

WP6- NA6: WP "Integration, outreach, and sustainability"
Deliverable D6.3: Report on initial end-user consultation phase
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Norwegian Meteorological Institute, Michael Schulz

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1. Goal

Within WP6 - ACTRIS end-user consultation is sought to develop the infrastructure in an efficient way. The end-users of the ACTRIS network data products have very different needs and expectations. Feedback from users is sought by different means: a) ACTRIS presentation from leading partners CNR and CNRS, but also other partners, at international meetings to promote partnership with ACTRIS, b) ACTRIS partners undertake to systematically consult the modeling community on annual meetings of international model intercomparisons AeroCom, ACCMIP, CFMIP, HTAP; c) a web based interface allows end users to traceable and easily formulate requests and provide feedback to the ACTRIS database outreach component; d) near-real-time and higher-level products are designed and prototypes are proposed to the scientific community in charge of international assessments of relevance (MACC, WMO, EMEP, EU DG's, IPCC) to explore interest and guide the use of resources for the development of these higher-level products. User requests will be bundled and discussed at the annual ACTRIS meeting. Of special relevance is the critical inquiry on the need of near-real-time dissemination of data for chemical weather prediction, to policy makers at all levels, and to the general public (e.g. "Shared Environmental Information System" SAIS, WMO "Weather Information System" WIS). A continuous dialogue with end users is of course also assured through the ACTRIS web portal.

2. End-user consultation

The following summarize the activities and links to end-users established by the ACTRIS infrastructure, including the partner assuring the presentation.

2.1. ACTRIS presentations at international meetings

- "Data police and ownership Why care?"; EBAS Online: User requirements workshop at NILU, Kjeller, Norway; 28/03/2012; NILU
- "European Aerosol and Reactive Gases monitoring network: a step towards international standardization"; 04/07/2012; Korea University, Seoul, South Korea; CNRS
- "European Cooperation Projects: ACTRIS and ITARS"; 2nd Stakeholders Meeting of the FP-REGPOT-2008-1 Proj. 229907 DELICE Bucharest-Magurele, Romania; 25/01/2012; INOE
- "ICOS meeting and stakeholder conference"; 30/06/2012; Bergen, Norway / 30 May - 1 Jun 2012; CNR
- "International Conference on Research Infrastructures" (ICRI 2012); 21/03/2012; Copenhagen, Denmark; CNR
- "ACTRIS overview", PEGASOS 1st annual meeting; 13/03/2012; Heraklion, Greece; CNRS
- "The ACTRIS research infrastructure in support to EMEP"; 17/04/2012; 13th TFMM annual meeting, 17 - 19 April 2012, Gozo, Malta; JRC
- "World Data Centre for Aerosol Status Report 2012; Meeting of WMO GAW Expertteam on World Data Centres, May 2012, Geneva; 16/05/2012; NILU
- "ACTRIS : a new infrastructure program for aerosol-reactive gas and cloud data provision"; 23/05/2011; MACC Conference , 23-27 May, Utrecht, The Netherlands; CNRS
- "Advanced atmospheric observations for climate and environmental studies", XCVII Congresso Nazionale della Societa Italiana di Fisica, L'Aquila (Italy), 26 - 30 Settembre 2011; 26/09/2011; L'Aquila (Italy); CNR

- "From EUSAAR to ACTRIS: recommendation for the monitoring strategy of short-lived species in Europe"; 11/05/2011; 12th TFMM annual meeting, Zurich, Switzerland; CNRS
- MACC Conference on Monitoring and Forecasting Atmospheric Composition; 23/05/2011; Utrecht, The Netherlands; CNR
- Meeting of the WMO/GAW; 06/10/2011; Fukuoka, Japan; CNRS
- Urbino Symposium - ACCENT PLUS
<http://www.uniurb.it/SA/AccentPlus2011/information2011.html>; 13/09/2011; Urbino, Italy, 13-16 Sept 2011; CNRS

2.2. ACTRIS & model intercomparisons AeroCom, ACCMIP, CFMIP, HTAP

ACTRIS representatives have visited major model intercomparison meetings of relevance:

- 11th AeroCom workshop, Seattle, US, October 2012 (M. Schulz, Met.No; S.Kinne, MPI)
- HTAP planning meeting with MetNo/JRC, Ispra, Italy, December 2012 (M.Schulz)
- 10th Aerocom workshop, Fukuoka, Japan, October 3-6 2011 (M. Schulz, Met.No; S.Kinne, MPI; Elisabetta Vignati,JRC)
- HTAP, Arona, Italy, 6-8 June, 2011, (M. Schulz, MetNo; Kjetil Torseth, NILU,)

A regular update of this list of presentations is found on the ACTRIS website.

2.3. Web services to formulate user requests

A twitter account has been created, which informs interested followers of the EBAS database to eventually comment recent database news. How to find EBAS on twitter: Goto <https://twitter.com/> ; Search and follow @EBAS_NILU. More information about the formal way on how users can provide feedback on the ACTRIS database is described in ACTRIS Deliverable D6.12: Website for continuous end-user consultation and user request collection & traceability.

2.4. Higher level products proposed to WMO, EMEP, EU DG's, IPCC

As described in ACTRIS deliverable D6.5 an interface has been created which holds higher level products available for model evaluation. Several publications from the ACTRIS community have been recently finalised which are directly informing the IPCC 5th assessment report authors. Publications are regularly updated on the ACTRIS web site. The bundling of information is highly appreciated by end-users.

2.5. NRT-products proposed to MACC WMO-SDS

- ACTRIS data are regularly received in near-real time at NILU. Aeronet/Photons AOD and air chemistry NRT data from ACTRIS/GAW sites are now used regularly for the evaluation of several chemical forecast models, in particular the MACC forecast model for aerosol and chemistry. The evaluation is regularly updated in the three-monthly validation reports (MACC-VAL subproject) and on dedicated validation quicklook websites (http://www.gmes-atmosphere.eu/services/gac/global_verification/). The exploitation is in an early phase and feedback has been rather technical this far, since data have to be processed in a new rapid way, which challenges both ACTRIS data providers as those combining data with recent model results.

- A second NRT data stream (mainly AOD at this stage) is used by the WMO-SDS sand and dust storm advisory and warning system. (<http://sds-was.aemet.es/forecast-products/forecast-evaluation>). Data are supplied to allow for a fast model evaluation of an ensemble of models, providing daily dust forecasts for North Africa and the Mediterranean. Evaluation is published on the SDS website.
- Cloudnet data are used regularly for the NRT model evaluation of several weather forecast models (<http://www.met.rdg.ac.uk/radar/cloudnet/>).

3. End-user requirements and recommendations

From the above consultations and end-user contacts the following preliminary requirements and recommendations have been extracted:

Data quality:

ACTRIS is defining new standards, cross-calibrates instruments and performs intercomparisons to increase data quality across a network with a variety of institutions. This is very well recognized in the scientific community. On the other hand, the expectations are indeed, that data quality benefits and improves by a project such as ACTRIS. However, often end-users do not know what they can or should expect. It is well understood that it is difficult to establish quality standards because of instrumental peculiarities. For example, the quality of an aerosol size distribution measurement can not be determined in the same way as an absorption or concentration measurement.

Nevertheless, some specific expectations are repeatedly mentioned:

- European standards and calibration procedures should be comparable internationally (sun photometers Photons / GAW / NASA Goddard / Skynet ; Organic carbon and elemental carbon EMEP/IMPROVE/EANET; GAW Aerosol absorption and extinction)
- measurements characterizing scattering and absorption should be better defined with respect to wavelength dependencies
- Instrumental characterization, specifics and raw data should not be hidden by the manufacturer. Instruments with black box components, critical to the understanding of the measurement, should not be used in the future
- Ambient air conditions during time of measurement, such as temperature, humidity should be provided together with the data
- Black carbon characterizing measurements should receive more attention in terms of comparability and quality
- Data quality information is difficult to use if too many different quality flags are used. Often a more simple characterization of quality would be preferred. Recommended grouping of flags to retrieve "best-quality" data would be helpful.

International Cooperation:

The ACTRIS infrastructure forms a specific supersite-oriented European brick in the broader landscape of atmospheric research. An efficient link to other global and regional networks is requested. Most commonly end-users wish to understand the link to EMEP, GAW, ICOS and standard networks run by the national meteorological services.

Error characterization:

GCOS has made a first attempt to specify in a general sense the required quality of data for essential climate variables. A closer look at these specifications reveals that more detail is needed to have clear goals for data quality. Precision and accuracy should be defined as a function of spatial and temporal scales. Further work is needed to both clarify the needed error characterization and the corresponding documentation in the ACTRIS data and data center.

Infrastructure sustainability:

The efficiency of the ACTRIS infrastructure depends on its sustainability. Only long-term measurements, planned carefully, will fulfill the needs to support a better understanding of the evolution of the chemical state of the atmosphere in a changing climate. There is considerable concern that budgetary constraints prevent the development of a sustainable network of super sites in Europe. Questions about the number of necessary super site stations in Europe are repeatedly put. An efficient cooperation between research agencies, universities and more long term oriented agencies on the other hand, such as national meteorological services and environmental protection agencies is required to develop the ACTRIS infrastructure.

Data access and Data base sustainability:

A common data portal and investment into its functionality is often requested. Free data access is still a difficult subject because of the current rewarding systems in science based on peer-reviewed publications. The requests are not very different from those summarized in other geo-science fields.

Near-real time data provision:

Some of the modern instruments allow for near-real-time data provision. While not all applications require this near real time access, some do or would benefit. Chemical weather forecasting is now possible for aerosols and gases and is for instance done on regional and global scale in the MACC project. Particular needs are the rapid evaluation of the model-based fields of pollution, sun-shading aerosols, volcanic ash, fire plumes and dust storms. There are several reasons why ground based ACTRIS measurements can help here: Satellite observations have limited detection capacity and are not covering all areas and times with requires precision and detail in time (overpass once a day, limited swath, geostationary satellites are too far away from Earth, satellite processing takes time, most are based on passive remote sensing, clouds and surface albedo provides constraints for detectability of atmospheric substances, surface concentrations are not easily separable from upper level constituents); Surface based instruments from ACTRIS can complement the basic air quality network data for a better understanding of model failure.

Integration of atmospheric data / Provision of higher level products:

A particular problem is the coupled nature of the atmosphere, where meteorological and chemical processes interact. Some phenomena can be revealed by joint inspection of observations. Sometimes a model is required to disentangle coupled processes. While the pure understanding of atmosphere processes requires integrated atmospheric data, often the science and policy questions are formulated on a level which is rather apart from the details of atmospheric chemistry. Another type of products is needed to be derived from the traditional atmospheric data, which is stored in a database. Motivation for higher

level products is manifold. General model evaluation studies, satellite retrieval development, and scientific assessments for climate and air pollution policy advice make use of integrated information and coarsely gridded data products, eventually on much lower time resolution than actually measured in ACTRIS. Measurements taken in ACTRIS thus require further integration and preparation as higher-level products to make the network efficient. Error documentation and sampling statistics need to be explained and documented in a form usable for model evaluation and assessments. Higher-level products require on the other hand scientific judgment and need to be designed with expertise coming from the data providers.