site with a particular focus on validation strategies for both satellite greenhouse gas measurements and atmospheric transport model.

*Intervenant

†Auteur correspondant: celine.lett@lsce.ipsl.fr