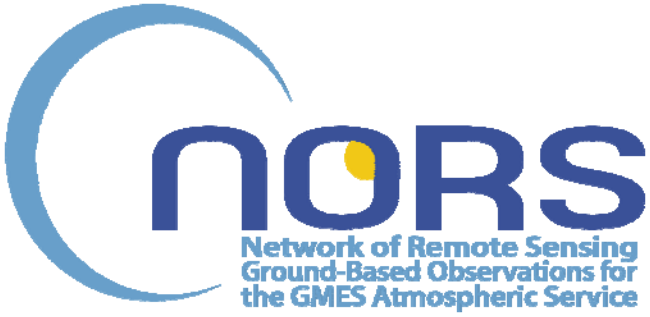

Data format definitions

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Executive summary

This document provides information on the formats, templates and content of the archives which will be used for data exchange within NORS and made available to the end users, in particular the GAS service. After careful evaluation of the NORS and end user needs and study of the existing GEOMS templates for all NORS-contributing ground-based techniques (i.e. FTIR, LIDAR, MWR and UVVIS-DOAS), we decided to stick to the current –and hence unmodified– versions of the GEOMS templates for the following reasons:

- the existing templates and file contents have been progressively and cautiously defined, they already correspond to mature format definitions
- these hdf files and their architecture result from a wide harmonization effort between several data centers, they are therefore –more and more– widely used and well mastered by the NORS partners submitting data, this will facilitate the implementation of the real time data delivery system for all NORS stations and instruments
- of equal importance, the end users are becoming familiar with these archives and are developing tools or routines to extract data and metadata pertinent for their respective investigations and validation activities, this should further ease and widen the exploitation of NORS data
- the DHFs (e.g. at NDACC, AVDC) are already prepared to handle and catalog these files without any change to their usual procedures
- ascii data and metadata files are generally used as an intermediate step in the generation of the hdf archives; within this context, the availability of idl routines developed by AVDC allowing to convert data and metadata ascii files into hdf archives while performing a suite of self-consistency tests is another important advantage of sticking to existing GEOMS templates.

Although we did not identify weaknesses in the existing file architectures, we noticed a limitation for sun-tracking techniques in the sense that the templates do not include direct information as to the position of the sampled airmasses, in particular the horizontal extent and resolution of the measurements. This is however balanced by the fact that the actual GEOMS relevant files include information such as the solar/lunar astronomical zenith angle, the solar/lunar azimuth angle and the vertical sensitivity of the measurements which allow precise subsequent determination of the effective airmass location. The NORS consortium decided to avoid including such redundant and/or specific information in the files. Instead, we will provide tools and guidelines to the end users to help them characterizing the sampled airmasses.

We should also point out that presently, two consecutive versions of hdf coexist, namely the versions 4 and 5. Within NORS, we decided to stick to version 4 since the NDACC DHF –which will host the NORS data– is not yet prepared to handle hdf5 archives.

Finally, it is important to mention that possibilities to further harmonize the naming of the uncertainty variables between the current templates have been identified. Implementation of theses changes could in some instances help to assign clear unambiguous names to these parameters, consistently across the NORS techniques. We cannot therefore rule out the

possibility that the existing templates could undergo some changes at the GEOMS level during the NORS project, leading us to consider adopting the latest definitions after careful evaluation of the potential negative impact(s) on the rapid data delivery chain. In case of template update, a brief report carefully documenting the change(s) will be issued by ULg (partner 8) and the new templates will be uploaded on the NORS web site.

Applicable and reference document

The Generic Earth Observation Metadata Standard (GEOMS), Version 1.0, 21/03/2011 (http://avdc.gsfc.nasa.gov/PDF/GEOMS/geoms-1.0.pdf)

Acronyms and abbreviations

AVDC	Aura Validation Data Center
DHF	Data Host Facility
DOAS	Differential Optical Absorption Spectrometry
FTIR	Fourier Transform InfraRed
GAS	GMES Atmospheric Service
GEOMS	Generic Earth Observation Metadata Standard
GMES	Global Monitoring for Environment and Security
HDF	Hierarchical Data Format
MWR	MicroWave Radiometer
NDACC	Network for the Detection of Atmospheric Composition Change
NORS	Demonstration Network Of ground-based Remote Sensing observations in support of the GMES Atmospheric Service
UVVIS	Ultraviolet visible spectroscopy

1. GEOMS Global Attributes and Variables

For a complete list and description of the GEOMS global originator (PI, data originator and submitter), dataset and file attributes, the reader is invited to consult the Chapter 4 of the Generic Earth Observation Metadata Standard (GEOMS) reference document (reference and web-link provided here above). This document further provides a description of the variable attributes (see Chapter 5). It is important to notice that all these entries are mandatory and common to all GEOMS-compliant archives, whatever the technique.

2. GEOMS Templates

The specific GEOMS templates defined for each NORS technique are available from the AVDC web site as excel files. These files list the mandatory and optional variables, the variable dependencies, the units to be used…

NORS relevant templates can be accessed through the following links:

FTIR (22/11/2011): http://avdc.gsfc.nasa.gov/index.php?site=1989220925

LIDAR (22/11/2011): http://avdc.gsfc.nasa.gov/index.php?site=455555165

MWR (22/11/2011): http://avdc.gsfc.nasa.gov/index.php?site=1209943366

UVVIS.DOAS (13/12/2011): http://avdc.gsfc.nasa.gov/index.php?site=1876901039

All these template definitions will also be available from the NORS web-site, they should be considered as annexes to the present milestone report.