

Questions & Answers.....

What is the project designed to achieve?

NORS is designed to demonstrate an operational validation of GAS products using tailored data from NDACC, based on four pilot stations and a selection of key species. The longer-term goal is to get the whole Network and new stations to be developed in NORS involved, and to widen the number of target species.

Why is this project important for Europe?

There are 2 major reasons:

- › The European stations of NDACC will take the lead in demonstrating the capability of the global NDACC Network to become an important player in GMES.
- › Europe will benefit from improved GMES atmospheric data products.

How does this project benefit European citizens?

By enhancing the quality of the GAS products, NORS will help improving our knowledge of our atmosphere and its evolution. As such, we will be able to face environmental challenges - which have a significant socio-economic impact - with better confidence.

More information about NORS
<http://nors.aeronomie.be/>

More information about NDACC
<http://www.ndacc.org/>

More information about MACC-II
<http://www.gmes-atmosphere.eu/>

Partners & Further Information....

BIRA-IASB - Belgian Institute for Space Aeronomy - Belgium
www.aeronomie.be (Coordinator)

EMPA - Eidgenössische Materialprüfungs- und Forschungsanstalt - Switzerland
www.empa.ch

INTA - Instituto Nacional de Técnica Aeroespacial - Spain
www.inta.es

UBern - Universität Bern - Switzerland
www.unibe.ch

KIT - Karlsruher Institut für Technologie - Germany
www.kit.edu

CNRS - Centre National de la Recherche Scientifique - France
www.cnrs.fr

UBremen - Universität Bremen - Germany
www.uni-bremen.de

ULg - Université de Liège - Belgium
www.ulg.ac.be

MPIC - Max Planck Gesellschaft zur Förderung der Wissenschaften E.V. - Germany
www.mpg.de

UH - Ruprecht-Karls-Universität Heidelberg - Germany
www.uni-heidelberg.de

S&T - Science and Technology B.V. - Netherlands
www.stcorp.nl

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Demonstration Network of Ground-based Remote Sensing Observations in Support of the GMES Atmospheric Service

<http://nors.aeronomie.be/>

NORS aims at demonstrating the value of ground-based remote sensing data from the Network for the Detection of Atmospheric Composition Change for quality assessment and improvement of the GMES (Global Monitoring for Environment and Security) Atmospheric Service products.



Objectives.....

The principal objective of the NORS project is to assess and improve the quality of the products delivered by the GMES Atmospheric Service (GAS). GAS combines state-of-the-art atmospheric modelling with Earth observation data to provide information services covering European Air Quality, Global Atmospheric Composition, Climate, and UV and Solar Energy. NORS uses independent, well-characterised, ground-based remote sensing data from the international Network for the Detection of Atmospheric Composition Change (NDACC).

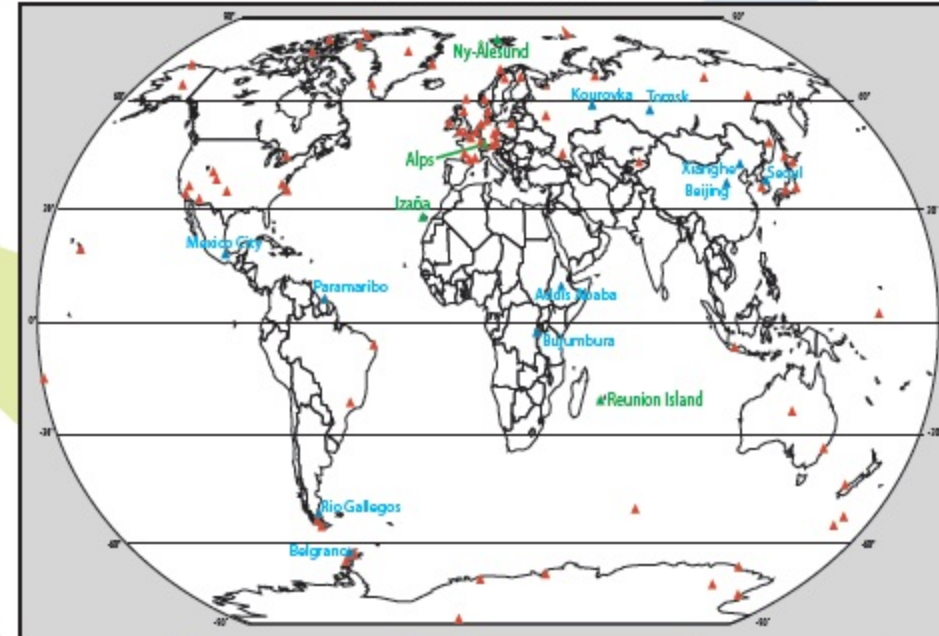
NDACC is a global research network with a strong European contribution, providing high-quality reference observational data for understanding the physical / chemical state of the stratosphere and troposphere, and for assessing the impact of atmospheric composition changes on climate.

NORS focuses on a selection of NDACC data that have high priority in the different domains of GAS, namely 'ozone and UV', 'air quality' and 'climate'. The research planned in NORS aims at tailoring these NDACC products to the needs of GAS. It includes a full characterisation of the products and an evaluation of the consistency between the ground-based data and the satellite data assimilated in the GAS production chain.

As ground-based remote sensing data form the ideal link between in situ surface concentrations and satellite column abundances, NORS will investigate the development of integrated tropospheric products and integrated ozone products. A web-based application for the operational validation of the GAS products will be built. NORS will also support the GAS long-term re-analyses – back to 2003. It will have strong connections to the European Environment Agency (EEA), Global Atmospheric Watch (GAW) and European Space Agency (ESA), and especially to the MACC-II (Monitoring Atmospheric Composition and Climate II) project. MACC-II is the Interim Implementation of GAS.



NDACC Sites



- ▲ Operational NDACC stations
- ▲ NDACC stations selected as pilot stations in NORS
- ▲ Stations to be developed in NORS to potentially become NDACC stations

Sites.....

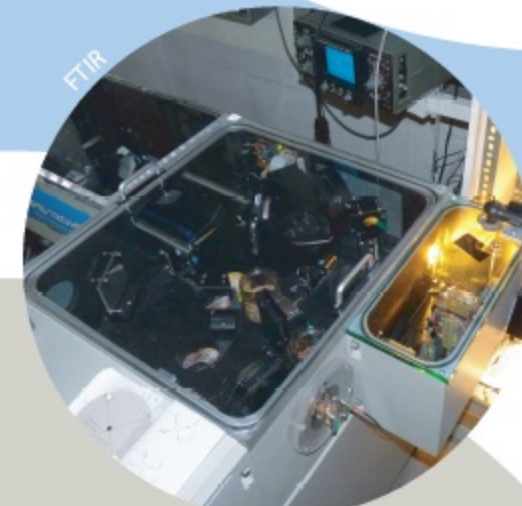
In NORS, we will focus on key species for the stratospheric ozone, air quality, and climate areas of GAS at four NDACC sites managed by European partners. NORS will also make an effort to export its achievements to more stations of the global NDACC network, including new stations under development, and to be prepared to include additional species in the near-future. The four pilot stations (Izaña, Reunion Island, the Alps and Ny-Ålesund) were selected for their latitudinal distribution and because each of them hosts a variety of instruments.



Instruments.....

The four types of instruments included in NORS represent the most important ground-based remote sensing techniques in the field of atmospheric composition. They have rarely been used in the validation of MACC-II products up to now.

- › Ozone LIDAR
- › Ozone Microwave Radiometer
- › FTIR (Fourier Transform InfraRed spectroscopy)
- › UV-VIS DOAS (Differential Optical Absorption Spectroscopy)



Target data products...

The target species in NORS are

- › tropospheric and stratospheric ozone columns and vertical profiles up to 70 km altitude;
- › tropospheric and stratospheric NO₂ columns and profiles;
- › lower tropospheric profiles of NO₂, H₂CO, aerosol extinction;
- › tropospheric and stratospheric columns of CO;
- › tropospheric and stratospheric columns of CH₄.