

# General requirements of ACTRIS

## Context of general requirements in ACTRIS

Complete report at: <https://envriplus.manageprojects.com/projects/requirements/notebooks/470/pages/36/comments/389/attachments/610/download>

ACTRIS-2 (Aerosols, Clouds, and Trace gases Research Infrastructure) Integrating Activity (IA) addresses the scope of integrating state-of-the-art European ground-based stations for long-term observations of aerosols, clouds and short lived gases.

ACTRIS-2 is a unique research infrastructure improving the quality of atmospheric observations, developing new methods and protocols, and harmonizing existing observations of the atmospheric variables.

The overall goal of the ACTRIS Data Centre is to provide scientists and other user groups with free and open access to all ACTRIS infrastructure data, complemented with access to innovative and mature data products, together with tools for quality assurance (QA), data analysis and research.

The numerous measurement methodologies applied in ACTRIS result in a considerable diversity of the data collected. In accordance with these requirements, the ACTRIS Data Centre consists of three topical data repositories archiving the measurement data, which are all linked through the ACTRIS data portal to provide a single access point to all data. Hence, the ACTRIS Data Centre is founded on 3 topical data repositories:

- Near-surface aerosol and trace gas data are reported to **EBAS** [1]
- Aerosol profile data are reported to the **EARLINET** Data base [2]
- Cloud profile data are reported to the **Cloudnet** data base [3]

In addition, ICARE contributes with the production and provision of satellite data that complements the ACTRIS ground-based data [4]

Generally, the ACTRIS Data Centre and data management activity aim to work in accordance with the ENVRI Reference Model, hosted at [5]

### References:

1. <http://ebas.nilu.no/>
2. <http://access.earlinet.org/EARLINET/>
3. <http://www.cloud-net.org/data/>
4. <http://www.icare.univ-lille1.fr/catalogue>
5. <http://www.envri.eu/rm>

## Summary of ACTRIS general requirements

ACTRIS data are available at no cost from the ACTRIS Data Portal [1], which provides access to the ACTRIS Data Base to select different type of data by fields (e.g. station, date, and other metadata), by period time (e.g. volcanic eruption in Iceland 2010) or by repositories (e.g. CLOUDNET, EARLINET and EUSAAR). Once retrieved the data, users can plot the selected data in the portal.

ACTRIS has three types of data repositories (also called topic databases): near surface data (EBAS), aerosol profiles (EARLINET) and cloud profiles (CLOUDNET). Furthermore, ACTRIS is starting to develop a new database with satellite data linked to ACTRIS ground based data, but it is not available yet. There are differences for retrieving data between those three types because they belong to three different repositories. But in general, each station acquires data and processes it at the station level. Later, data (processed) is uploaded to the topic database where a quality check procedure is performed before storing the data. The Data Portal is structured as a metadata catalogue, searching the topical data bases, enabling data download from the primary archive.. Typically all the data are available to the users. In ACTRIS 2, some of the data process (e.g. aerosol profile data) will be centrally and automatically performed (some of them in NRT) and data will be directly submitted to the database.

### References:

1. <http://actris.nilu.no>

## Detailed requirements

Taking account the software and computational environments involved in ACTRIS, in the case of the aerosol profile data, each station provides NetCDF files (standard data format), and they are transferred to a computational resource (located in CNR-Potenza, Southern Italy) for processing them by using the Single Calculus Chain (SCC). Once processed the data, a dialog with the data provided is performed for upload it to the topic database (EARLINET).

About the Data Portal (NILU), is a VM environment, with a Linux server, and data are stored in a relational database (SYBASE) named EBAS. More info available at [1].

ACTRIS does not offer software to users yet, but in the next year they will provide tools to perform data processing and the quality check.

ACTRIS has three different data policies, one for each data topic, but they are working for having a homogenous data policy (will be covered in the next data management plan). As we mentioned before, data is free and accessible, and for some data, registration is needed to know and understand who is using the data. However, there is a requirement to acknowledge the authorship of the data for publications. (ACTRIS Data Policy [2] and ACTRIS Data Management plan [3])

Regarding to the question of interactions with other RIs, ACTRIS has interactions with IAGOS and ICOS. Also ACTRIS collaborate with AeroCom [4] (project "outside EU"), which is a open international initiative of scientists interested in the advancement of the understanding of the global aerosol and its impact on climate

ACTRIS brings to ENVRIplus the SCC software for aerosol profiles data analysis. The software itself is offered as open source software. And it will be the same for the other ACTRIS components. However, it is worth to mention that this software is so customized that hardly any RI can be interested in them.

It also offers access to the computing resource for performing analysis of some data and quality checks (but again, very target specific, not general purpose). Besides, ACTRIS has open-access calibration facilities (3 calibration centres) and advanced observing platforms to Trans-National Access (TNA) to the benefit of a large user community, including SMEs, and to further facilitate virtual access to high quality information, tools and services enhancing the ACTRIS Data Centre. Those Calibration facilities also offer trainings and specific advice.

ACTRIS provides expertise in different ways:

- Providing TNA to different calibration centres and laboratories
- Training of operators and users and enhance the linkage between research, education and innovation in the field of atmospheric science, e.g. quality check.
- Providing material for doing quality check in the user side.
- Calibration Centres offer training and specific advice to users.

The access to related scholarly publications depends of the journals policy, but ACTRIS website provides different literature like the Data Management Plan and Data Policy are available [2 and 3]. In general terms, deliverables are open source and has an open-access publication policy.

ACTRIS would like to achieve through the participation to ENVRIplus:

- To improve the interoperability to make the data as accessible and understandable as possible to the others
- To understand which are the best practice to discover data
- To link with others RIs, because there are many points in common (technology and scientifically)
- To improve through the experience of the others RIs
- Learn about aspects in data management less covered so far, e.g. provenance documentation, virtual collaboration tools, data citation, provenance tracking.

ACTRIS expects that ENVRIplus provide technology/advice for:

- Activity of sensors
- How instrument works in extreme conditions
- Small sensors capabilities
- Work with standardisation bodies to take into account ACTRIS needs (e.g. OGC).

About the standards, most of the data is in NetCDF format, but ACTRIS is moving to CF (Climate and Forecast )1.5 -Compliant format. For near surface data the datasets are archived and provided in NASA-Ames 1001. The exploitation of the data is provided by the ACTRIS Data Portal, where users can see and access the three type of data separately, but in the future, the visualize of the three type of data will be combined in a single plot. Furthermore, ACTRIS plans to provide data in different formats at users wish (NASA-Ames, NetCDF), customised aggregated datasets. OAI-PMH / ISO 19115 / WMO profile for discovery, OGC web services for data access, option for OGC discovery service.

The following ACTRIS aspects could be improved:

- The data visualization needs to be improved to make it as much understandable as possible.
- Data provision.
- Inter-operability between data centre nodes.

The current data management draft covers already all the topics except the optimization, and it will be updated once per year.

The most challenging have non-functional constraint for ACTRIS can be the computational environment cost, because is going to be open quite soon, so depending how many users access to it, it can be a problem or not.

ACTRIS has a general concern about the access of the data. The current approach to security and access is that most data are open access without login. However, some communities place restriction with password / login, which does impact use of the data. Depending of the network, ACTRIS has different timing to provide data, e.g. near surface data is provided once per year, which is no the case for the other types. ACTRIS does not have any embargo period.

ACTRIS has data, software and computational environment subject to an open-access policy. More information available in the data policy document [2].

The main big problems to handling and exploiting data are:

- Data visualization, which is the key-factor for the effective data-use in order to avoid users to be lost handling many variables at the same time.
- Providing and handling data from external community. ACTRIS is expected to provide the data in certain amount of time, avoiding delays. However, if the amount data sent by an external community is huge, receiving, processing (calculus chain) and performing the quality check of the data can be very time-consuming.
- Many users accessing to ACTRIS services at the same time can become a problem for computational and for archiving.
- Basic inter-operability - but ACTRIS has already a plan for it.

## References:

1. [https://www.wmo.int/pages/prog/arep/gaw/documents/Toerseth\\_WDCA\\_GAW2009May09.pdf](https://www.wmo.int/pages/prog/arep/gaw/documents/Toerseth_WDCA_GAW2009May09.pdf)
2. <http://actris.nilu.no/Content/Documents/DataPolicy.pdf>
3. [http://www.actris.eu/Portals/46/Publications/DataCentre/ACTRIS\\_Data\\_Management\\_Plan.pdf](http://www.actris.eu/Portals/46/Publications/DataCentre/ACTRIS_Data_Management_Plan.pdf)
4. <http://aerocom.met.no/Welcomes.html>

## Formalities (who & when)

<b>Go-between</b>	Rosa Filgueira
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<b>Period of requirements collection</b>	July to November
<b>Status</b>	Finished