



ACTRIS Aerosol Remote Sensing data processing: Single Calculus Chain Overview

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IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-
Mission 4 "Education and Research" - Component 2: "From research to business" - Investment
3.1: "Fund for the realisation of an integrated system of research and innovation infrastructures"



What is SCC?

- SCC stands for ACTRIS/EARLINET Single Calculus Chain
- Centralized and automatic tool to process raw lidar data
- Developed within EARLINET community (multi-years projects – since 2006)
- Core service of ACTRIS Aerosol Remote Sensing Node (ARES)
- Standard tool to process ACTRIS(ARES)/EARLINET measurements
- Open-source project coordinated by CNR-IMAA
- Current development team: 13 members from 7 different scientific institutions
- Extensively tested on ARES/EARLINET data
- Freely accessible via Web/API → <https://scc.ima.cnr.it>

D'Amico et al.: EARLINET Single Calculus Chain – overview on methodology and strategy, Atmos. Meas. Tech., 8, 4891-4916, <https://doi.org/10.5194/amt-8-4891-2015>, 2015

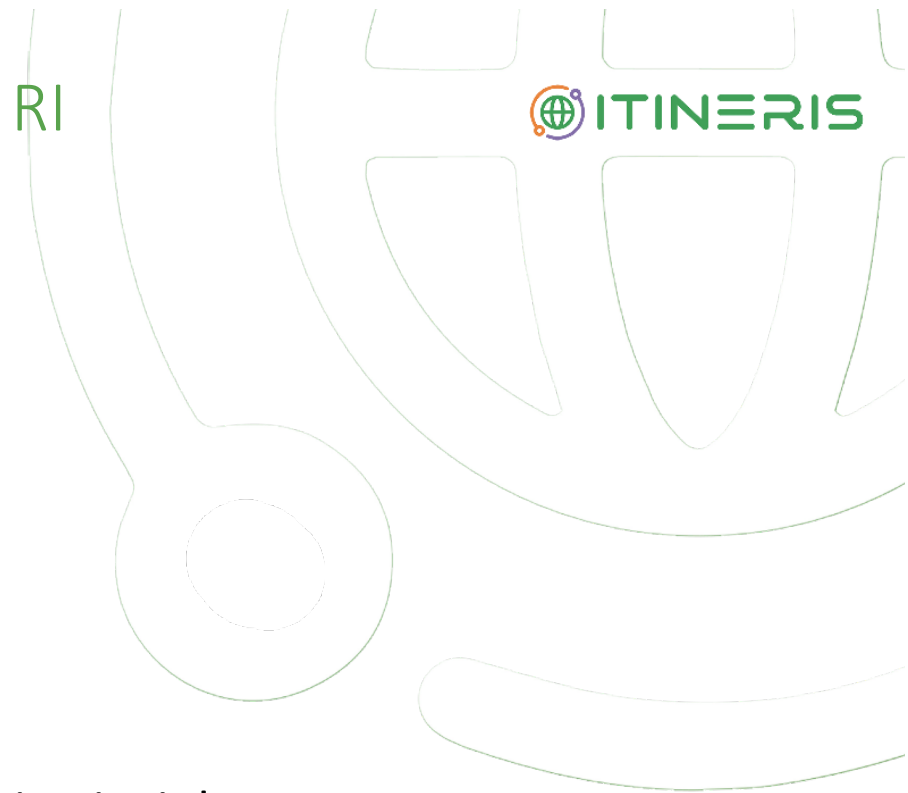
Main requests for a modern and efficient RI

- Standardization
- Full traceability
- Quality control
- Unique data access point
- NRT data provision
- FAIR compliance

<https://www.force11.org/group/fairgroup/fairprinciples>

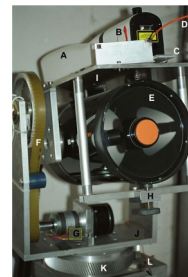
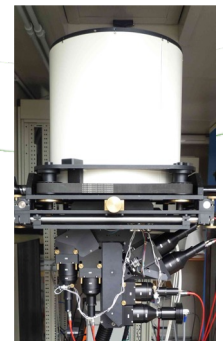
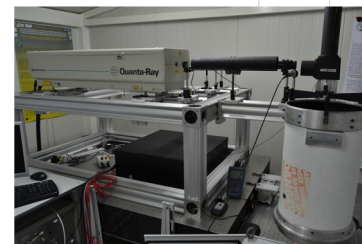
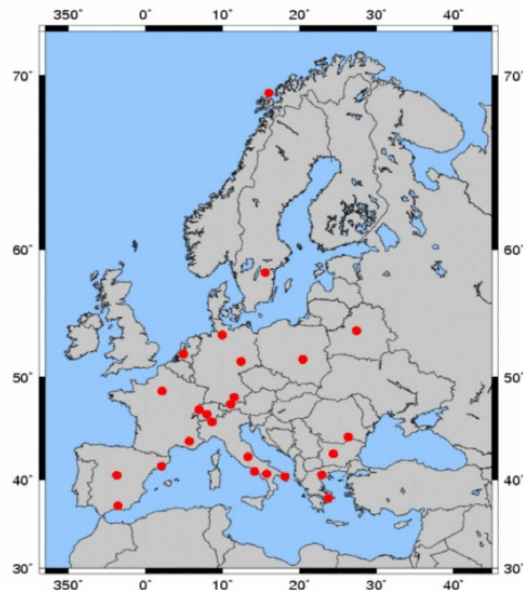
These are mandatory requirements to provide operative monitor services like for example CAMS or to participate in satellite validation plans.

→ Submission of raw data to centralized processing chain



ACTRIS ARS Products Standardization

- Standardization of ACTRIS/EARLINET products is difficult
- EARLINET was born as Research Lidar Network
- lidar systems as often highly customized or fully home made
- differences in laser sources, telescopes, detection and acquisition systems



ACTRIS ARS Standardization Approach



- Define quality control procedures to be applied on both hardware and software levels
- Several inter-comparison campaigns
- Definition of a standard format for all the data products including raw data (NetCDF, CF compliance)
- Development of an automatic and centralized processing chain (Single Calculus Chain - SCC)
- Storage of all the processing parameters in persistent way

- Long process: started on 2006 (EARLINET-ASOS) and still in progress in the framework of ACTRIS

ACTRIS Data Centre

ACTRIS Data Centre Management Board

Data Centre leader, deputy (from ACCESS)

+ one representative from each one of the other Data Centre Units

Data Centre coordination and management

Data and services access Unit (ACCESS)

In situ Data Centre Unit (In-Situ)

Aerosol remote sensing Data Centre Unit (ARES)

Cloud remote sensing Data Centre Unit (CLU)

Trace gas remote sensing Data Centre Unit (GRES)

Atmospheric simulation chamber Data Centre Unit (ACT)

Interaction with corresponding and relevant National Facilities and Topic Centres

ACTRIS data expert team

representatives from all Data Centre units and Topic Centres



National Facilities

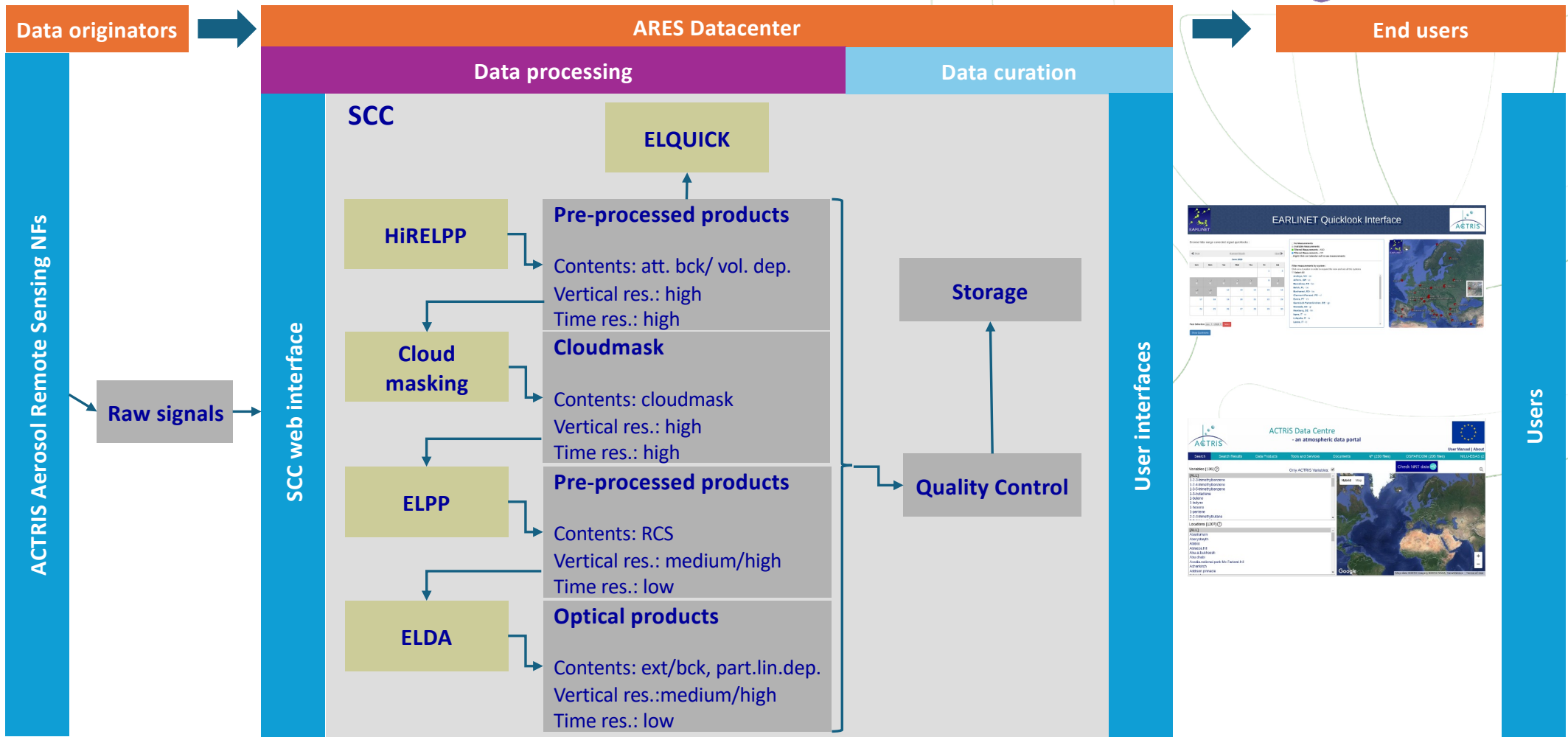
*Providing standardized and harmonised data.
The extent of data contributions varies from each National Facility*



Topic Centres

Ensuring compliance with ACTRIS requirements on data quality, methods, ...

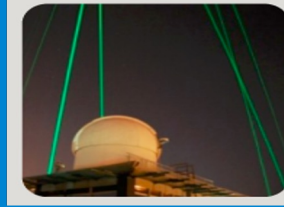
ACTRIS: ARES Datacenter Workflow



SCC and ACTRIS Datacenter

ACTRIS National Facilities

- Raman + depolarization lidars
- photometer



ARES (Data Centre)

- Data Curation and Standardization
- Quality Control
- Centralized Processing (SCC)

CARS (Topic Centre)

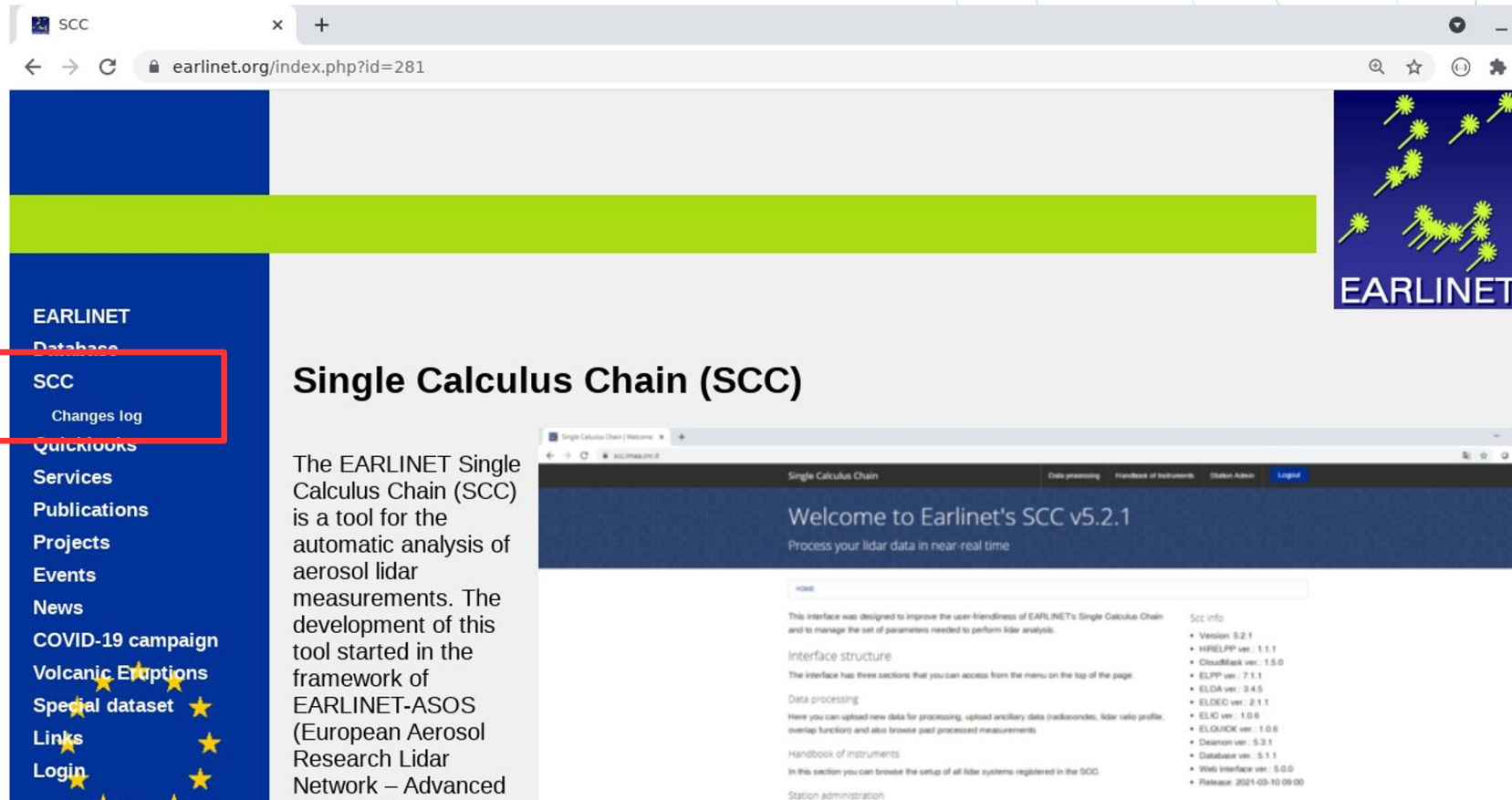
- Calibration
- Quality Assurance Tests
- Instrumental Characterization

End-Users / Stakeholders



Where to get info?

- EARLINET web site: <https://www.earlinet.org>



The screenshot shows the EARLINET website with a navigation menu on the left. The 'SCC' item is highlighted with a red box. The main content area displays the 'Single Calculus Chain (SCC)' title and a description of the tool. An inset image shows the SCC v5.2.1 interface with a 'Welcome to Earlinet's SCC v5.2.1' message and a list of system components.

EARLINET
Database
SCC
Changes log
Quicklooks
Services
Publications
Projects
Events
News
COVID-19 campaign
Volcanic Eruptions
Special dataset
Links
Login

Single Calculus Chain (SCC)

The EARLINET Single Calculus Chain (SCC) is a tool for the automatic analysis of aerosol lidar measurements. The development of this tool started in the framework of EARLINET-ASOS (European Aerosol Research Lidar Network – Advanced

Welcome to Earlinet's SCC v5.2.1
Process your lidar data in near-real time

This interface was designed to improve the user-friendliness of EARLINET's Single Calculus Chain and to manage the set of parameters needed to perform lidar analysis.

Interface structure
The interface has three sections that you can access from the menu on the top of the page:

- Data processing
Here you can upload new data for processing, upload ancillary data (radiosondes, lidar ratio profile, overlap function) and also browse past processed measurements.
- Handbook of instruments
In this section you can browse the setup of all lidar systems registered in the SCC.
- Station administration

Sec info

- Version: 5.2.1
- HRELUPP ver: 1.1.1
- CloudMask ver: 1.5.0
- ELUPP ver: 7.1.1
- ELDA ver: 3.4.5
- ELDED ver: 2.1.1
- ELIC ver: 1.0.6
- ELQUICK ver: 1.0.6
- Deamon ver: 5.3.1
- Database ver: 5.1.1
- Web Interface ver: 5.0.0
- Release: 2021-03-10 09:00

Where to get info?

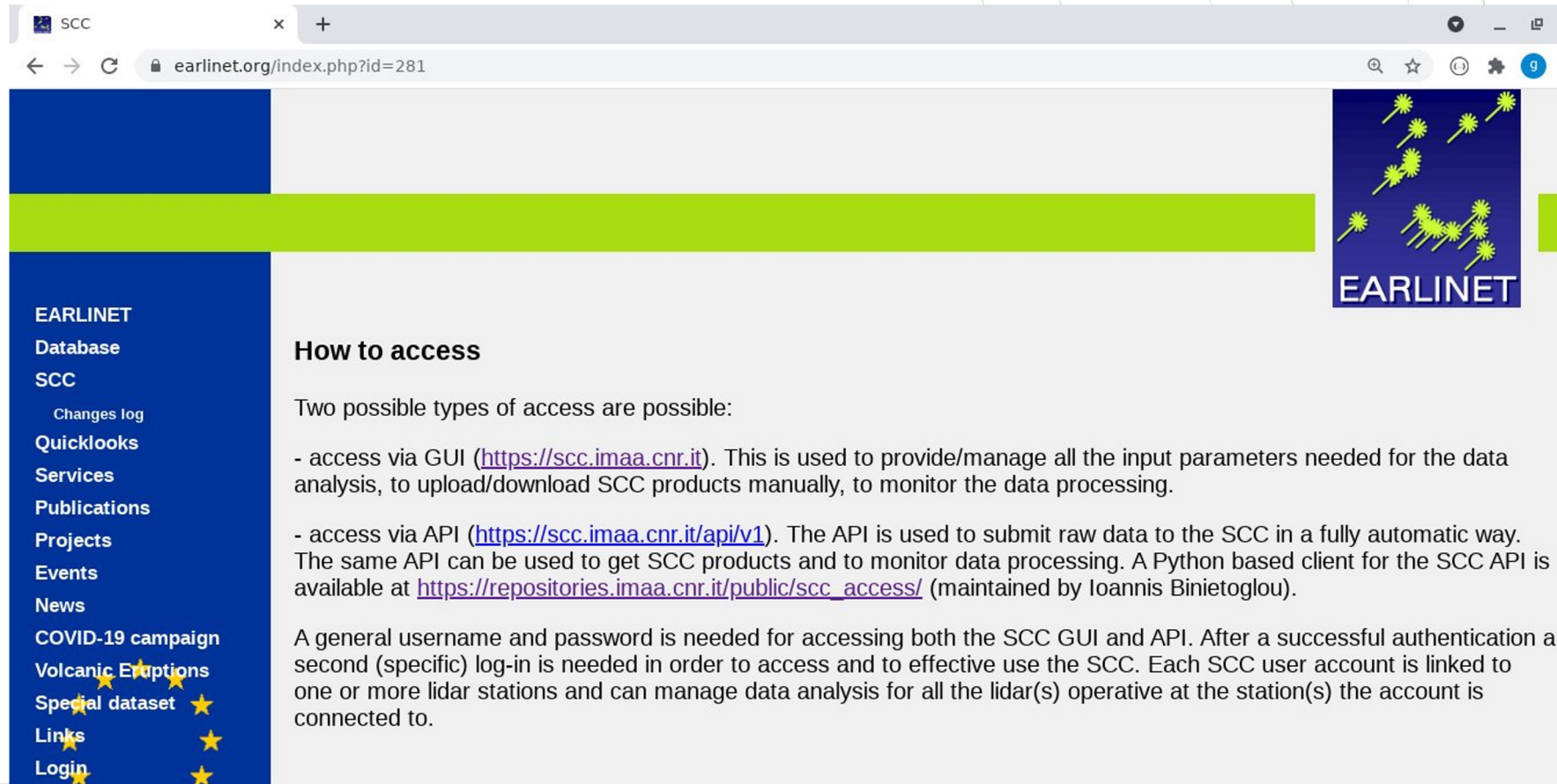
- EARLINET web site: <https://www.earlinet.org>



A screenshot of a web browser displaying the EARLINET website. The browser's address bar shows the URL "earlinet.org/index.php?id=281". The page has a blue header and a green horizontal bar. On the left, there is a blue sidebar menu with the following items: EARLINET, Database, SCC, Changes log, Quicklooks, Services, Publications, Projects, Events, and News. The main content area is titled "How to register" and contains two bullet points. The first bullet point states that registration is automatic for ACTRIS/EARLINET lidar stations once an ACTRIS lidar code is assigned. The second bullet point explains that non-ACTRIS/EARLINET lidar stations can also use the SCC, and provides instructions to request access to the ACTRIS DC-ARES service, including links to the application form and a guidance document. In the top right corner of the page, there is a logo for EARLINET, which consists of a blue square with yellow starburst patterns and the word "EARLINET" in white text below it.

Where to get info?

- EARLINET web site: <https://www.earlinet.org>



The screenshot shows a web browser window with the URL [earlinet.org/index.php?id=281](https://www.earlinet.org/index.php?id=281). The page features a blue sidebar on the left with a menu of links: EARLINET, Database, SCC, Changes log, Quicklooks, Services, Publications, Projects, Events, News, COVID-19 campaign, Volcanic Eruptions, Special dataset, Links, and Login. The main content area is titled "How to access" and contains the following text:

How to access

Two possible types of access are possible:

- access via GUI (<https://scc.imaa.cnr.it>). This is used to provide/manage all the input parameters needed for the data analysis, to upload/download SCC products manually, to monitor the data processing.
- access via API (<https://scc.imaa.cnr.it/api/v1>). The API is used to submit raw data to the SCC in a fully automatic way. The same API can be used to get SCC products and to monitor data processing. A Python based client for the SCC API is available at https://repositories.imaa.cnr.it/public/scc_access/ (maintained by Ioannis Binietoglou).

A general username and password is needed for accessing both the SCC GUI and API. After a successful authentication a second (specific) log-in is needed in order to access and to effective use the SCC. Each SCC user account is linked to one or more lidar stations and can manage data analysis for all the lidar(s) operative at the station(s) the account is connected to.

SCC access

- <https://scc.imaa.cnr.it>



The screenshot shows a web browser window with the URL scc.imaa.cnr.it. The page title is "Single Calculus Chain". The navigation menu includes "Data processing", "Handbook of Instruments", "Station Admin", and "Logout". The main heading is "Welcome to Earlinet's SCC v5.2.3" with the subtitle "Process your lidar data in near-real time". A "HOME" button is visible. The page content is divided into two columns. The left column contains a paragraph about the interface's purpose, a section titled "Interface structure" with a sub-section "Data processing" and its description. The right column is titled "Scc info" and lists several software versions.

Single Calculus Chain | Web x +

← → ↻ scc.imaa.cnr.it

Single Calculus Chain Data processing Handbook of Instruments Station Admin Logout

Welcome to Earlinet's SCC v5.2.3

Process your lidar data in near-real time

HOME

This interface was designed to improve the user-friendliness of EARLINET's Single Calculus Chain and to manage the set of parameters needed to perform lidar analysis.

Interface structure

The interface has three sections that you can access from the menu on the top of the page.

Data processing

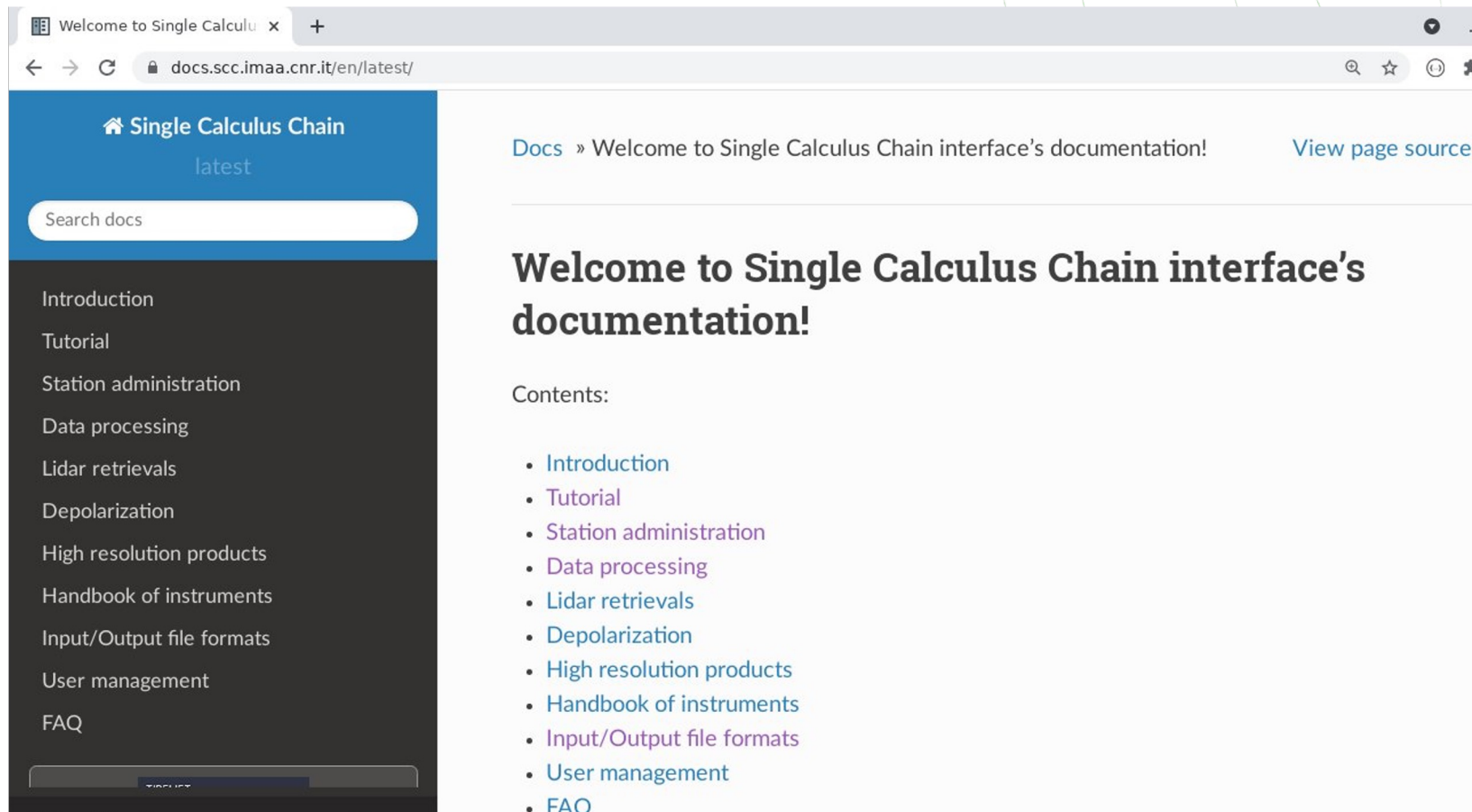
Here you can upload new data for processing, upload ancillary data (radiosondes, lidar ratio profile, overlap function) and also browse past processed measurements

Scc info

- Version: 5.2.3
- HiRELPP ver.: 1.1.2
- CloudMask ver.: 1.6.0
- ELPP ver.: 7.1.3
- ELDA ver.: 3.4.8
- ELDEC ver.: 2.1.3
- ELIC ver.: 1.0.7
- ELQUICK ver.: 1.0.7

SCC documentation

- <https://docs.scc.imaa.cnr.it>

A screenshot of a web browser displaying the documentation for the Single Calculus Chain (SCC) interface. The browser's address bar shows the URL "docs.scc.imaa.cnr.it/en/latest/". The page has a blue header with the text "Single Calculus Chain" and "latest". Below the header is a search bar labeled "Search docs". A dark sidebar on the left contains a list of navigation links: Introduction, Tutorial, Station administration, Data processing, Lidar retrievals, Depolarization, High resolution products, Handbook of instruments, Input/Output file formats, User management, and FAQ. The main content area has a breadcrumb trail "Docs » Welcome to Single Calculus Chain interface's documentation!" and a "View page source" link. The main heading is "Welcome to Single Calculus Chain interface's documentation!". Below this is a "Contents:" section with a bulleted list of links to the same topics as the sidebar: Introduction, Tutorial, Station administration, Data processing, Lidar retrievals, Depolarization, High resolution products, Handbook of instruments, Input/Output file formats, User management, and FAQ.

EARLINET forum



- <https://earlinetforum.imaa.cnr.it>

earlinetforum.imaa.cnr.it
Earlinet forum

Search...

Quick links FAQ ACP MCP

Notifications 88 Private messages Giuseppe Damico

Board index

It is currently 26 Nov 2018 14:30 Last visit was: 26 Nov 2018 07:34

Mark forums read

FORUM	TOPICS	POSTS	LAST POST
LIDAR General discussion about lidar scientific and technical issues Moderator: VolkerFreudenthaler	11	54	Extra neutral density filter ... by VolkerFreudenthaler 19 Dec 2017 00:34
Software and programming Discussions about software and programming Moderator: ioannis.binietoglou	11	59	Re: Bin shift correction in S... by qiaoyun.hu 23 Mar 2018 13:23
Single Calculus Chain A forum for ideas and problems about the use of the SCC Moderators: ioannis.binietoglou, imattis, Holger.Baars, Giuseppe Damico	83	431	ELDA (22) Unknown runtime exc... by ingrhan 19 Nov 2018 11:31
Single Calculus Chain Development A forum for ideas and problems about the development of new SCC versions Moderators: ioannis.binietoglou, imattis, Holger.Baars, Giuseppe Damico	10	78	Re: Depol implementation - ge... by Giuseppe Damico 17 Nov 2018 09:59
EARLINET Discussions concerning EARLINET activity	7	20	Re: Proposal of a new schedul... by lucia.mona 31 Oct 2016 16:00
Cloudnet Discussions concerning Cloudnet activity Moderator: johannesbuehl	1	1	2nd Cloudnet Training School by janapreissler 01 Apr 2017 09:36
Measurement cases Discussions for interesting cases	1	5	Re: Smoky summer in 2017 by Holger.Baars 27 Feb 2018 10:29

EARLINET forum



- <https://earlinetforum.imaa.cnr.it>

Single Calculus Chain

Moderators: ioannis.biniotoglou, imattis, Holger.Baars, Giuseppe Damico

New Topic

Mark topics read • 86 topics 1 2 3 4 ➤

TOPICS	REPLIES	VIEWS	LAST POST
SCC FORUM GUIDELINES PLEASE READ BEFORE POSTING!!! by Giuseppe Damico » 14 Dec 2016 10:52	0	52	by Giuseppe Damico 14 Dec 2016 10:52
Guideline to go from SCC v400 to SCC v500 from a user by christophe.pietras » 01 Dec 2018 01:25	0	3	by christophe.pietras 01 Dec 2018 01:25
HIRELPP(96): NetCDF Error: Missing one or more polarization channels. Please be sure you included both rlflected and tra by Alejandro Rodríguez » 30 Nov 2018 12:09	1	10	by Giuseppe Damico 30 Nov 2018 14:26
ELDA exit code #30 by togialitaki » 27 Nov 2018 12:51	2	18	by togialitaki 29 Nov 2018 09:15
ELIC error 26 by Alejandro Rodríguez » 12 Nov 2018 09:27	6	26	by Alejandro Rodríguez 29 Nov 2018 08:46
ELDA (22) Unknown runtime exception by ingghan » 19 Nov 2018 11:31	0	9	by ingghan 19 Nov 2018 11:31
HiRELPP (24) Found error(s) in SCC_DB for the submitted Measurement_ID by ingghan » 12 Nov 2018 09:58	2	16	by ingghan 19 Nov 2018 11:22
ELPP (187) Overlap file error: "Overlap_Function" array should contain valid overlap correction values by ingghan » 12 Nov 2018 08:25	1	8	by Giuseppe Damico 12 Nov 2018 09:39
SCC feedback from french ACTRIS-FR community by christophe.pietras » 03 Nov 2018 15:59	1	12	by Giuseppe Damico 03 Nov 2018 21:06
Depolarization Calibration Raw Input File by Giuseppe Damico » 27 Sep 2018 14:56	2	30	by Giuseppe Damico 30 Oct 2018 09:40
Error Optical retrieval (22) Unknown runtime exception by Athina Argyroli » 04 Mar 2015 10:51	18	133	by belegantelivio 10 Oct 2018 11:10
Error optical retrieval: 24 (No MC options are provided for the retrieval of Klett bsc) by ingghan » 03 May 2017 06:54	7	44	by imattis 18 Jun 2018 18:19
ELPP error: No correction factor (K) for depolarization calibration is available in SCC_DB. Please provide at least one by belegantelivio » 15 Jun 2018 08:48	3	17	by Giuseppe Damico 15 Jun 2018 10:51
support Raman basckatter usecase 19 (merge NR,FR telescope) by christophe.pietras » 02 Apr 2018 20:50	1	12	by Giuseppe Damico 03 Apr 2018 12:55
ELDA error Processing (20) Iterative bsc calculation does n by Alejandro Rodríguez » 30 Nov 2018 14:48	4	28	by Giuseppe Damico 28 Mar 2018 16:26

Bug reporting system

- <https://bugzilla.ima.cnr.it>

EARLINET Bugzilla Repository - Main Page

Home | New | Browse | Search | Search [?] | Reports | New Account | Log In | Forgot Password

Welcome to EARLINET Bugzilla Repository

[File a Bug](#) [Search](#) [Open a New Account](#) [Documentation](#)

Enter a bug # or some search terms [Quick Search](#) [?]

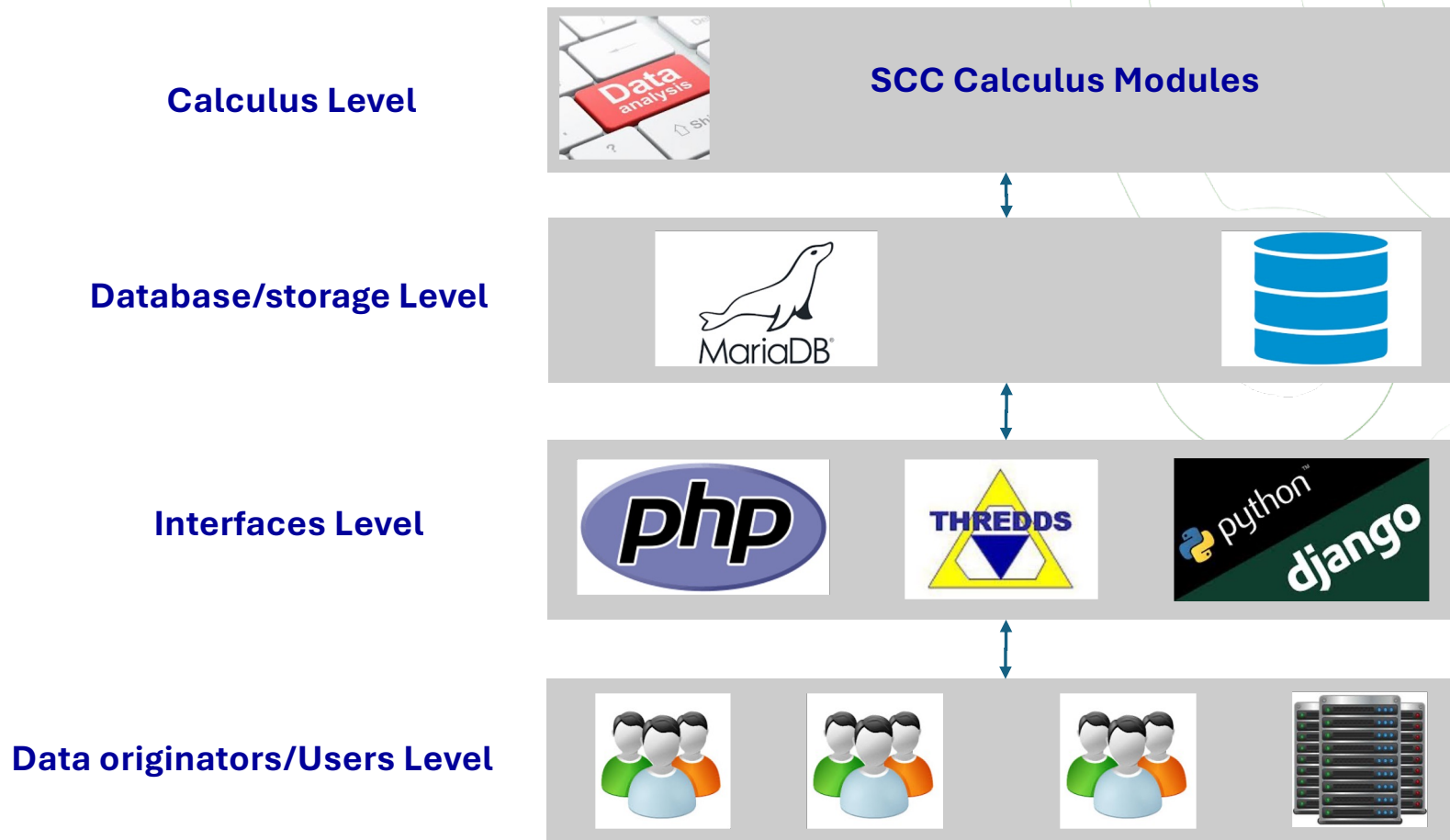
Common Queries:

[Bugs reported in the last 24 hours](#) | [last 7 days](#)

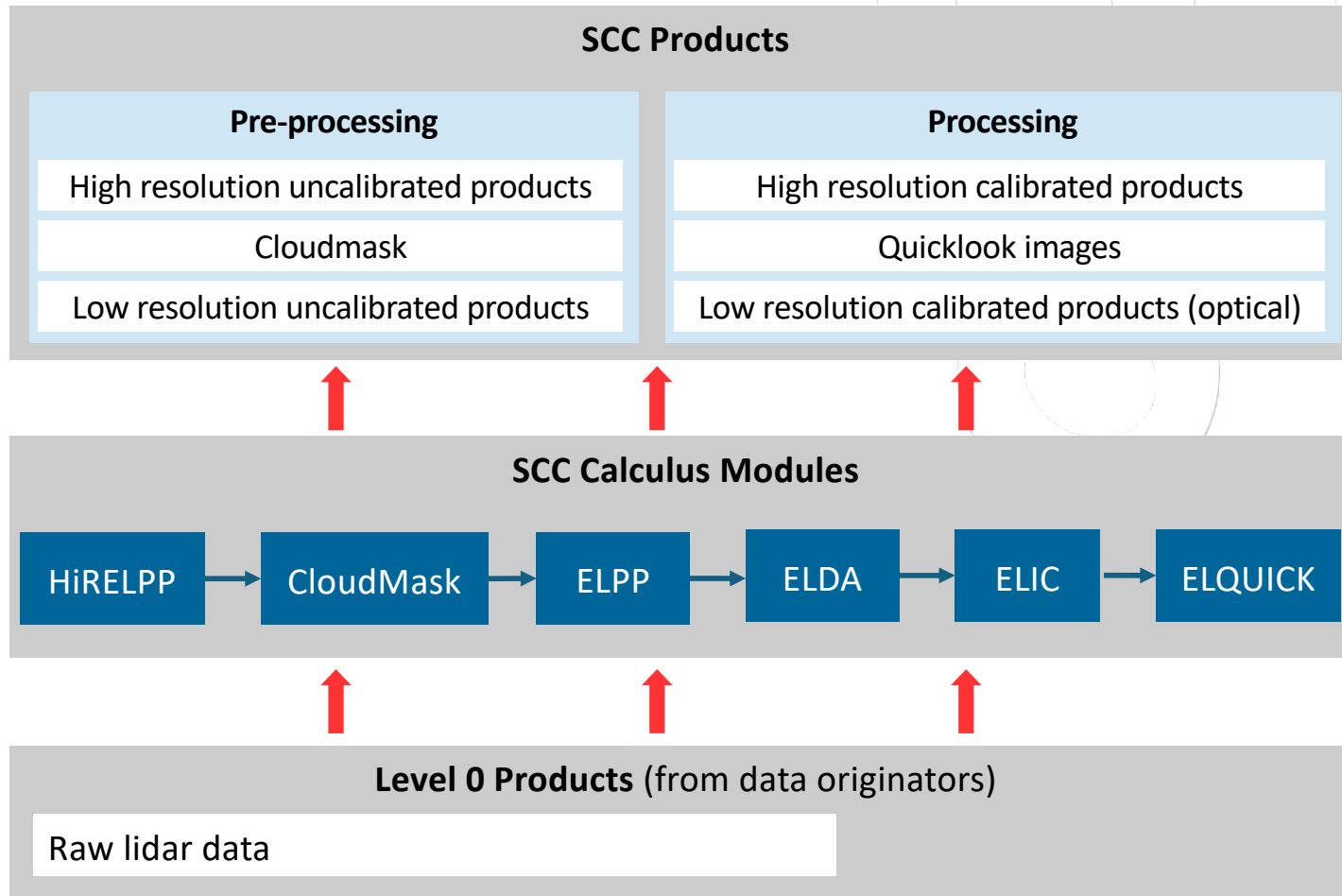
[Bugs changed in the last 24 hours](#) | [last 7 days](#)

Home | New | Browse | Search | Search [?] | Reports | New Account | Log In | Forgot Password

SCC main structure



SCC main structure



Latest SCC release

SCC v5.2.9

- Released on 4th June 2024
- ELPP v7.1.3
- ELDEC v2.1.4
- ELDA v3.4.8.1
- SCC web interface v5.1.1
- HiRELPP v1.1.5
- CloudMask v1.6.0
- ELIC v1.0.8
- ELQUICK v1.0.7

Earlinet Lidar Pre-Processor

Earlinet Lidar DEpolarization Calibrator

Earlinet Lidar Data Analyzer

High Resolution ELPP

Earlinet Lidar Calibrator

Earlinet Lidar QUICKlook



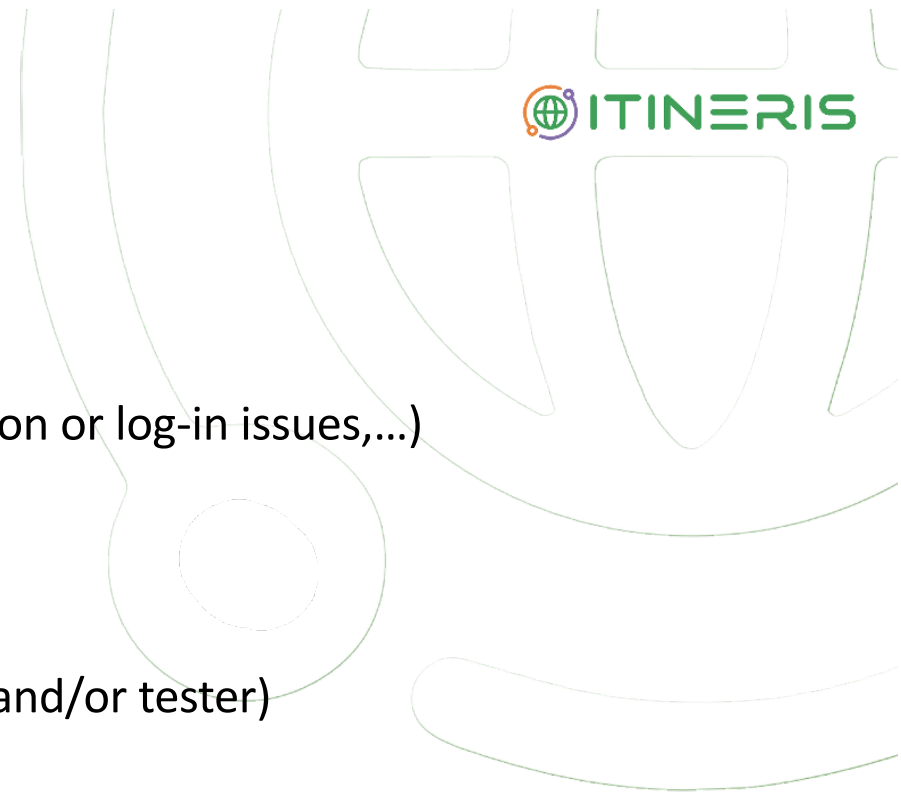
SCC: contact points

- New station registration request
- New SCC accounts request
- Support for any technical problems (for example permission or log-in issues,...)

earlinetdb@actris.imaa.cnr.it

- Do you want to collaborate on SCC project (as developer and/or tester)

giuseppe.damico@imaa.cnr.it



SCC: steps to go!

1. Station registration
2. SCC account(s)
3. Log in
4. Lidar(s) registration
5. Convert raw data in SCC format
6. Submit raw data
7. Get calculated products



SCC: Station registration (Step 1/7)



Station information					
Name	Potenza	Id	pot		
Institute name	Consiglio Nazionale delle Ricerche - Istituto di	Institute name acronym	CNR-IMAA		
Latitude <small>in degrees north</small>	40.6	Longitude <small>in degrees east</small>	15.72	Height asl <small>in meters</small>	760.0
Cloudnet Station ID	potenza	Actris status	1 - ACTRIS Partner		
PI First Name	Aldo	PI Last Name	Amodeo		
Pi phone	+39 0971 427263	Pi mail	aldo.amodeo@imaa.cnr.it		
Pi affiliation	Consiglio Nazionale delle Ricerche - Istituto di	Pi affiliation acronym	CNR-IMAA		
Description	The Institute of Methodologies for Environmental Analysis (IMAA) is part of the Department of Earth and Environment of the Italian National Research Council (CNR). To-date IMAA is the only institute of the CNR network with its headquarter in the Basilicata Region consisting of aResearch Area in Potenza and a Research Laboratory in Marsico Nuovo, Agri valley).				

SCC: Station registration (Step 1/7)

Station information					
Name	Potenza	Id	pot		
Institute name	Consiglio Nazionale delle Ricerche - Istituto di	Institute name acronym	CNR-IMAA		
Latitude <small>in degrees north</small>	40.6	Longitude <small>in degrees east</small>	15.72	Height asl <small>in meters</small>	760.0
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Pi affiliation	Consiglio Nazionale delle Ricerche - Istituto di	Pi affiliation acronym	CNR-IMAA		
Description	The Inst National Region Main Station Info rth and Environment of the Italian headquarter in the Basilicata gri valley).				

Main Station Info

SCC: Station registration (Step 1/7)

Station information					
Name	Potenza	Id	pot		
Institute name	Consiglio Nazionale delle Ricerche - Istituto di	Institute name acronym	CNR-IMAA		
Latitude <small>in degrees north</small>	40.6	Longitude <small>in degrees east</small>	15.72	Height asl <small>in meters</small>	760.0
Cloudnet Station ID	potenza	Actris status	1 - ACTRIS Partner		
PI First Name	Aldo	PI Last Name	Amodeo		
Pi phone	+39 0971 427263	Pi mail	aldo.amodeo@imaa.cnr.it		
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Station PI info

SCC: Station registration (Step 1/7)

Station information			
Name	Potenza	Id	pot
Institute name	Consiglio Nazionale delle Ricerche - Istituto di	Institute name acronym	CNR-IMAA
Latitude <small>in degrees north</small>	40.6	Longitude <small>in degrees east</small>	15.72
Height asl <small>in meters</small>			760.0
Cloudnet Station ID	3 digits station code		ACTRIS Partner
PI First Name	A		eo
Pi phone	+		modeo@imaa.cnr.it
Pi affiliation	Consiglio Nazionale delle Ricerche - Istituto di	Pi affiliation acronym	CNR-IMAA
Description	The Institute of Methodologies for Environmental Analysis (IMAA) is part of the Department of Earth and Environment of the Italian National Research Council (CNR). To-date IMAA is the only institute of the CNR network with its headquarter in the Basilicata Region consisting of aResearch Area in Potenza and a Research Laboratory in Marsico Nuovo, Agri valley).		

3 digits station code

- unique station identifier
- used also by ARES data curation component

SCC: Station registration (Step 1/7)

Station information					
Name	Potenza	Id	pot		
Institute name	Consiglio Nazionale delle Ricerche - Istituto di	Institute name acronym	CNR-IMAA		
Latitude	40.6 <small>in degrees north</small>	Longitude	15.72 <small>in degrees east</small>	Height asl	760.0 <small>in meters</small>
Cloudnet Station ID	potenza	Actris status	1 - ACTRIS Partner		
PI First Name	Aldo	PI Last Name	Amodeo		
Pi phone	Station coordinates		modeo@imaa.cnr.it		
Pi affiliation	Consiglio Nazionale delle Ricerche - Istituto di	Pi affiliation acronym	CNR-IMAA		
Description	The Institute of Methodologies for Environmental Analysis (IMAA) is part of the Department of Earth and Environment of the Italian National Research Council (CNR). To-date IMAA is the only institute of the CNR network with its headquarter in the Basilicata Region consisting of aResearch Area in Potenza and a Research Laboratory in Marsico Nuovo, Agri valley).				

SCC: Station registration (Step 1/7)



How to request station registration (for ACTRIS NFs only)?

- Station PI (or a deputy) should send a request by e-mail (preferably by her/his institutional mail address) to:
earlinetdb@actris.imaacnr.it
- Once the request has been processed the PI will be contacted and asked to provide the info needed for the registration
- Finally, the PI will be notified (by e-mail) when the station registration is concluded

SCC: Account registration (Step 2/7)



Username	<input type="text" value="test_user"/>
	Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only.
Password	algorithm: pbkdf2_sha256 iterations: 30000 salt: rplgeO***** hash: on+UO/***** Raw passwords are not stored, so there is no way to see this user's password, but you can change the password using this form .
Personal info	
First name	<input type="text"/>
Last name	<input type="text"/>
Email address	<input type="text"/>
Permissions	
<input checked="" type="checkbox"/> Active	Designates whether this user should be treated as active. Unselect this instead of deleting accounts.
<input checked="" type="checkbox"/> Staff status	Designates whether the user can log into this admin site.

SCC: Account registration (Step 2/7)



How to request new SCC account?

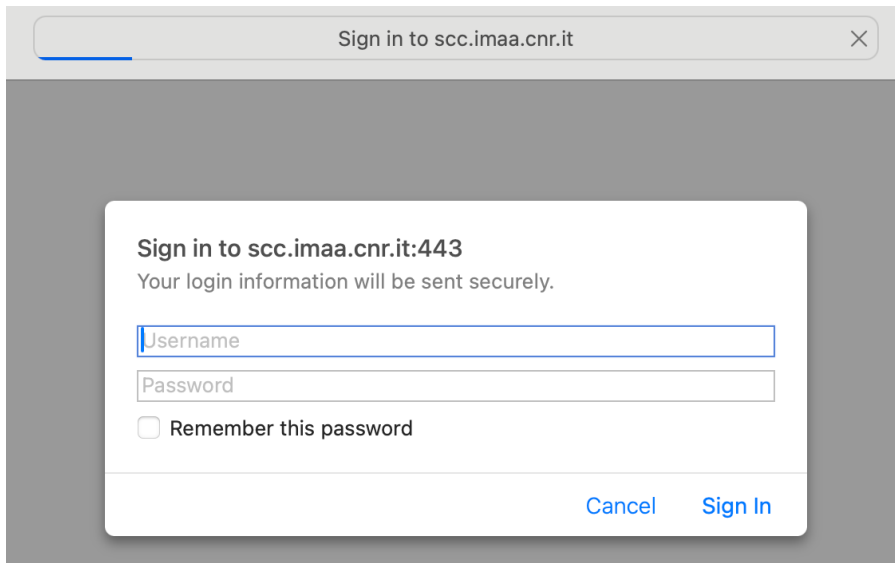
- Station PI (or a deputy) should send a request (specifying the his/her station code) by e-mail to:
earlinetdb@actris.imaacnr.it
- Once the request has been processed the PI will be contacted and asked to provide the info needed for the registration
- Finally, the account owner will be notified (by e-mail) when the new account has been created

SCC: Log in (Step 3/7)

Entry point: <https://scc.imaa.cnr.it>

Two levels authentication

1. Https authentication
2. Web interface authentication



Sign in to scc.imaa.cnr.it

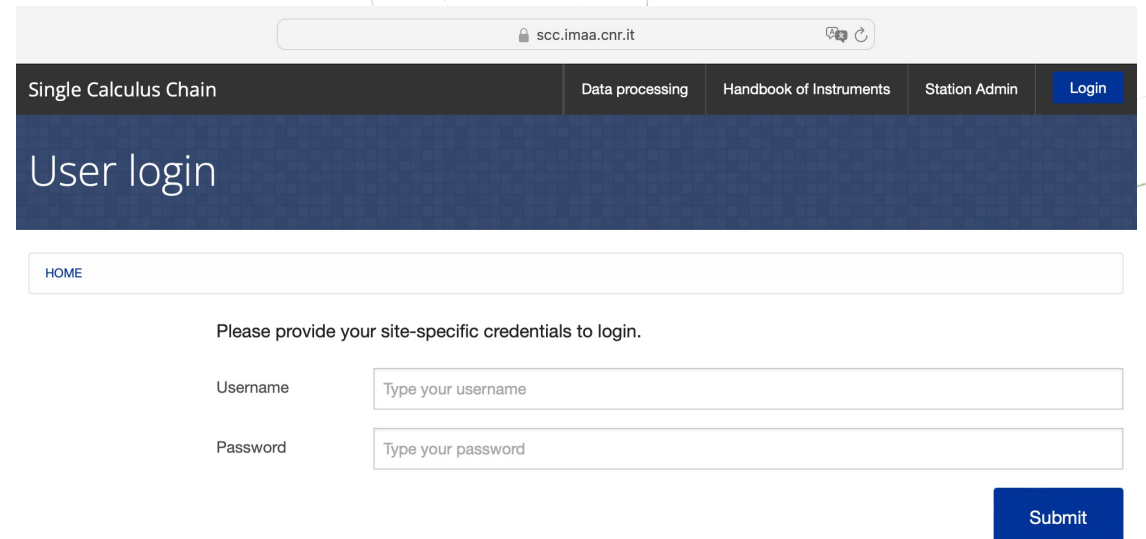
Sign in to scc.imaa.cnr.it:443
Your login information will be sent securely.

Username

Password

Remember this password

Cancel Sign In



scc.imaa.cnr.it

Single Calculus Chain

Data processing Handbook of Instruments Station Admin Login

User login

HOME

Please provide your site-specific credentials to login.

Username

Password

Submit

SCC: Log in (Step 3/7)



Single Calculus Chain Data processing Handbook of Instruments Station Admin **Logout**

Welcome to Earlinet's SCC v5.2.9

Process your lidar data in near-real time

[HOME](#)

This interface was designed to improve the user-friendliness of EARLINET's Single Calculus Chain and to manage the set of parameters needed to perform lidar analysis.

Interface structure

The interface has three sections that you can access from the menu on the top of the page.

Data processing

Here you can upload new data for processing, upload ancillary data (radiosondes, lidar ratio profile, overlap function) and also browse past processed measurements

Handbook of instruments

In this section you can browse the setup of all lidar systems registered in the SCC.

ScC info

- Version: 5.2.9
- HiRELPP ver.: 1.1.5
- CloudMask ver.: 1.6.0
- ELPP ver.: 7.1.3
- ELDA ver.: 3.4.8.1
- ELDEC ver.: 2.1.4
- ELIC ver.: 1.0.8
- ELQUICK ver.: 1.0.7
- Deamon ver.: 5.3.3
- Database ver.: 5.1.2
- Web interface ver.: 5.1.1
- Release: 2024-06-04 12:00

SCC: Lidar(s) registration (Step 4/7)

Single Calculus Chain Data processing Handbook of Instruments **Station Admin** Logout

Welcome to Earlinet's SCC v5.2.9

Process your lidar data in near-real time

[HOME](#)

This interface was designed to... and to manage the set of para...

Interface structure

The interface has three sections:

Data processing

Here you can upload new data for processing, upload ancillary data (radiosondes, lidar ratio profile, overlap function) and also browse past processed measurements

Handbook of instruments

In this section you can browse the setup of all lidar systems registered in the SCC.

- **register your lidars**
- **provide all instrumental parameters needed for the data processing**

- SCC ver.: 5.2.9
- ELDEC ver.: 2.1.4
- ELIC ver.: 1.0.8
- ELQUICK ver.: 1.0.7
- Deamon ver.: 5.3.3
- Database ver.: 5.1.2
- Web interface ver.: 5.1.1
- Release: 2024-06-04 12:00

SCC: Lidar(s) registration (Step 4/7)

SCC station management

Home

Site administration

Systems settings	
General settings about stations, systems and their various components.	
Stations	+
Lidars	+
Lidar versions	+
Lidar configurations	+
Telescopes	+
Lasers	+
Channels	+
Laser emission lines	+
System photos	+

Product settings	
Settings about the optical products that will be calculated.	
Products	+
HiRELPP Products	+

Measurements and files	
Advanced controls for the already uploaded measurements and files.	
Measurements	+

Generated Products	
Rapid Visualization of Products generated by SCC Modules	
HiRELPP Products (Files)	
CloudMask Products	
ELPP Products	
ELDA Products	
ELDEC Products	
ELIC Products	
ELQUICK Products	

Quicklook settings	
Settings for generating quicklooks	
ELQUICK Color Palette	+
ELQUICK Excluded Types	+
ELQUICK Product Options	+
ELQUICK Timelengths	+

Import Data	
Advanced Controls for Importing	

ModelList: Administration	
Groups	+
Sites	+
Users	+

Support	
SCC documentation	
Forum	

Recent Actions	
fabio.lopes User	
sa Station	
ni Station	
ct Station	
ct Station	



SCC: Lidar(s) registration (Step 4/7)

1) Lidar definition

SCC station management

[Home](#) > [Database](#) > [Lidars](#) > [Add lidar](#)

Add lidar

Station	<input type="text" value="-----"/>  
Name	<input type="text"/> <small>A unique lidar name</small>
Pi	<input type="text"/>
Quicklook name	<input type="text"/> <small>Short name (max. 10 chars) to use in quicklooks</small>
	<input type="checkbox"/> Enable quicklook <small>If selected, data from this lidar will be allow in quicklooks</small>



Station



Lidar







SCC: Lidar(s) registration (Step 4/7)

2) Lidar Version definition

SCC station management

Home > Database > Lidar versions > Add lidar version

Add lidar version

Name	<input type="text"/>
	Identifier of the lidar version (max. 20 chars).
Description	<input type="text"/>
Lidar	<input type="text" value="-----"/>  
	<input type="checkbox"/> Exclude from hoi
	<input type="checkbox"/> Enable quicklook
Start date	<input type="text"/>  <input type="text"/> 
Stop date	<input type="text"/>  <input type="text"/> 



Station



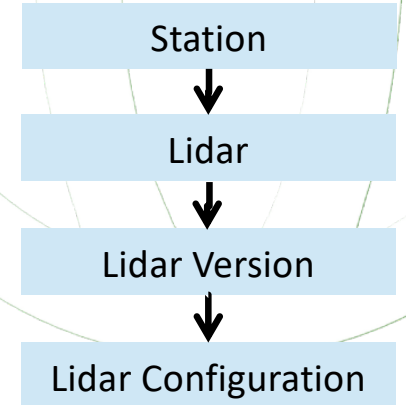
Lidar



Lidar Version

SCC: Lidar(s) registration (Step 4/7)

3) Lidar Configuration definition



SCC station management Giuseppe

Home > Database > Lidar configurations > Add lidar configuration

Add lidar configuration

System information			
Basic system settings			
Id	-	Configuration Name	<input type="text"/>
Lidar version	----- <input type="button" value="v"/> +	Station (owner)	-
Pi	<input type="text"/>		
Latitude	<input type="text"/>	Longitude	<input type="text"/>
		Height asl	<input type="text"/> <small>in meters</small>
Configuration from	<input type="text"/> <input type="button" value="📅"/>	Configuration to	<input type="text"/> <input type="button" value="🕒"/> <input type="button" value="🕒"/> Locked

SCC: Lidar(s) registration (Step 4/7)

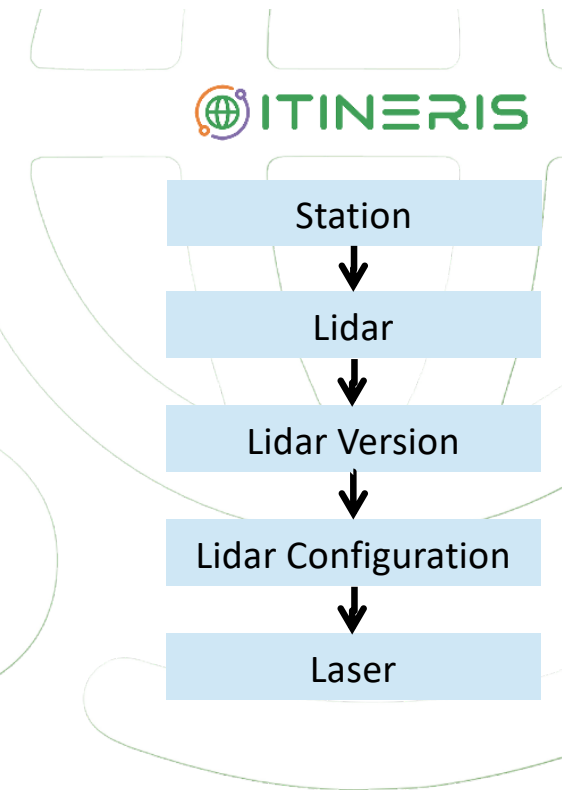
4) Laser(s) definition

SCC station management

[Home](#) > [Database](#) > [Lasers](#) > **Add Laser**

Add Laser

Station	<input type="text" value="-----"/> ▾ +
Manufacturer	<input type="text"/>
Model	<input type="text"/>
Repetition rate	<input type="text"/> in Hz
Type	<input type="text"/>





SCC: Lidar(s) registration (Step 4/7)

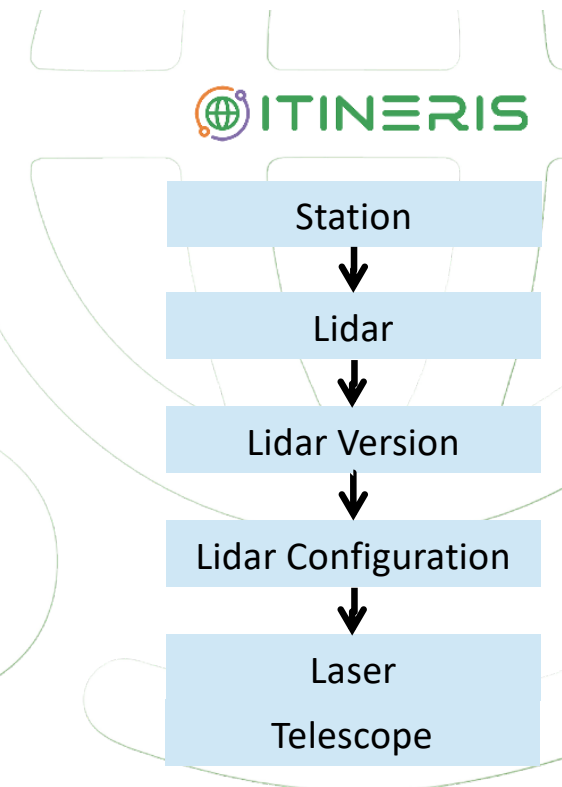
5) Telescope(s) definition

SCC station management

Home > Database > Telescopes > Add Telescope

Add Telescope

Station	<input type="text" value="-----"/>  
Type	<input type="text"/>
Diameter	<input type="text"/> primary mirror diameter in mm
Focal length	<input type="text"/> equivalent focal length of the telescope in mm
Full overlap height	<input type="text"/> full overlap height (m AGL)







SCC: Lidar(s) registration (Step 4/7)

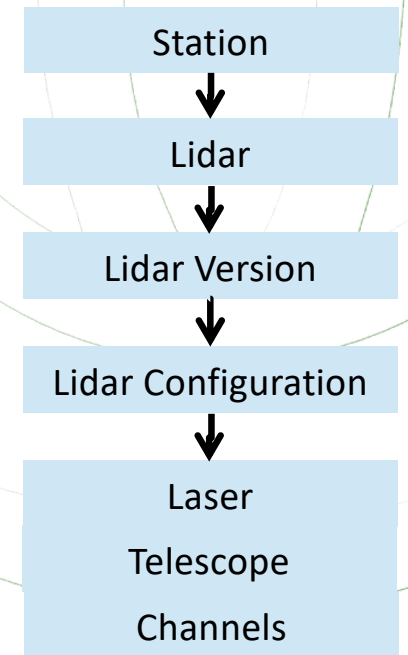
6) Lidar Channels definition

SCC station management

Home > Database > Channels > Add channel

Add channel

String id	<input type="text"/>
	Unique identifier of the channel e.g. po001 or bu355_01. Max 20 characters.
Name	<input type="text"/>
Telescope	<input type="text"/>
Laser	<input type="text"/>  
Scattering mechanism	<input type="text"/>  
Interference filter center	<input type="text"/>
	in nm
Interference filter FWHM	<input type="text"/>






SCC: Lidar(s) registration (Step 4/7)

7.a) Optical Products definition

SCC station management

[Home](#) > [Database](#) > [Products](#) > Add Product

Add Product

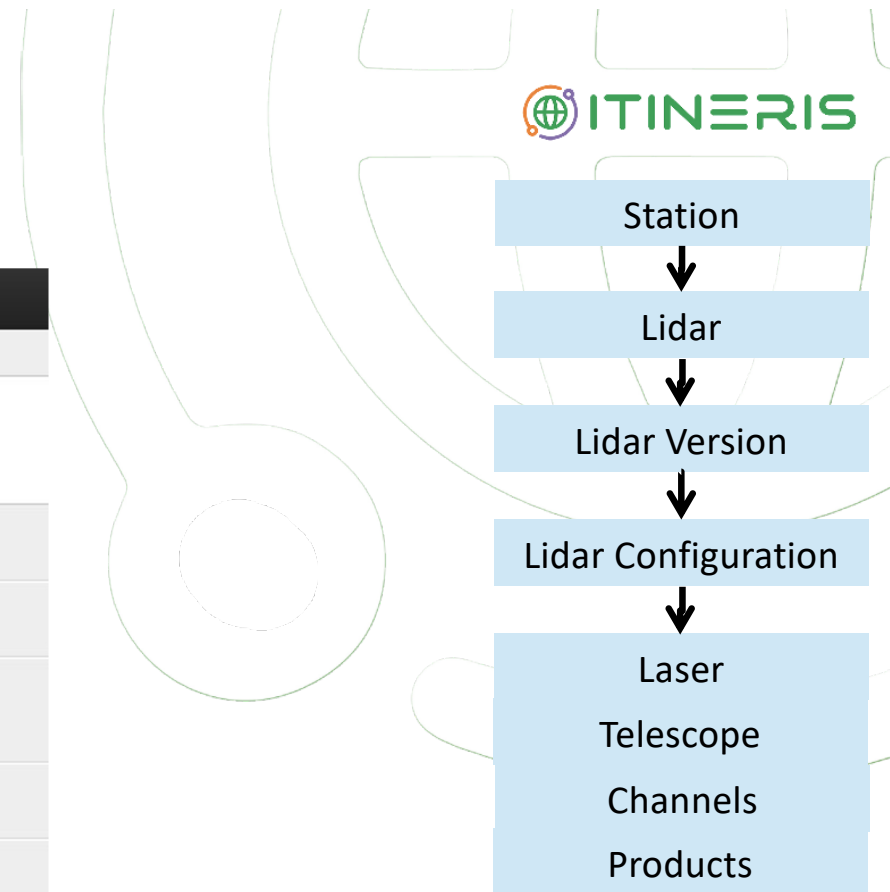
Id	-
Product type	-----  +
Usecase	<input type="text"/> <small>the use-case number based on the documentation</small>
Station	-----  +
Locked Product	<input type="checkbox"/> 

Product/channel connections

Channel id	Signal type
Add another product/channel connection	

System/product connections

system id
Add another system/product connection



SCC: Lidar(s) registration (Step 4/7)

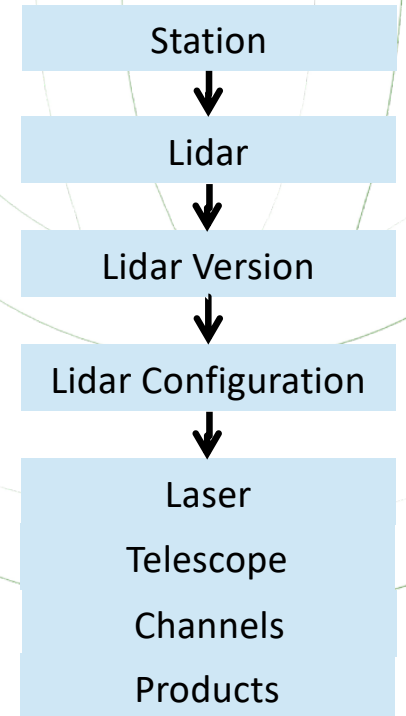
7.b) High Resolution Products definition

SCC station management

[Home](#) > [Database](#) > [HiRELPP Products](#) > [Add HiRELPP Product](#)

Add HiRELPP Product

Min height	<input type="text"/>	Minimum height in meters, to calculate high-resolution product.
Max height	<input type="text"/>	Maximum height in meters, to calculate high-resolution product.
Emission Wavelengths To Glue	<input type="text"/>	Provide a comma separated list of the emission wavelengths to glue. E.g. '355, 532, 1064' means that all the channels emission wavelength 355nm, 532nm and 1064nm will be glued.
Locked Product	<input type="checkbox"/>	



SCC: Convert raw data into SCC format (Step 5/7)

In order to use the SCC raw lidar data need to be converted from native format to SCC input NetCDF format

- the conversion is under station responsibility
- detailed description of SCC input NetCDF data file is available in SCC documentation (https://docs.scc.ima.cnr.it/en/latest/file_formats/netcdf_file.html)
- ARES can provide support to the stations
- tools available for commonly used data acquisition subsystem (like for example Licel TR)
- more info in Pilar presentation

Warning: During the conversion no operation/correction should be applied to the raw data!

SCC: Convert raw data into SCC format (Step 5/7)



Available tools:

atmospheric-lidar

author: Iannis Biniotoglou

language: Python

link: https://repositories.imaa.cnr.it/public/atmospheric_lidar/

description: licel2scc, licel2scc-depol (convert Licel binary files to the EARLINET's Single Calculus Chain NetCDF format)

SCC: Convert raw data into SCC format (Step 5/7)



Available tools:

SCC netcdf checker

author: Iannis Biniotoglou

language: Python

link: <https://repositories.imaa.cnr.it/public/scc-netcdf-checker/>

description: The aim of this script is to check if a netcdf file has the correct format to be used with the EARLINET's Single Calculus Chain

SCC: Convert raw data into SCC format (Step 5/7)



Available tools:

SCC access

author: Iannis Biniotoglou

language: Python

link: https://repositories.imaa.cnr.it/public/scc_access/

description: tool for interacting with the Single Calculus Chain through the command line. Specifically, with the script you can upload a file to the SCC for processing, download the processed files and graphs, delete an existing measurement from the SCC

SCC: Convert raw data into SCC format (Step 5/7)



Measurements (raw input files) are identified unique ID (**MeasurementID**)

MeasurementID format:

YYYYMMDDcccHHMM (for example 20181204pot0830, 20181204pot0115,...)

YYYYMMDD	→	start date of the measurement
ccc	→	station code (unique)
HHMM	→	start time of the measurement

SCC: Convert raw data into SCC format (Step 5/7)

Measurements (raw input files) are identified unique ID (**MeasurementID**)

- **Warning:** do not include too many hours in the same MeasurementID.
Too large input files are difficult to handle. 1-3 hours raw input files are recommended.
- NetCDF4 format is strongly suggested!
- The measurement ID is linked to a specific lidar configuration (during the submission phase)
- Processing is made according to parameters and the products defined for the corresponding lidar configuration

SCC: Raw data submission (Step 6/7)

Single Calculus Chain

Data processing Handbook of Instruments Station Admin Logout

Welcome to Earlinet's SCC v5.2.9

Process your lidar data in near-real time

HOME

This interface was designed to... and to manage the set of para...

Interface structure

The interface has three sections:

Data processing

Here you can upload new data for processing, upload ancillary data (radiosondes, lidar ratio profile, overlap function) and also browse past processed measurements

Handbook of instruments

In this section you can browse the setup of all lidar systems registered in the SCC.

- **submit raw data**
- **monitor your data processing**
- **get calculated products**

- SCC ver.: 5.2.9
- ELDEC ver.: 2.1.4
- ELIC ver.: 1.0.8
- ELQUICK ver.: 1.0.7
- Deamon ver.: 5.3.3
- Database ver.: 5.1.2
- Web interface ver.: 5.1.1
- Release: 2024-06-04 12:00

SCC: Raw data submission (Step 6/7)

Data processing

HOME / DATA PROCESSING

Explore

[Search](#)

[Measurements](#)

[Ancillary files](#)

Actions

[Quick Upload](#)

[Upload Ancillary](#)

Data processing overview

In the data processing section you can upload lidar measurements to be processed, monitor the processing procedure, and download the output products. Use the links in the “*Explore*” section of the menu to search for already processed measurements and browse the related ancillary files. Use the links in the “*Actions*” section to upload new measurements and ancillary files. Before using these options be sure to set-up your system and product parameters in the Admin section.

Recently updated measurements

Id	Uploaded on	Last update	Status
20171206mn00	2018-02-18 18:20 UTC	23 minutes ago	     
20170904an20	2018-08-06 13:30 UTC	36 minutes ago	     
20120417an00	2017-09-15 08:36 UTC	37 minutes ago	     

SCC: Raw data submission (Step 6/7)

Single Calculus Chain

Data processing Handbook of Instruments Station Admin Logout

Data processing

HOME / DATA PROCESSING

Explore
Search
Measurements
Ancillary files

Actions
Quick Upload
Upload Ancillary

Choose one

- 4: PEARL, first
- 32: MUSA, licl09_nighttime
- 47: MUSA, licl09_daytime
- 51: MUSA, licl09_analog
- 104: PEARL, nighttime
- 105: PEARL, daytime
- 109: PEARL, daytime
- 110: MUSA, charmex
- 124: MUSA, nighttime
- 125: MUSA, daytime
- 141: MUSA, licl09_nighttime_without_607pc
- 175: LR111-D200 Lecce, nighttime
- 176: LR111-D200 Lecce, daytime
- 177: LR111-D200 Napoli, nighttime
- 178: LR111-D200 Napoli, daytime
- 179: LR111-D200 Lamezia, nighttime
- 180: LR111-D200 Lamezia, daytime
- 181: LR111-D200 Potenza, nighttime
- 182: LR111-D200 Potenza, daytime

Choose one

Choose the system configuration that was used to measure the uploaded data.

Data file Required
 No file chosen

Sounding file
 No file chosen

Overlap file
 No file chosen

Lidar ratio file
 No file chosen

Raw input file →

Ancillary files →

SCC: Get SCC products (Step 7/7)



Measurement 20180505le18 (Finished)

The measurement parameters, processing status, and possible outputs are shown bellow. You can edit the system used in the processing and the categories in the "Admin" section.

System	356: PollyXT_next_generation, CNT80 12 Channles 4 lambda nf LACROS
Start	2018-05-05 18:00
Stop	2018-05-05 23:59
Sounding file	-
Overlap file	-
Lidar ratio file	-
Categories	-
Created on	2018-11-16 13:24
Last update	2018-11-29 10:56
Comments	
Status	

File actions

- [Edit in admin](#)
- [Rerun all](#)
- [Rerun HiRELPP](#)
- [Rerun CloudMask](#)
- [Rerun ELPP](#)
- [Rerun ELDA](#)
- [Rerun ELIC](#)
- [Rerun ELQUICK](#)
- [Download HIRELPP products](#)
- [Download CloudMask products](#)
- [Download ELPP files](#)
- [Download ELDA products](#)
- [Download plots](#)
- [Download ELIC products](#)

N.B. = If products have not been obtained with the latest version of SCC, rerunning an intermediate module will automatically restart all the processing chain.

SCC: Get SCC products (Step 7/7)

Measurement 20180505le18 (Finished)

The measurement parameters, processing status, and possible outputs are shown bellow. You can edit the system used in the processing and the categories in the "Admin" section.

System	356: PollyXT_next_generation, CNT80 12 Channles 4 lambda nf LACROS
Start	2018-05-05 18:00
Stop	2018-05-05 23:59
Sounding file	-
Overlap file	-
Lidar ratio file	-
Categories	-
Created on	2018-11-16 13:24
Last update	2018-11-29 10:56
Comments	
Status	

File actions

- Edit in admin
- Rerun all
- Rerun HiRELPP
- Rerun CloudMask
- Rerun ELPP
- Rerun ELDA
- Rerun ELIC

Individual SCC module status


Colors:

- Stand-by
- Running
- Success
- Error

SCC: Get SCC products (Step 7/7)

Measurement 20180505le18 (Finished)

The measurement parameters, processing status, and possible outputs are shown bellow. You can edit the system used in the processing and the categories in the "Admin" section.

System	356: PollyXT_next_generation, CNT80 12 Channles 4 lambda nf LACROS
Start	2018-05-05 18:00
Stop	2018-05-05 23:59
Sounding file	-
Overlap file	-
Lidar ratio file	-
Categories	-
Created on	2018-11-16 13:24
Last update	2018-11-29 10:56
Comments	
Status	

File actions

- [Edit in admin](#)
- [Rerun all](#)
- [Rerun HiRELPP](#)
- [Rerun CloudMask](#)
- [Rerun ELPP](#)
- [Rerun ELDA](#)
- [Rerun ELIC](#)
- [Rerun ELQUICK](#)
- [Download HIRELPP products](#)
- [Download CloudMask products](#)
- [Download ELPP files](#)
- [Download ELDA products](#)
- [Download plots](#)
- [Download ELIC products](#)

N.B. = If products have not been obtained with the latest version of SCC, rerunning an intermediate module will automatically restart all the processing chain.

Re-processing section

SCC: Get SCC products (Step 7/7)



Measurement 20180505le18 (Finished)

The measurement parameters, processing status, and possible outputs are shown bellow. You can edit the system used in the processing and the categories in the "Admin" section.

System	356: PollyXT_next_generation, CNT80 12 Channles 4 lambda nf LACROS
Start	2018-05-05 18:00
Stop	2018-05-05 23:59
Sounding file	-
Overlap file	-
Lidar ratio file	-
Categories	-
Created on	2018-11-16 13:24
Last update	2018-11-29 10:56
Comments	
Status	

File actions

- [Edit in admin](#)
- [Rerun all](#)
- [Rerun HiRELPP](#)
- [Rerun CloudMask](#)
- [Rerun ELPP](#)
- [Rerun ELDA](#)
- [Rerun ELIC](#)
- [Rerun ELQUICK](#)
- [Download HiRELPP products](#)
- [Download CloudMask products](#)
- [Download ELPP files](#)
- [Download ELDA products](#)
- [Download plots](#)
- [Download ELIC products](#)

N.B. = If products have not been obtained with the latest version of SCC, rerunning an intermediate module will automatically restart all the processing chain.

Download section

SCC: Data processing monitoring



Single Calculus Chain

Data processing Handbook of Instruments Station Admin Logout

Data processing

HOME / DATA PROCESSING

Explore

- Search
- Measurements
- Ancillary files

Actions

- Quick Upload
- Upload Ancillary

Data processing overview

In the data processing section you can upload lidar measurements to be processed, monitor the processing procedure, and download the output products. Use the links in the "Explore" section of the menu to search for already processed measurements and browse the related ancillary files. Use the links in the "Actions" section to upload new measurements and ancillary files. Before using these options be sure to set-up your system and product parameters in the Admin section.

Number of currently processing measurements

Station Id	Station Name	N° of Processing Measurements
lei	Leipzig	266
hpb	Hohenpeissenberg	40
puy	Clermont-Ferrand	4
ino	Bucharest	3
amg	National Technical University of Athens	1
arr	Andoya	1
brc	Barcelona	1

SCC: Data processing monitoring



Number of queued measurements

Station Id	Station Name	Processing Priority	N° of Queued Measurements
rzc	Rzecin	Low	15
arr	Andoya	Low	3
aky	Antikythera	Low	2
lle	Lille	Low	2
sma	Servizio Meteorologico Nacional Argentina	Low	1
spl	Saint Petersburg	Low	1

Recently updated measurements

Id	Uploaded on	Last update	Status
20241108cvo1400	2024-11-08 15:44 UTC	11 minutes ago	
20241108kuo1400	2024-11-08 15:33 UTC	22 minutes ago	

SCC: Data processing monitoring

HOME / DATA PROCESSING / MEASUREMENTS / 20100511PO00

Explore
Search
Measurements
Ancillary files
Actions
Quick Upload
Upload Ancillary

Measurement 20100511po00 (Finished)

The measurement parameters, processing status, and possible outputs are shown below. You can edit the system used in the processing and the categories in the "Admin" section.

System	124: MUSA, nighttime
Start	2010-05-11 01:48
Stop	2010-05-11 02:29

File actions

- Edit in admin
- Rerun all
- Rerun HIRELPP

Exit codes

HIRELPP (0)	Finished without errors
CLOUDMASK (0)	Finished without errors.
ELPP (189)	Dimension "time" is zero in the output file. This may be due to few cloud-free profile within integration time or the integration time is too small. Please check that there are enough (>2) cloud-free profiles within the integration time in the submitted timeseries (on Product 291)
ELIC (0)	Finished without errors
ELQUICK (0)	Finished without errors

Exit codes

HIRELPP (0)	Finished without errors
CLOUDMASK (0)	Finished without errors.
ELPP (189)	Dimension "time" is zero in the output file. This may be due to few cloud-free profile within integration time or the integration time is too small. Please check that there are enough (>2) cloud-free profiles within the integration time in the submitted timeseries (on Product 291)
ELIC (0)	Finished without errors
ELQUICK (0)	Finished without errors

SCC: Data processing monitoring

Explore
Search
Measurements
Ancillary files
Actions
Quick Upload
Upload Ancillary

Products pid330_hpb1906261700.b1064.nc

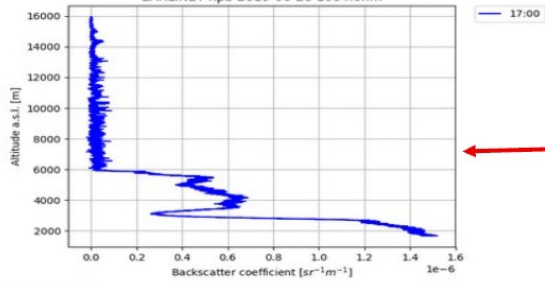
General info

Database id	30643
File name	pid330_hpb1906261700.b1064.nc
Product	ID: 330 elast. backscatter (usecase: 0) at 1064.0000 nm
Calculation date	2019-10-25 13:14

Product actions
• Replot data

Variable plots

EARLINET hpb 2019-06-26 1064.0nm



File details

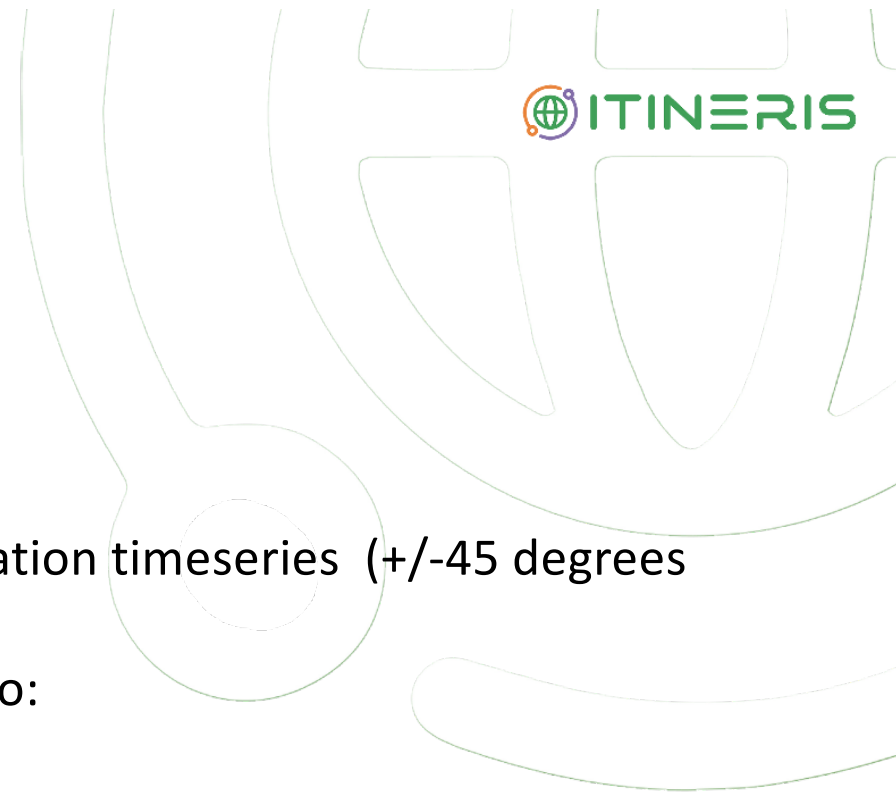
Start	2019-06-26 17:00
Stop	2019-06-26 17:59
Duration	0:59:00
Averaged shots	707470
Zenith angle	4.0 deg
Evaluation method	Elastic Backscatter
Elastic Backscatter Algorithm	Klett-Fernald
Backscatter Calibration Range	Find Calibration Interval between 14522.0m and 15000.9m
Backscatter Calibration Range Search Algorithm	Minimum of Elastic Signal
Software version	3.3.18
File format version	NETCDF4

Allows visualization of
multiwavelengths
multitimes
optical products

SCC Product Types

Calibration products

- Product type: “**Linear polarization calibration**”
- Only for lidars equipped with polarization channels
- Require the submission of a raw polarization calibration timeseries (+/-45 degrees measurements)
- Provides the polarization channels gain ratio used to:
 - Compute the volume depolarization ratio
 - Combine polarization channels



SCC Product Types



Low resolution optical products

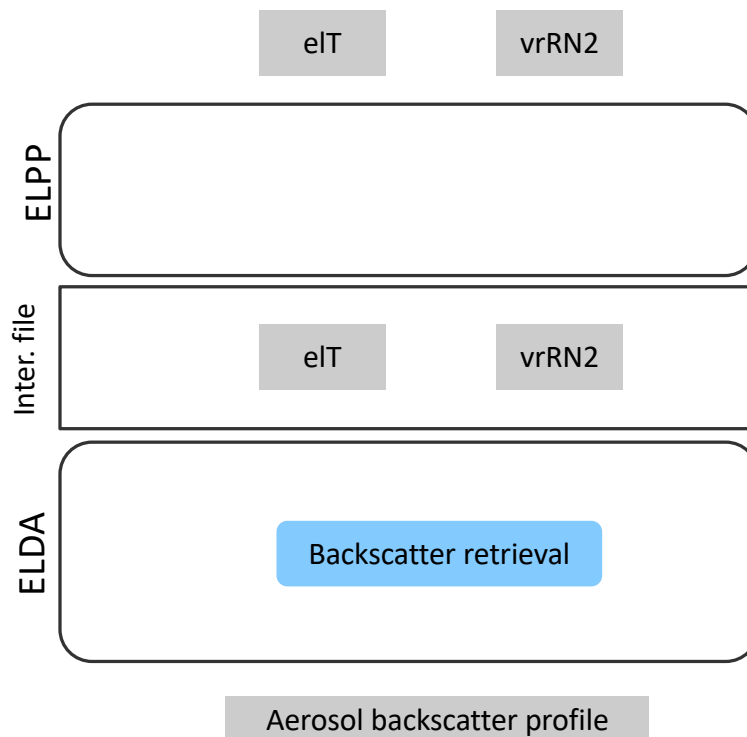
- **“Extinction only”**
- **“Raman backscatter”**
- **“Elastic backscatter”**
- **“Lidar ratio”**
 - requires the definition of **“Extinction only”** and **“Raman backscatter”** products
- **“Raman backscatter and Linear Depolarization Ratio”**
 - requires the definition of **“Raman backscatter”** product
- **“Elastic backscatter and Linear Depolarization Ratio”**
 - requires the definition of **“Elastic backscatter”** product

SCC Product Types

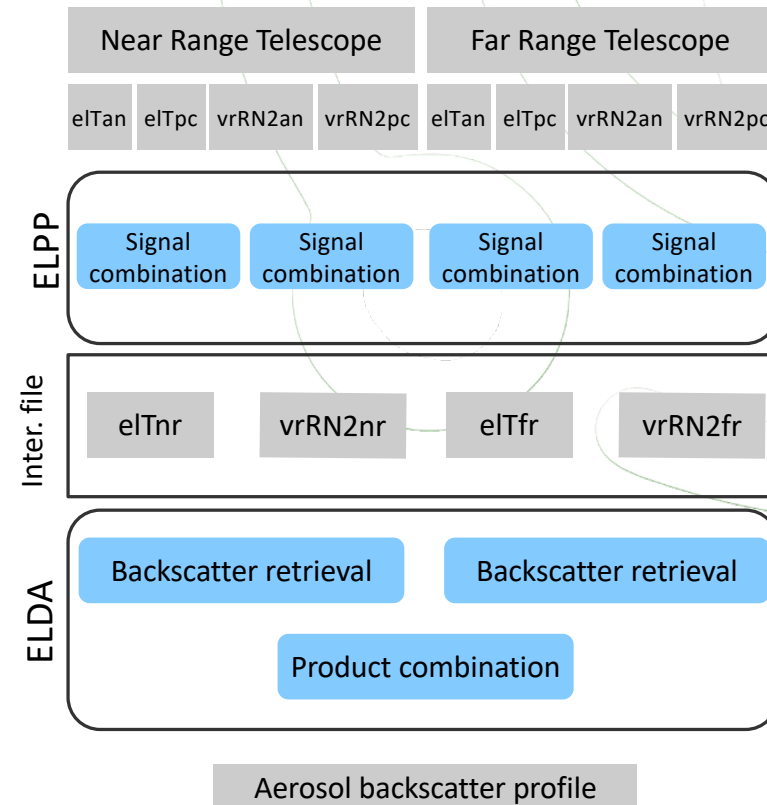
	RCS	Cloudmask	Attenuated backscatter	Particle backscatter	Particle extinction	VLDR	PLDR
HiRELPP products	✓					✓	
Cloudmask products		✓					
ELIC products			✓			✓	
ELPP products	✓	✓					
Elastic backscatter		✓		✓			
Raman backscatter		✓		✓			
Elastic backscatter + depol		✓		✓		✓	✓
Raman backscatter + depol		✓		✓		✓	✓
Extinction only		✓			✓		
Lidar ratio		✓		✓	✓		

SCC processing flexibility: Usecase concept

Raman Backscatter Calculation: Usecase 0

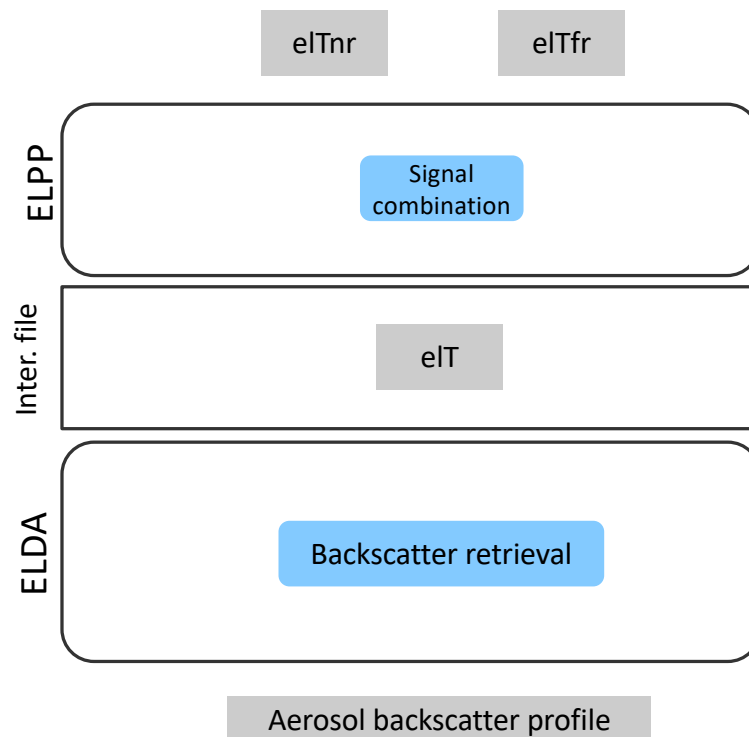


Raman Backscatter Calculation: Usecase 13

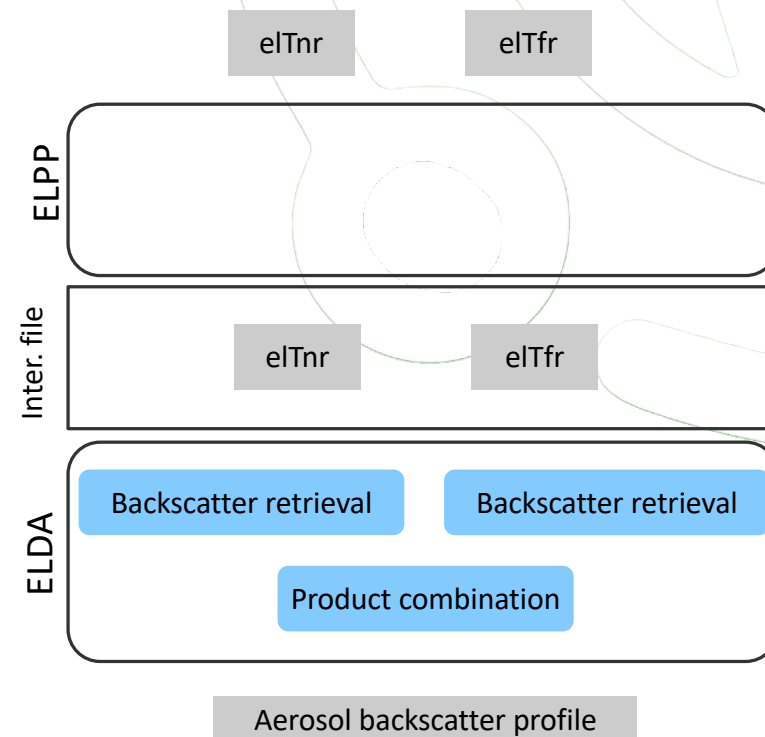


SCC processing flexibility: Usecase concept

Elastic Backscatter Calculation: Usecase 1



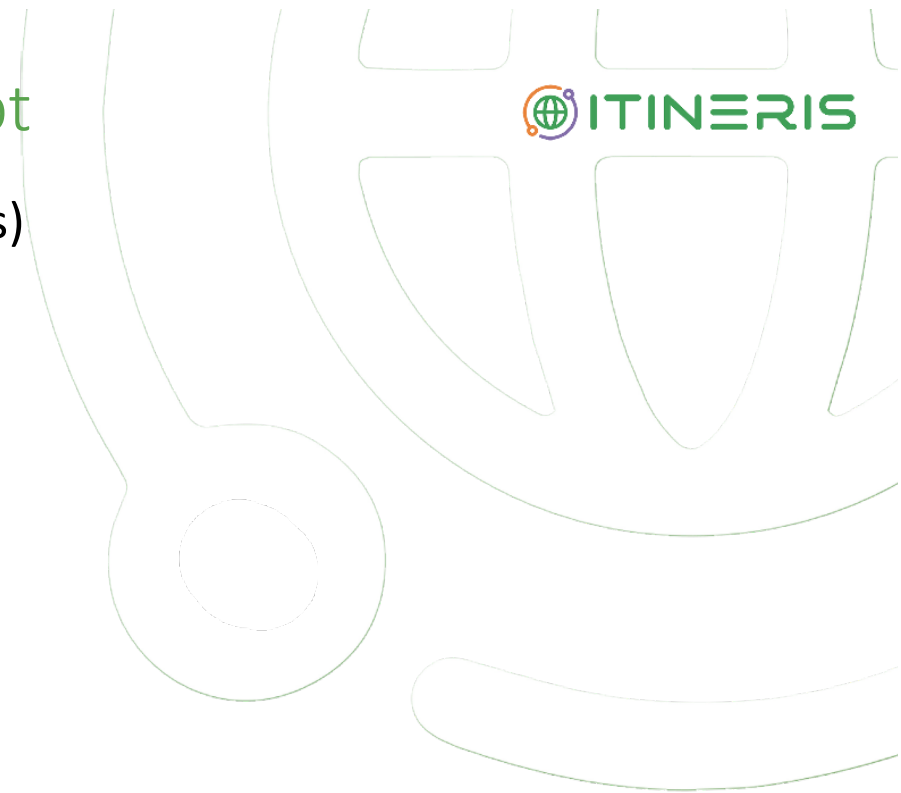
Elastic Backscatter Calculation: Usecase 2



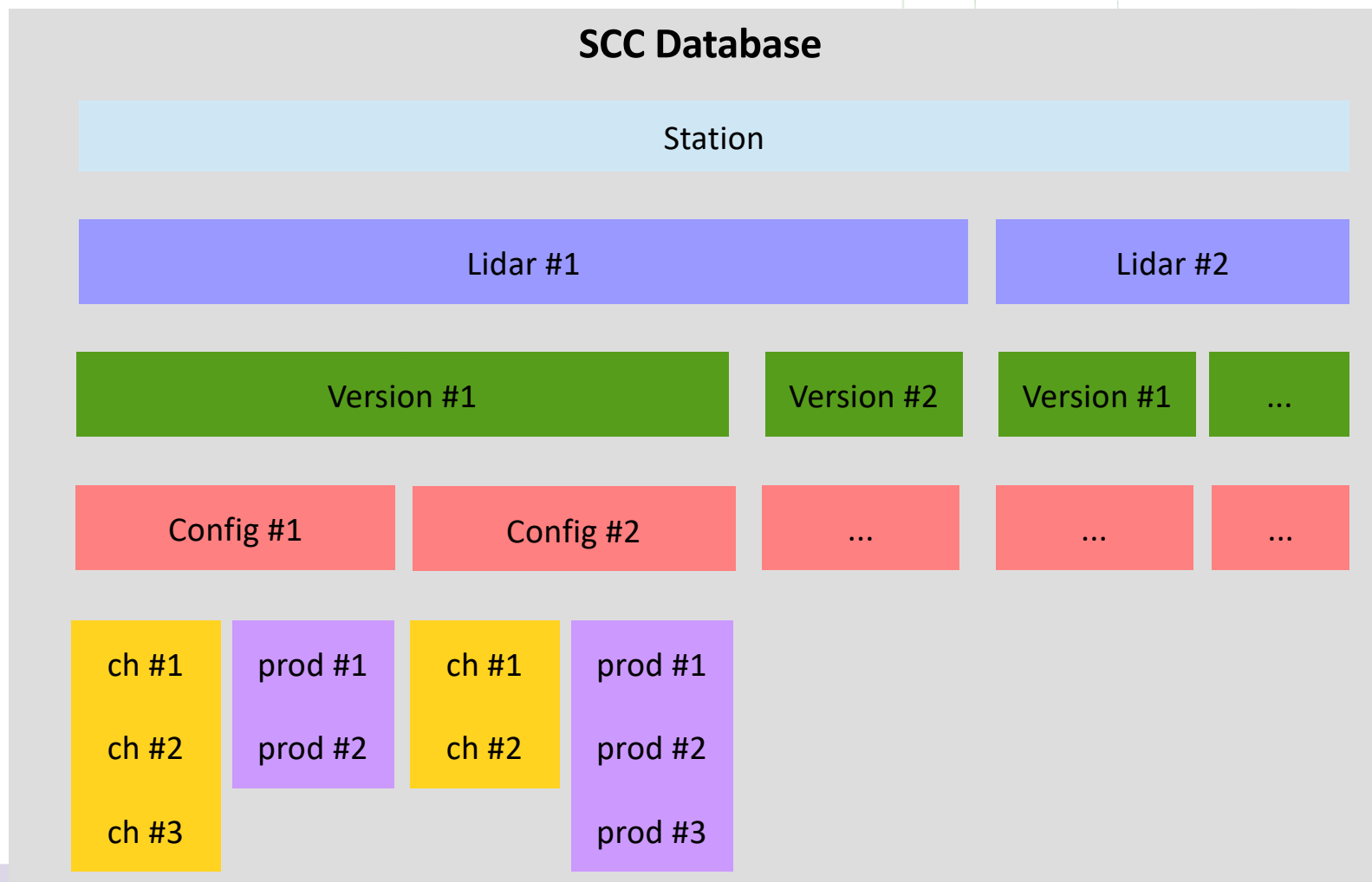
SCC processing flexibility: Usecase concept

Many analysis scenarios for optical products (usecases)

- Raman backscatter (and Lidar ratio)
Number of usecases: 19
- Elastic backscatter
Number of usecases: 9
- Elastic backscatter + depol
Number of usecases: 14
- Raman backscatter + depol
Number of usecases: 24
- Extinction only
Number of usecases: 5
- Linear polarization calibration
Number of usecases: 11



SCC processing traceability



SCC processing traceability

Unique ID for each channel

All the channels' characteristics used in the data processing are collected

- Trigger delay
- Pre-trigger region
- Dead time
- Dead time correction method
- Gluing options
- Raw resolution
- Wavelength
- ...



SCC processing traceability

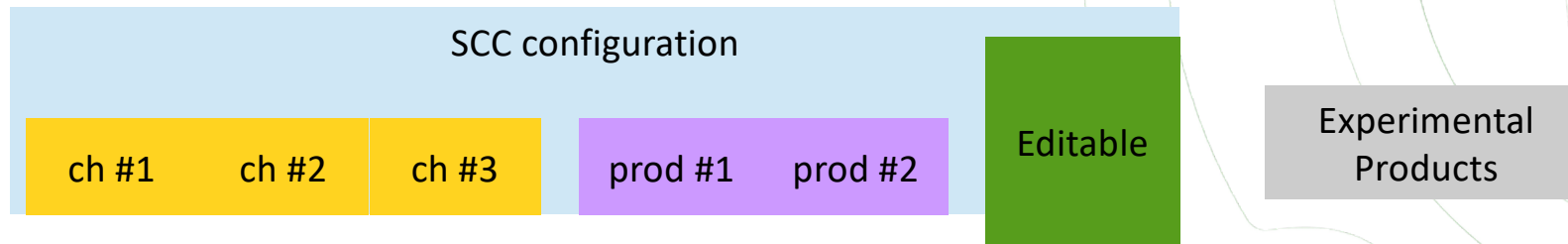
Unique ID for each product

All the product characteristics used in the data processing are collected

- Type (extinction, backscatter, depolarization ratio,...)
- Retrieval method
- Calibration options
- Minimum and maximum valid heights
- Error propagation method
- Maximum allowable statistical uncertainties
- ...

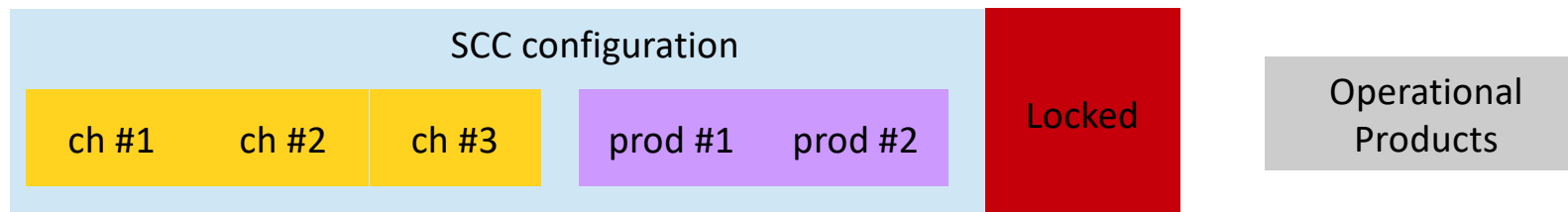


SCC: Connections with CARS instrumental QC



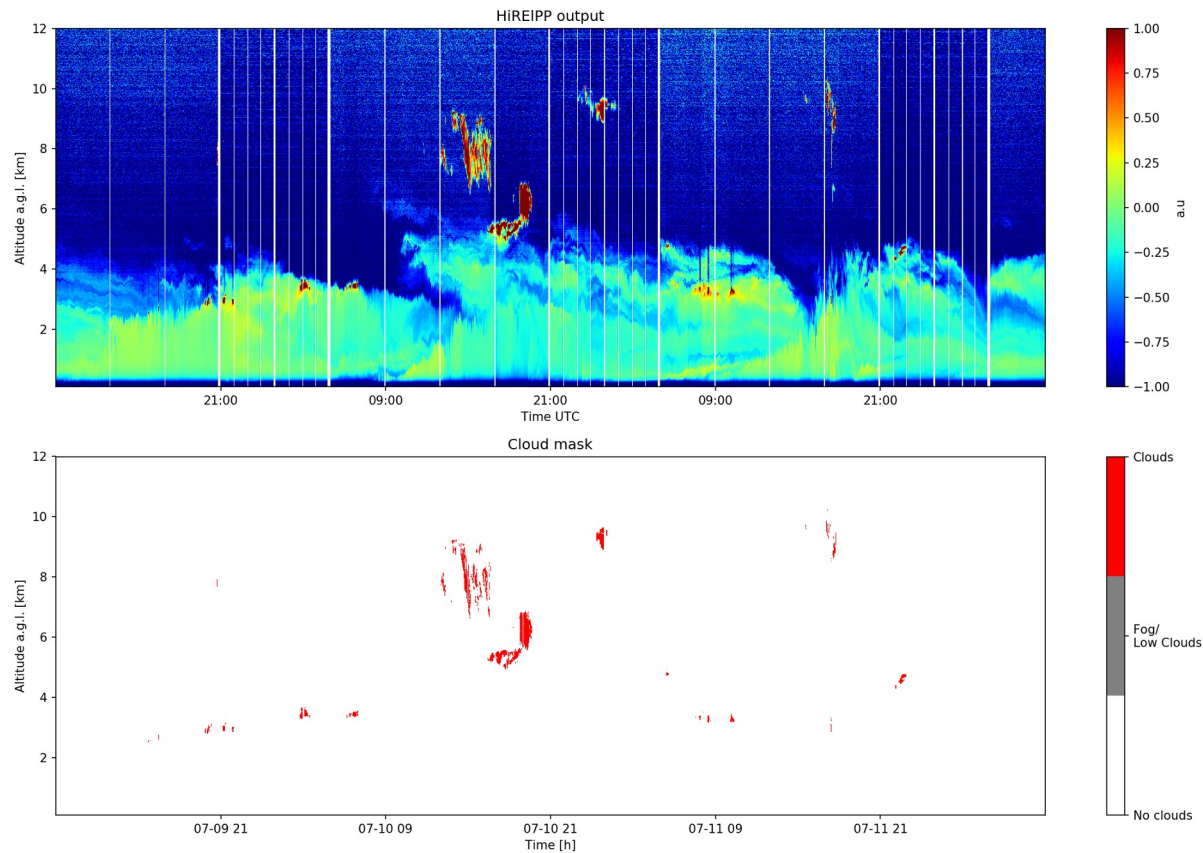
CARS & ARES approval

Configuration parameters checked against the outputs of quality assurance tests (telecover, Rayleigh fit, Dark measurement, GHK,...) or recommended values



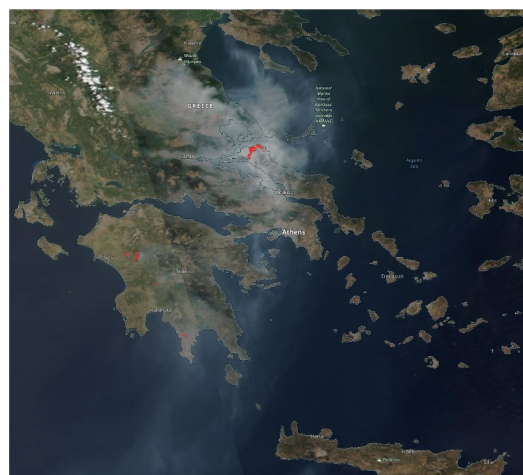
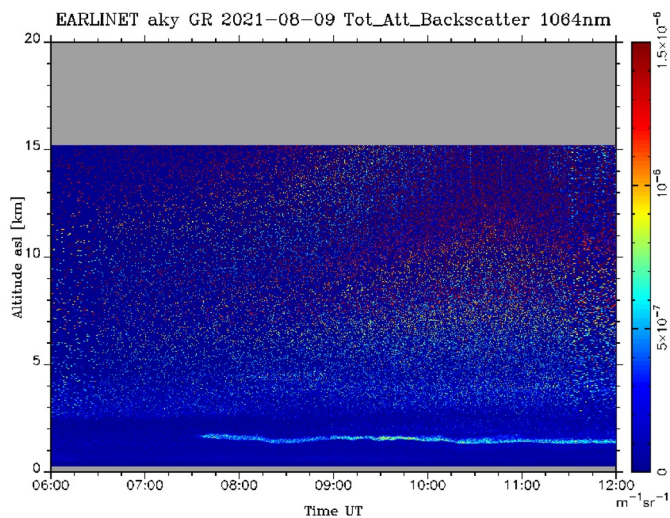
SCC: Example of retrieved products

Cloudmask



SCC: Example of retrieved products

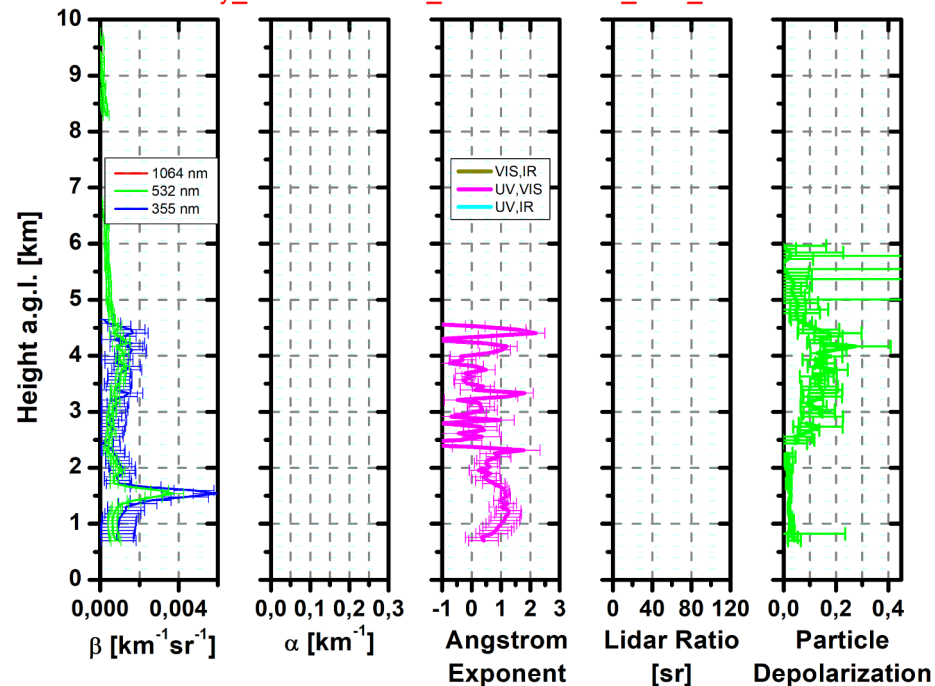
Optical product #1



Smoke case (daytime)

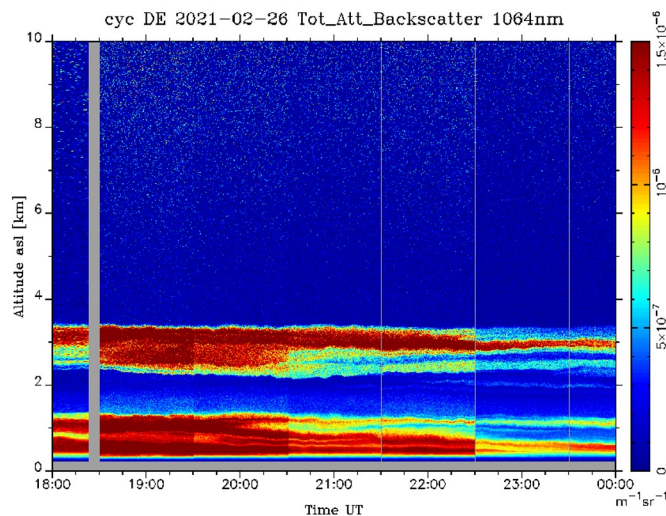
9 Aug 2021

aky_202108090830_202108090930_elda_v5.2.3.nc



SCC: Example of retrieved products

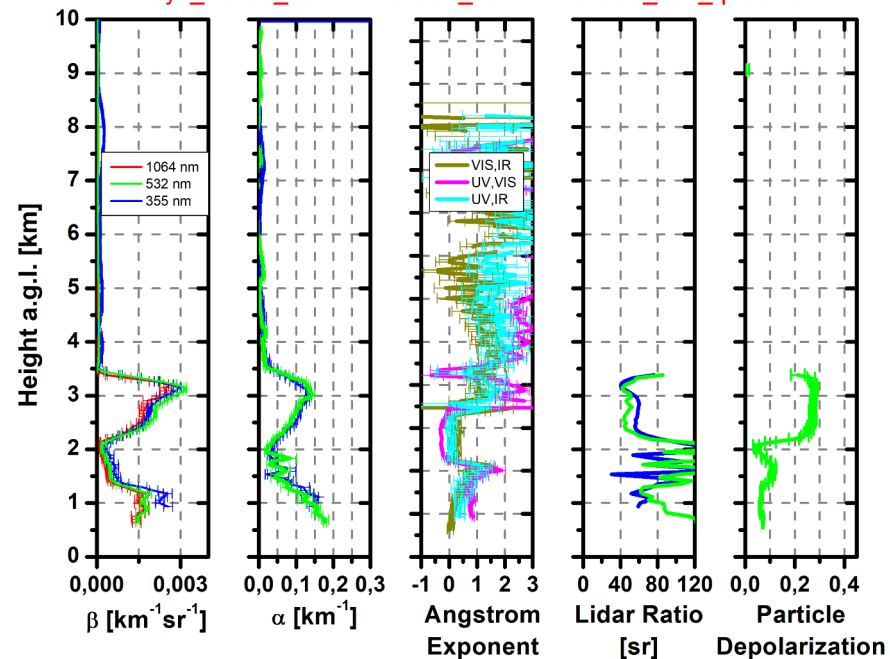
Optical product #2



Dust case (nighttime)

26 Feb 2021

cyc_Lev02_202102261930_202102262030_v01_qc03.nc



SCC: Example of retrieved products

Quicklooks (<https://quicklooks.earlinet.org>)

Browse lidar range corrected signal quicklooks :

◀ Prev Current Month Next ▶

September 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 ☐	2 ☐	3 ☐	4 ☐
5 ☐	6 ☐	7 ☐	8 ☐	9 ☐	10 ☐	11 ☐
12 ☐	13 ☐	14 ☐	15 ☐	16 ☐	17 ☐	18 ☐
19 ☐	20 ☐	21 ☐	22 ☐	23 ☐	24 ☐	25 ☐
26 ☐	27 ☐	28 ☐	29 ☐	30 ☐		

- No Measurements
- Available Measurements
- Filtered Measurements - AND
- Filtered Measurements - OR
- Right Click on Calendar cell to see measurements

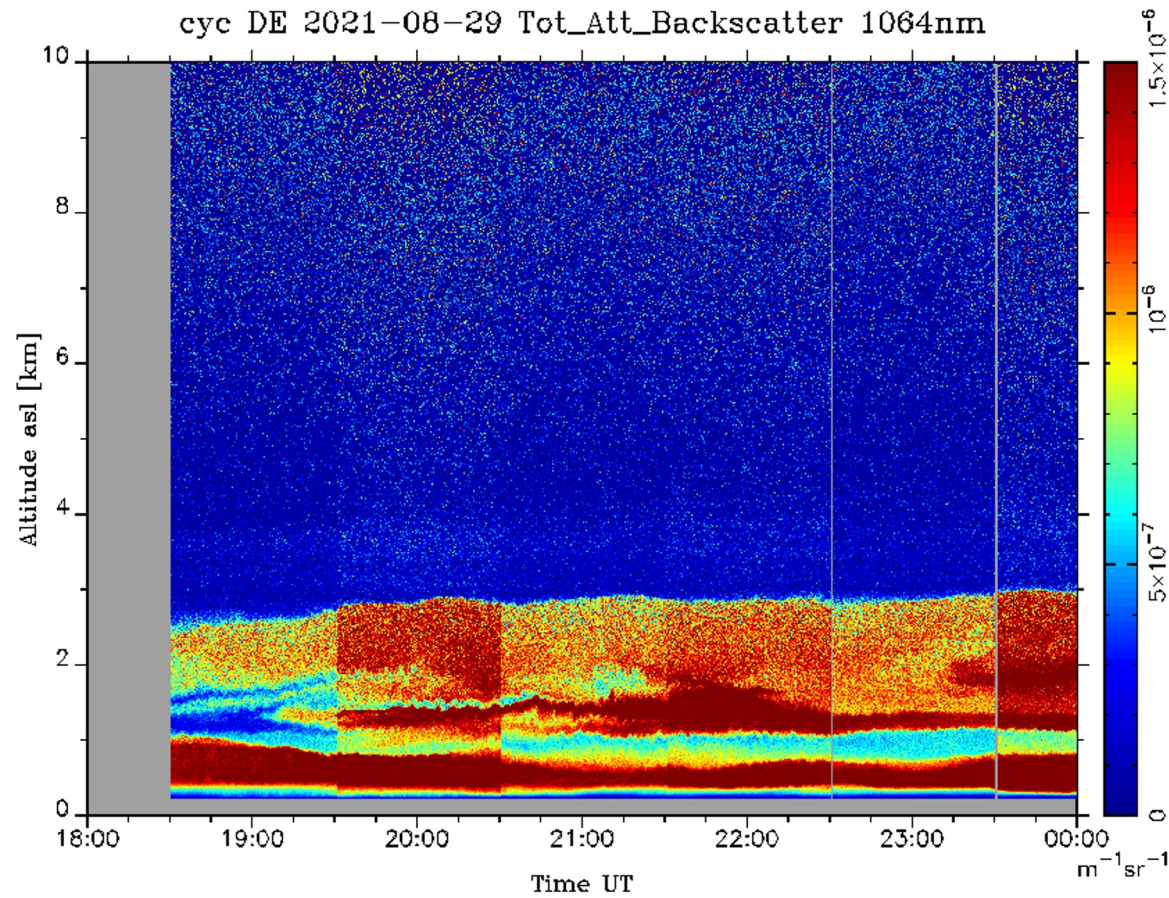
Filter measurements by system :

Click on a Location in order to expand the view and see all the systems

- Select All
- Andoya, NO - arr
- Antikythera, GR - aky
- Athens, GR - atz
- Barcelona, ES - brc
- Belgrade, RS - bgd
- Belsk, PL - cog
- Bucharest, RO - ino
- Burjassot, ES - buj
- Cabauw, NL - cbw
- Catania, IT - ctn
- Clermont-Ferrand, FR - puv

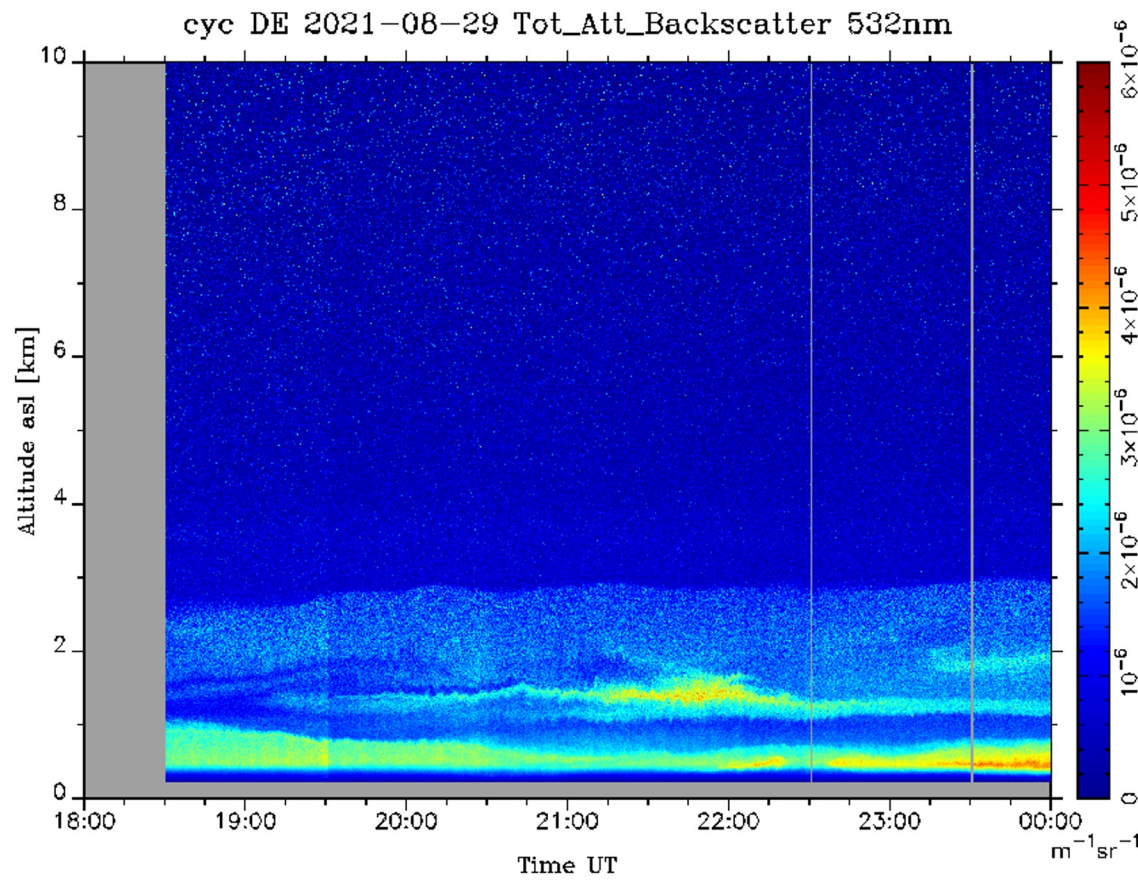
SCC: Example of retrieved products

Quicklooks (<https://quicklooks.earlinet.org>)



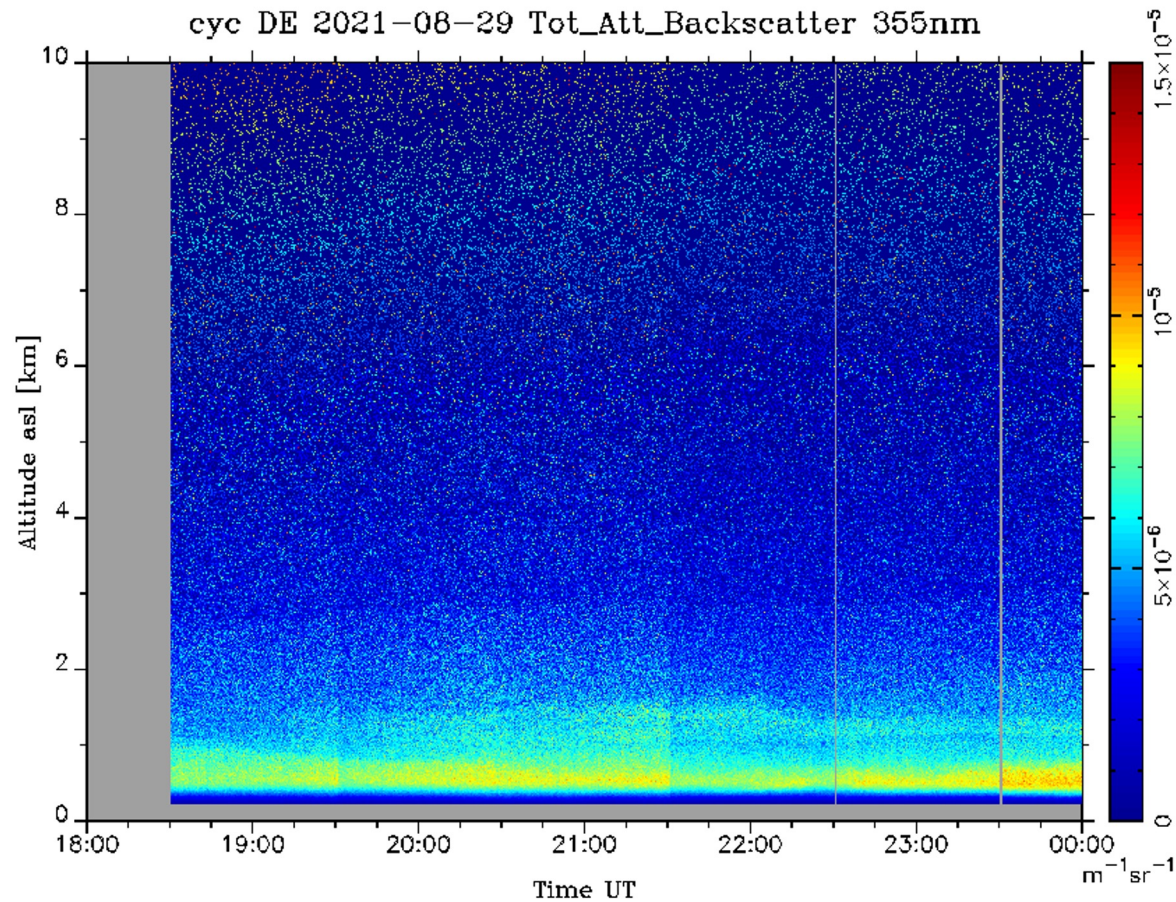
SCC: Example of retrieved products

Quicklooks (<https://quicklooks.earlinet.org>)



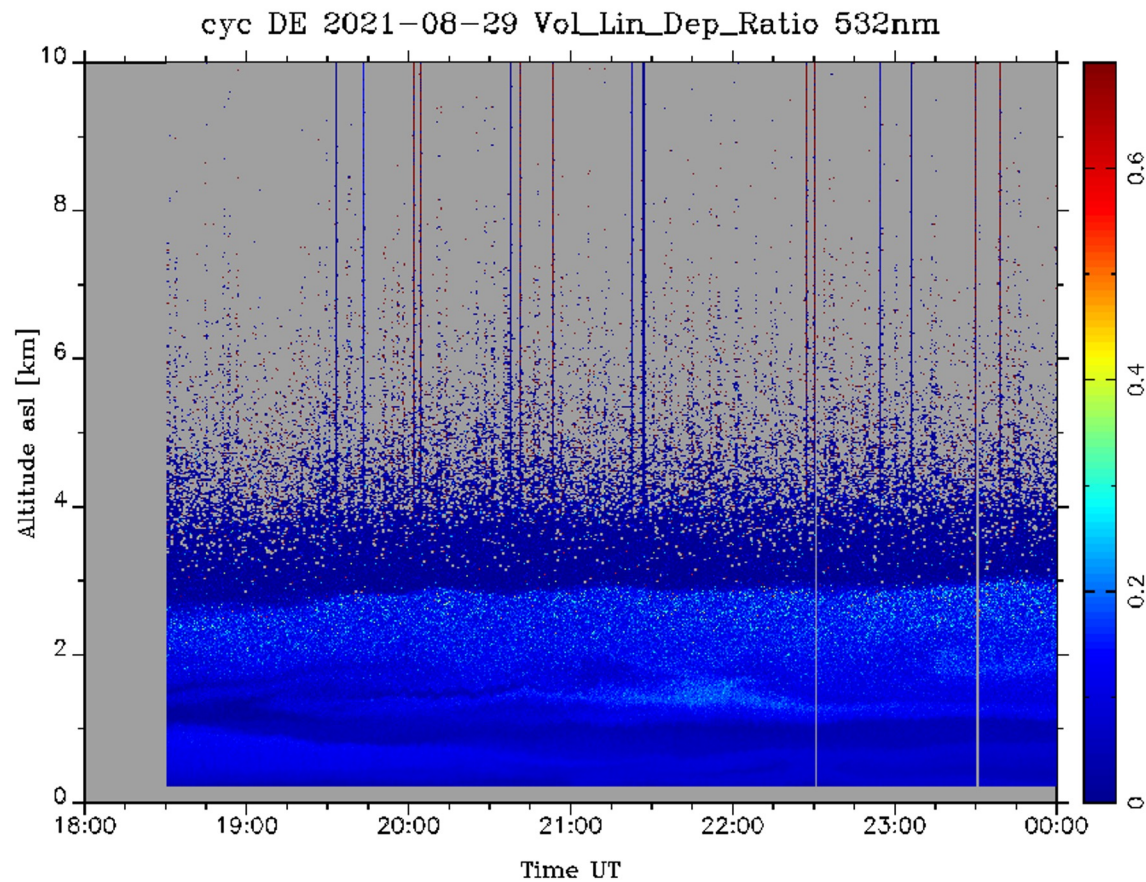
SCC: Example of retrieved products

Quicklooks (<https://quicklooks.earlinet.org>)



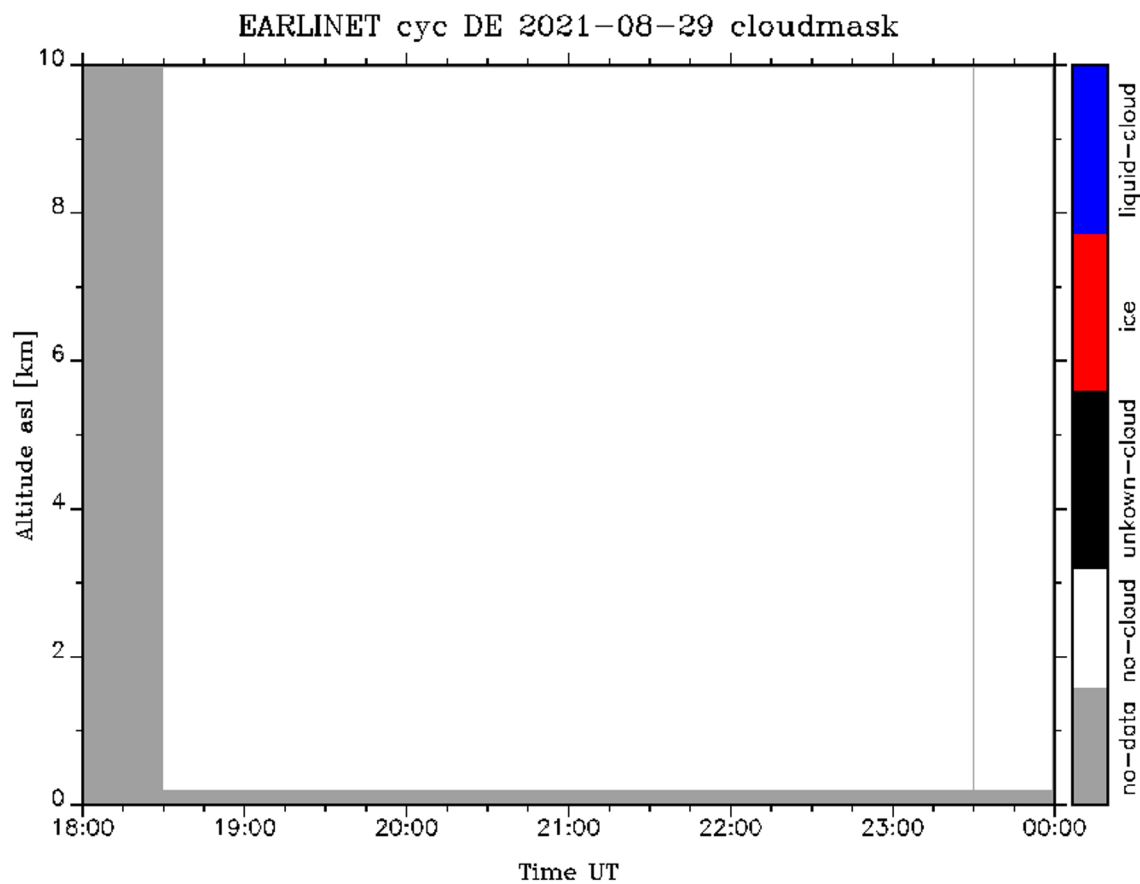
SCC: Example of retrieved products

Quicklooks (<https://quicklooks.earlinet.org>)



SCC: Example of retrieved products

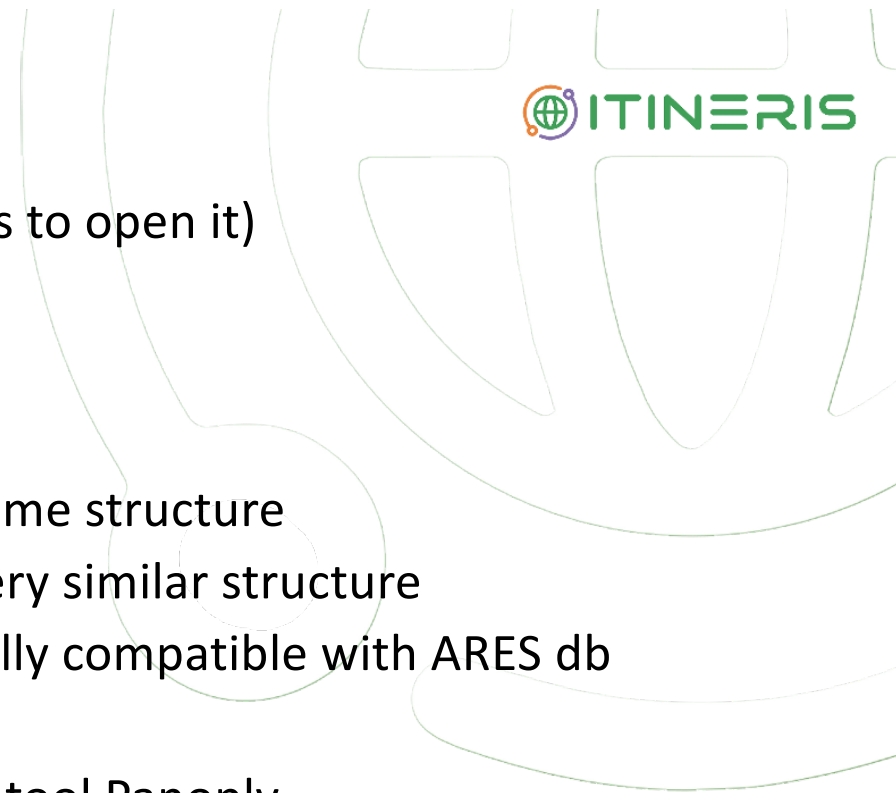
Quicklooks (<https://quicklooks.earlinet.org>)



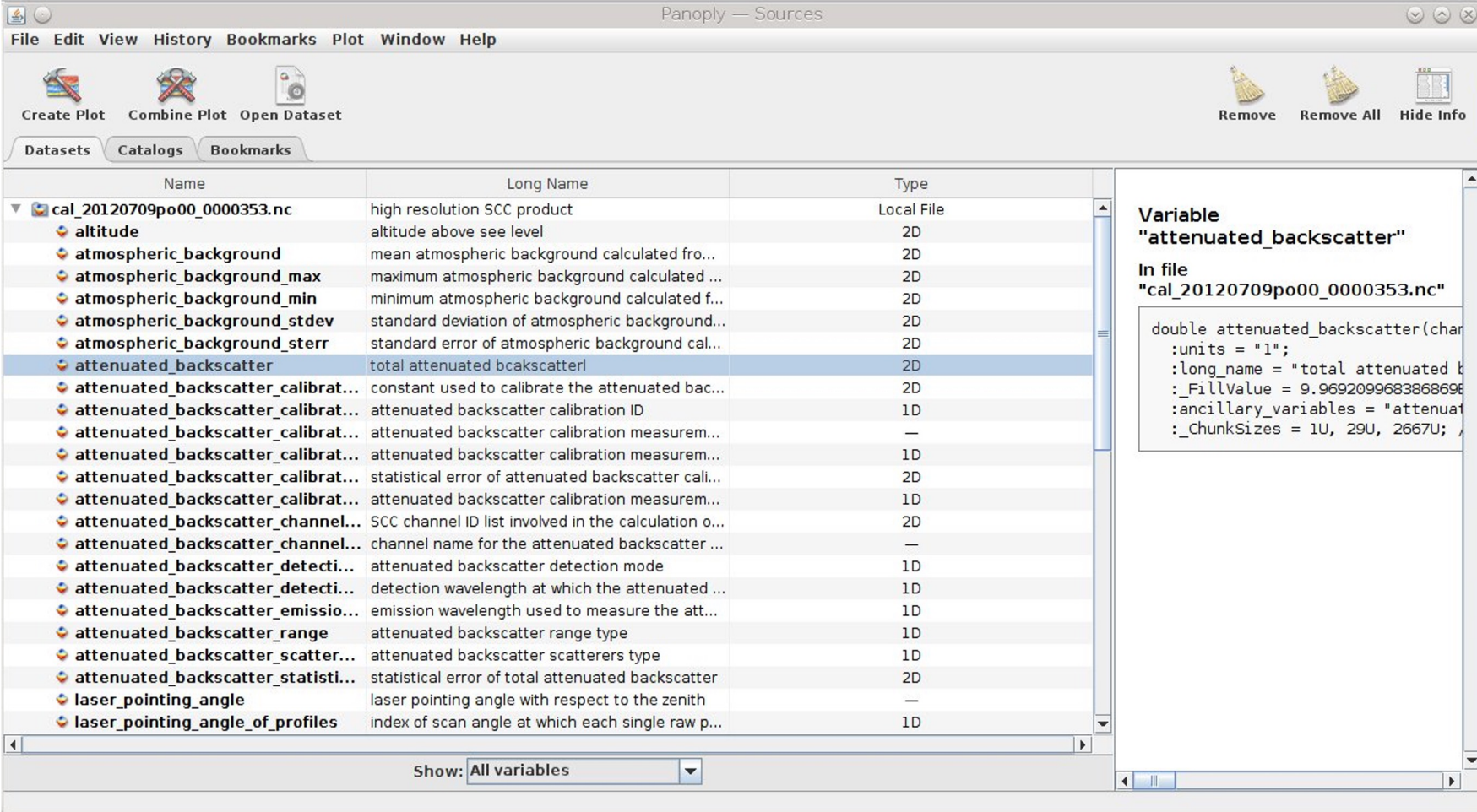
SCC Products format

- NetCDF4 (→ you need recent version of NetCDF libs to open it)
- CF compliant (version 1.7)
- Auto-descriptive
- Homogenized through all product types
- Calibrated and uncalibrated prods → same structure
- Low and high resolution prods → very similar structure
- Optical products → fully compatible with ARES db
- Rich metadata improve traceability
- All the SCC products are compatible with the NASA tool Panoply
(<https://www.giss.nasa.gov/tools/panoply/>) - Use it to evaluate your data!!!
- More info on SCC official documentation:

https://docs.scc.ima.cnr.it/en/latest/file_formats/scc_product_format.html



SCC: Products plotting (via Panoply)



The screenshot shows the Panoply software interface with the following components:

- Menu Bar:** File, Edit, View, History, Bookmarks, Plot, Window, Help
- Toolbar:** Create Plot, Combine Plot, Open Dataset, Remove, Remove All, Hide Info
- Navigation:** Datasets, Catalogs, Bookmarks
- Table:** A table listing variables with columns for Name, Long Name, and Type.
- Variable Information Panel:** A panel on the right showing details for the selected variable "attenuated_backscatter".

Name	Long Name	Type
cal_20120709po00_0000353.nc	high resolution SCC product	Local File
altitude	altitude above see level	2D
atmospheric_background	mean atmospheric background calculated fro...	2D
atmospheric_background_max	maximum atmospheric background calculated ...	2D
atmospheric_background_min	minimum atmospheric background calculated f...	2D
atmospheric_background_stdev	standard deviation of atmospheric background...	2D
atmospheric_background_sterr	standard error of atmospheric background cal...	2D
attenuated_backscatter	total attenuated backscatter	2D
attenuated_backscatter_calibrat...	constant used to calibrate the attenuated bac...	2D
attenuated_backscatter_calibrat...	attenuated backscatter calibration ID	1D
attenuated_backscatter_calibrat...	attenuated backscatter calibration measur...	—
attenuated_backscatter_calibrat...	attenuated backscatter calibration measur...	1D
attenuated_backscatter_calibrat...	statistical error of attenuated backscatter cali...	2D
attenuated_backscatter_calibrat...	attenuated backscatter calibration measur...	1D
attenuated_backscatter_channel...	SCC channel ID list involved in the calculation o...	2D
attenuated_backscatter_channel...	channel name for the attenuated backscatter ...	—
attenuated_backscatter_detecti...	attenuated backscatter detection mode	1D
attenuated_backscatter_detecti...	detection wavelength at which the attenuated ...	1D
attenuated_backscatter_emissio...	emission wavelength used to measure the att...	1D
attenuated_backscatter_range	attenuated backscatter range type	1D
attenuated_backscatter_scatter...	attenuated backscatter scatterers type	1D
attenuated_backscatter_statisti...	statistical error of total attenuated backscatter	2D
laser_pointing_angle	laser pointing angle with respect to the zenith	—
laser_pointing_angle_of_profiles	index of scan angle at which each single raw p...	1D

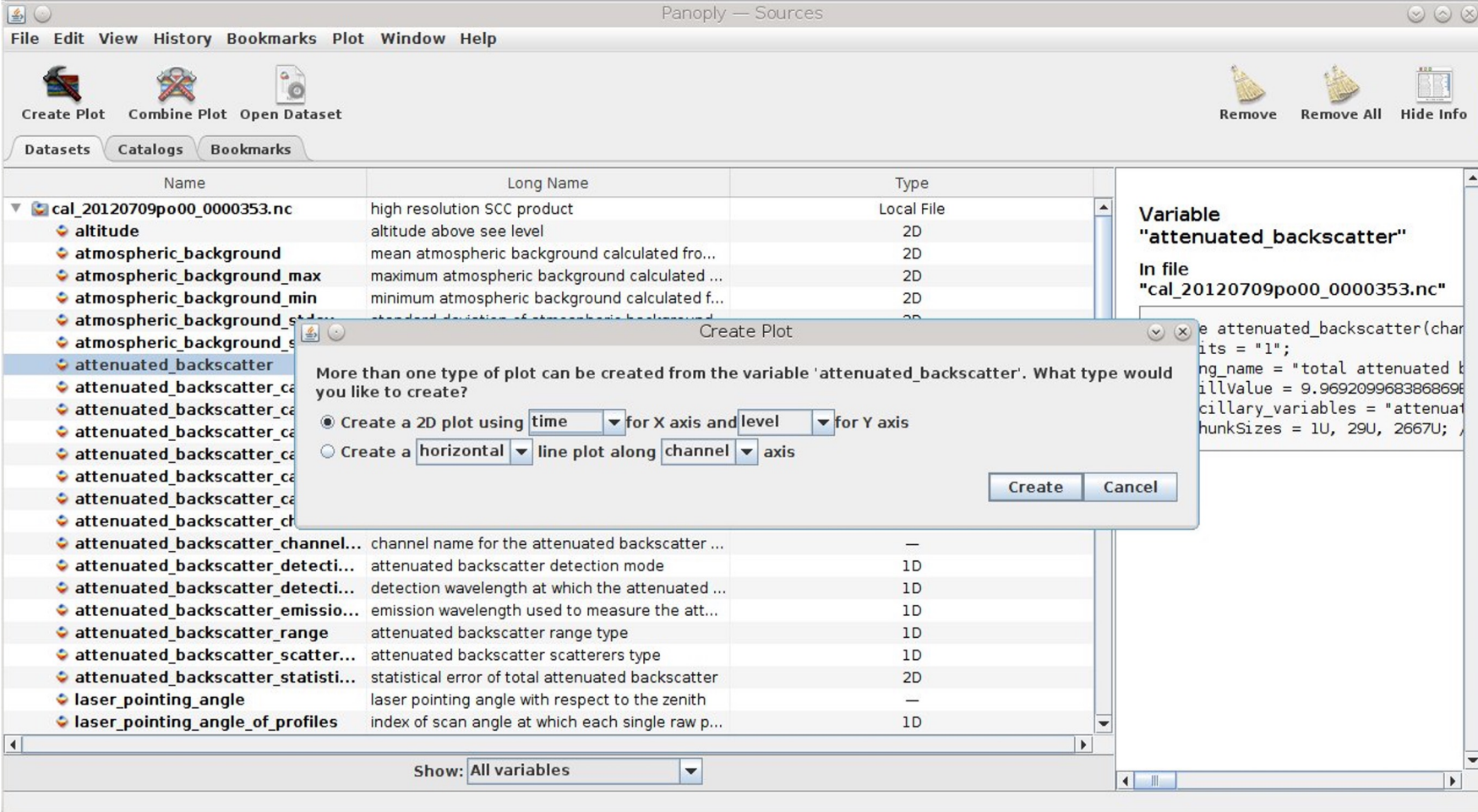
Variable Information Panel:

Variable
"attenuated_backscatter"

In file
"cal_20120709po00_0000353.nc"

```
double attenuated_backscatter(char  
:units = "1";  
:long_name = "total attenuated b  
:_FillValue = 9.9692099683868696  
:ancillary_variables = "attenuat  
:_ChunkSizes = 1U, 29U, 2667U; ;
```

SCC: Products plotting (via Panoply)



The screenshot shows the Panoply software interface with a dataset list and a 'Create Plot' dialog box. The dataset list includes variables such as altitude, atmospheric background, and attenuated backscatter. The dialog box asks for the plot type and axis variables.

Name	Long Name	Type
cal_20120709po00_0000353.nc	high resolution SCC product	Local File
altitude	altitude above see level	2D
atmospheric_background	mean atmospheric background calculated fro...	2D
atmospheric_background_max	maximum atmospheric background calculated ...	2D
atmospheric_background_min	minimum atmospheric background calculated f...	2D
atmospheric_background_std	standard deviation of atmospheric background	2D
attenuated_backscatter		
attenuated_backscatter_channel...	channel name for the attenuated backscatter ...	—
attenuated_backscatter_detecti...	attenuated backscatter detection mode	1D
attenuated_backscatter_detecti...	detection wavelength at which the attenuated ...	1D
attenuated_backscatter_emissio...	emission wavelength used to measure the att...	1D
attenuated_backscatter_range	attenuated backscatter range type	1D
attenuated_backscatter_scatterer...	attenuated backscatter scatterers type	1D
attenuated_backscatter_statisti...	statistical error of total attenuated backscatter	2D
laser_pointing_angle	laser pointing angle with respect to the zenith	—
laser_pointing_angle_of_profiles	index of scan angle at which each single raw p...	1D

Create Plot

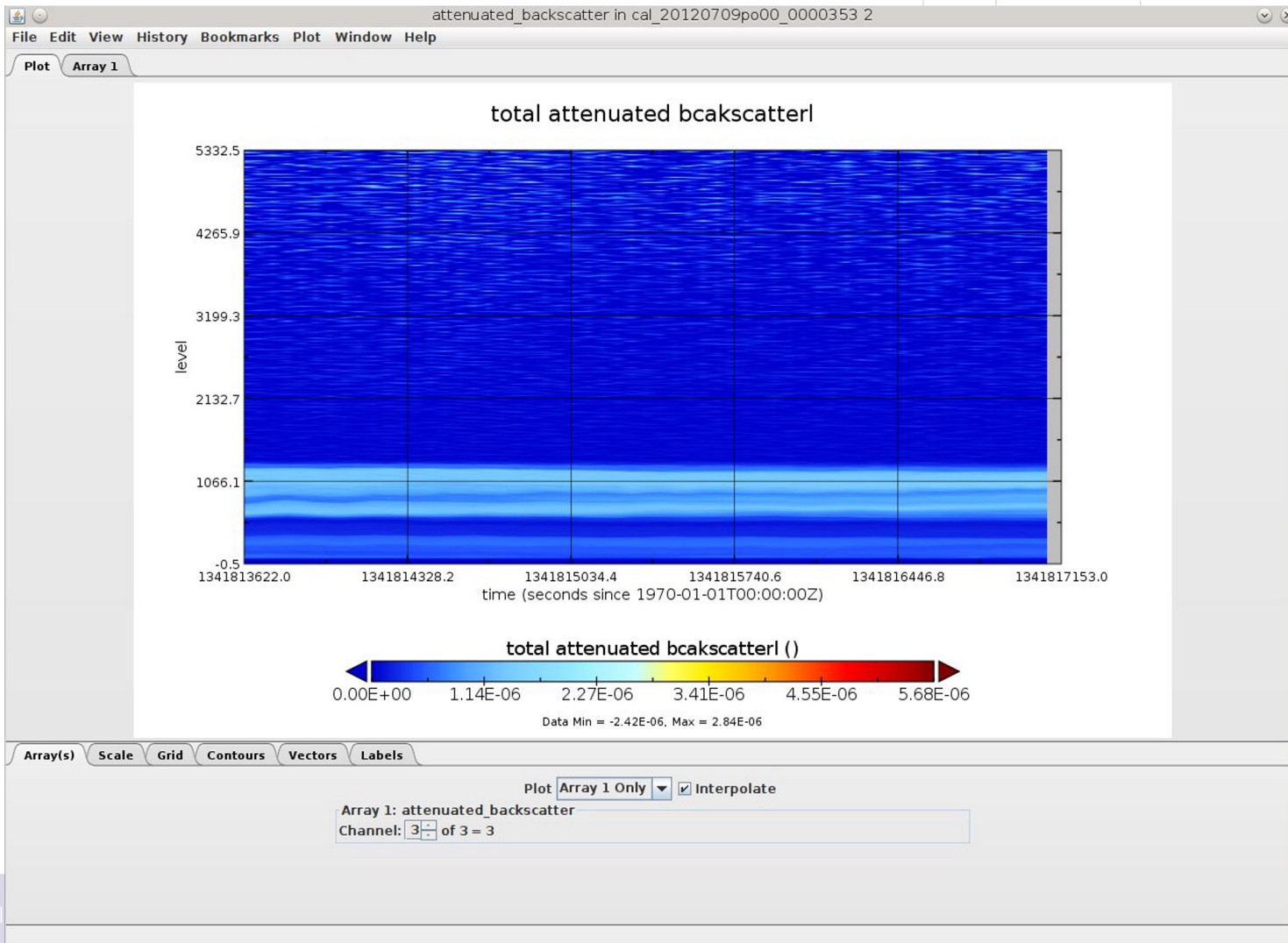
More than one type of plot can be created from the variable 'attenuated_backscatter'. What type would you like to create?

Create a 2D plot using **time** for X axis and **level** for Y axis

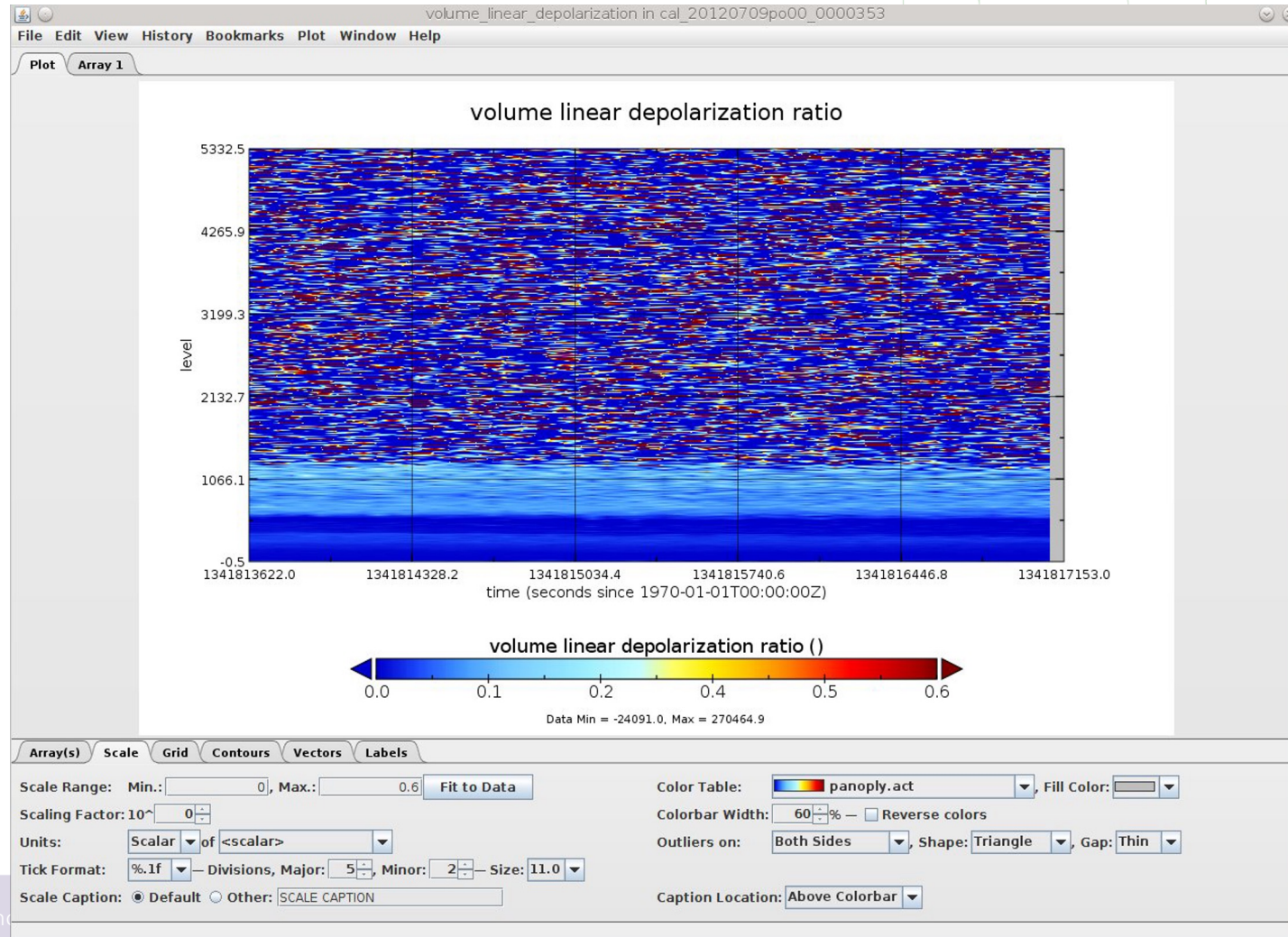
Create a **horizontal** line plot along **channel** axis

Create **Cancel**

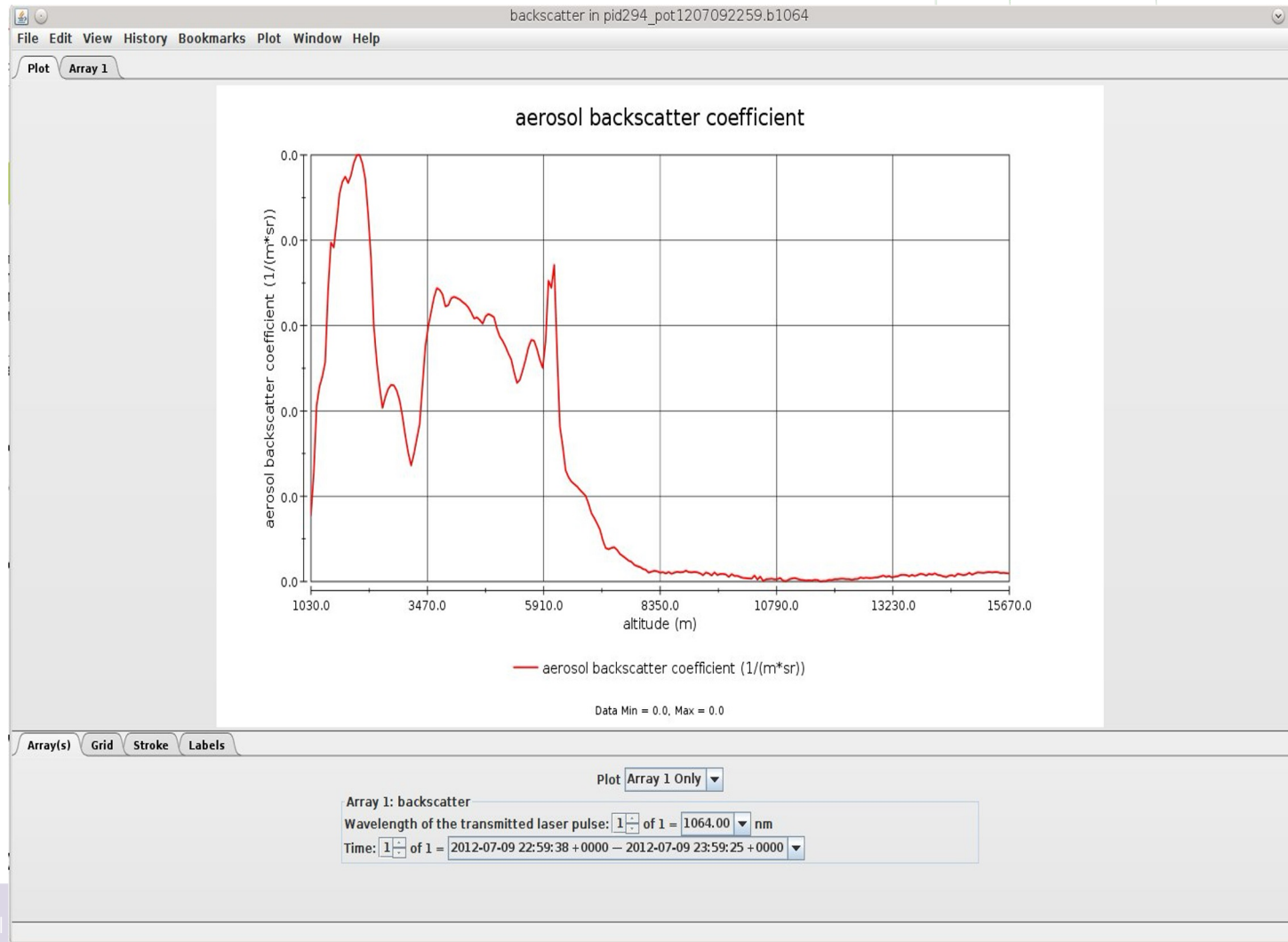
SCC: Products plotting (via Panoply)



SCC: Products plotting (via Panoply)



SCC: Products plotting (via Panoply)



SCC: Requirements

Who can use the SCC?

- In principle any station running one or more lidar systems.
- Many types of lidars are supported:
 - Single wavelength elastic lidar
 - Single wavelength Raman lidar
 - Multi-wavelength Raman lidar
 - Single and multi-wavelength depolarization Raman lidar
 - Multiple telescope lidars (partially)

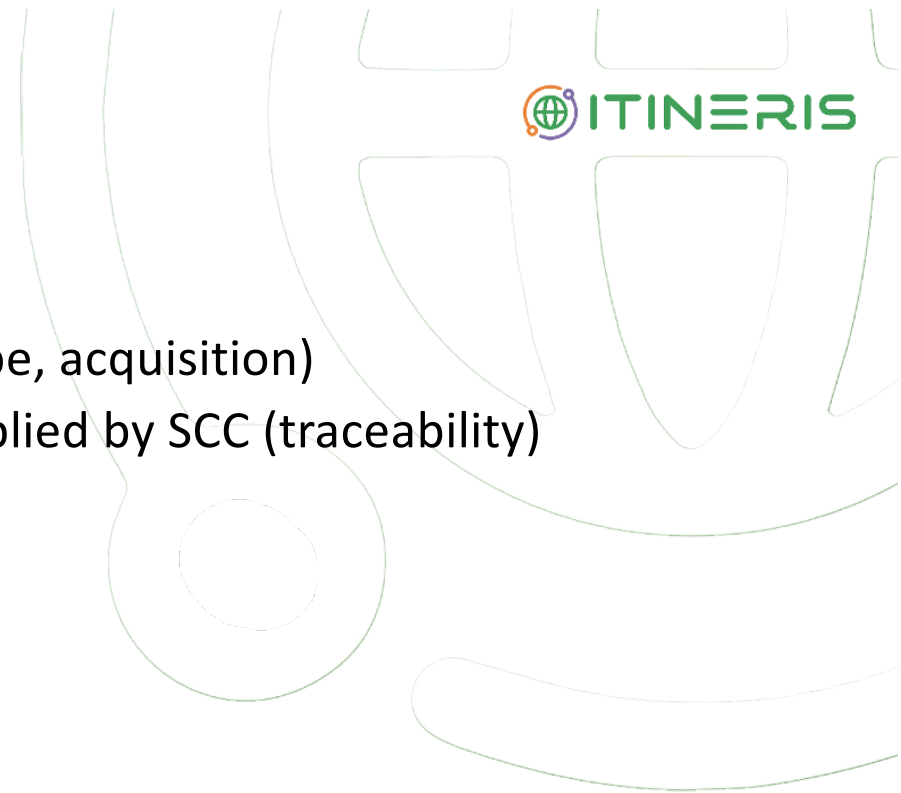
Not (yet!) supported systems:

- Ceilometer
- MPL
- HSRL
- Water vapour



SCC: Requirements

- “open” lidar systems!
- Access to all the info about the lidar (laser, telescope, acquisition)
- Access to raw data: all the correction should be applied by SCC (traceability)
 - Pure counts for photon-counting signals
 - Volts detected by ADC for analog signals
- Station registered into the SCC
- SCC account
- Insert all the lidar info into the SCC
- Produce an input file compliant with SCC format





THANKS!

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Mission 4 “Education and Research” - Component 2: “From research to business” - Investment
3.1: “Fund for the realisation of an integrated system of research and innovation infrastructures”



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