The Pandonia Global Network: Reference Measurements of Atmospheric Composition

Ilias Bougoudis[1], André Sayler[2]

1: LuftBlick OG, Innsbruck, Austria
2: Institute of Environmental Physics, University of Bremen, Germany

With the start of the 21th century, the focus of atmospheric satellite missions has shifted gradually from the stratosphere (ozone chemistry) to the troposphere (air quality, aerosols, clouds, greenhouse gases). With this new situation NASA and ESA have identified a number of gaps in the satellite validation infrastructure for reactive trace gases such as nitrogen dioxide, ozone, sulfur dioxide, formaldehyde, etc. In 2005 NASA initiated an effort at Goddard Space Flight Center (GFSC) to address this issue by starting to develop a cost-effective, compact, easy to deploy, ground-based, passive remote sensing spectrometer system capable of performing sun, moon and sky observations called "Pandora". Soon Pandoras were distributed around the globe to form a validation network. In 2013 ESA joined NASA in funding this development through prime contractor LuftBlick OG, Innsbruck, Austria. Since 2018, this network has been called "Pandonia Global Network" (PGN).

The goal of this talk is to present the PGN, its objectives, goals, and structure. The PGN provides real-time, standardized, calibrated and verified air quality data and associated uncertainty values. In the context of satellite validation PGN data sets are representing Fiducial Reference Measurements. PGN also seeks to coordinate and implement network standards regarding common algorithms and data processing, instrument operating routines, quality control, real-time data processing and data archiving. Results from the Bremen Pandora instrument, including comparisons of surface NO_2 concentrations to in-situ measurements from the BLUES pollution monitoring network in Bremen (traffic and background stations), and comparisons of tropospheric NO_2 vertical column densities to the local MAX-DOAS instrument are presented and discussed.