NA5
Optimization of data processing

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NA5
Optimization of data processing

Main objective

To provide all partners with a common processing chain for the evaluation of their data, from raw signals to final products.

TASKS

NA5.1 Optimisation of data processing to retrieve aerosol optical properties. (IFT)

NA5.2 Optimisation of data processing to retrieve aerosol microphysical properties. (UP)

NA5.3 Implementation of a single chain data processing procedure for the automatic retrieval of aerosol properties. (CNR-IMAA)

Involved partners

Activity number	NA5	Start month	1	End month	60
Activity Title	Optimisation of data processing				

Participant number	1	6	8	2	9	3	4	5	7	10	11	12	13	14	15	16	17	18	19	20	21	
Participant short name	CNR-IMAA	IFT	UP	MPIMET	BISIP.SMO	AUTH	UPC	LMU-MUENCHEN	RIVM	NILU	ON	NTUA	UNILE	UNIAQ	EPFL	IG PAS	CNISM	IE-BAS	FZK	CNRS	CIEMAT	Total (additional staff only)
Total person-months	46	65 (46)	36 (25)	10 (7)	58 (41)	6 (4)	2	3 (2)	2	2	2	3 (2)	3 (2)	2	3 (2)	2	3 (2)	2	2	2	2	199

Specific goals:

- the compilation of an optimised algorithm to retrieve, in an automatic way and without the need for operator interaction, aerosol optical properties, such as extinction and backscatter coefficients, lidar ratio, optical depth, Angstrom coefficient using Raman lidar signals, or backscatter and Angstrom coefficients using elastic lidar signals only (when no Raman signal is available);

- the implementation of the capability of constraining the solutions using sun-photometer measurements at several wavelengths;

Specific goals:

- the compilation of an optimised software package to retrieve aerosol microphysical properties: particle size, surface and volume concentrations, and refractive index from multi-spectral lidar measurements;
- the compilation of a software package to derive the microphysical properties of particles in the vertical column starting from combined lidar/photometer data, as far as possible;
- the implementation of a single data processing chain starting from raw lidar data, to include system-dependent pre-processing, and providing optical aerosol properties as final products.

Impact:

This will have a strong impact on the scientific community because data with homogeneous well characterized quality and characteristics will be made available in nearly real time, allowing studies of important events in a timely way and permitting comparative studies between different regions.

Transport phenomena

Satellite products validation

Difficulties:

- the instruments used by the individual groups are different and not standardized (differences exist for the wavelengths used, acquisition mode (analog and/or photoncounting), space resolution, detection systems)
- the algorithms used by the several groups are different and the algorithm to be implemented in the processing chain has to be optimized for the data provided by the partners.

Milestones

M5.1: Full documentation of existing algorithms available. Month 9 **(November 2006)**

M5.2: Application of the software package (test version) for the retrieval aerosol optical parameters to EARLINET-ASOS lidar data. Month 26 **(April 2008)**

M5.3: Application of the software package for the retrieval of aerosol microphysical properties (test version) to EARLINET-ASOS data. Month **28 (June 2008)**

M5.4: Application of the software package for the retrieval of aerosol microphysical properties in the vertical column to combined lidar/photometer data (test version) from the EARLINET-ASOS data base. Month 34 **(December 2008)**

M5.5: Pre-processing of raw lidar data from all EARLINET-ASOS lidar stations. Month 36 **(February 2009)**

Deliverable Nr.	Deliverable title	Workpackage /Task Nr.	Lead Contractor (s)	Delivery date	Nature
D5.1	Assessment of the existing calculus subsystems used within EARLINET	NA5.1	IFT	14	Report
D5.2	Software package for the retrieval aerosol optical parameters (test version)	NA5.1	IFT	24	Software
D5.3	Software package for the retrieval of aerosol microphysical properties (test version).	NA5.2	UP	24	Software
D5.4	Definition of the evaluation single chain for the aerosol properties retrieval	NA5.3	CNR-IMAA	26	Report
D5.5	Software package for the retrieval of aerosol microphysical properties in the vertical column using combined lidar/photometer data (test version)	NA5.2	UP	32	Software
D5.6	Implementation of single calculus chain for the aerosol properties retrieval (test version)	NA5.3	CNR-IMAA	38	Software
D5.7	Software package for the retrieval aerosol optical parameters (operational version).	NA5.1	IFT	42	Software
D5.8	Software package for the retrieval of aerosol microphysical properties (operational version).	NA5.2	UP	45	Software
D5.9	Software package for the retrieval of aerosol microphysical properties in the vertical column using combined lidar/photometer data (operational version)	NA5.2	UP BISIP.SMO	48	Software
D5.10	Implementation of the single calculus chain for the aerosol properties retrieval (operational version)	NA5.3	CNR-IMAA	60	Software

Ideas:

The basic ideas were defined in a document distributed and discussed within the network:

- platform independency
- open source phylosophy within the network
- data format: NetCDF
- operability both on a central single server accessible from web and on local server/PC
- flexibility allowing the user to choose the retrieval procedure suitable for his instrument
- easy expandibility allowing to handle data from new and upgraded lidar systems

The central single server is hosted by the Barcelona Supercomputer Center (BSC).

1st Step:

Collection of all the information relative to the calculus subsystems existing within EARLINET:

- Experimental specifications
- Data pre-processing methods
- Data processing methods

Pre-processing information

- Experimental specifications
- Raw data vertical resolution
- Raw data time resolution
- Laser repetition rate
- Integration time
- Dead-time correction
- After-pulse correction
- Details for overlap function determination
- Other corrections
- Raw data handling before the application of the processing algorithm
- Background subtraction on raw signals
- Merging of analog and photon counting profiles
- Merging high and low range profiles
- Error calculation on raw signals
- Error calculation on signals background subtracted
- Error calculation on merged signals
- Cloud screening

Optical Processing information

- Molecular vertical profile calculation
- Formula or reference to derive Rayleigh extinction and backscatter coefficients
- Aerosol Extinction calculation
  - Wavelength dependence parameter
  - Algorithm
  - Error calculation
  - Effective vertical resolution
  - Quality control
- Aerosol backscatter
  - From elastic signal only
    - Detailed description of the used inversion algorithm
    - Error calculation
    - Handling of the backscatter profile (smoothing, filtering, other)
    - Quality control
  - From elastic and Raman signals combination
    - Calibration
    - Error calculation
    - Effective vertical resolution
    - Handling of the backscatter profile (smoothing, filtering, other)
    - Quality control
- Lidar ratio calculation
  - Method
  - Quality control
- Multiple scattering correction

Description of the method used to determine the PBL height

- Depolarization ratio
  - Optical components (total, cross, parallel)
  - Description of calibration method
  - Error calculation
  - Handling of the depolarization ratio profile (smoothing, filtering, other)

EARLINETASOS:
European Aerosol Research Lidar Network:
Advanced Sustainable Observation System

Contract RICA 025991

Assesment report of existing calculus subsystems used within EARLINET-ASOS

compiled by:
I. Mattis, A. Chaikovsky, A. Amodeo, G. D'Amico, and G. Pappalardo

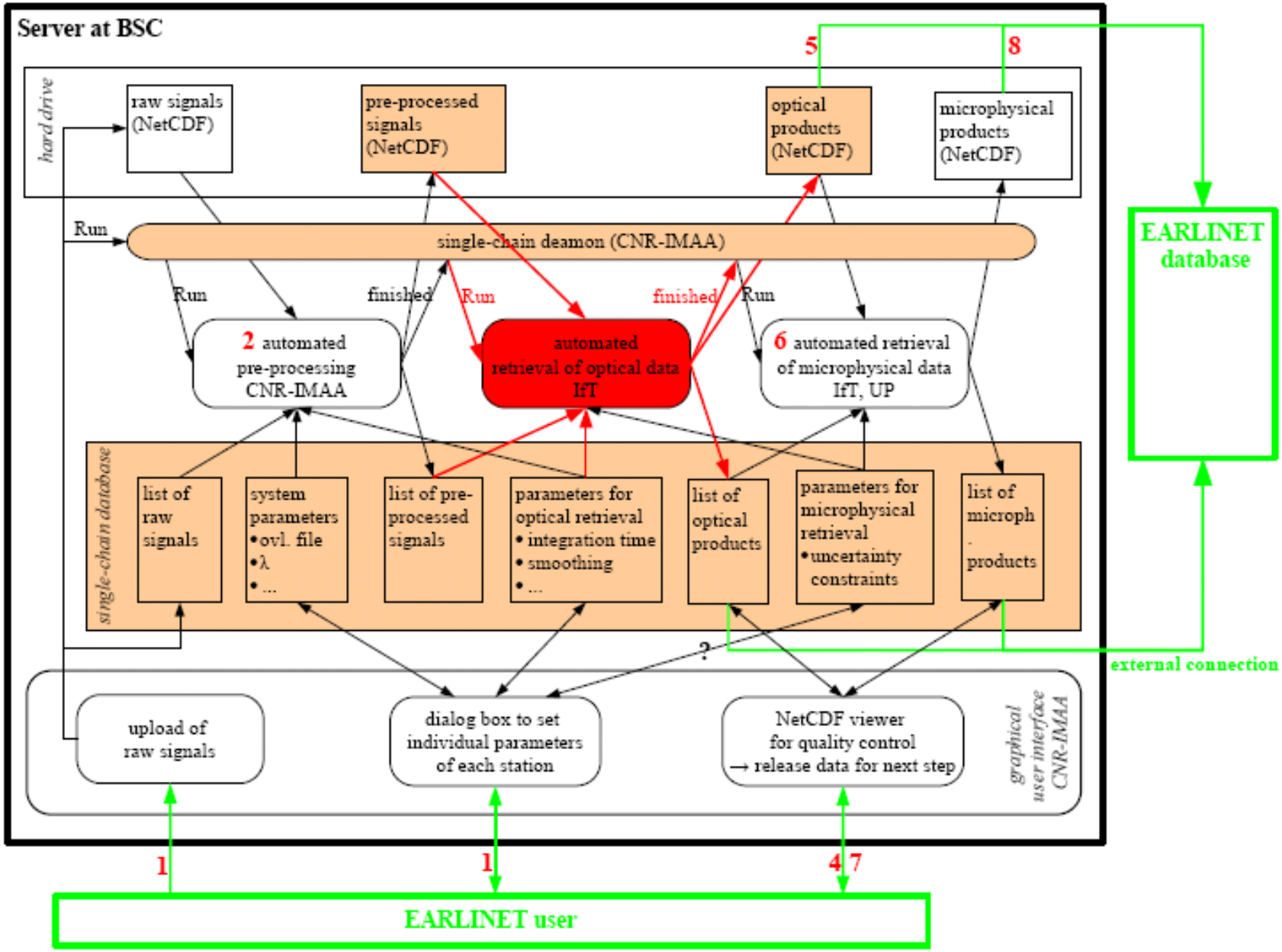
April 1, 2007

Deliverable 5.1

2nd Step:

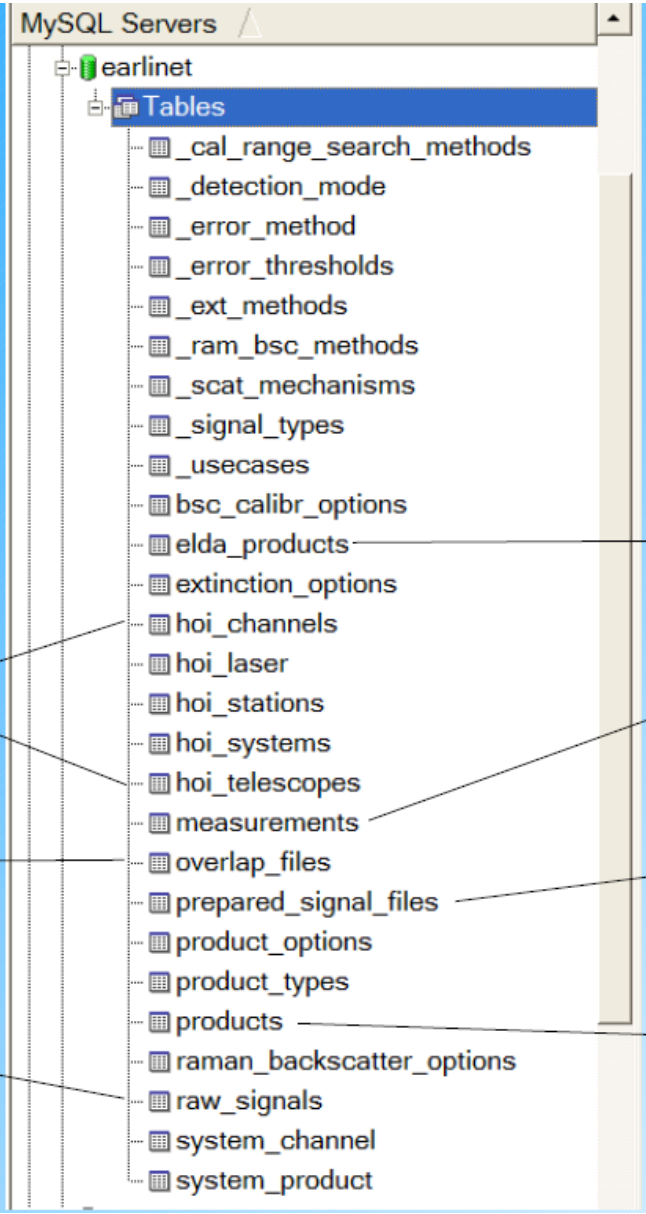
Design of the Single Calculus Chain:

- definition of the structure
- definition of the input and intermediate data files format and content
- definition and design of the relational database


Server at BSC
hard drive
raw signals (NetCDF)
pre-processed signals (NetCDF)
optical products (NetCDF)
microphysical products (NetCDF)
5
8
Run
single-chain deamon (CNR-IMAA)
Run
finished
Run
finished
Run
2 automated pre-processing CNR-IMAA
automated retrieval of optical data IfT
6 automated retrieval of microphysical data IfT, UP
EARLINET database
single-chain database
list of raw signals
system parameters •ovl. file •λ • ...
list of pre-processed signals
parameters for optical retrieval • integration time • smoothing • ...
list of optical products
parameters for microphysical retrieval •uncertainty constraints
list of microph. products
?
external connection
upload of raw signals
dialog box to set individual parameters of each station
NetCDF viewer for quality control → release data for next step
graphical user interface CNR-IMAA
1
1
4 7
EARLINET user

Relational database

MySQL:
→Windows
→Linux
→free available



hardware description handbook of instruments

list of all overlap files

list of all raw signal NetCDF files

The database has the same structure of the Handbook Of Instruments (NA4). It will be linked directly to this.

list of all produced NetCDF files with optical data

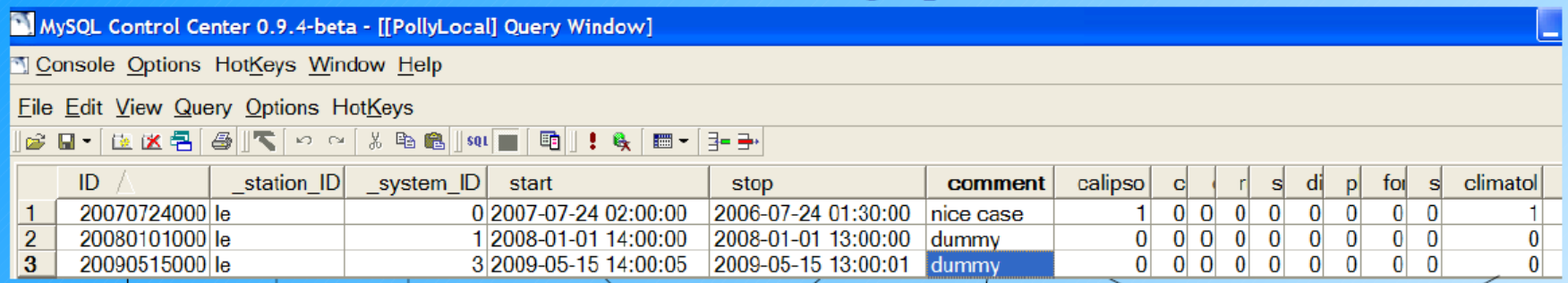
list of all measurements

list of all intermediate NetCDF files

list of all products, which has to be derived with ELDA

Relational database

Table „measurements“ - to be filled via the graphical user interface



	ID	_station_ID	_system_ID	start	stop	comment	calipso	c		r	s	di	p	fo	s	climatol
1	20070724000	le	0	2007-07-24 02:00:00	2006-07-24 01:30:00	nice case	1	0	0	0	0	0	0	0	0	1
2	20080101000	le	1	2008-01-01 14:00:00	2008-01-01 13:00:00	dummy	0	0	0	0	0	0	0	0	0	0
3	20090515000	le	3	2009-05-15 14:00:05	2009-05-15 13:00:01	dummy	0	0	0	0	0	0	0	0	0	0

measurement ID

station ID

system ID

start and stop time

comment

categories

Input data

Parameter	NetCDF	Database
Measurements ID	✔	
Location, System name	✔	✔
Scan Angles	✔	
Coordinates	✔	✔
Start date	✔	✔
Start time	✔	✔
Stop time	✔	✔
Channels_ID	✔	
Background sub. mode	✔	✔
Detection mode	✔	✔
Dead time	✔	✔
Range type	✔	✔
Scattering mechanism	✔	✔
Lidar data	✔	
Time scale(s)	✔	

Parameter	NetCDF	Database
Emitted, detected wavel.	✔	✔
Number of Shots	✔	
Molecular Calc	✔	
Trigger Delay	✔	✔
Raw range resolution	✔	✔
First bin range	✔	✔
Overlap correction	✔	✔
Telescopes data		✔
Laser		✔

Pre-processing module

Language: C

- Reads data from database
- Checks if the raw data are from a lidar system that passed all the required instruemental quality checks (NA3)
- Reads NetCDF input raw lidar signals
- Dead time correction
- Trigger delay correction
- First bin range correction
- Overlap correction
- Background subtraction (both atmospheric and electronic)
- Low and high range signals gluing (from AN/PC systems or from different telescopes)
- Vertical interpolation (resolution defined in the database for each product)
- Molecular profile calculation (standard, correlative sounding)
- Time averaging (interval defined in the database for each product)
- Statistical error propagation on pre-processed lidar signals

NetCDF input file

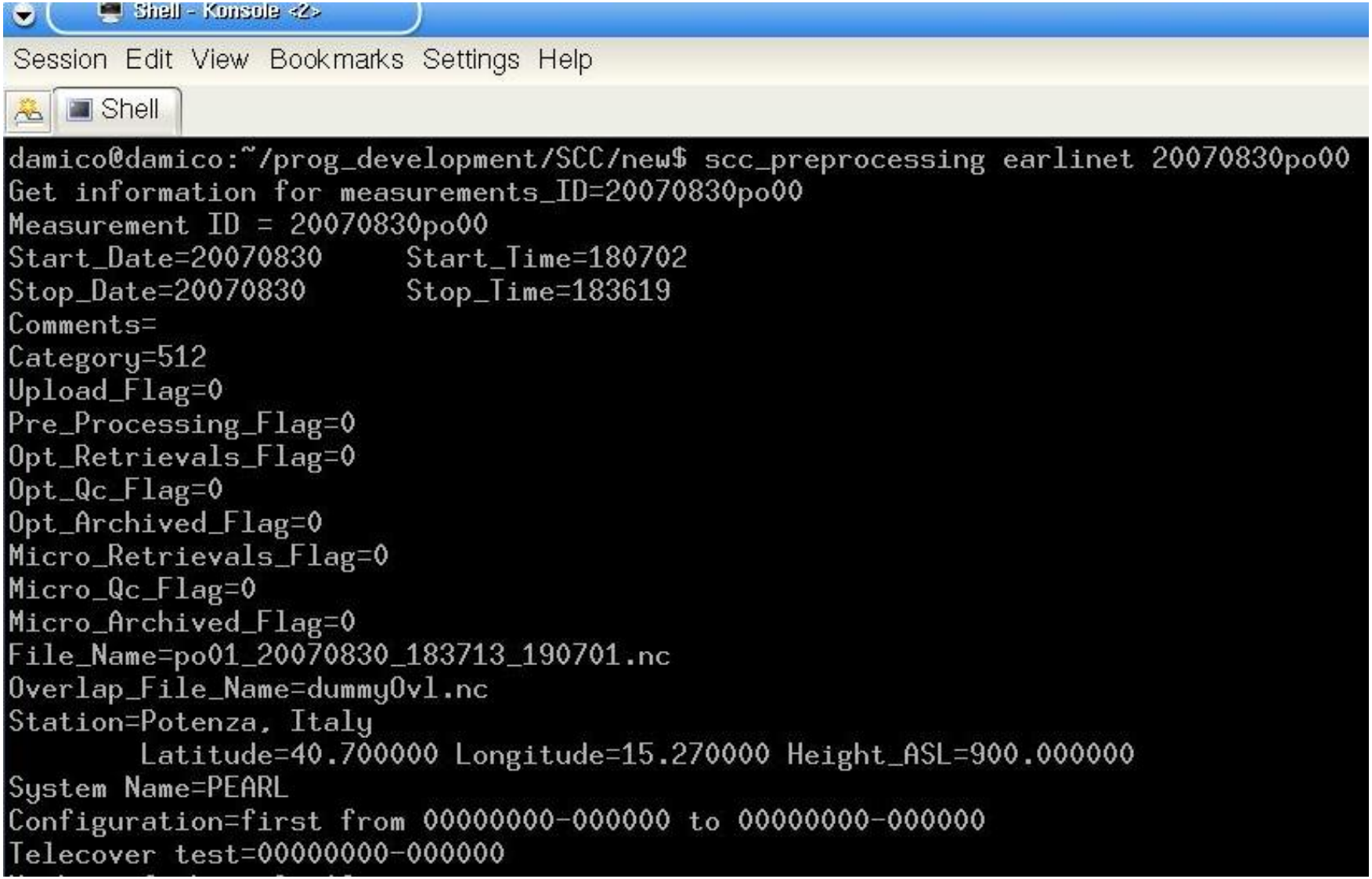
```
netcdf po01_20070830_183713_190701 {
dimensions:
        points = 5000 ;
        channels = 12 ;
        time = UNLIMITED ; // (60 currently)
        nb_of_time_scales = 2 ;
        scan_angles = 1 ;
variables:
        int channel_ID(channels) ;
                channel_ID:Comments = "Channel ID in SCC relational database" ;
        int id_timescale(channels) ;
        double Laser_Pointing_Angle(scan_angles) ;
                Laser_Pointing_Angle:Comments = "Laser pointing angle with respect to the zenith" ;
                Laser_Pointing_Angle:Unite = "degrees" ;
        int Laser_Pointing_Angle_of_Profiles(time, nb_of_time_scales) ;
                Laser_Pointing_Angle_of_Profiles:Comments = "Index of actual Laser_Pointing_Angle
starting with 0" ;
        int Raw_Data_Start_Time(time, nb_of_time_scales) ;
                Raw_Data_Start_Time:Comments = "Seconds from the Start_Time_UT" ;
        int Raw_Data_Stop_Time(time, nb_of_time_scales) ;
                Raw_Data_Stop_Time:Comments = "Seconds from the Start_Time_UT" ;
        double Raw_Data_Range_Resolution(channels) ;
                Raw_Data_Range_Resolution:Units = "m" ;
```

NetCDF input file

```
        int Laser_Shots(time, channels) ;
        double Raw_Lidar_Data(time, channels, points) ;

// global attributes:
                :Measurement_ID = "20070830po00" ;
                :RawData_Start_Date = "20070830" ;
                :RawData_Date_Format = "YYYYMMDD" ;
                :RawData_Start_Time_UT = "183713" ;
                :RawData_Stop_Time_UT = "190701" ;
                :RawData_Time_Format = "HHMMSS" ;
data:
 channel_ID = 12, 11, 7, 13, 10, 16, 8, 14, 9, 15, 17, 6 ;
 Laser_Pointing_Angle = 0 ;
 Laser_Pointing_Angle_of_Profiles =... ;
 id_timescale = 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1 ;
 Raw_Data_Start_Time = ... ;
 Raw_Data_Stop_Time = ...;
 Raw_Data_Range_Resolution = 15, 15, 15, 15, 15, 15, 15, 15, 15, 15, 15, 7.5 ;

 Laser_Shots = ...;
 Raw_Lidar_Data = ... ;
```


Shell - Konsole <2>
Session Edit View Bookmarks Settings Help
Shell
damico@damico:~/prog_development/SCC/new$ scc_preprocessing earlinet 20070830po00
Get information for measurements_ID=20070830po00
Measurement ID = 20070830po00
Start_Date=20070830 Start_Time=180702
Stop_Date=20070830 Stop_Time=183619
Comments=
Category=512
Upload_Flag=0
Pre_Processing_Flag=0
Opt_Retrievals_Flag=0
Opt_Qc_Flag=0
Opt_Archived_Flag=0
Micro_Retrievals_Flag=0
Micro_Qc_Flag=0
Micro_Archived_Flag=0
File_Name=po01_20070830_183713_190701.nc
Overlap_File_Name=dummyOvl.nc
Station=Potenza, Italy
Latitude=40.700000 Longitude=15.270000 Height_ASL=900.000000
System Name=PEARL
Configuration=first from 00000000-000000 to 00000000-000000
Telecover test=00000000-000000

```
Number of channels=12
Channel n. 0
        Channel ID = 6
        Name=1064an
        Type=elT
        IF center=1064.000000
        IF bandwidth=1.000000
        Emissione Wave=1064.000000
        FOV=0.100000
        Dead Time=0.000000
        Background subtraction mode= Far Field (1)
        Telescope Type=Cassegrain
        Telescope Diameter=500.000000
        Telescope Focal=5000.000000
        Laser Manufacturer=Continuum
        Laser Model=PowerLite 9050
        Laser Type=Nd:YAG
        Scattering Type elastically, total signal (0)
        Detection Mode analog (0)
Channel n. 1
        Channel ID = 7
```

```
Product Number = 5
Product n. = 0
        Use case = 0
        Product ID = 3
        Product Type ID = 3
        Product Type = elast. backscatter
        Number of channels involved = 1
                Channel n. 0 ID = 6
Product n. = 1
        Use case = 0
        Product ID = 4
        Product Type ID = 0
        Product Type = Raman backscatter
        Number of channels involved = 2
                Channel n. 0 ID = 7
                Channel n. 1 ID = 10
Product n. = 2
        Use case = 0
        Product ID = 5
        Product Type ID = 0
        Product Type = Raman backscatter
        Number of channels involved = 2
                Channel n. 0 ID = 8
                Channel n. 1 ID = 9
Product n. = 3
        Use case = 0
        Product ID = 6
        Product Type ID = 1
        Product Type = extinction only
        Number of channels involved = 1
                Channel n. 0 ID = 9
Product n. = 4
        Use case = 0
        Product ID = 7
        Product Type ID = 1
        Product Type = extinction only
        Number of channels involved = 1
                Channel n. 0 ID = 10
```

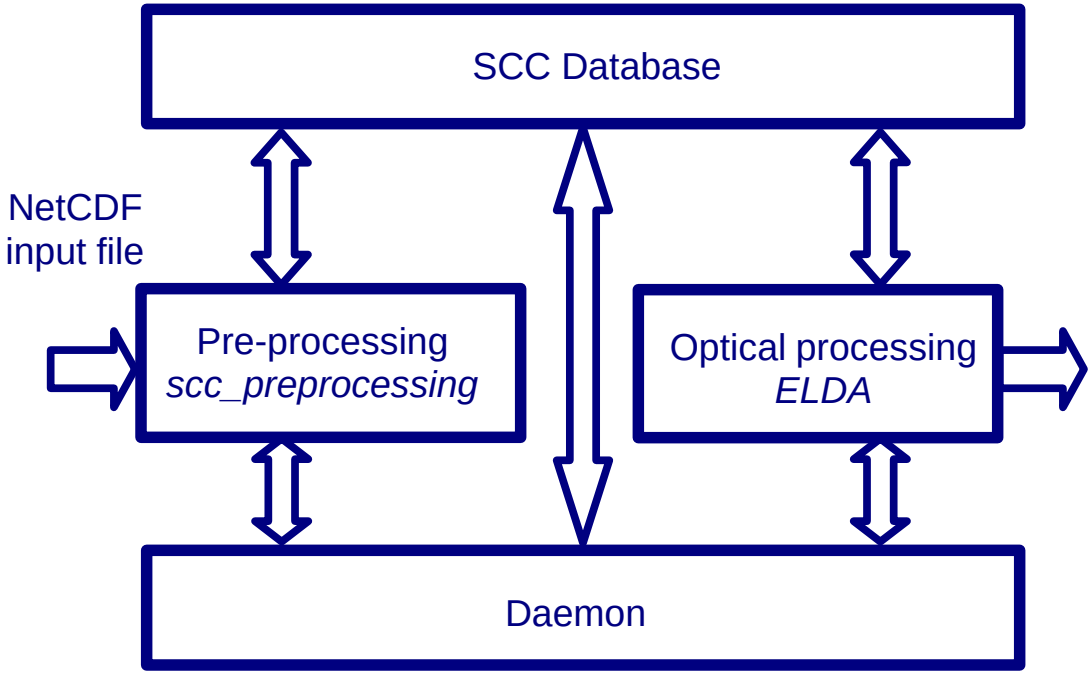
Optical processing module

Language: Pascal

ELDA: EARLINET Lidar Data Analyzer

- Reads the intermediate NetCDF file produced by pre-processing module
- Reads information from the relational database
- Performs analysis in a flexible way using the selected algorithm and usecase
- Retrieval of aerosol extinction and backscatter profiles (lidar ratio profiles)
- Retrieval of backscatter starting from only elastic lidar signal (Klett, Iterative algorithms)
- Retrieval of extinction from Raman signals
- Retrieval of backscatter starting from Raman and elastic signals
- Calculation of statistical error on extinction and backscatter using Montecarlo technique or error propagation.
- An authomatic smoothing and averaging technique allows to select the the optimal smoothing level as a function of altitude on the base of the fixed error level and of the resolution.
- Writes output files in NetCDF format according to the EARLINET rules.

Daemon software



Language: C

Main implemented features:

- *Checks if a new input NetCDF input file is available (every 60 seconds)*
- *Starts the scc_preprocessing and waits for a return value*
- *Starts ELDA and waits for a return value*
- *Logs all the its activities*
- *At moment the scc_daemon runs only on Unix/Linux systems.*

ID	_station_ID	_system_ID	start	upload	pre_processing	opt_retrievals	opt_qc	opt_archived	micro_
20070830po00	po	4	2007-08-30 18:07:02	0	0	0	0	0	
20060724le00	le	3	2006-07-24 00:10:42	0	0	0	0	0	
20090101in00	in	7	2009-01-01 00:00:00	0	0	0	0	0	
20021006na00	na	8	2002-10-06 18:36:59	0	0	0	0	0	
20060721sf00	sf	9	2006-07-21 16:26:22	0	0	0	0	0	
20070101ne00	ne	10	2007-01-01 00:00:00	0	0	0	0	0	
20060721th00	th	11	2006-07-21 18:21:21	0	0	0	0	0	
20060727ba00	ba	12	2006-07-27 01:10:00	0	0	0	0	0	
20071210at00	at	13	2007-12-10 19:00:01	0	0	0	0	0	
20070913la00	la	14	2007-09-13 00:00:00	0	0	0	0	0	
20070801gr00	gr	16	2007-08-01 21:23:15	0	0	0	0	0	
20060624lk00	lk	17	2006-06-24 00:59:05	0	0	0	0	0	
20060518le00	le	18	2006-05-18 20:09:07	0	0	0	0	0	
20060724le01	le	19	2006-07-24 00:02:00	0	0	0	0	0	
20080804bu00	bu	20	2008-08-04 18:10:32	0	0				
20081016ma00	ma	21	2008-10-16 03:39:26	0	0				
20071015ms00	ms	15	2007-10-15 17:55:10	0	0				
20080225lc00	lc	22	2008-02-25 18:14:46	0	0				

0 – Process not started

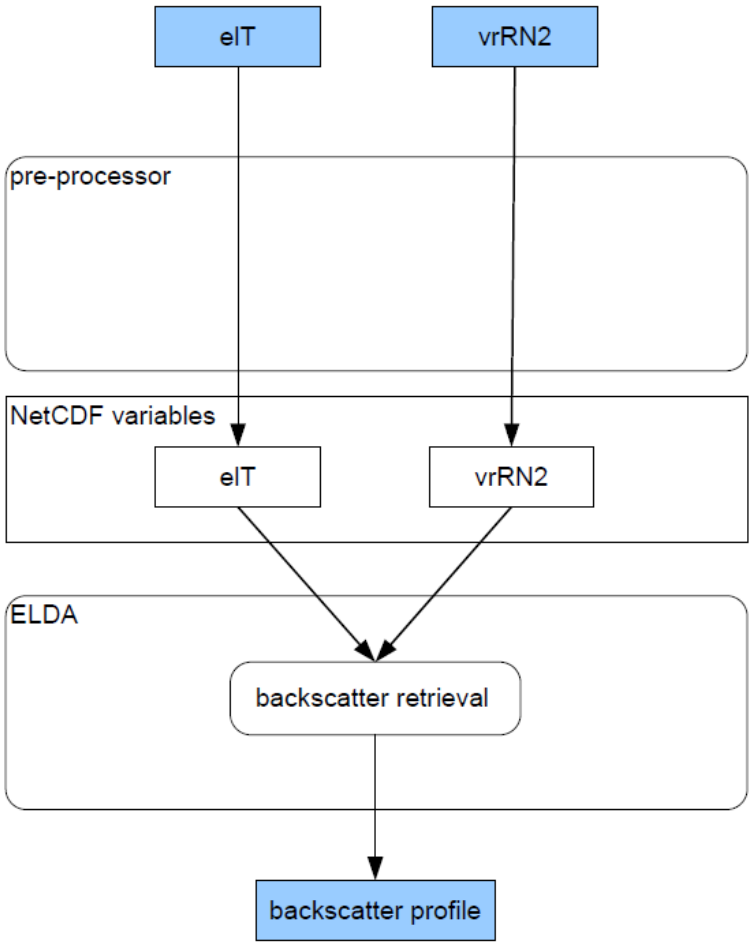
1 – Process started

127 – Process terminated

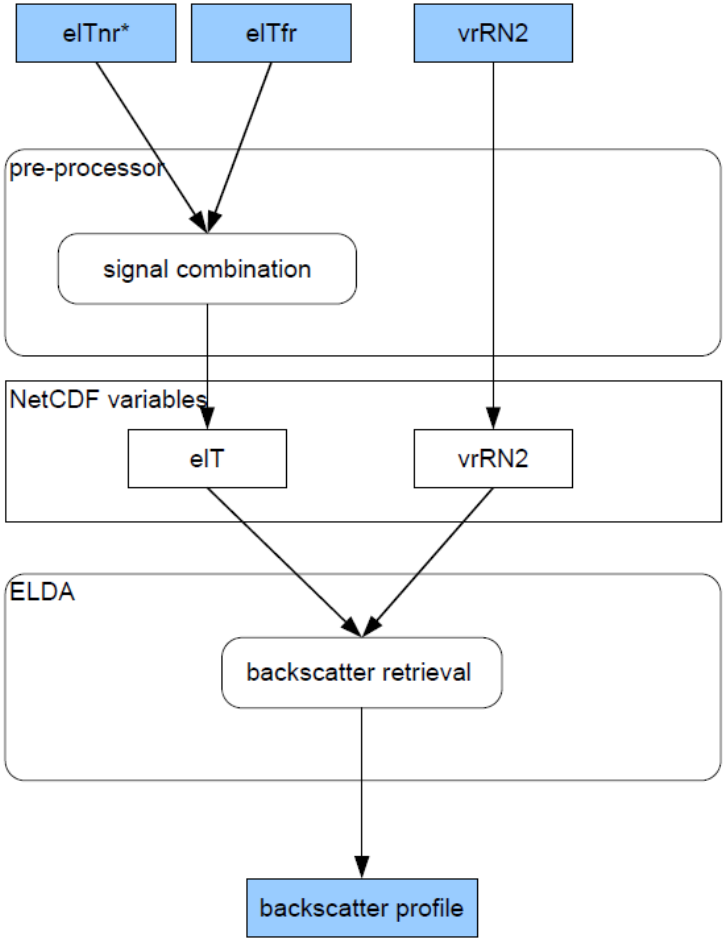
-127 – Process failed

Usecases

Raman Backscatter Calculation: Usecase 0



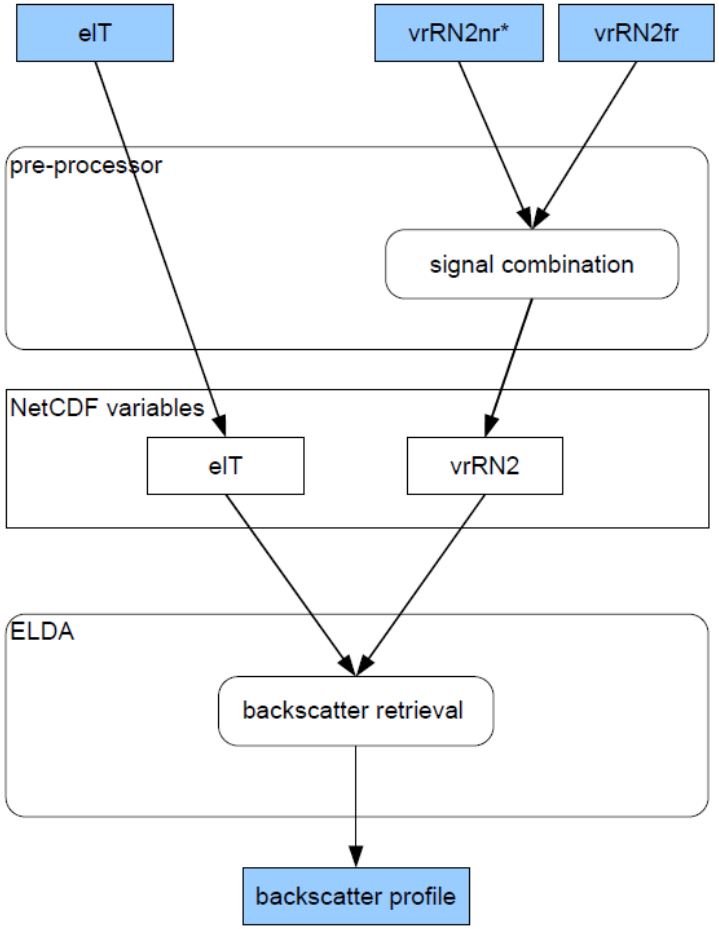
Raman Backscatter Calculation: Usecase 1



* this can be an analog or pc signal

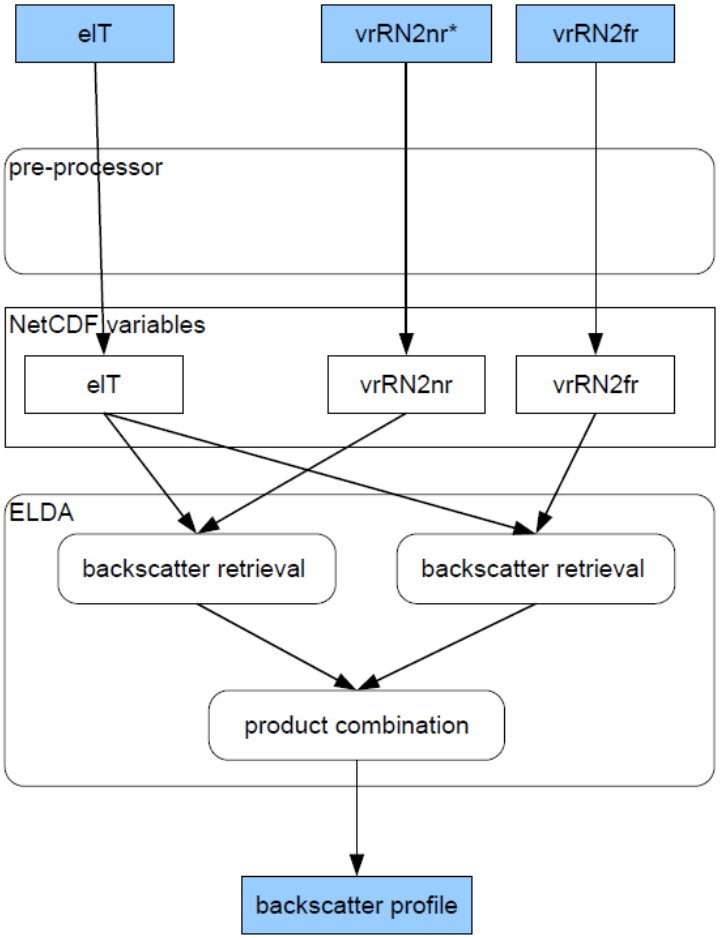
Usecases

Raman Backscatter Calculation: Usecase 3



* this can be an analog or pc signal

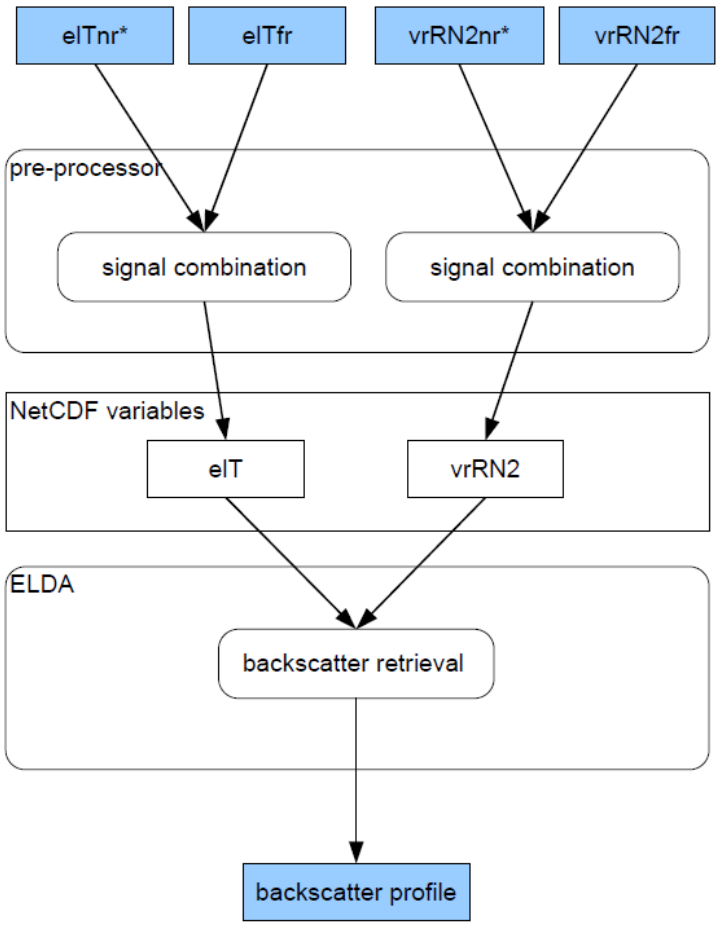
Raman Backscatter Calculation: Usecase 4



* this can be an analog or pc signal

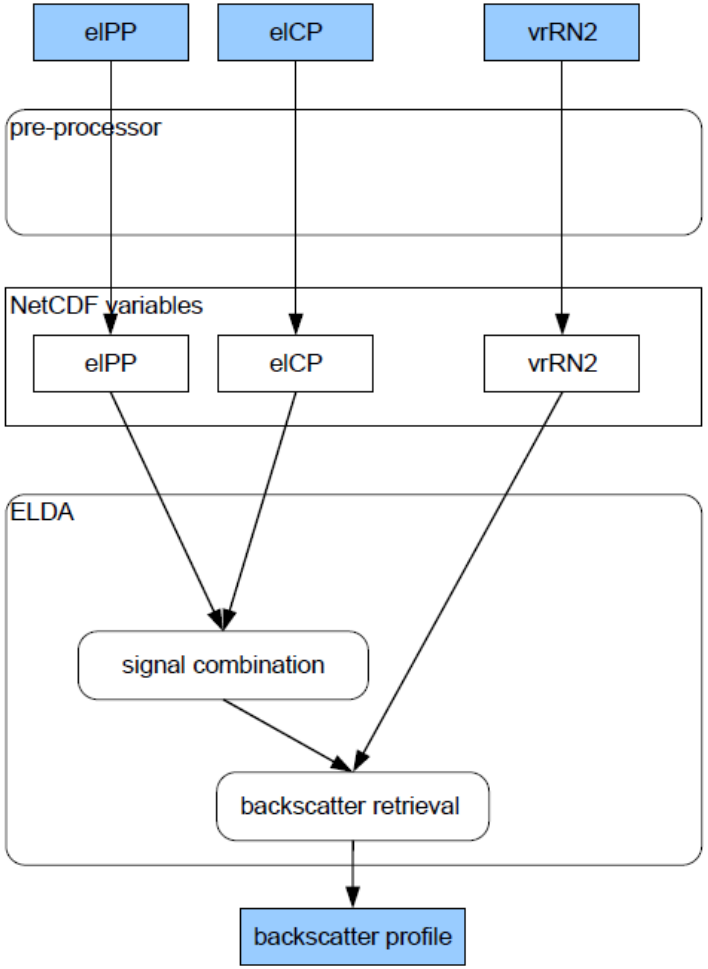
Usecases

Raman Backscatter Calculation: Usecase 5



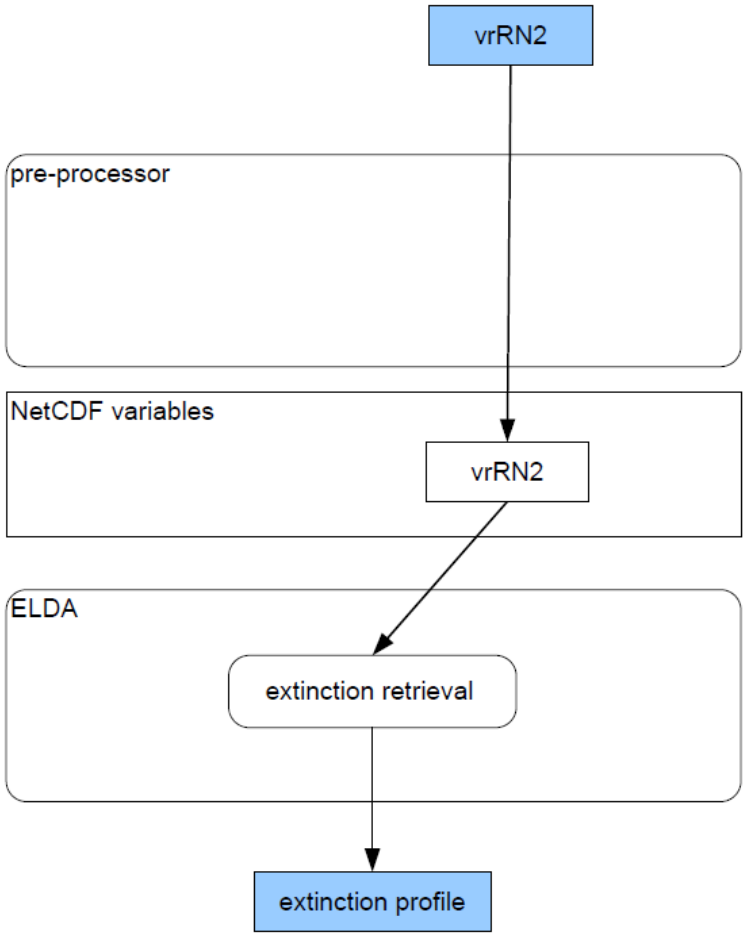
* this can be an analog or pc signal

Raman Backscatter Calculation: Usecase 7

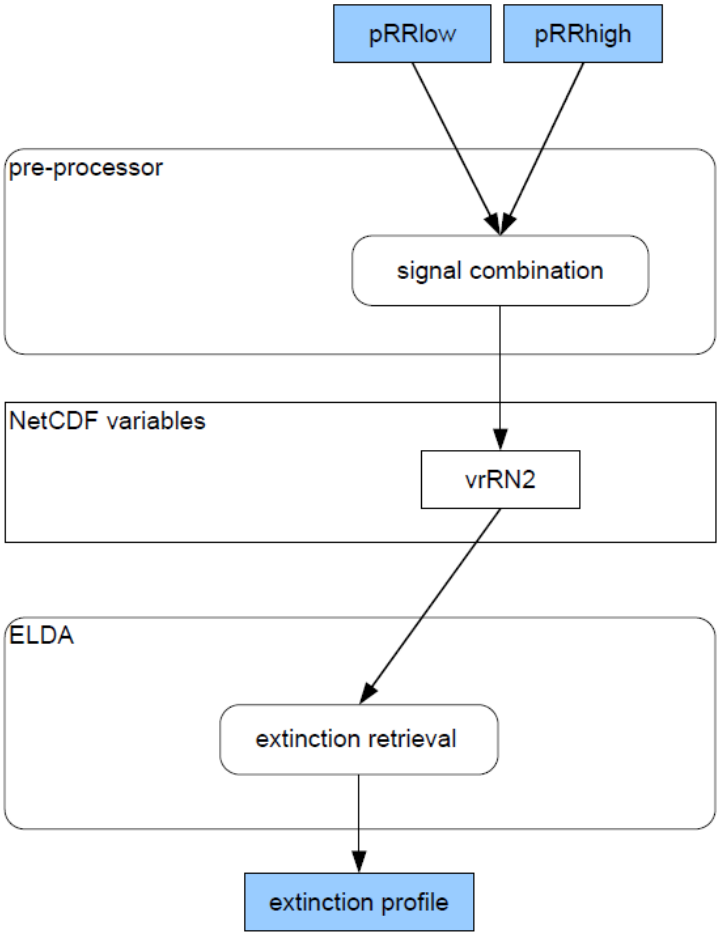


Usecases

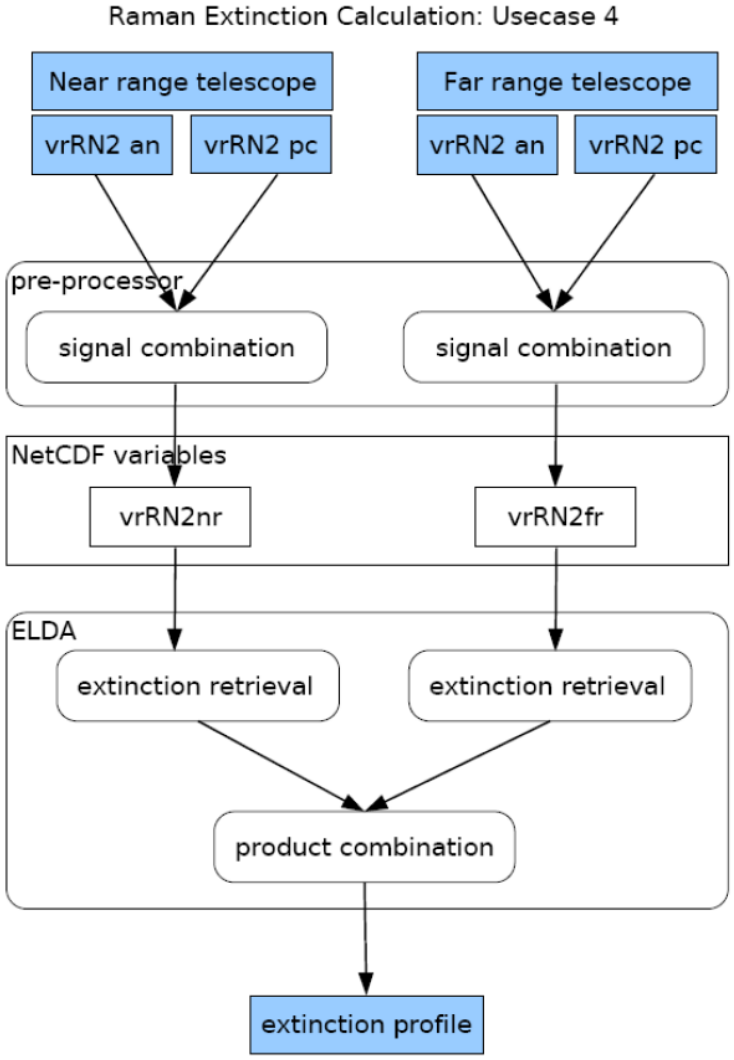
Raman Extinction Calculation: Usecase 0

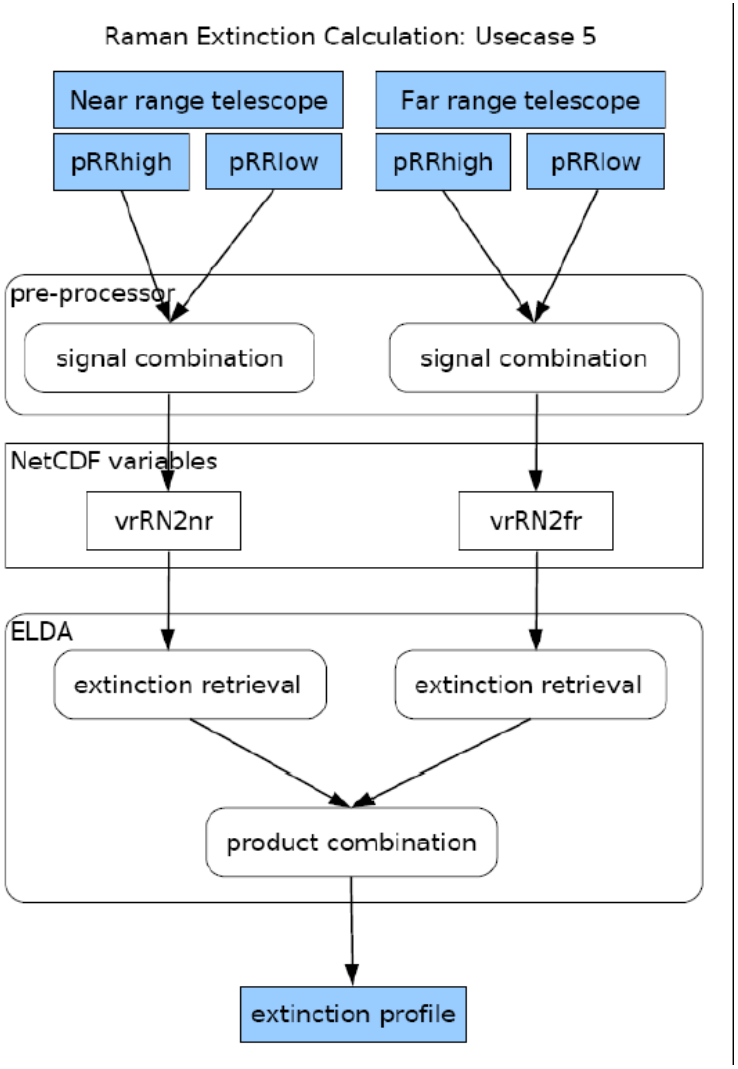


Raman Extinction Calculation: Usecase 3



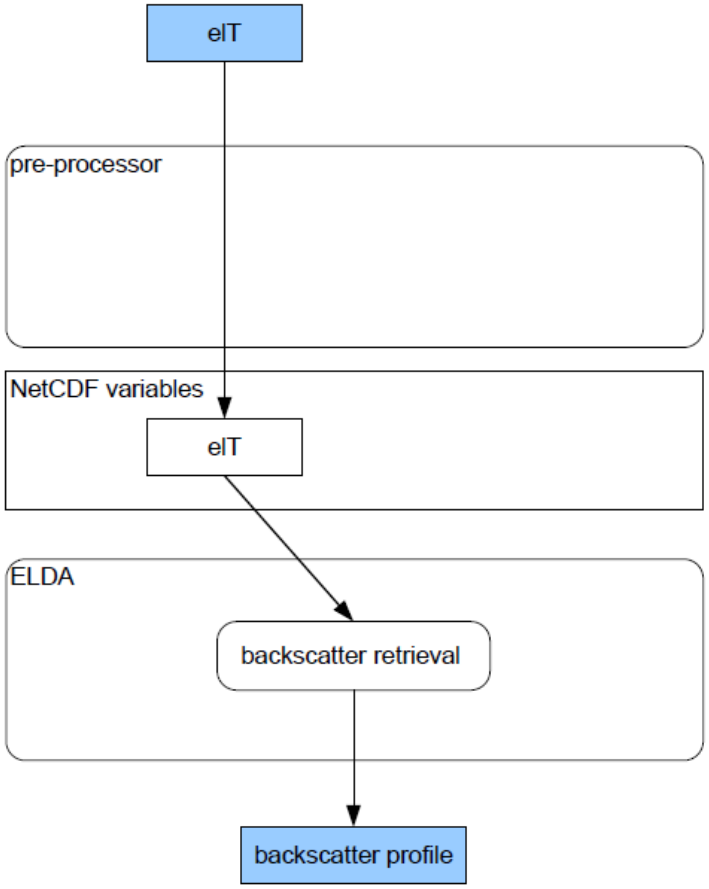
Usecases


Raman Extinction Calculation: Usecase 4
Near range telescope
Far range telescope
vrRN2 an
vrRN2 pc
vrRN2 an
vrRN2 pc
pre-processor
signal combination
signal combination
NetCDF variables
vrRN2nr
vrRN2fr
ELDA
extinction retrieval
extinction retrieval
product combination
extinction profile

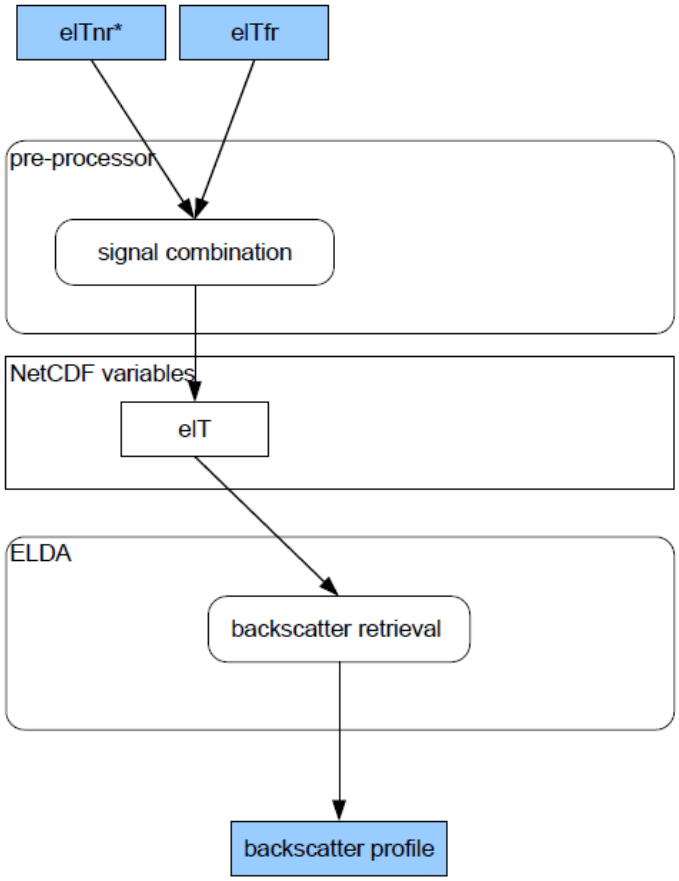

Raman Extinction Calculation: Usecase 5
Near range telescope
Far range telescope
pRRhigh
pRRlow
pRRhigh
pRRlow
pre-processor
signal combination
signal combination
NetCDF variables
vrRN2nr
vrRN2fr
ELDA
extinction retrieval
extinction retrieval
product combination
extinction profile

Usecases

Elastic Backscatter Calculation: Usecase 0

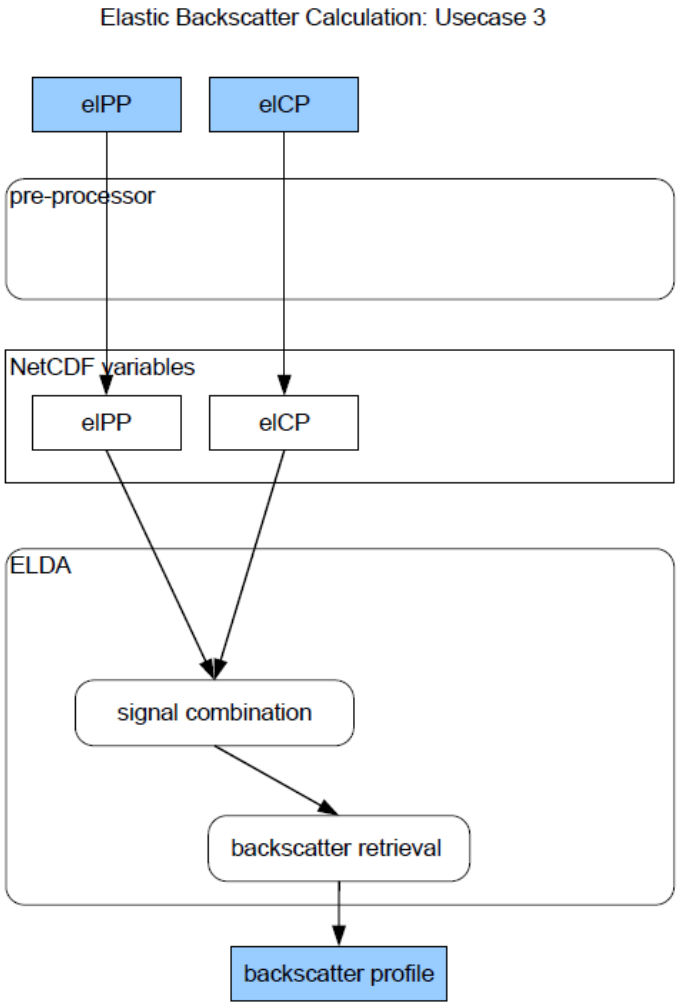


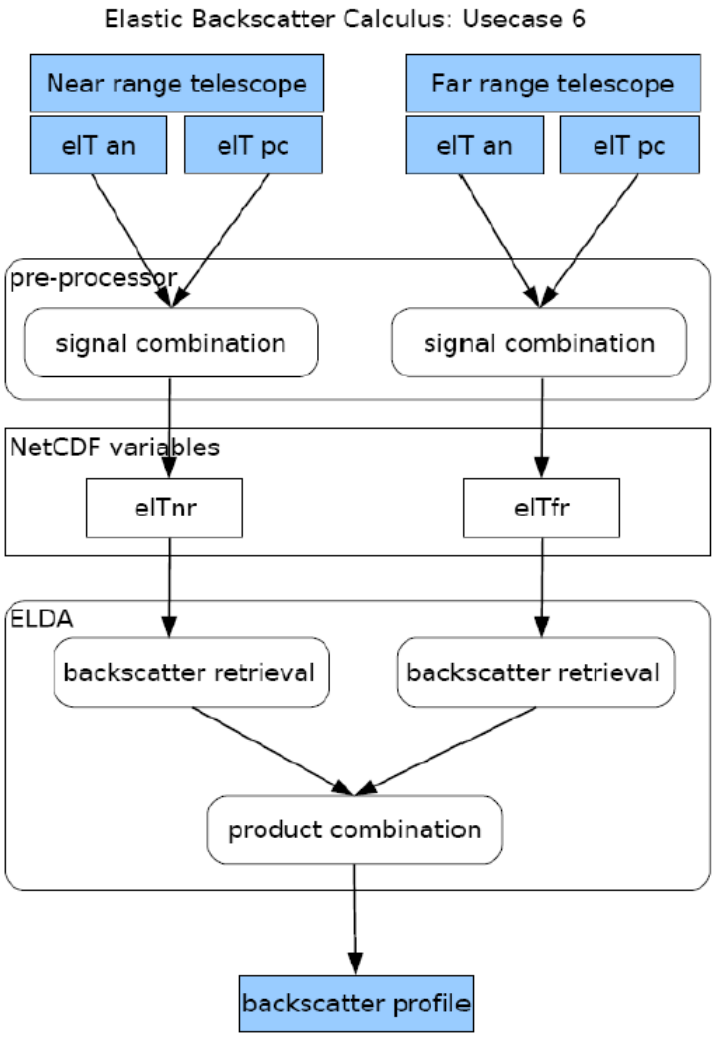
Elastic Backscatter Calculation: Usecase 1



* this can be an analog or pc signal

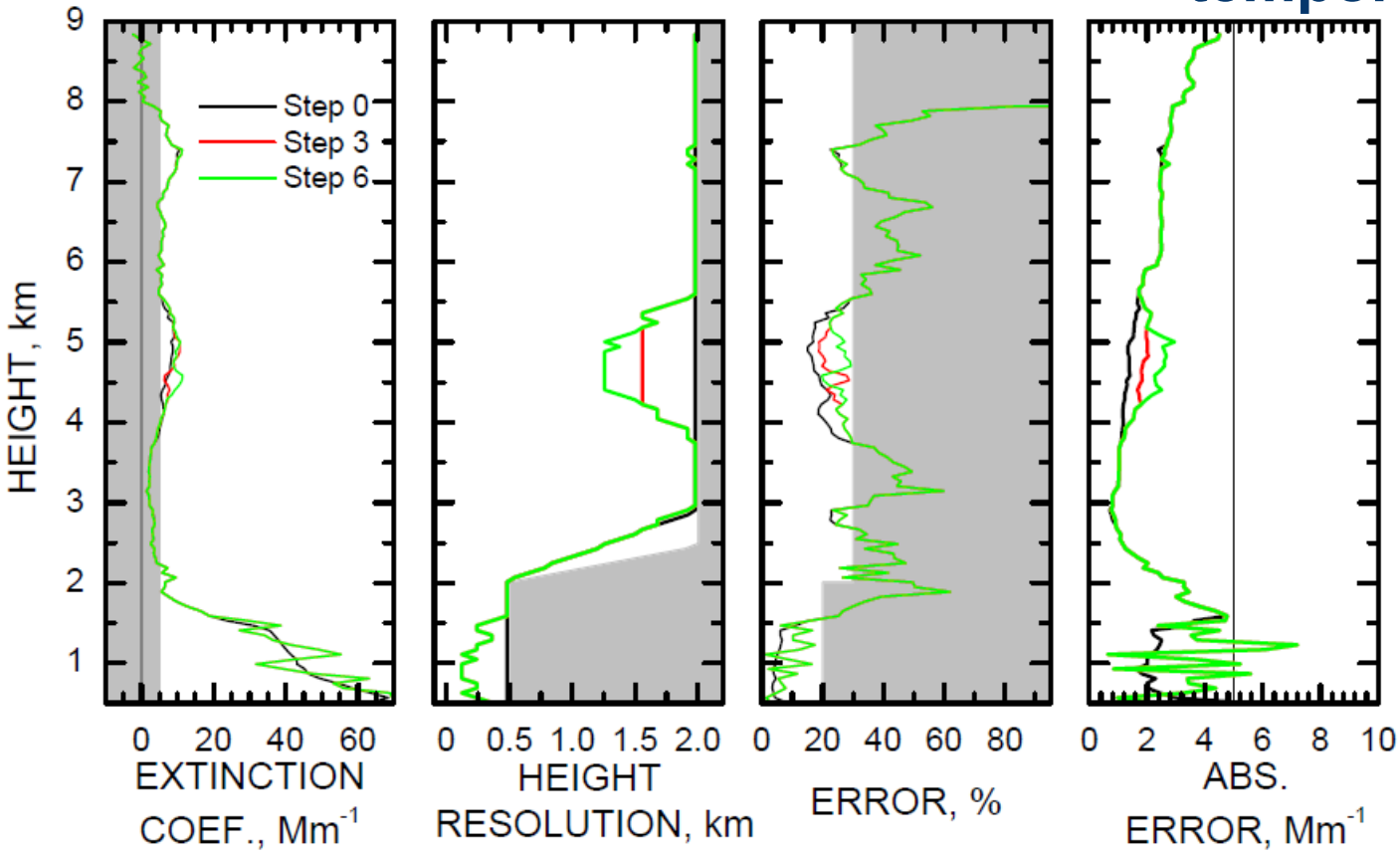
Usecases


Elastic Backscatter Calculation: Usecase 3
elPP
elCP
pre-processor
NetCDF variables
elPP
elCP
ELDA
signal combination
backscatter retrieval
backscatter profile


Elastic Backscatter Calculus: Usecase 6
Near range telescope
Far range telescope
elT an
elT pc
elT an
elT pc
pre-processor
signal combination
signal combination
NetCDF variables
elTnr
elTfr
ELDA
backscatter retrieval
backscatter retrieval
product combination
backscatter profile

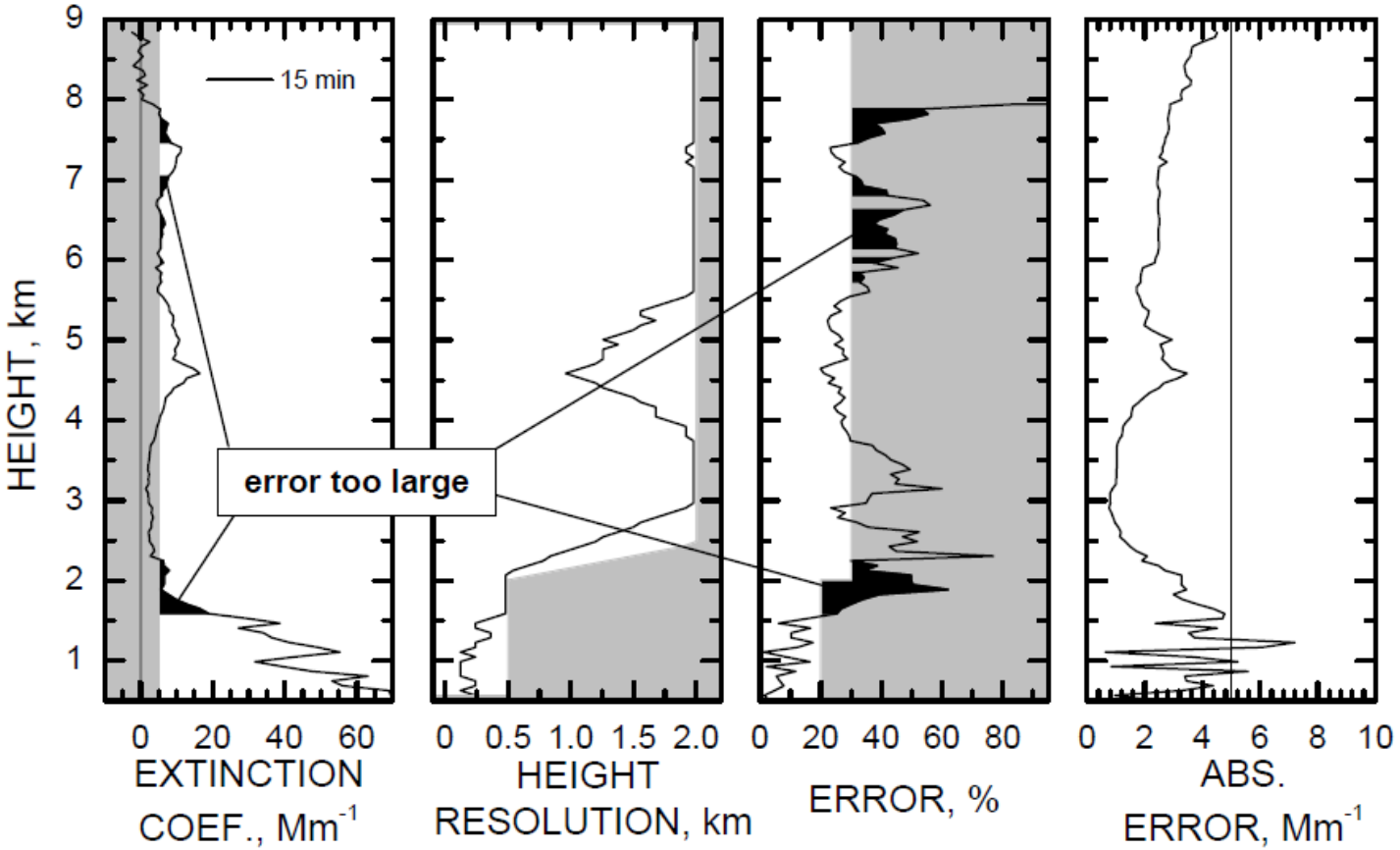
A new implemented feature in the processing module: the authomatic smoothing and temporal averaging

Repeat
for all bins
smooth window = smooth window -2 bins
* relative error < error threshold
* vertical gradient in altitude resolution < 200m
until no further improvements possible



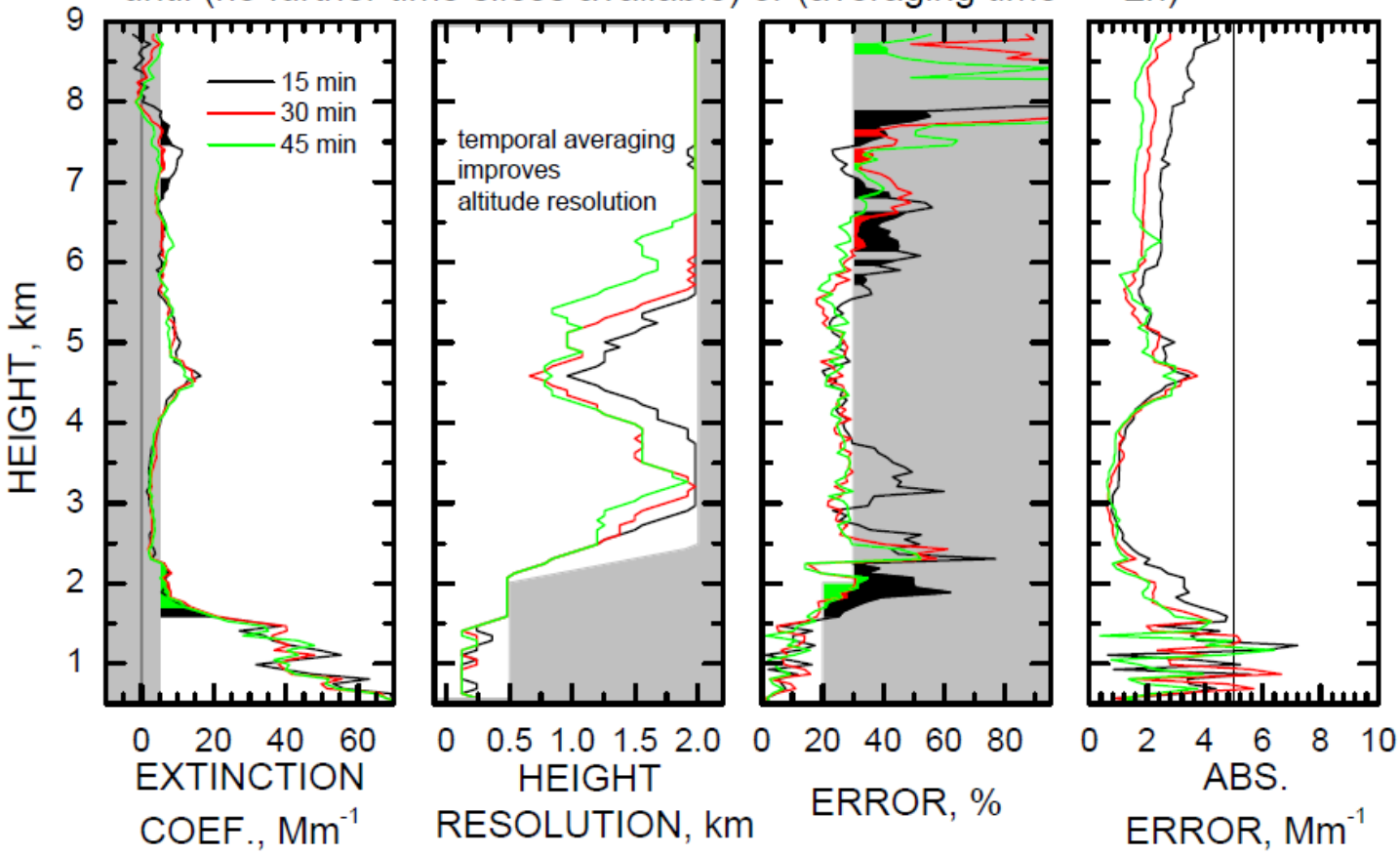
first 15min average

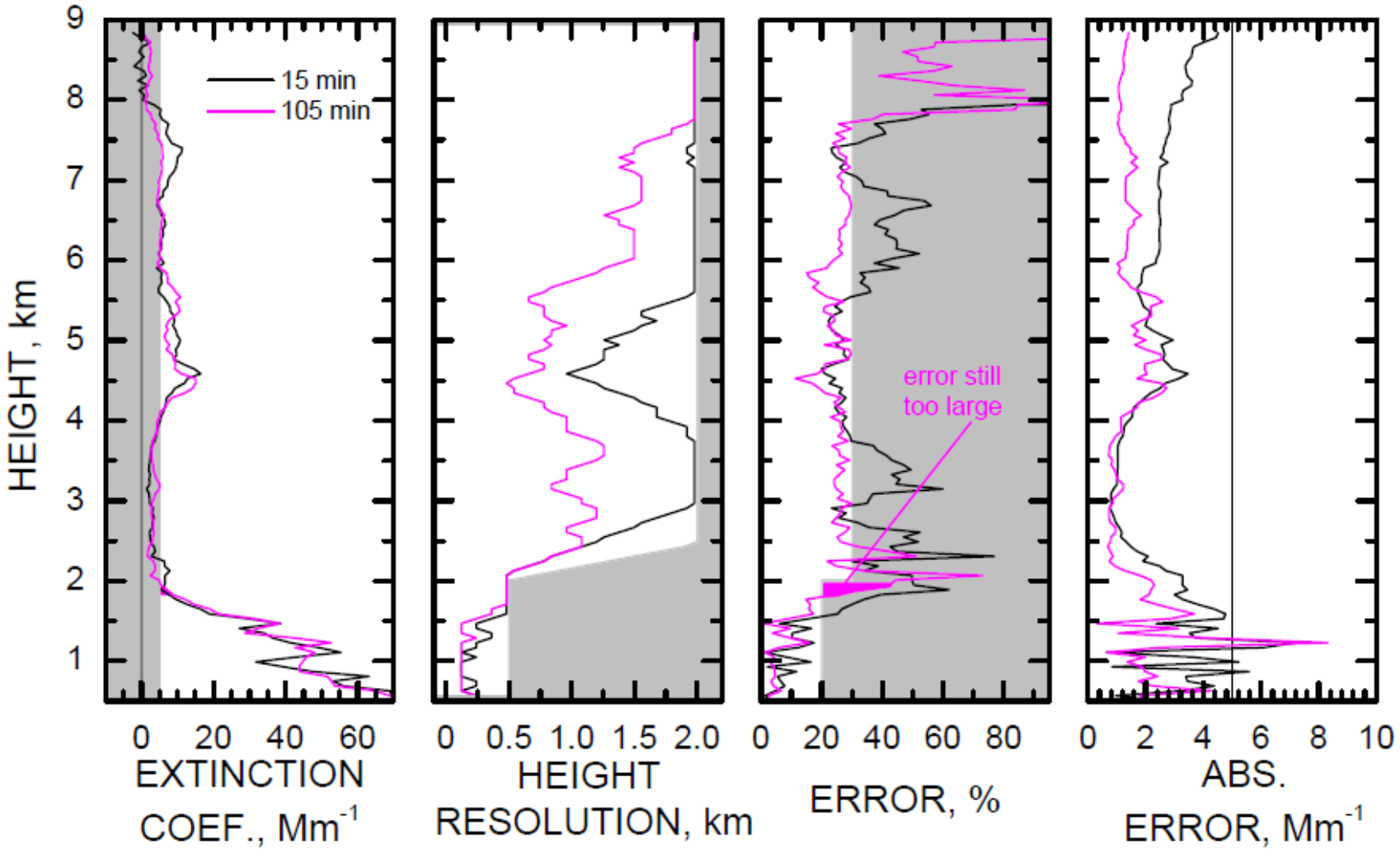
Step 0:
calculate automatically smoothed profile for the first 15 min time slice



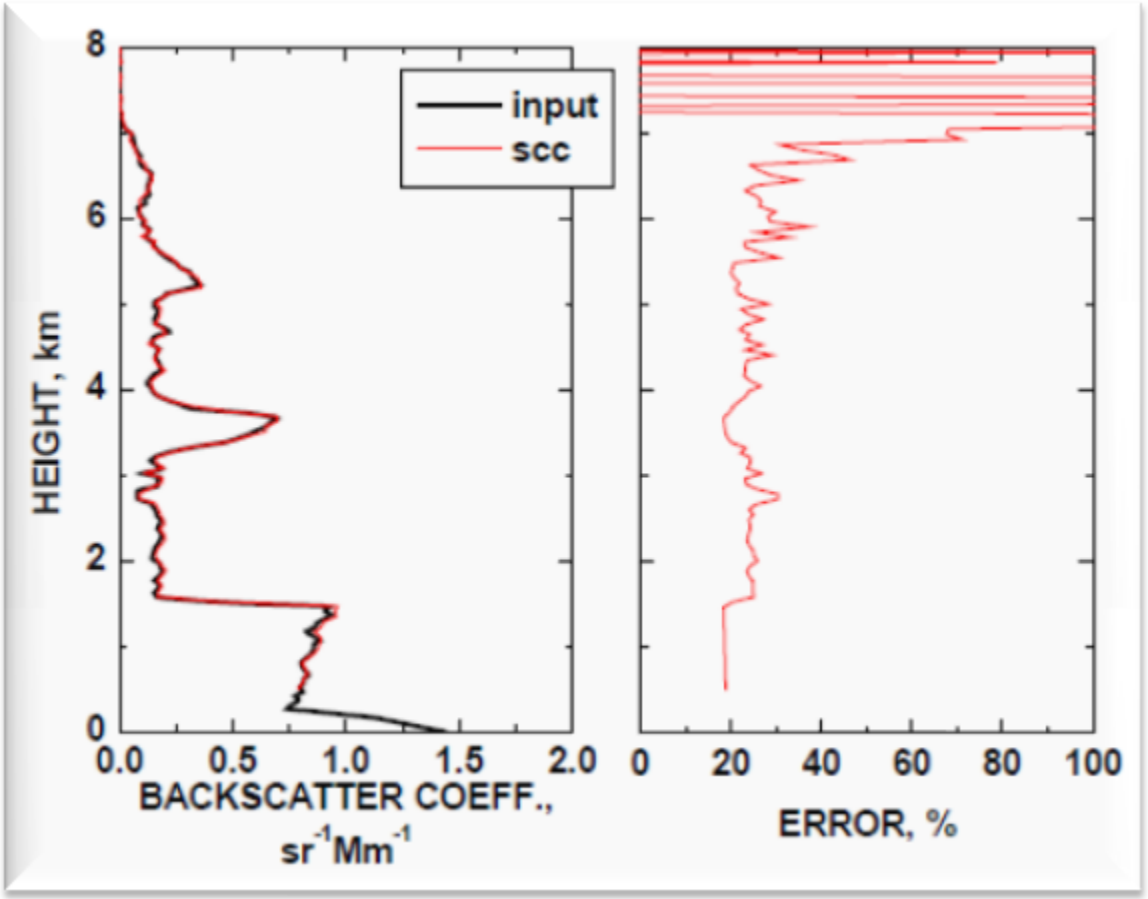
auto average

Repeat if for one of the bins
(relative error > error threshold) and (value > detection limit)
then
* add next 15 min time slice
* recalculate extinction wit auto smoothing
until (no further time slices available) or (averaging time >= 2h)



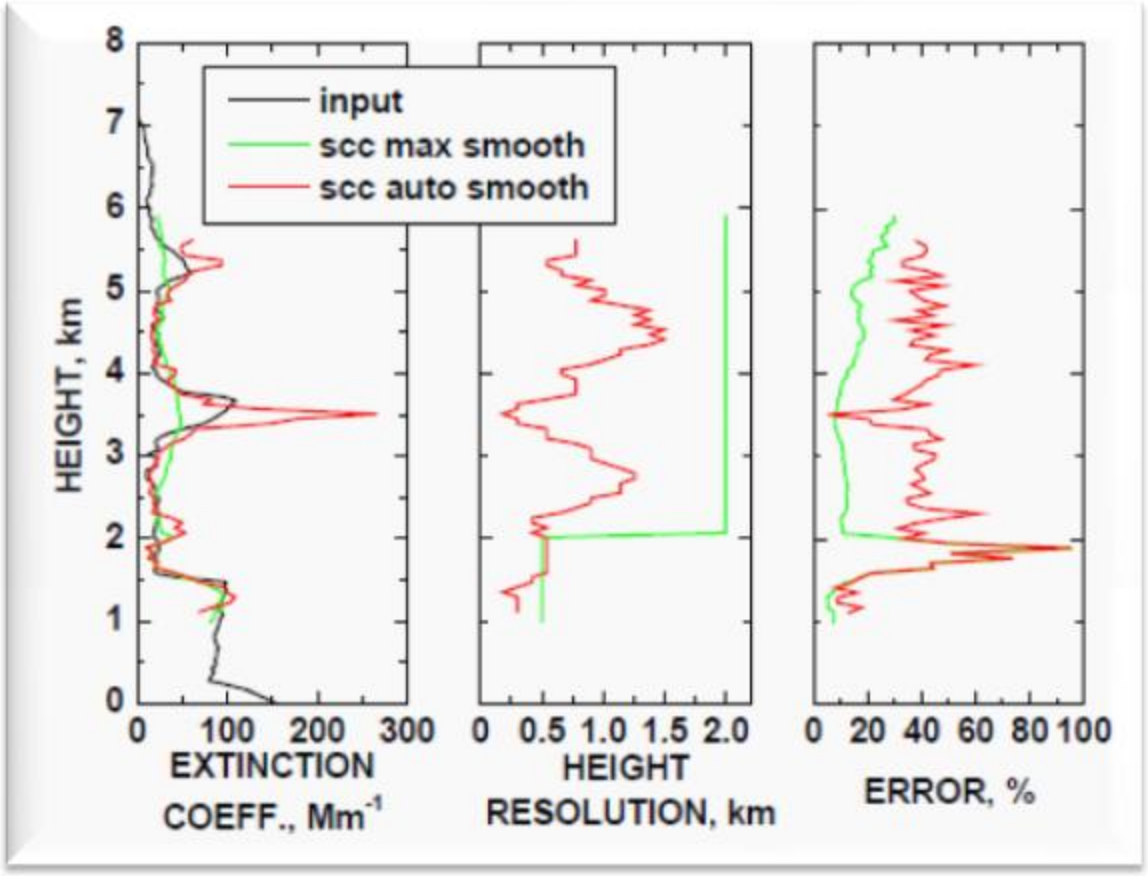

HEIGHT, km
9
8
7
6
5
4
3
2
1
15 min
105 min
error still
too large
0 20 40 60
EXTINCTION
COEF., Mm-1
0 0.5 1.0 1.5 2.0
HEIGHT
RESOLUTION, km
0 20 40 60 80
ERROR, %
0 2 4 6 8 10
ABS.
ERROR, Mm-1

ELDA: EARLINET Lidar Data Analyzer
Example of retrieval



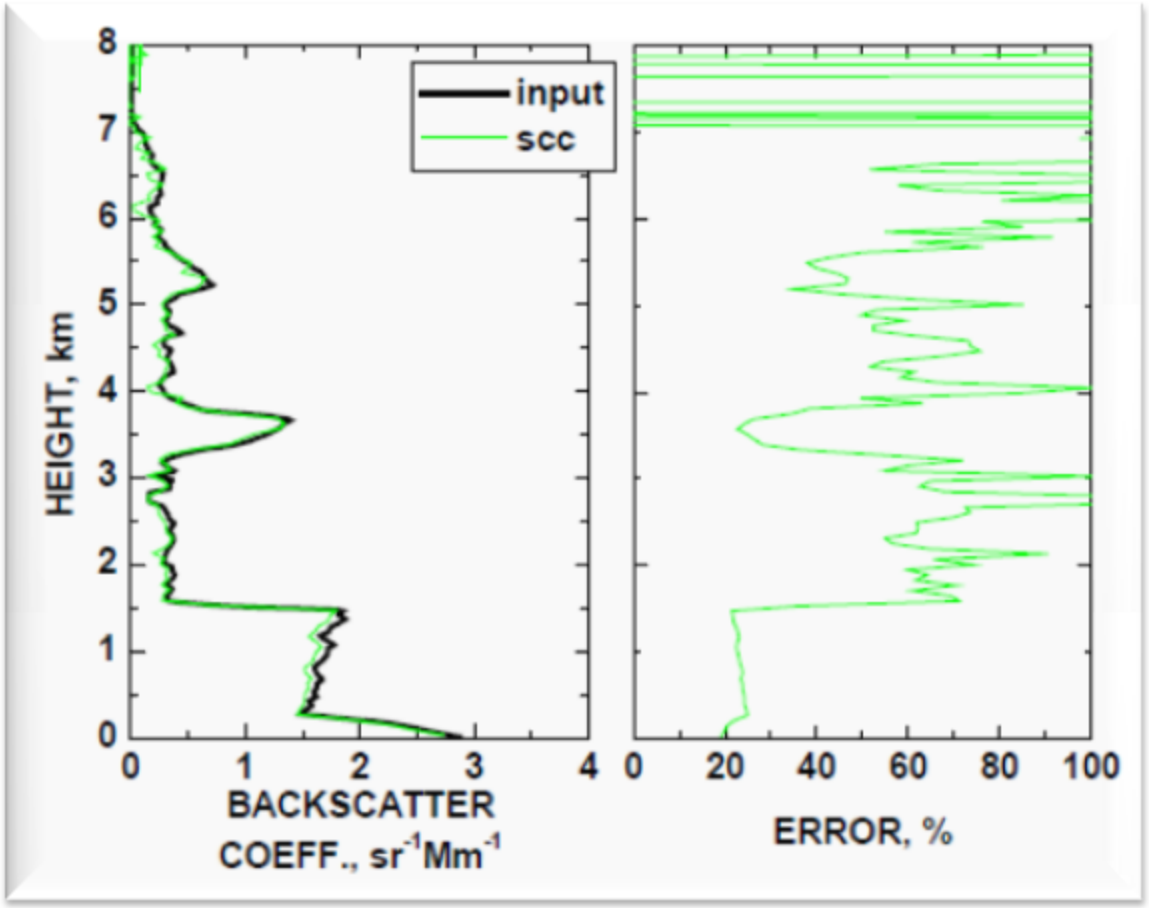
Result of the algorithm intercomparison of backscatter retrieval at 1064 nm. The vertical resolution is 60 m. The backscatter profile (red profile) has been obtained using the iterative method implemented in the single calculus chain.

ELDA: EARLINET Lidar Data Analyzer
Example of retrieval



Algorithm intercomparison of extinction retrieval (left), the resulting smoothing lengths (center), and the retrieved statistical errors (right) at 532 nm. The profiles have been obtained using the extinction retrieval algorithm implemented in the single calculus chain.

ELDA: EARLINET Lidar Data Analyzer
Example of retrieval

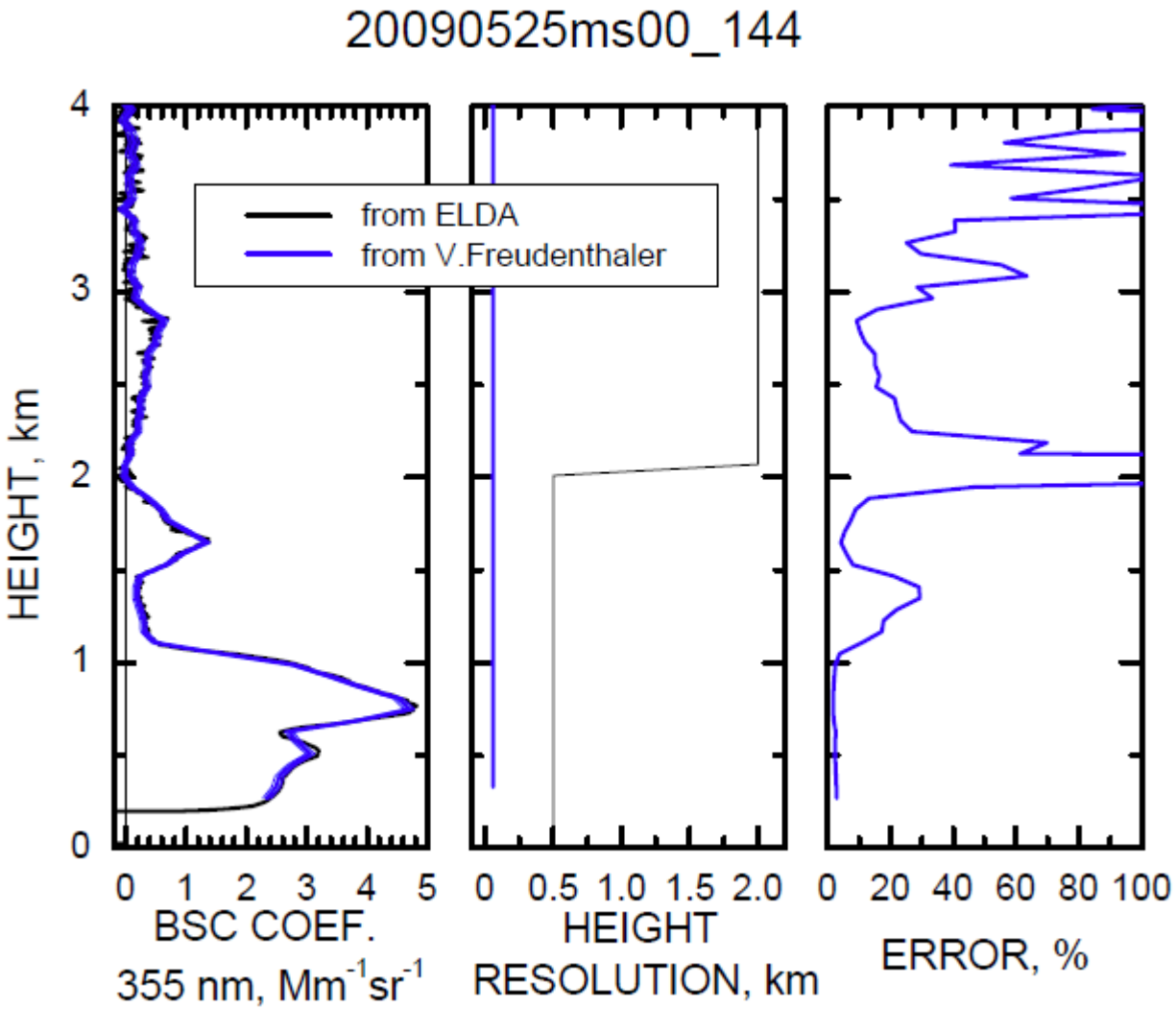


Result of the algorithm intercomparison of backscatter retrieval at 532 nm. The profile has been obtained using the combined Raman/elastic algorithm implemented in the single calculus chain.

The Single Calculus Chain has been used during the EARLINET-ASOS intercomparison campaign (EARLI09) held in Leipzig (Germany) in May 2009.
All the data were successfully pre-processed.

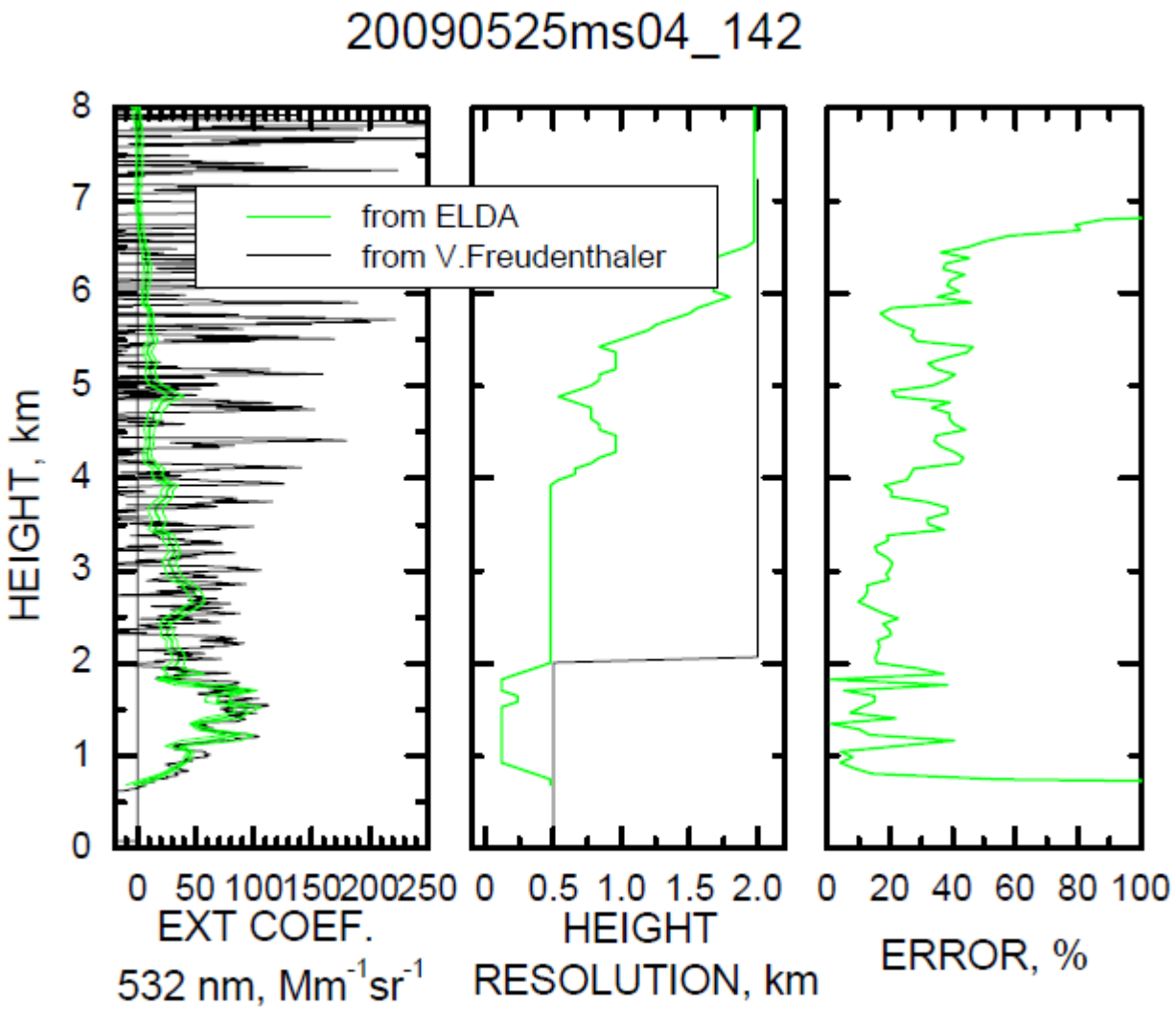
Comparison of SCC_pre-processing + ELDA retrieval and home retrieval on data from EARLI09 campaign

Backscatter coefficient at 355 nm by Klett retrieval



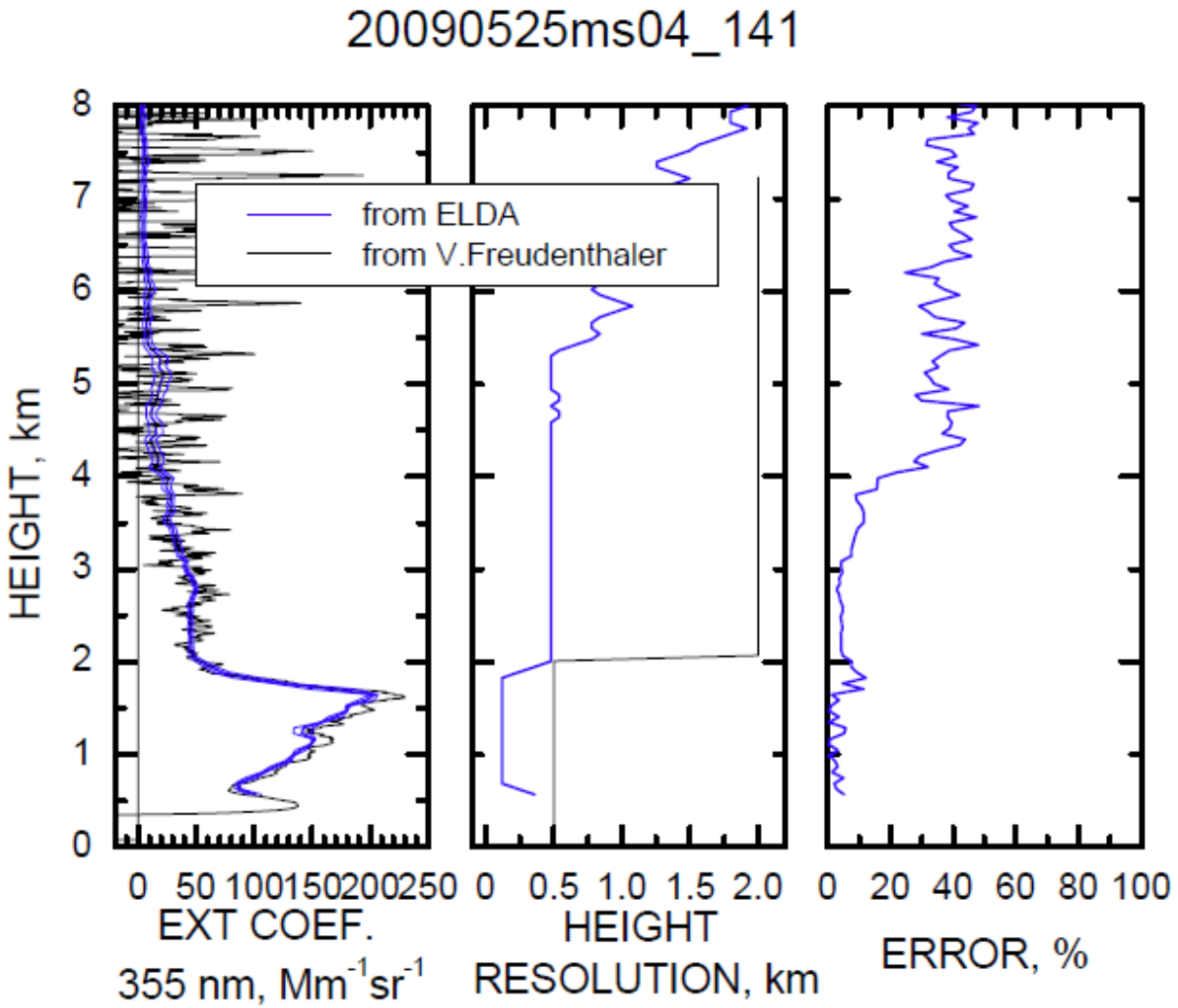
Comparison of SCC_pre-processing + ELDA retrieval and home retrieval on data from EARLI09 campaign

Extinction coefficient at 532 nm



Comparison of SCC_pre-processing + ELDA retrieval and home retrieval on data from EARLI09 campaign

Extinction coefficient at 355 nm



Microphysical properties retrieval module

Two modules developed independently by IfT and UP

Microphysical properties retrieval module (UP)

Improvement of the algorithms and mathematical model

- The new Padé algorithm delivers substantially better results
- Base points number and position are adapted for more precision
- The search space could be drastically reduced

Platform indepedence

- The new algorithm software works well in Linux and Windows
- The UI has been decoupled and implemented in QT

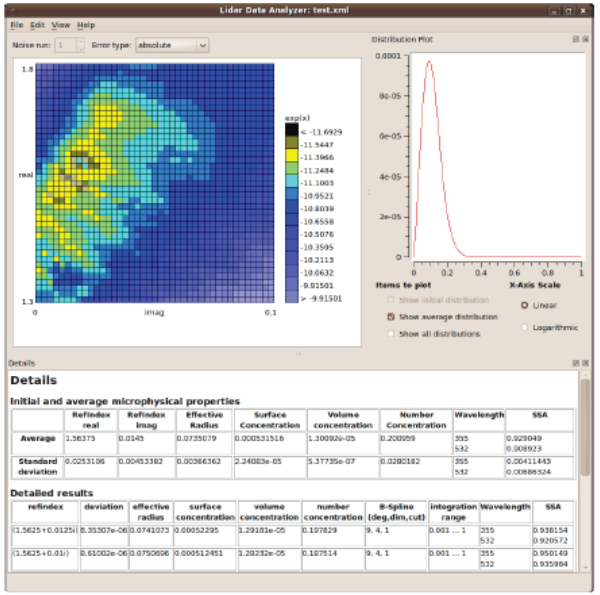
Canonization of input and output

- Configuration of the algorithm is done via human-readable XML
- The tool can directly evaluate EARLINET NetCDF files
- Distribution results can be saved either in binary or XML

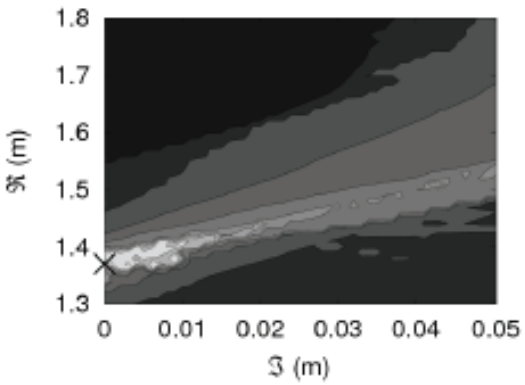
Microphysical properties retrieval module (UP)

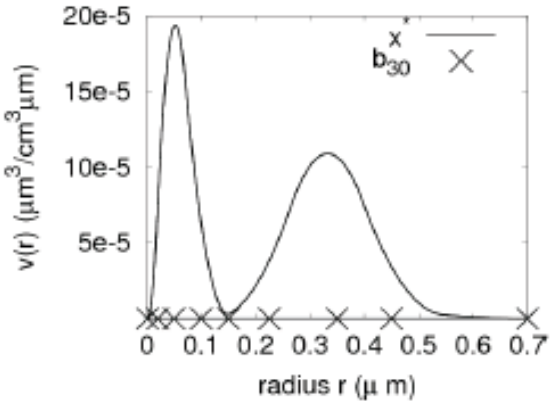
Parallelization / scalability

- The software has been parallelized to scale with available hardware
- The problem has been found to scale excellently
- The software has proven to be stable and reliable



Experimental Validation June 29, 2007 over Athens



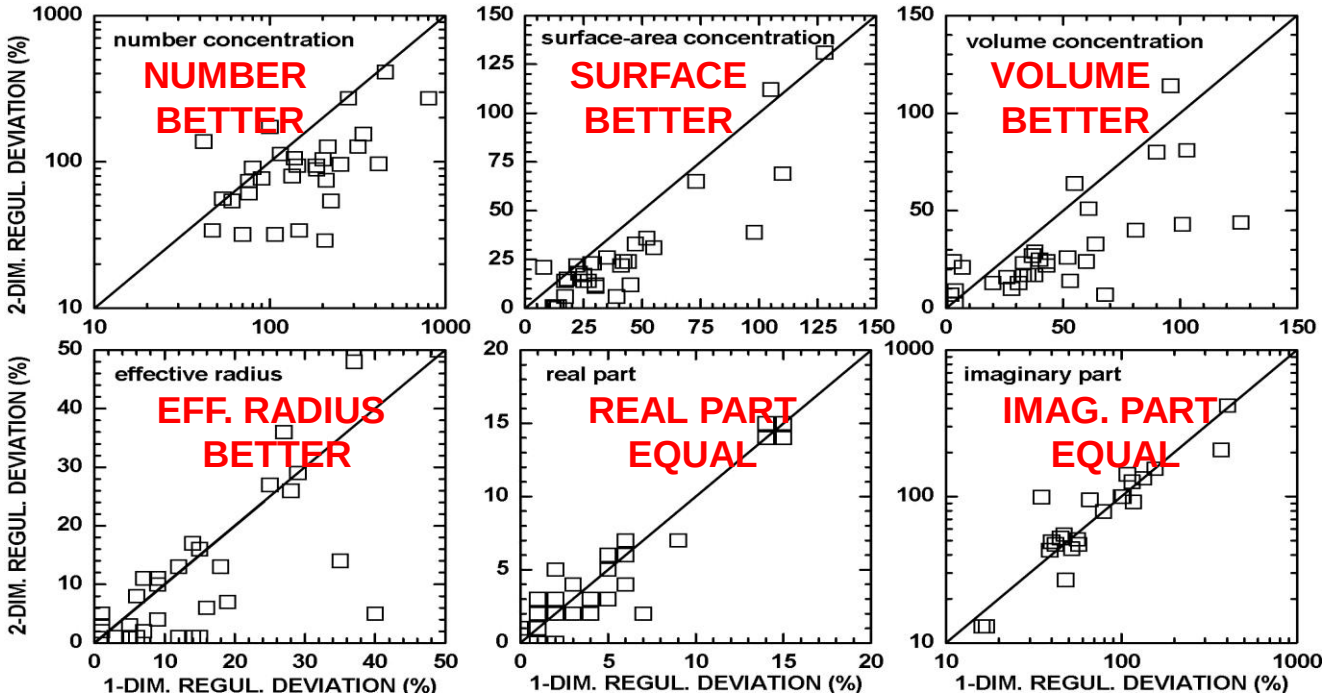


Microphysical properties retrieval module (IfT)

- Inversion software has been upgraded so that other EARLINET groups can use the software
- Software environment has been developed:

  - Improvements of inversion results on the basis of novel inversion methodology

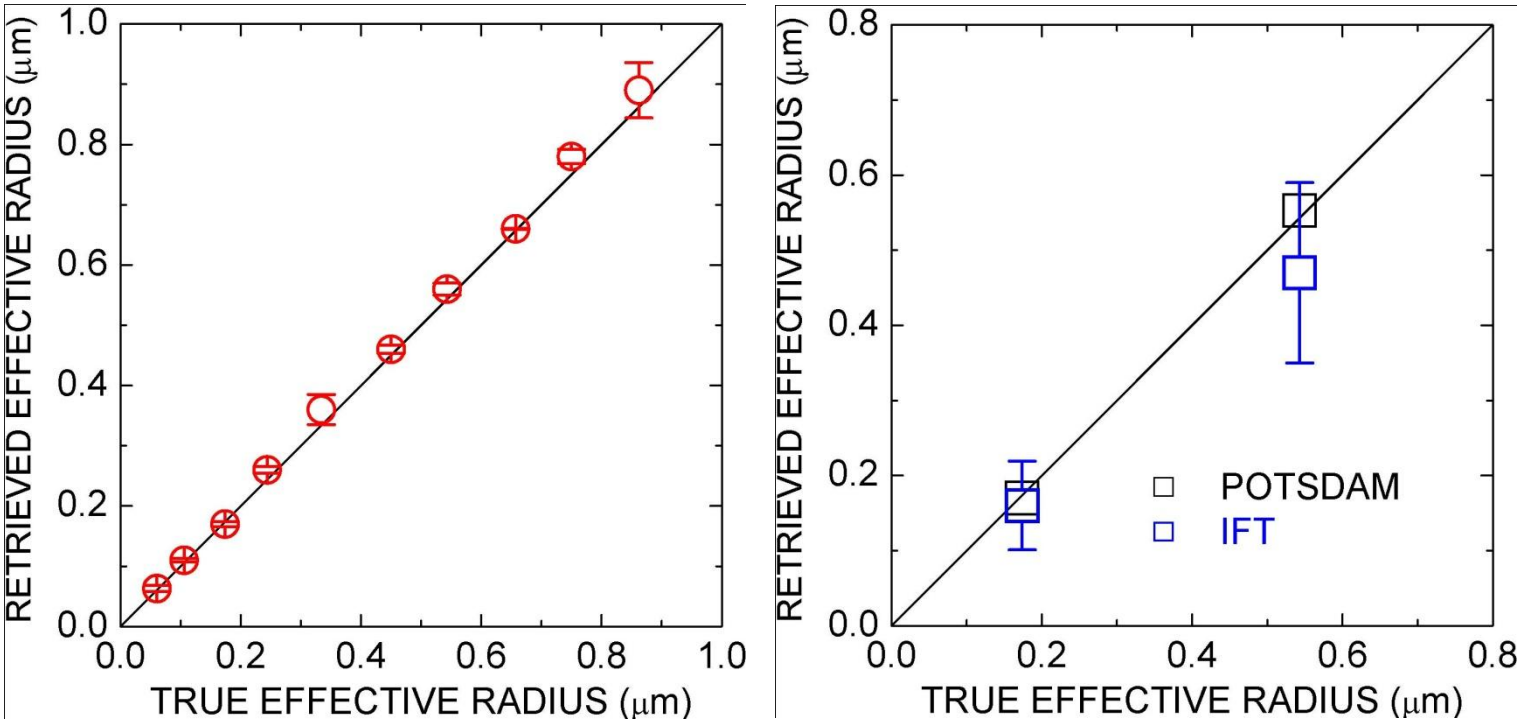
  - Prototype will require more development work



Microphysical properties retrieval module (IfT)

Routines for semi-automated and unsupervised data analysis have been developed and tested

- effective radius, refractive index, quality flag parameters



Example for (left) known and (right) unknown complex refractive index in the retrieval

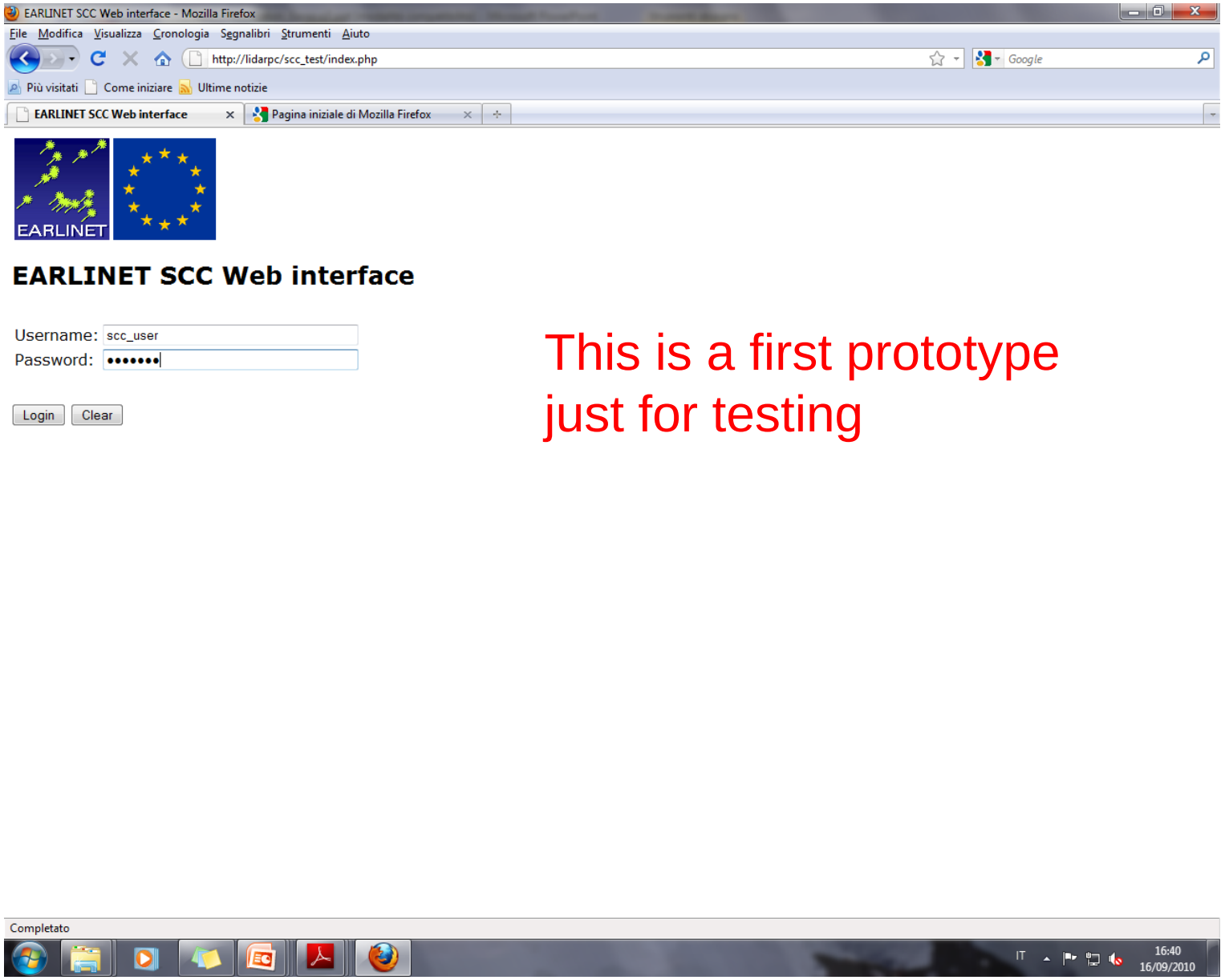
Microphysical properties retrieval module

Comparison between IFT and UP algorithms.

- IFT algorithm shows a processing speed higher than UP, but UP algorithm uses high-speed data processing schemes, not yet implemented into the IfT algorithm, e.g., parallel processing.
- IFT algorithm delivers better results of some of the investigated microphysical parameters (e.g. complex refractive index), while the UP algorithm performs better for a different set of the investigated parameters (e.g. size parameters).

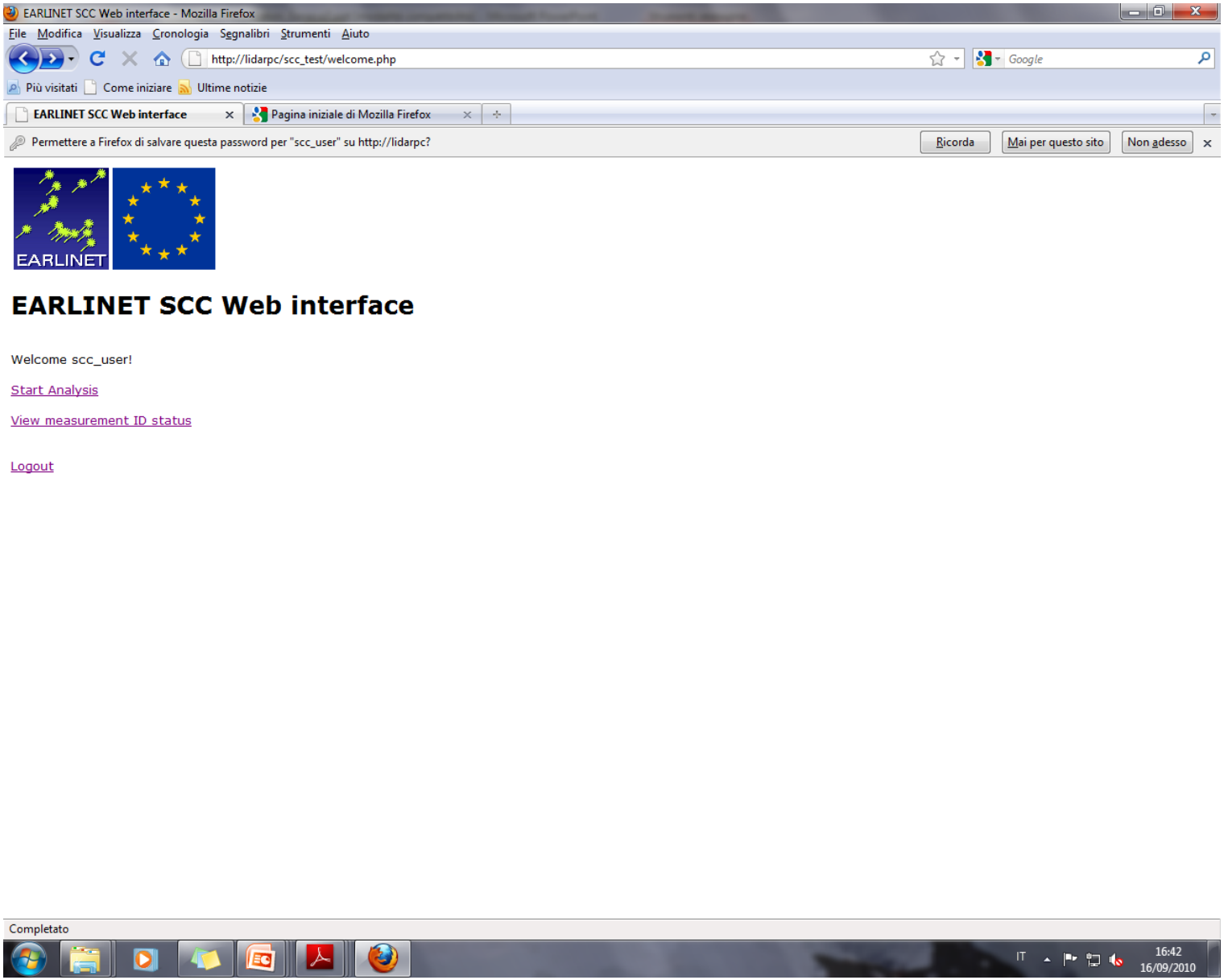
A future synthesis of both algorithms will further improve performance of data inversion.

Single Calculus Chain user interface

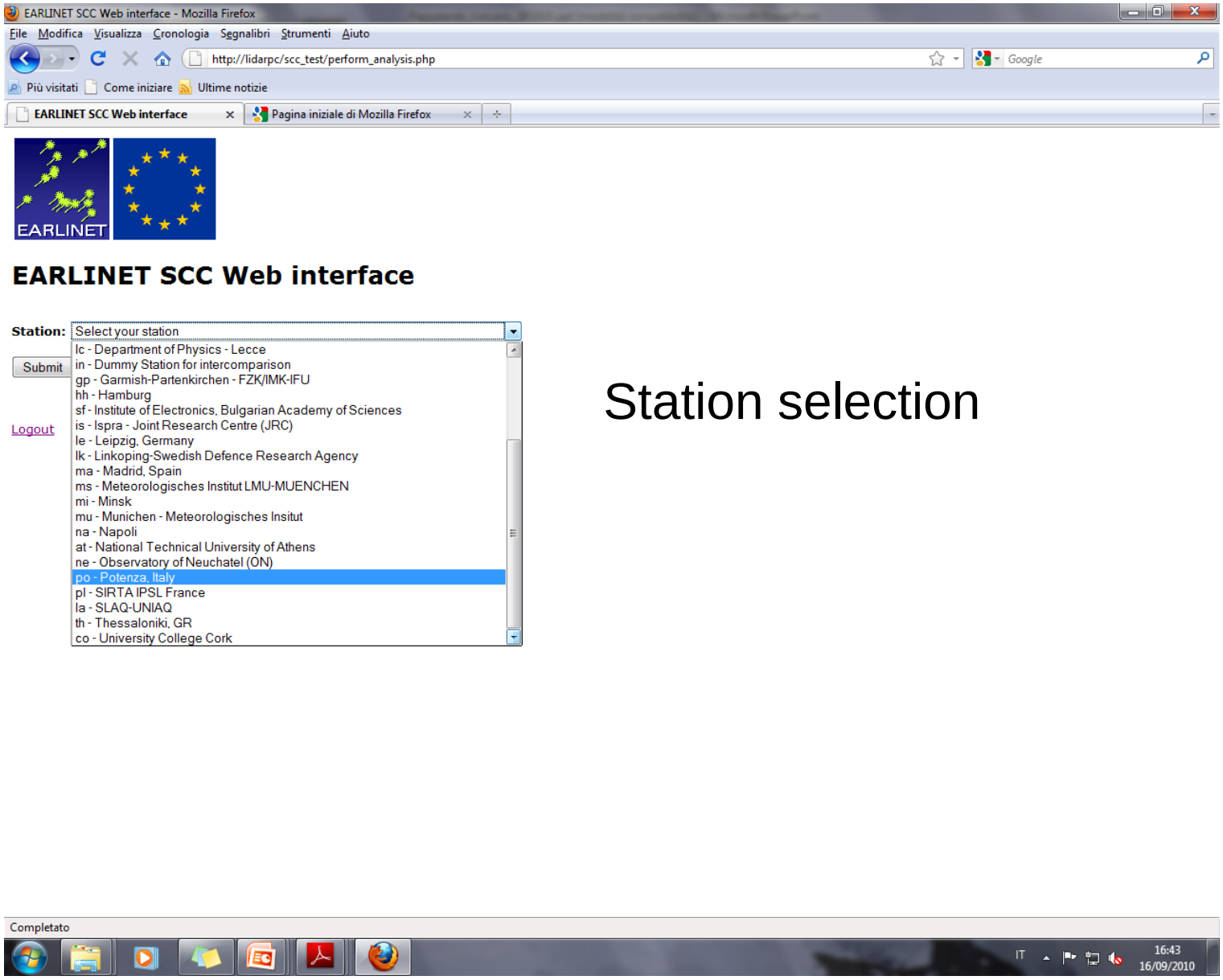


This is a first prototype just for testing

Single Calculus Chain user interface

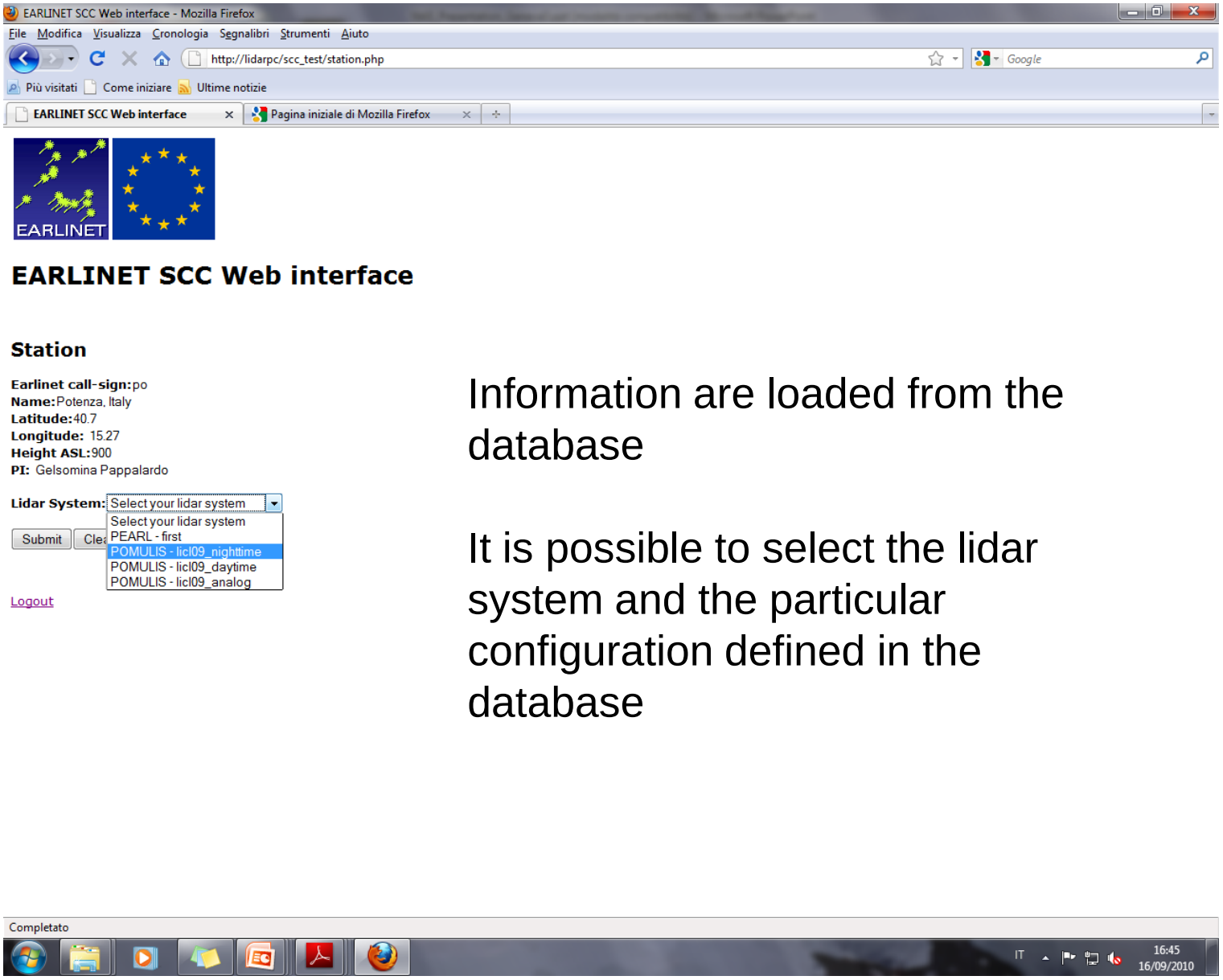


Single Calculus Chain user interface



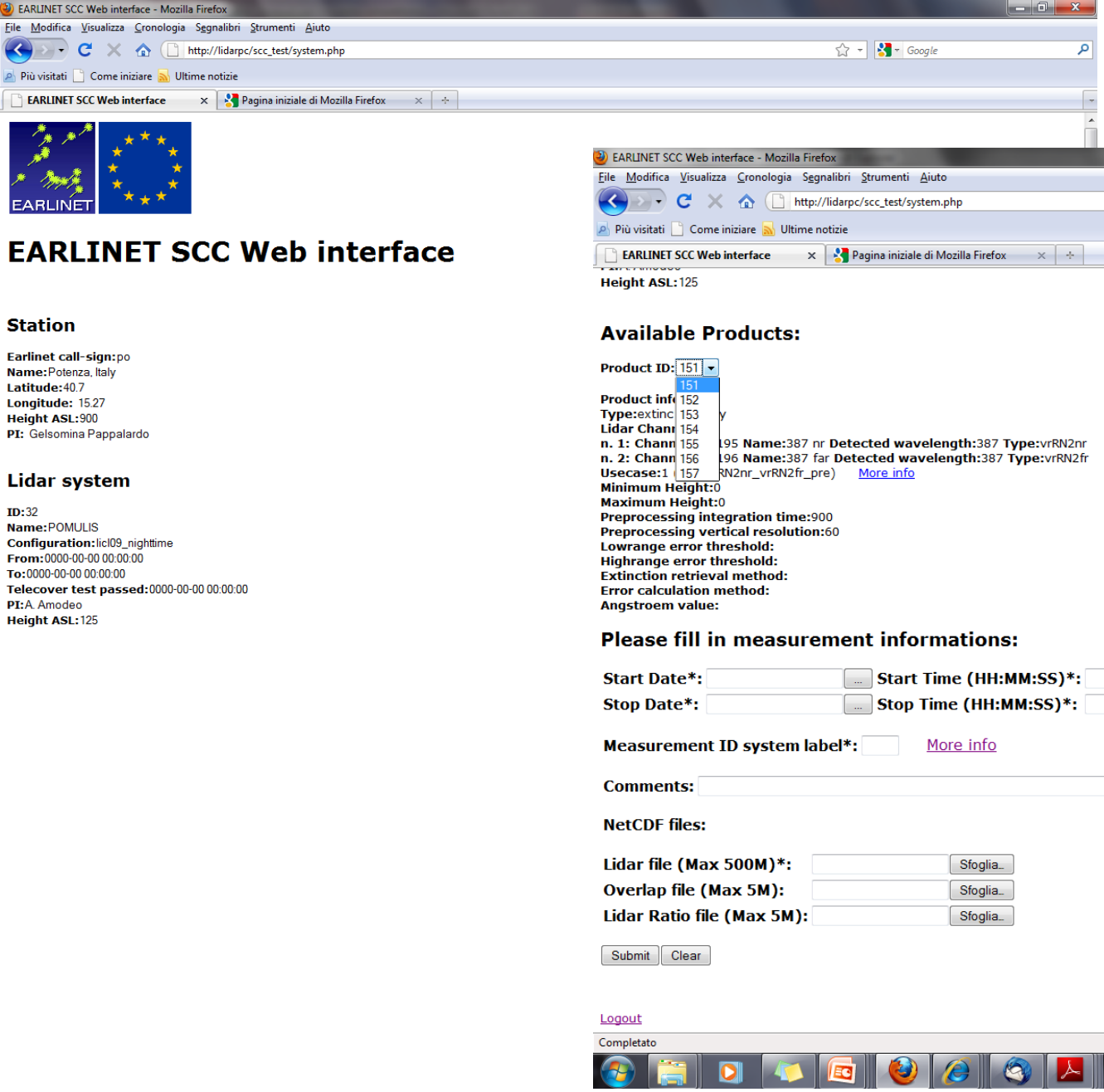
Station selection

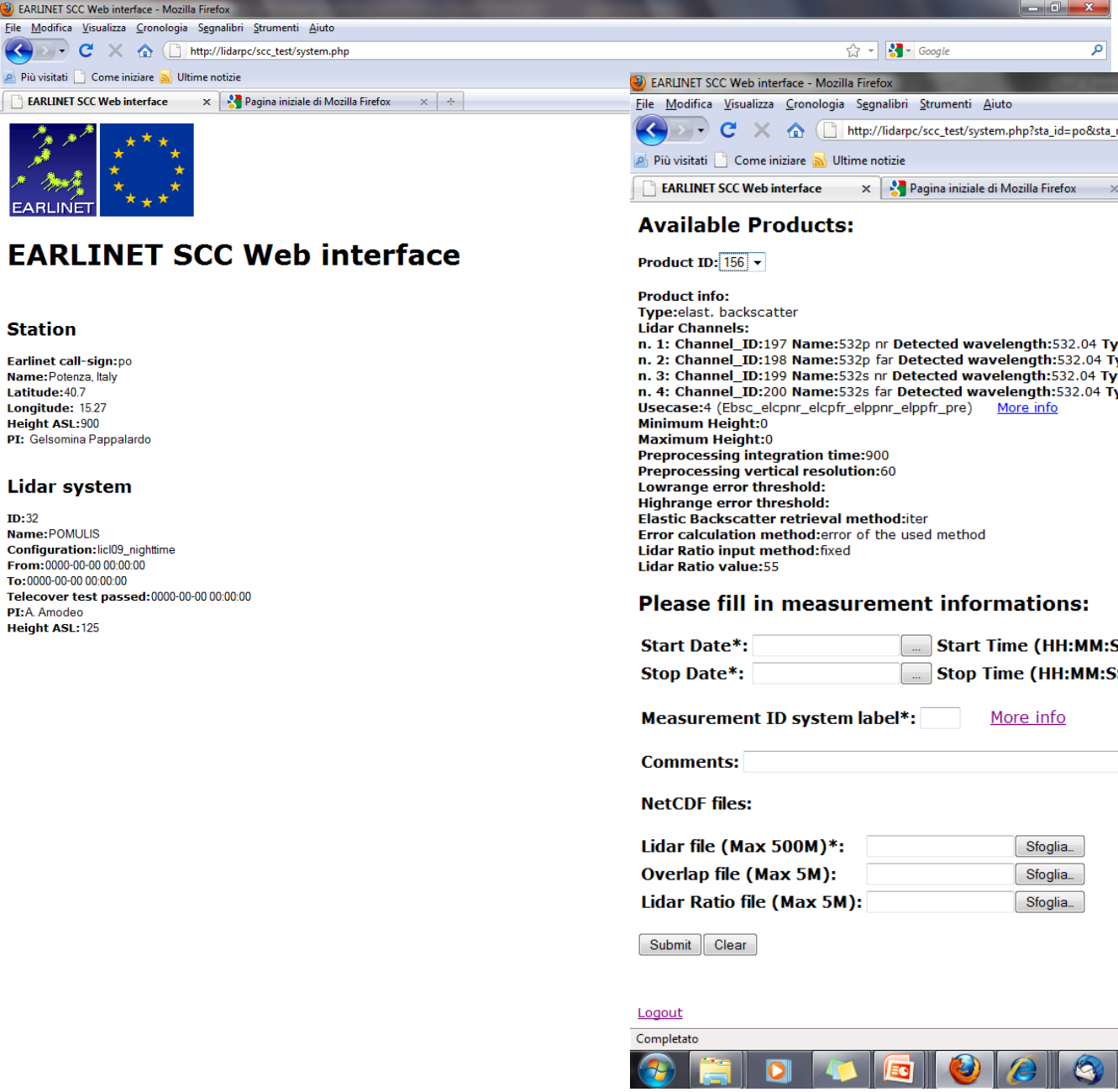
Single Calculus Chain user interface



Information are loaded from the database

It is possible to select the lidar system and the particular configuration defined in the database


EARLINET SCC Web interface - Mozilla Firefox
File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto
http://lidarpc/scc_test/system.php
Più visitati Come iniziare Ultime notizie
EARLINET SCC Web interface
Pagina iniziale di Mozilla Firefox
EARLINET
EARLINET SCC Web interface
Station
Earlinet call-sign:po
Name:Potenza, Italy
Latitude:40.7
Longitude: 15.27
Height ASL:900
PI: Gelsomina Pappalardo
Lidar system
ID:32
Name:POMULIS
Configuration:licl09_nighttime
From:0000-00-00 00:00:00
To:0000-00-00 00:00:00
Telecover test passed:0000-00-00 00:00:00
PI:A. Amodeo
Height ASL:125
EARLINET SCC Web interface - Mozilla Firefox
File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto
http://lidarpc/scc_test/system.php
Più visitati Come iniziare Ultime notizie
EARLINET SCC Web interface
Pagina iniziale di Mozilla Firefox
Height ASL:125
Available Products:
Product ID: 151
151
152
153
154
155
156
157
Product inf
Type:extinc y
Lidar Chan
n. 1: Chann 195 Name:387 nr Detected wavelength:387 Type:vrRN2nr
n. 2: Chann 196 Name:387 far Detected wavelength:387 Type:vrRN2fr
Usecase:1 RN2nr_vrRN2fr_pre) More info
Minimum Height:0
Maximum Height:0
Preprocessing integration time:900
Preprocessing vertical resolution:60
Lowrange error threshold:
Highrange error threshold:
Extinction retrieval method:
Error calculation method:
Angstroem value:
Please fill in measurement informations:
Start Date*: ... Start Time (HH:MM:SS)*:
Stop Date*: ... Stop Time (HH:MM:SS)*:
Measurement ID system label*: More info
Comments:
NetCDF files:
Lidar file (Max 500M)*: Sfoglia...
Overlap file (Max 5M): Sfoglia...
Lidar Ratio file (Max 5M): Sfoglia...
Submit Clear
Logout
Completato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EARLINET SCC Web interface
Pagina iniziale di Mozilla Firefox
EARLINET
EARLINET SCC Web interface
Station
Earlinet call-sign:po
Name:Potenza, Italy
Latitude:40.7
Longitude: 15.27
Height ASL:900
PI: Gelsomina Pappalardo
Lidar system
ID:32
Name:POMULIS
Configuration:licl09_nighttime
From:0000-00-00 00:00:00
To:0000-00-00 00:00:00
Telecover test passed:0000-00-00 00:00:00
PI:A. Amodeo
Height ASL:125
EARLINET SCC Web interface - Mozilla Firefox
File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto
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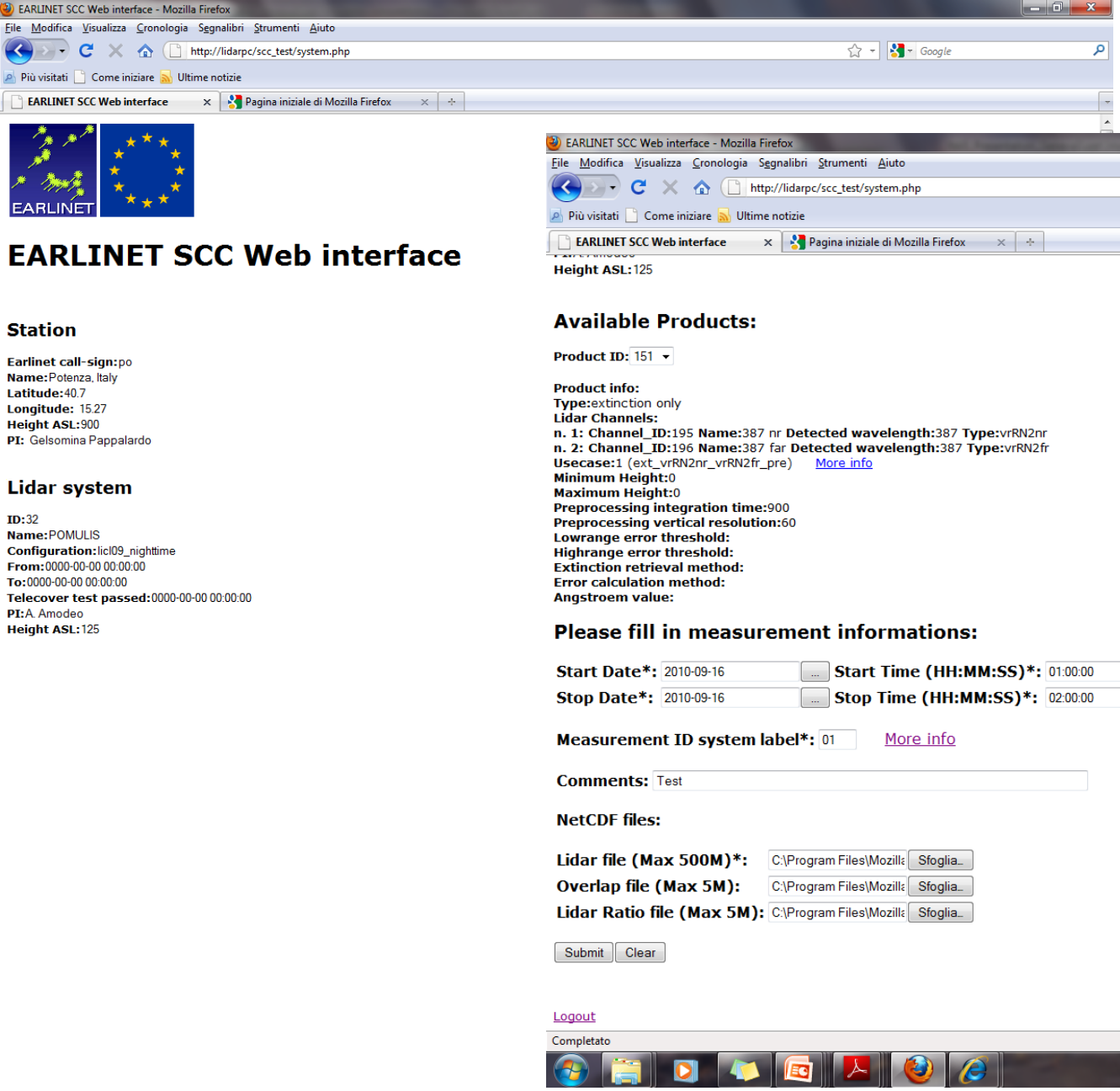
Più visitati Come iniziare Ultime notizie
EARLINET SCC Web interface
Pagina iniziale di Mozilla Firefox
Available Products:
Product ID: 156
Product info:
Type:elast. backscatter
Lidar Channels:
n. 1: Channel_ID:197 Name:532p nr Detected wavelength:532.04 Type:elPPnr
n. 2: Channel_ID:198 Name:532p far Detected wavelength:532.04 Type:elPPfr
n. 3: Channel_ID:199 Name:532s nr Detected wavelength:532.04 Type:elCPnr
n. 4: Channel_ID:200 Name:532s far Detected wavelength:532.04 Type:elCPfr
Usecase:4 (Ebsc_elcpnr_elcpfr_elppnr_elppfr_pre) More info
Minimum Height:0
Maximum Height:0
Preprocessing integration time:900
Preprocessing vertical resolution:60
Lowrange error threshold:
Highrange error threshold:
Elastic Backscatter retrieval method:iter
Error calculation method:error of the used method
Lidar Ratio input method:fixed
Lidar Ratio value:55
Please fill in measurement informations:
Start Date*:
Start Time (HH:MM:SS)*:
Stop Date*:
Stop Time (HH:MM:SS)*:
Measurement ID system label*:
More info
Comments:
NetCDF files:
Lidar file (Max 500M)*:
Overlap file (Max 5M):
Lidar Ratio file (Max 5M):
Sfoglia...
Submit
Clear
Logout
Completato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File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto
http://lidarpc/scc_test/system.php
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EARLINET SCC Web interface
Pagina iniziale di Mozilla Firefox
EARLINET
EARLINET SCC Web interface
Station
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Name:Potenza, Italy
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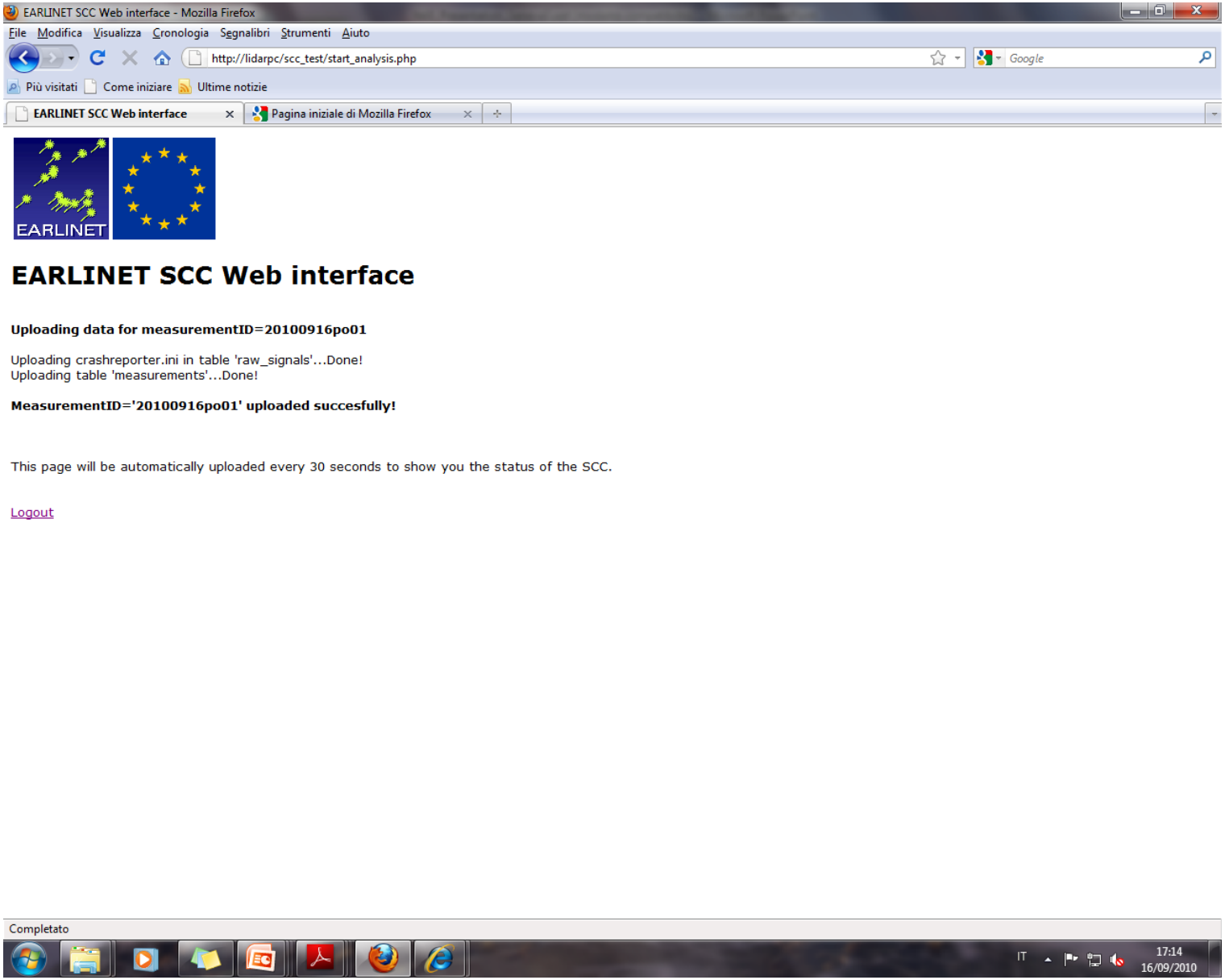
From:0000-00-00 00:00:00
To:0000-00-00 00:00:00
Telecover test passed:0000-00-00 00:00:00
PI:A. Amodeo
Height ASL:125
Available Products:
Product ID: 151
Product info:
Type:extinction only
Lidar Channels:
n. 1: Channel_ID:195 Name:387 nr Detected wavelength:387 Type:vrRN2nr
n. 2: Channel_ID:196 Name:387 far Detected wavelength:387 Type:vrRN2fr
Usecase:1 (ext_vrRN2nr_vrRN2fr_pre) More info
Minimum Height:0
Maximum Height:0
Preprocessing integration time:900
Preprocessing vertical resolution:60
Lowrange error threshold:
Highrange error threshold:
Extinction retrieval method:
Error calculation method:
Angstroem value:
Please fill in measurement informations:
Start Date*: 2010-09-16 Start Time (HH:MM:SS)*: 01:00:00
Stop Date*: 2010-09-16 Stop Time (HH:MM:SS)*: 02:00:00
Measurement ID system label*: 01 More info
Comments: Test
NetCDF files:
Lidar file (Max 500M)*: C:\Program Files\Mozill Sfoglia...
Overlap file (Max 5M): C:\Program Files\Mozill Sfoglia...
Lidar Ratio file (Max 5M): C:\Program Files\Mozill Sfoglia...
Submit Clear
Logout
Completato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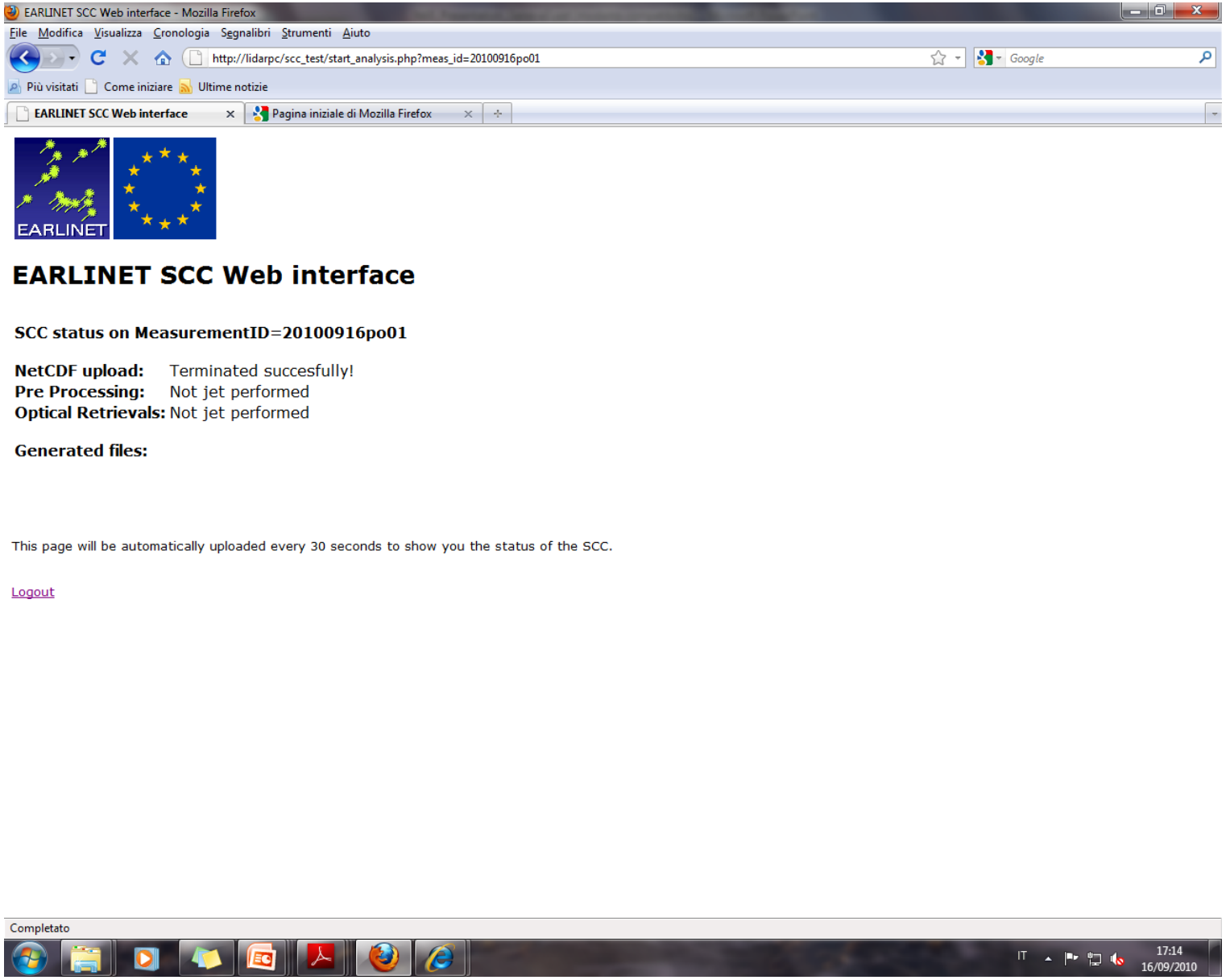
File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto
http://lidarpc/scc_test/start_analysis.php
Più visitati Come iniziare Ultime notizie
EARLINET SCC Web interface
Pagina iniziale di Mozilla Firefox
EARLINET
EARLINET SCC Web interface
Uploading data for measurementID=20100916po01
Uploading crashreporter.ini in table 'raw_signals'...Done!
Uploading table 'measurements'...Done!
MeasurementID='20100916po01' uploaded succesfully!
This page will be automatically uploaded every 30 seconds to show you the status of the SCC.
Logout
Completato
IT
17:14
16/09/2010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http://lidarpc/scc_test/start_analysis.php?meas_id=20100916po01
Più visitati Come iniziare Ultime notizie
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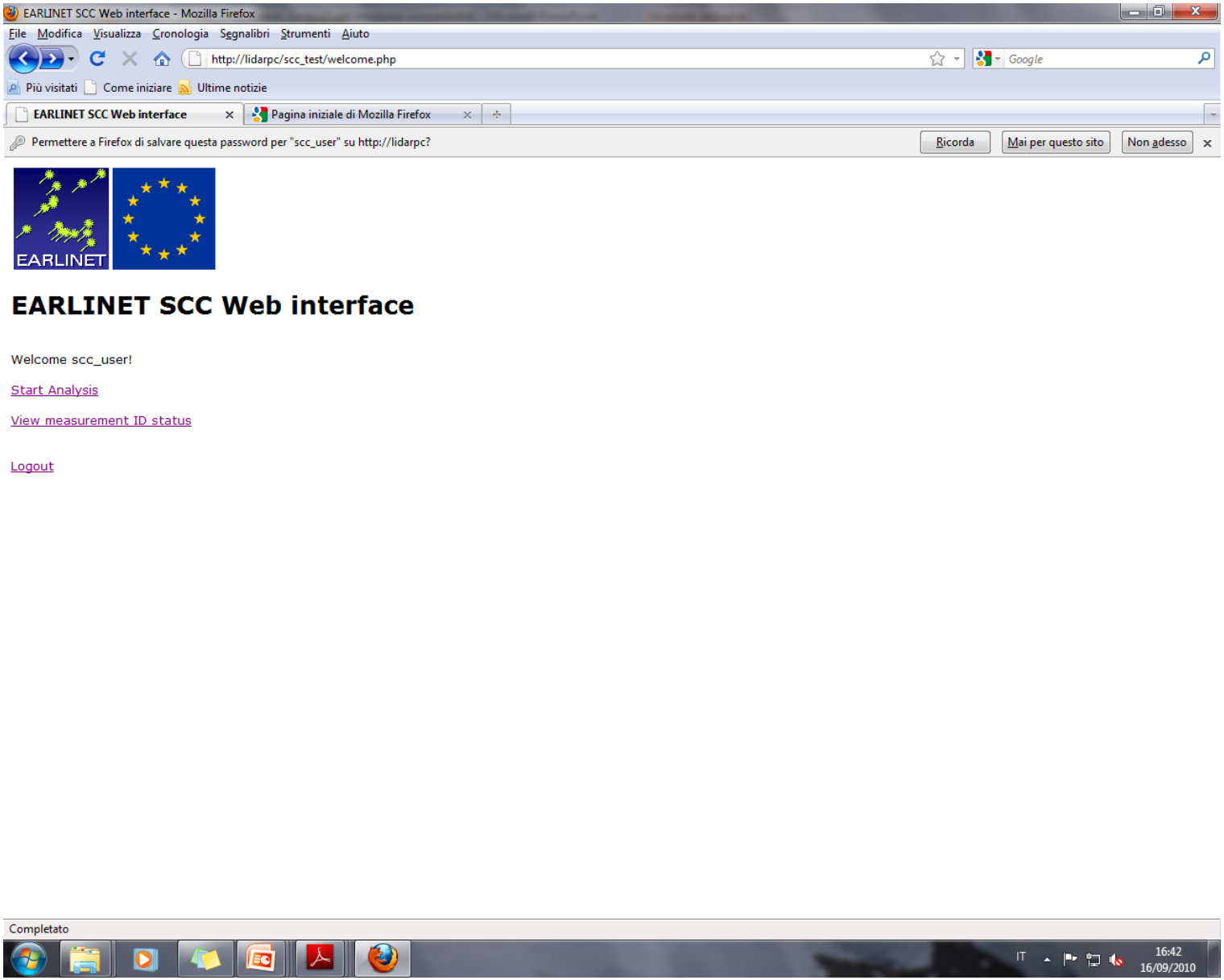
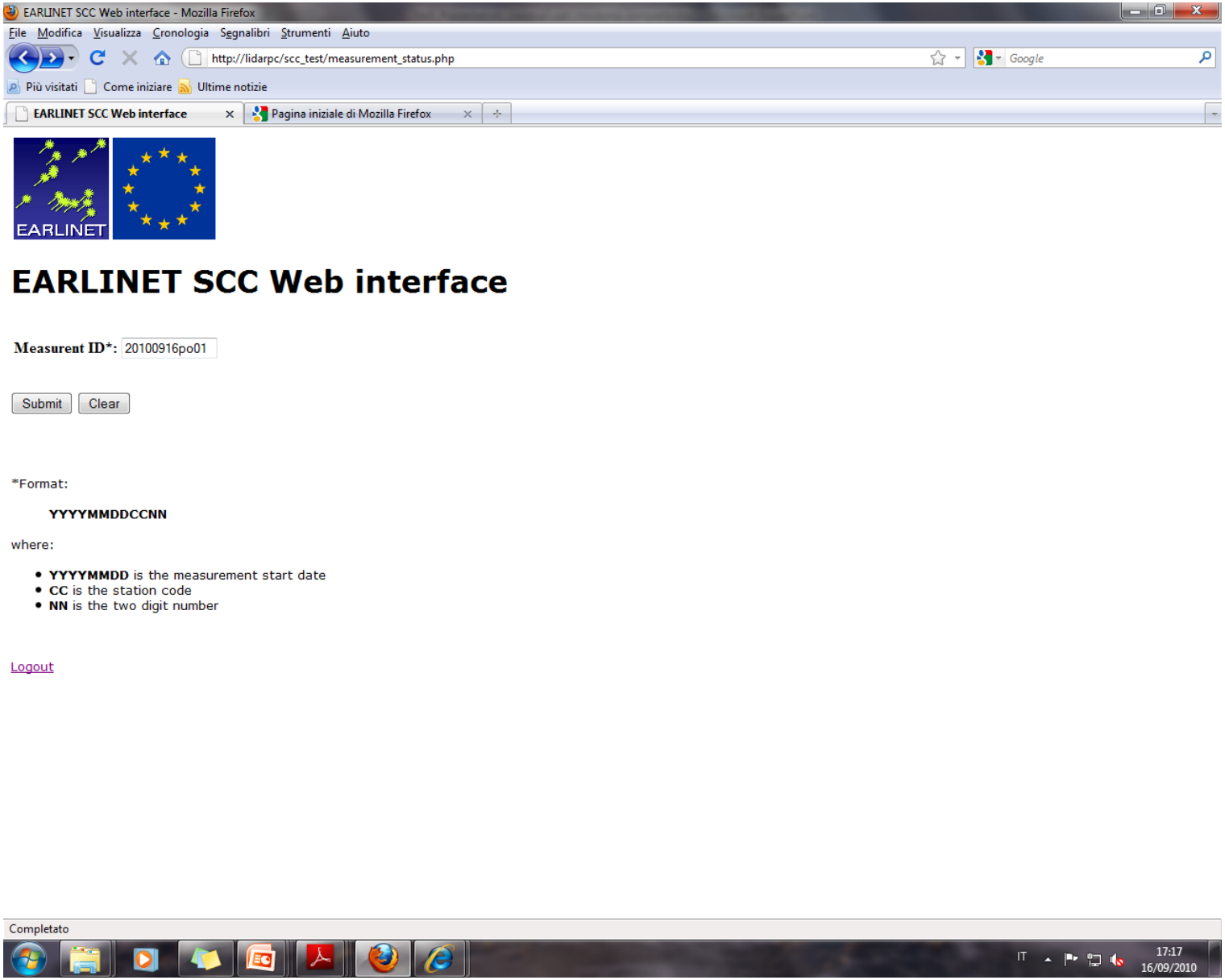
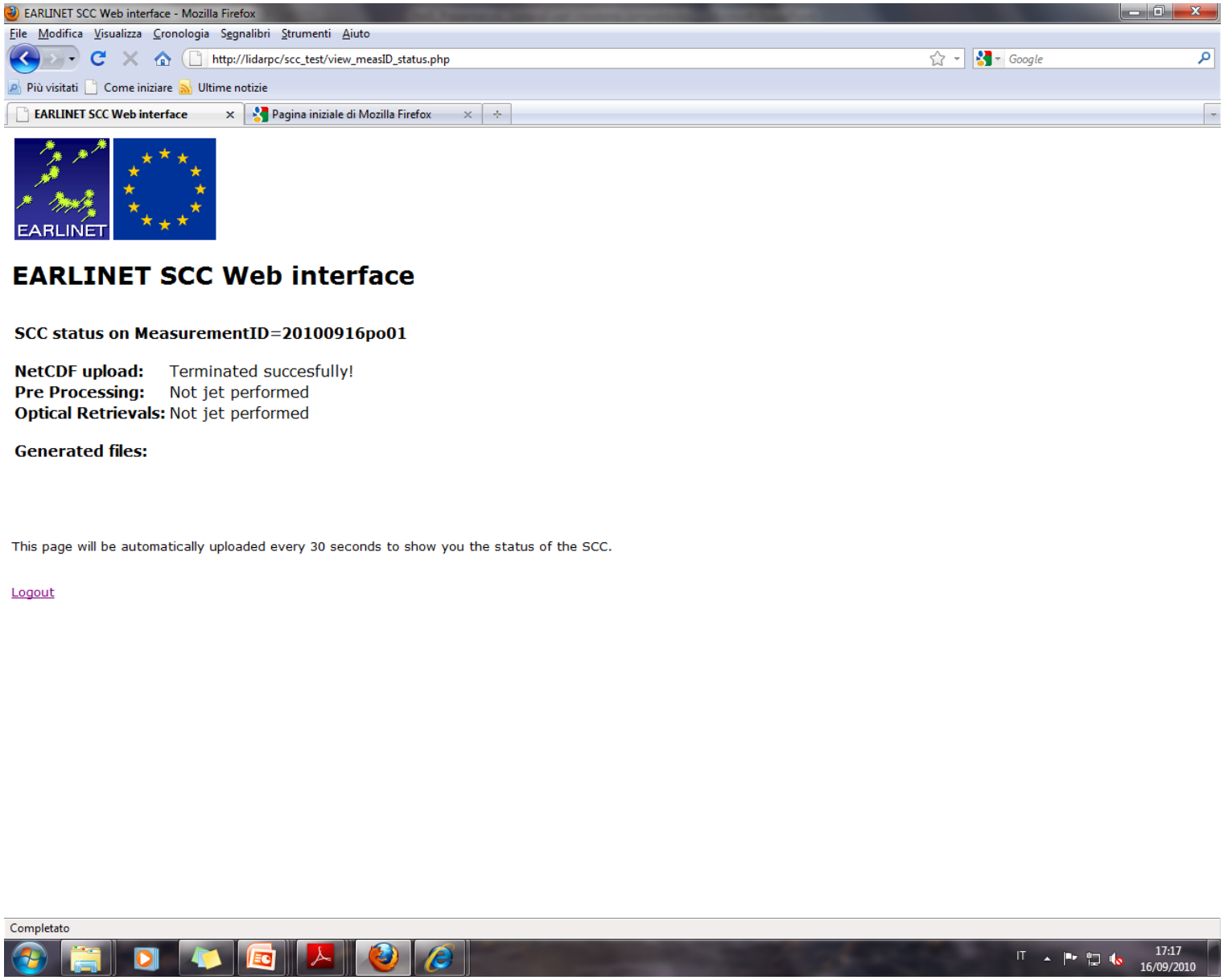
Pagina iniziale di Mozilla Firefox
EARLINET
EARLINET SCC Web interface
SCC status on MeasurementID=20100916po01
NetCDF upload: Terminated succesfully!
Pre Processing: Not jet performed
Optical Retrievals: Not jet performed
Generated files:
This page will be automatically uploaded every 30 seconds to show you the status of the SCC.
Logout
Completato
IT
17:14
16/09/2010

Single Calculus Chain user interface




EARLINET SCC Web interface - Mozilla Firefox
File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto
http://lidarpc/scc_test/measurement_status.php
Più visitati Come iniziare Ultime notizie
EARLINET SCC Web interface
Pagina iniziale di Mozilla Firefox
EARLINET
EARLINET SCC Web interface
Measurent ID*: 20100916po01
Submit Clear
*Format:
YYYYMMDDCCNN
where:
YYYYMMDD is the measurement start date
CC is the station code
NN is the two digit number
Logout
Completato
IT
17:17
16/09/2010


EARLINET SCC Web interface - Mozilla Firefox
File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto
http://lidarpc/scc_test/view_measID_status.php
Più visitati Come iniziare Ultime notizie
EARLINET SCC Web interface
Pagina iniziale di Mozilla Firefox
EARLINET
EARLINET SCC Web interface
SCC status on MeasurementID=20100916po01
NetCDF upload: Terminated succesfully!
Pre Processing: Not jet performed
Optical Retrievals: Not jet performed
Generated files:
This page will be automatically uploaded every 30 seconds to show you the status of the SCC.
Logout
Completato
IT
17:17
16/09/2010

Acknowledgements

EARLINET-ASOS project
funded by the European Commission (EC)
under grant RICA-025991