**How the Network for the Detection of Atmospheric Composition Change (NDACC) contributes to the provision of reference data for climate monitoring.**

M. De Mazière1, I. Petropavloskikh2,3, J. Wild4,5, J. W. Hannigan6, E. Mahieu7, J. Notholt8, A. Dehn9, and the IRWG10 and FRM4GHG11 teams

1Royal Belgian Institute for Space Aeronomy (BIRA-IASB), Brussels, B-1180, Belgium

2CIRES, University of Colorado, Boulder, CO, USA

3NOAA, Global Monitoring Lab, Boulder, CO, USA

4CISESS, University of Maryland, College Park, MD, USA

5NOAA/NESDIS/STAR, College Park, MD, USA

6NCAR,Boulder, CO, USA

7 ULiège, Liège, Belgium

8 Institute of Environmental Physics, University of Bremen, Bremen, Germany

9 ESA, ESRIN, Frascati, Italy

10 [www.ndacc.org](http://www.ndacc.org)

11 [frm4ghg.aeronomie.be](https://frm4ghg.aeronomie.be)

The Network for the Detection of Atmospheric Composition Change (NDACC; [ndacc.org](http://www.ndacc.org)) began network operations in January 1991. Important objectives of the Network are to establish long-term databases for detecting changes and trends in atmospheric composition, and to establish scientific links and feedbacks between those changes and climate. It contributes significantly to the analyses of models and validation of atmospheric measurements from other platforms, especially satellites, and provides critical data sets to help fill gaps in satellite observations. Key target parameters observed since the start of the network (and at some stations even long before) are ozone and various greenhouse gases including methane, nitrous oxide, some CFC and HCFC, as well as some precursor gases.

Through various measurement, data collection, and data validation protocols, the Network has always strived for the acquisition and delivery of high-quality, harmonized reference data. The need for traceability to international agreed standards is becoming ever more important, especially for enabling consistency with other observations relevant for climate monitoring like the [ICOS](https://www.icos-cp.eu/) (Integrated Carbon Observation System), [AGAGE](https://agage.mit.edu/) ([Advanced Global Atmospheric Gases Experiment](https://agage.mit.edu/) and [TCCON](http://tccon.caltech.edu) (Total Carbon Column Observing Network) data.

It is the Infrared Working Group (IRWG) in NDACC that is dealing especially with the measurement of greenhouse gases, using high-spectral-resolution Fourier- transform Infrared (FTIR) spectrometry in the mid-infrared spectral regions. The performance of various low-spectral-resolution, more compact and mobile FTIR instruments for observation of greenhouse gases and precursors are assessed in the context of the [FRM4GHG](https://frm4ghg.aeronomie.be/) (Fiducial Reference Measurements for Greenhouse Gases) projects. The data acquired with these instruments in the mid-infrared region are compared with the observations from the standard NDACC-IRWG type instruments.

In this presentation we will describe the current status of these comparisons in the mid-infrared spectral region, and the continued need for improving the precision and accuracy of the observational data implying the need for accurate traceable spectroscopic data. We will also discuss the development of traveling standards for ensuring consistency within the NDACC-IRWG network and across networks. It will be shown that NDACC-IRWG type observations are an essential contribution to long-term climate change monitoring.