

New Developments in ACTRIS Surface In-Situ Data Flow and Handling

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Proposed ACTRIS VOC Data Flow in a Nutshell

1. Data is quality assured at the station, including tools provided by ACTRIS
2. Data are submitted to ACTRIS DC / EBAS via submission portal (ensures homogeneous format low in errors), associated with project “ACTRIS_preliminary”.
3. Data are moved to a read-only FTP site at ACTRIS DC for download by the ACTRIS VOC QA group.
4. ACTRIS VOC QA group checks data, and either:
 1. logs issues found in issue tracker, and associates issue with responsible PI / submitter. Data are corrected by submitter, change documented in issue tracker. Back to 2.
 2. Finds the data to pass all QA tests, i.e. closes all issues on dataset (or creates a closed issue if pass at first submission). Go to 5.
5. Data are taken from FTP site, and imported into EBAS with project association “ACTRIS”.

Note: for NO_x, the whole QA procedure will be handled by NO_x QA centre. Will NO_x QA centre give feedback via issue tracker?

Requirements for Organising Data QA and Feedback

2 related requirements when organising data QA and data feedback:

1. VOC:

Issues found with submission of a station by QA group need to be recorded, station PI notified, correction followed up, DC notified when issues are solved.

2. Aerosol

Issues are found when data are screened for larger studies (e.g. trend analysis, model inter-comparison). Issue needs to be documented, assigned to responsible PI, correction followed up, and corrected in archive.

→ Issue tracker at <http://ebas-feedback.nilu.no>. To be used for project / framework QA, but also general feedback on EBAS / ACTRIS system.

What is an issue tracker?

- Web portal for organising and keeping track of issues and tasks in a project.
- Issues are described in text, attachments allowed for illustration & documentation.
- Issues can have 4 statuses reflecting work flow: open, assigned, resolved, closed.
- All users need to have an account!
- Each user has a “role” (set of rights): anybody can report issues or set issue to “resolved”
- Only “managers” (members of QA group) can assign or close an issue.

HOMEWORK:

- Every station / data PI & submitter to create account at ebas-feedback.nilu.no
- Use syntax for login name: <First Name>_<Last Name>

EBAS Feedback: Organising Quality Assurance and Feedback on Data

ACTRIS

Login

Username	<input type="text" value="Markus"/>
Password	<input type="password" value="....."/>
Remember my login in this browser	<input type="checkbox"/>
Secure Session	<input checked="" type="checkbox"/> Only allow your session to be used from this IP address.

[[Signup for a new account](#)] [[Lost your password?](#)]

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EBAS Feedback: Organising Quality Assurance and Feedback on Data

The screenshot shows a web browser window with the following details:

- Browser tabs: "Where are the results of...", "EBAS", "actris2.nilu.no > Events ...", "ACTRIS Issue Tracker".
- Address bar: "ebas-feedback.nilu.no/signup_page.php".
- Navigation bar: "Meistbesucht", "Comics", "Wetter", "Zeitungen", "Lawinen", "LEO Deutsch-Englische...", "Heizelnisse - Ordbok ...", "Finanzen".
- ACTRIS logo at the top center.
- Signup** form with the following fields:
 - Username:**
 - E-mail:**
 - Enter the code as it is shown in the box on the right.:** [CAPTCHA: B 6 E 3 C]
- Text below the form:

On completion of this form and verification of your answers, you will be sent a confirmation e-mail to the e-mail address you specified. Using the confirmation e-mail, you will be able to activate your account. If you fail to activate your account within seven days, it will be purged. You must specify a valid e-mail address in order to receive the account confirmation e-mail.
-
- Links: [[Login](#)] [[Lost your password?](#)]
- Footer: Copyright © 2000 - 2015 MantisBT Team. Mantis Bug Tracker logo.

EBAS Feedback: Organising Quality Assurance and Feedback on Data

The screenshot shows a web browser window displaying the EBAS feedback system. The page title is "My View - ACTRIS Issue ...". The browser address bar shows "ebas-feedback.nilu.no/my_view_page.php". The user is logged in as "Markus (Markus Fiebig - administrator)" on "2015-11-05 21:53 CET". The page displays a navigation menu with links like "My View", "View Issues", "Report Issue", "Change Log", "Roadmap", "Summary", "Manage", "My Account", and "Logout".

The main content area is divided into four sections:

- Unassigned [^] (1 - 10 / 19)**: A list of 10 feedback items, each with a unique ID, a description, and a timestamp. The items include feedback on Harvest Cloudnet catalog, easier access to metadata, advanced search options, data levels, and QA self-assessment tools.
- Reported by Me [^] (1 - 10 / 13)**: A list of 10 feedback items reported by the user, including requests for easier access to metadata, advanced search options, data levels, and QA self-assessment tools.
- Resolved [^] (0 - 0 / 0)**: A section for resolved feedback items, currently empty.
- Recently Modified [^] (1 - 10 / 22)**: A list of 10 recently modified feedback items, including requests for systematic uncertainty and data format guidance.

EBAS Feedback: Organising Quality Assurance and Feedback on Data

The screenshot shows a web browser window displaying the EBAS feedback system. The page title is "View Issues - ACTRIS Iss...". The URL is "ebas-feedback.nilu.no/view_all_bug_page.php". The user is logged in as "Markus (Markus Fiebig - administrator)" on "2015-11-05 22:19 CET". The project is set to "All Projects".

Navigation links include: [My View](#), [View Issues](#), [Report Issue](#), [Change Log](#), [Roadmap](#), [Summary](#), [Manage](#), [My Account](#), [Logout](#). There is also a search bar and a "Jump" button.

Recently Visited: [0000016](#), [0000009](#), [0000006](#)

Filtering options include: Reporter, Monitored By, Assigned To, Category, Severity, Resolution, Profile, Status, Hide Status, Priority, Show, View Status, Show Sticky Issues, Changed(hrs), Use Date Filters, Relationships, Platform, OS, OS Version, Tags, Note By, Sort by, Match Type.

Buttons: Search, Apply Filter, [Advanced Filters], [Create Permalink], Reset Filter, Save Current Filter.

Viewing Issues (1 - 13 / 13) [[Print Reports](#)] [[CSV Export](#)] [[Excel Export](#)]

	Project	Category	ID #	Status	P	Due Date	Updated	Summary
<input type="checkbox"/>	General feedback	[General feedback] Task	0000003	assigned (user6)	-	2011-10-10	2015-11-04	EARLINET dataflow
<input type="checkbox"/>	General feedback	[General feedback] Idea / Wish	0000007	new	-		2015-11-04	easier access to metadata
<input type="checkbox"/>	General feedback	[General feedback] Idea / Wish	0000006	new	-		2015-11-04	Advanced search options
<input type="checkbox"/>	General feedback	[General feedback] Idea / Wish	0000005	new	-		2015-11-04	data levels, data versions, and traceability

EBAS Feedback: Organising Quality Assurance and Feedback on Data

The screenshot displays a web browser window with the URL `ebas-feedback.nilu.no/view.php?id=12`. The page header includes the ACTRIS logo and user information: "Logged in as: Markus (Markus Fiebig - administrator)" and "2015-11-05 22:20 CET". A navigation bar contains links such as "My View", "View Issues", "Report Issue", "Change Log", "Roadmap", "Summary", "Manage", "My Account", and "Logout".

The main content area is titled "View Issue Details" and features a table with the following data:

ID	Project	Category	Date Submitted	Last Update
0000012	General feedback	[All Projects] Idea / Wish	2012-10-26 11:35	2015-11-04 10:28

Below the table, the issue details are shown:

- Reporter:** Markus
- Assigned To:** (empty)
- Due Date:** (empty)
- Priority:** normal
- Status:** new
- Summary:** 0000012: Service integrating satellite, aircraft, ground remote sensing, ground in situ data
- Description:** The nature of the proposed service for integrating satellite, aircraft, ground remote sensing, and ground in situ data is still rather diffuse, but could consist of mapping tools for plotting these data together or for comparing them.
- Tags:** ACTRIS, EBAS
- Attach Tags:** (Separate by ",") Existing tags Attach
- Attached Files:** (empty)

At the bottom of the issue details, there are several action buttons: Edit, Assign To: [Myself], Change Status To: feedback, Monitor, Stick, Clone, Close, Move, and Delete.

The "Relationships" section at the bottom shows a "New relationship" form with a dropdown menu set to "related to" and an "Add" button.

EBAS Feedback: Organising Quality Assurance and Feedback on Data

The screenshot displays a web browser window with the URL `ebas-feedback.nilu.no/view.php?id=12`. The interface is organized into several sections:

- Upload File:** A section for uploading files, featuring a "Select File" button (Maximum size: 2,097k), a "Durchsuchen..." button, the text "Keine Datei ausgewählt.", and an "Upload File" button.
- Users monitoring this issue:** A section titled "User List" with the message "There are no users monitoring this issue." It includes a "Username" input field and an "Add" button.
- Notes:** A section with the message "There are no notes attached to this issue."
- Add Note:** A section for adding notes, containing a "Note" text area, a "View Status" section with a "private" checkbox, and an "Add Note" button.
- Issue History:** A table showing the history of changes to the issue.

Date Modified	Username	Field	Change
2012-10-26 11:35	Markus	New Issue	

Quality Assurance Metadata: Why Do We Need That?

- So far, quality metadata has focused on uncertainty of individual data points.
- A huge fraction of ACTRIS' work is around QA measures:
 - inter-comparison workshops
 - round-robin experiments
 - on-site inter-comparison
 - on-site audit
- ACTRIS markets itself as RI for high-quality data – we need to “show-off” and document that.
- Motivation for stations to participate in QA measures.

Metadata Documenting Quality Assurance

- Measure master data:
 - Unique ID of QA measure (issued by EBAS)
 - Type of QA measure (on site intercomparison, off-site intercomparison, round-robin, on site audit)
 - Entity issuing QA measure (name, address, URL)
 - Date of QA measure
 - Reference to test procedure used (title, URL).
- Requested from data provider:
 - Unique ID of QA measure (issued by EBAS)
 - Date of QA measure
 - Outcome:
 - pass / no pass,
 - uncertainty found (number, unit)
 - reference document (title, date, URL)
 - Will depend on component, at least for gases
- Consistent with ISO19115 DQ metadata items.

To Do: Defined Interface between QA Centre and Data Centre:

- Public documentation of QA measures and results at QA centre website.
- Documentation in machine-readable format

Data Levels Defined in ACTRIS: Use for VOC & NOx?

Data Level	Description		Used for
0	<ul style="list-style-type: none"> • Annotated raw data • format instrument specific • all data / information for processing to final value. 	<ul style="list-style-type: none"> • contains all parameters provided by instrument as provided • "native" time resolution 	NRT
1	<ul style="list-style-type: none"> • processed to final parameter • invalid data removed 	<ul style="list-style-type: none"> • "native" time resolution • format property specific 	intercomparisons
1.5	<ul style="list-style-type: none"> • aggregated to hourly averages • variability quantified • format property specific • STP correction if necessary 	auto-processed	NRT
2		manual QA	regular collection

- SOP describes steps from one to the next level.
- All levels use EBAS NASA-Ames format.

Why Do We Have Data Levels?

- **Traceability:** Whole chain of data acquisition / processing / QA can be traced back to the time of measurement.
- Allows to reprocess the data.
- Separates DAQ / processing / QA chain into well defined steps, great tool for finding the cause of failing intercomparison.
- Data is documented also for a user in 15 years from now.
- Higher level frameworks are moving to requiring this feature.

How to Make Use of Data Levels for NO_x & VOCs

NO_x:

- Similar to online aerosol observations: make use of all levels?
- Draft templates exist, expert / stake holder overhaul needed.

VOCs:

- Offline measurement, levels normally not used.
- Calibration & target gas measurements should be documented, but may confuse end-user
- Use level 0 & 2, almost identical templates, except:
 - Level 0: contains all calibration / zero / target gas measurements, respective data points use respective flags.
 - Level 2: same data, but excluding calibration / zero / target gas measurements
- Level 0 archived offline, level 2 accessible in EBAS-web
- Expert / stake holder input needed.

Use of Flags in Data Submission: The General Philosophy

So far, data archives are often single purpose – ACTRIS is multi-purpose:

- Data are flagged invalid only with non-quantifiable instrument malfunction or severe local contamination (paint job on station, smoking under inlet) – non-representative even for close surroundings, can't be corrected.
- Other conditions of local influence are to be flagged with respective flag, but data are reported as valid, e.g.:
 - Farming activity
 - Dust storm
 - Biomass burning episode
 - Volcanic eruption

Comparison of Data Flags, 1/2

Flag	V/I/M	Description	VOC use	NOx use	Aerosol use
000	V	Valid measurement	no obvious local influence or technical/instrumental problems		
110	V	Episode data checked and accepted by data originator.	----	----	Used to validate outlier
147	V	Below theoretical detection limit or formal Q/A limit, but a value has been measured and reported and is considered valid			----
185	V	Possible local contamination indicated by wind direction or velocity	----	----	
186	V	Possible local contamination indicated by single scattering albedo	----	----	
187	V	Possible local contamination indicated by occurrence of new particles.	----	----	Used in a setting where new particle formation indicates contamination)
188	V	Possible local contamination indicated by low wind speed.	----	----	Used in case of auto-contamination by station
189	V	Possible local contamination indicated by wind from contaminated sector.	----	----	Used if flag 185 is too unspecific.
390	V	Data completeness less than 50%	Needed for averaged values, SOP uses 66%		
392	V	Data completeness less than 75%			
394	V	Data completeness less than 90%			
410	V	Saharan dust event	----	----	
459	I	Extreme value, unspecified error	----	----	Unexplained extreme values, technical problem suspected.

Comparison of Data Flags, 2/2

Flag	V/I/M	Description	VOC use	NOx use	Aerosol use
499	V	Inconsistent with another unspecified measurement.	----	----	Inconsistent e.g scattering coefficient calculated from particle size distribution.
559	V	Unspecified contamination or local influence, but considered valid	unexpected values, no instrumental or technical failure.		
599	I	Unspecified contamination or local influence	----	----	
640	V	Instrument internal relative humidity above 40%.	----	----	Used to signal possible hygroscopic growth of aerosol particles (neph, MPSS)
652	V	Construction / activity nearby.	----	----	Includes disturbance by other lab activity.
662	V	Too high sampling flow, data considered valid.	----	----	E.g. aerosol flow rate out of range but considered valid.
676	V	station inside cloud (visibility < 1000 m).	----	----	
677	I	Icing or hoar frost in the intake.	----	----	
699	I	Mechanical problem, unspecified reason.	----	----	E.g. problems with flow, leaks.
797	V	Data element taken from co-located instrument			----
980	M	Missing due to calibration or zero/span check	----	----	e.g. neph zero checks
999	M	Missing measurement, unspecified reason	missing measurements, outliers, technical problems, non-ambient contamination, definitely unusable for known reason (smoking, ...)		
???	I	Missing due to zero/span check	Zero/span gas applied		----
???	I	Missing due to target gas check	Target gas applied		----
???	I	Missing due to calibration	Calibration gas applied		----