

AERONET organization

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ECOST-MEETING-ES1207

WG meeting - Database and processing
27th January 2015

AERONET is an optical ground based aerosol monitoring network and data archive, established by NASA's Earth Observing System and the Laboratoire d'Optique Atmosphérique (LOA) expanded by federation with many non-NASA institutions.

AERONET: Federated Network.

- Data processing and archive:
NASA
- Owners of the network instruments:
National agencies and universities
- Instrument calibration:
NASA, PHOTONS, RIMA

Federation of ground-based remote sensing aerosol networks

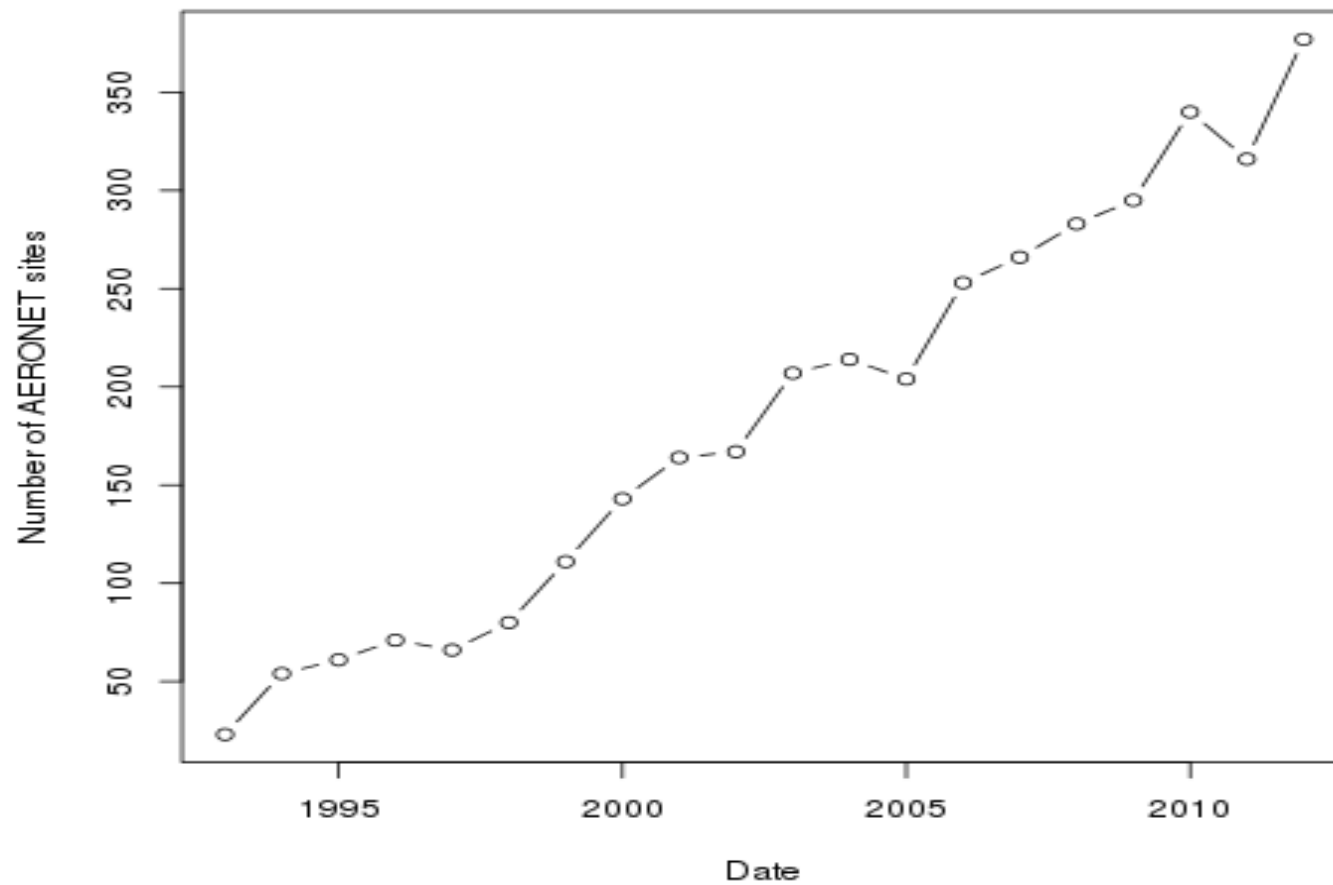
- NASA's Goddard Space Flight Center
- PHOTONS (PHOtométrie pour le Traitement Opérationnel de Normalisation Satellitaire)
Laboratoire d' Optique Atmosphérique, Research Unit formed by the Université Lille 1 and CNRS
- RIMA (Iberian network for aerosol measurements)
Joint collaboration between the Grupo de Óptica Atmosférica de la (Universidad de Valladolid) and the Izaña Atmospheric Research Center (AEMET)
- AEROCAN sunphotometer network
Joint collaboration between the Université de Sherbrooke and the Meteorological Service of Canada
- CARSNET (China Aerosol Remote Sensing Network)
China meteorological administration
- SONET (Sun/sky-radiometer Observation NETwork)
Chinese Academy of Science
- AEROSIBNET (Siberian system for aerosol research)
Russian Academy of Sciences
- AeroSpan (Aerosol characterisation via Sun Photometry: Australian Network)
CSIRO (Commonwealth Scientific and Industrial Research Organisation), Australia

Evolution of the network

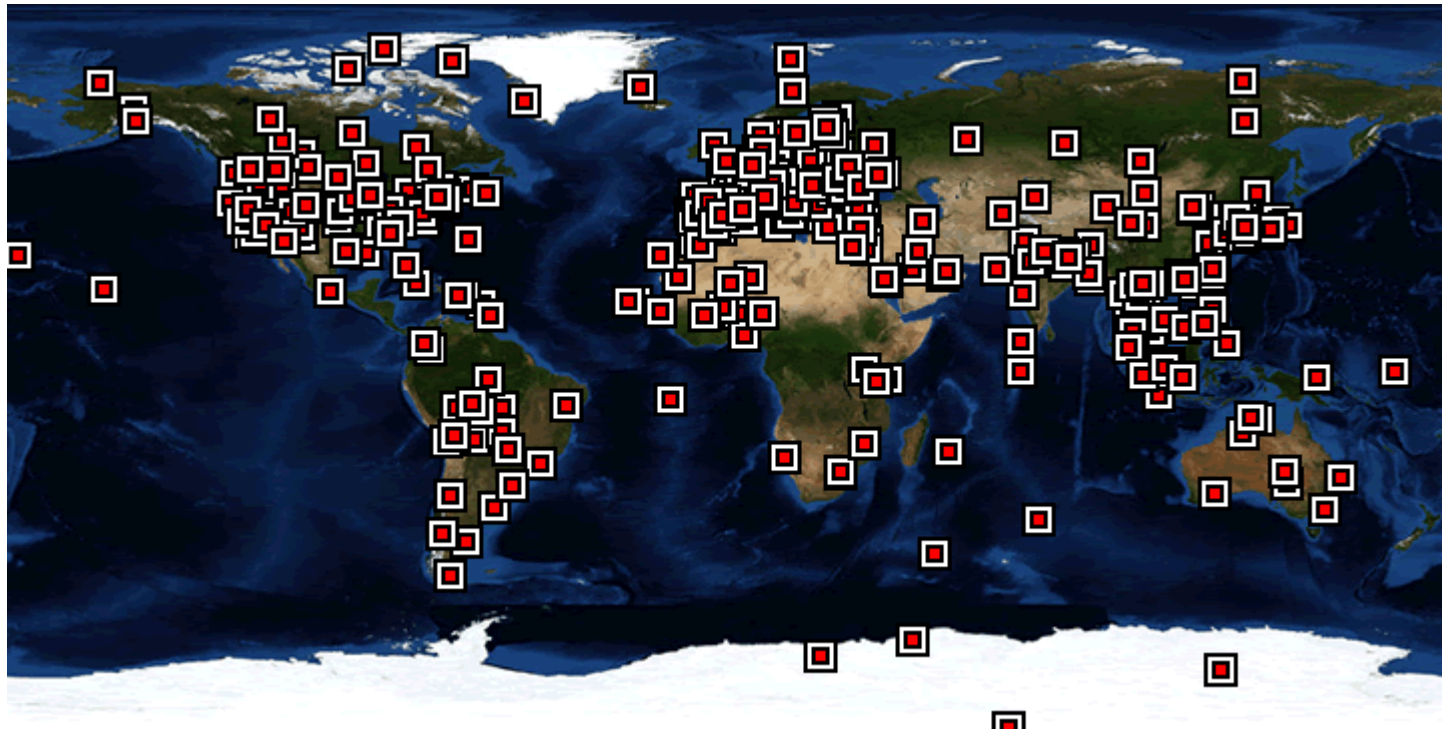


1993

Evolution of the network



Evolution of the network



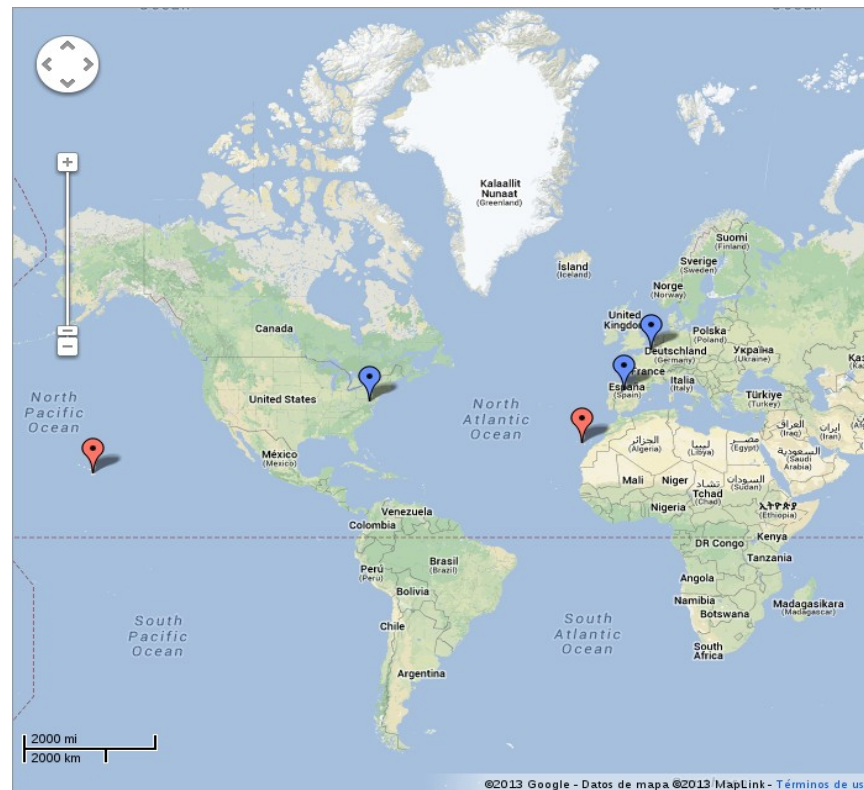
2012

Calibration

- Extraterrestrial solar irradiance of each instrument by Langley method
Mauna Loa Observatory 3397m asl
Izaña Observatory 2373m asl

Only "master" instruments

- Intercomparison between master instruments and field instruments
GSFC (AERONET), Carpentras (PHOTONS), Valladolid (RIMA)



Calibration

- Extraterrestrial solar irradiance of each instrument by Langley method
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Only "master" instruments

- Intercomparison between master instruments and field instruments
GSFC (AERONET), Carpentras (PHOTONS), Valladolid (RIMA)
- Radiance calibration using an integrating sphere:
GSFC (AERONET), Lille (PHOTONS), Valladolid (RIMA)

Traveling master: link between spheres

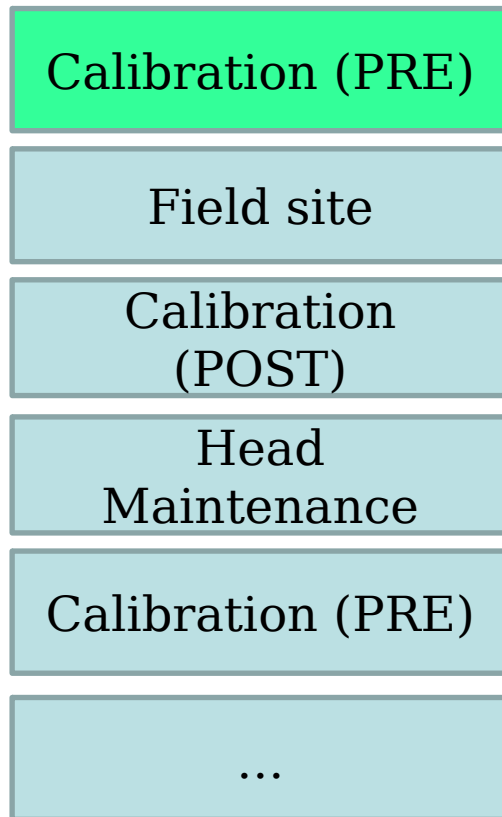
- Temperature sensitivity of the instruments:
GSFC (AERONET), Lille (PHOTONS), Valladolid (RIMA)
- Polarization:
Lille (PHOTONS)

"CIMEL type CE-318 is the standard instrument of the Aerosol Robotic Network"

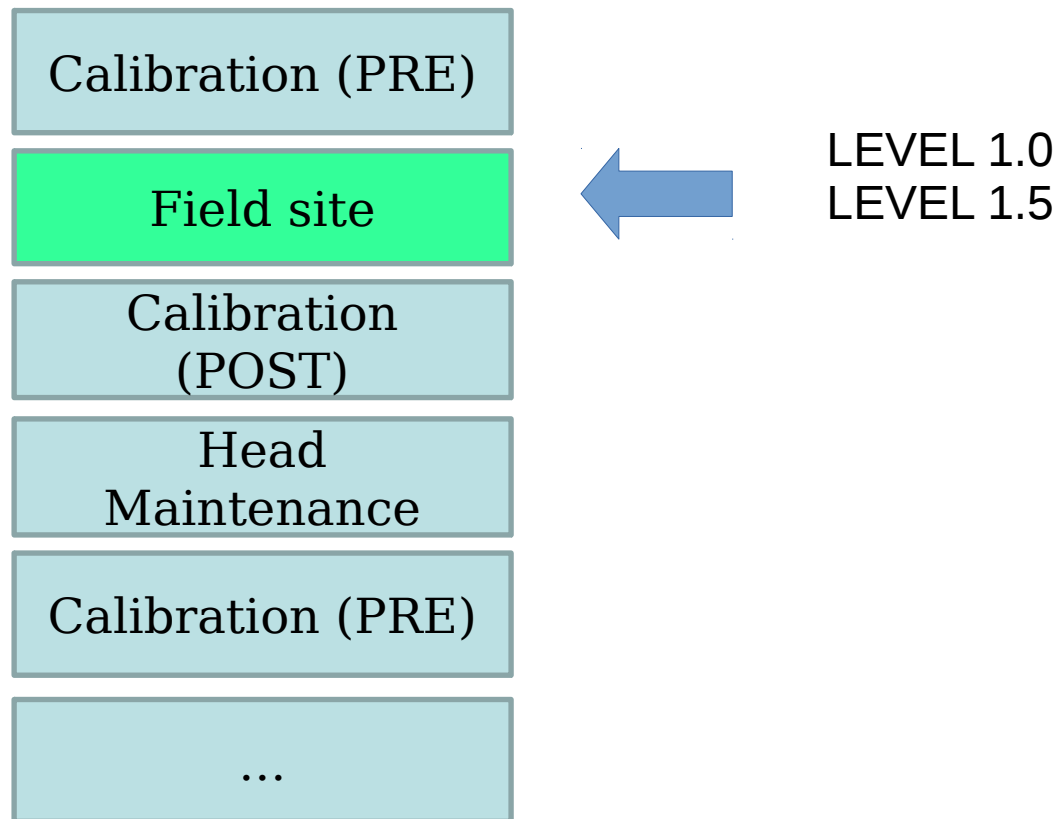
- CE318 Analogical
- CE318 polarized 870 nm
- CE318 Digital
- CE318 Extended 1640nm
- CE318DP (double wheel polarized)
- CE318T



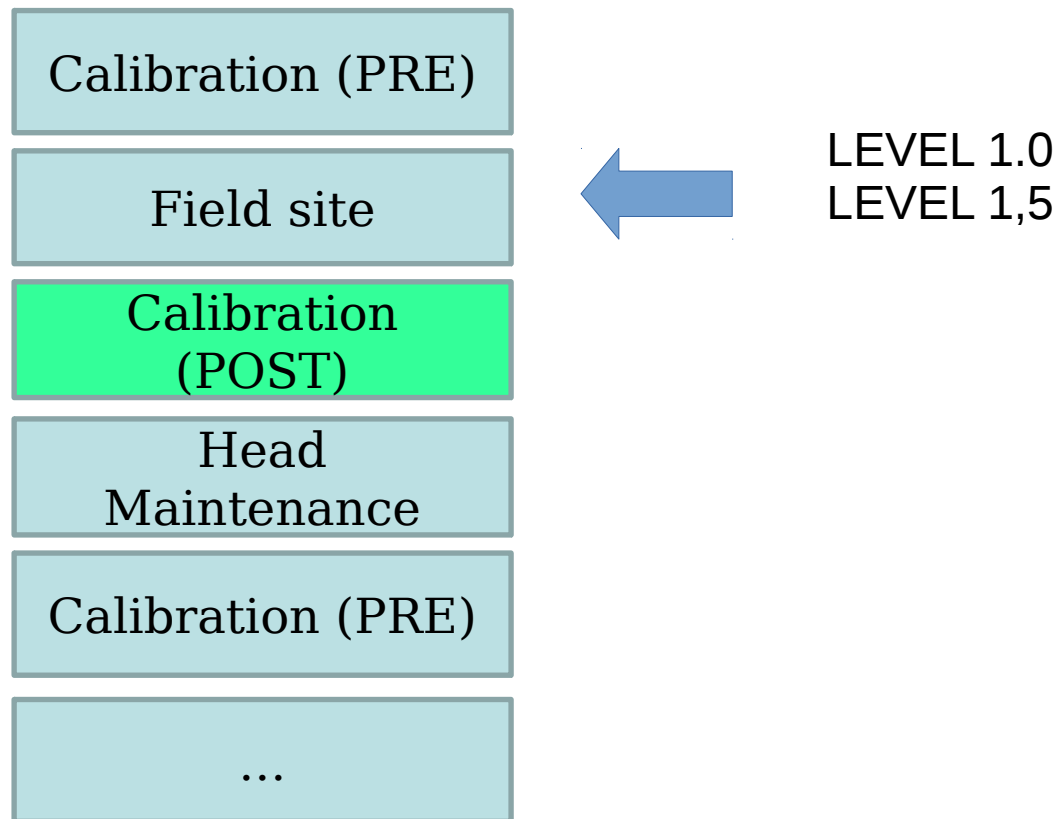
Calibration / Measurement cycle



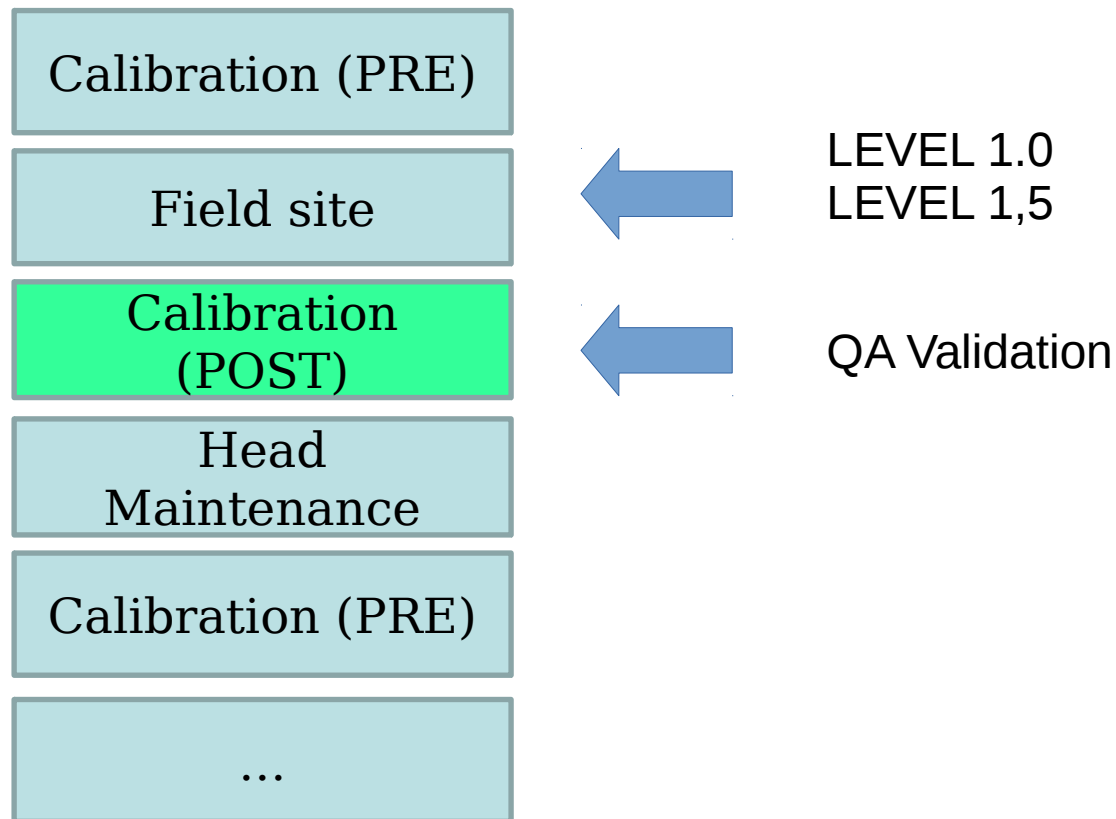
Calibration / Measurement cycle



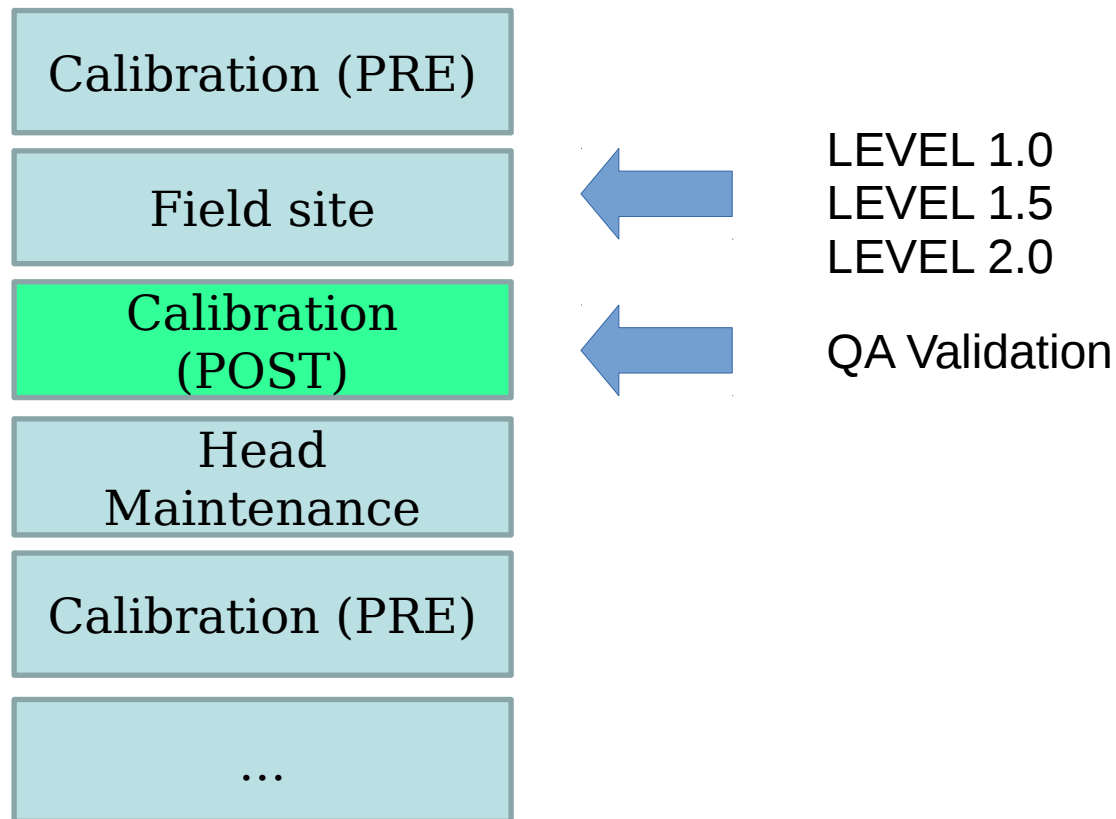
Calibration / Measurement cycle



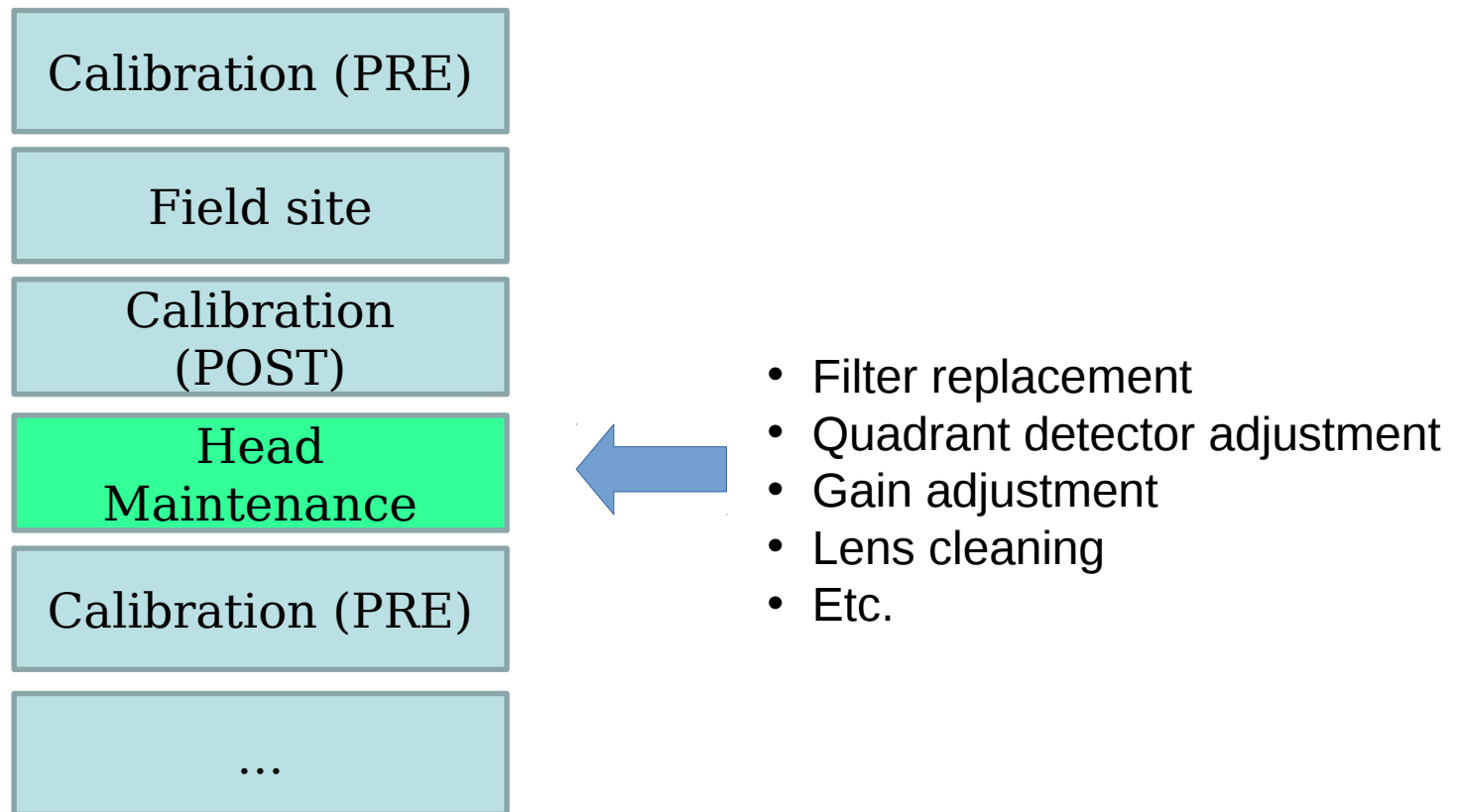
Calibration / Measurement cycle



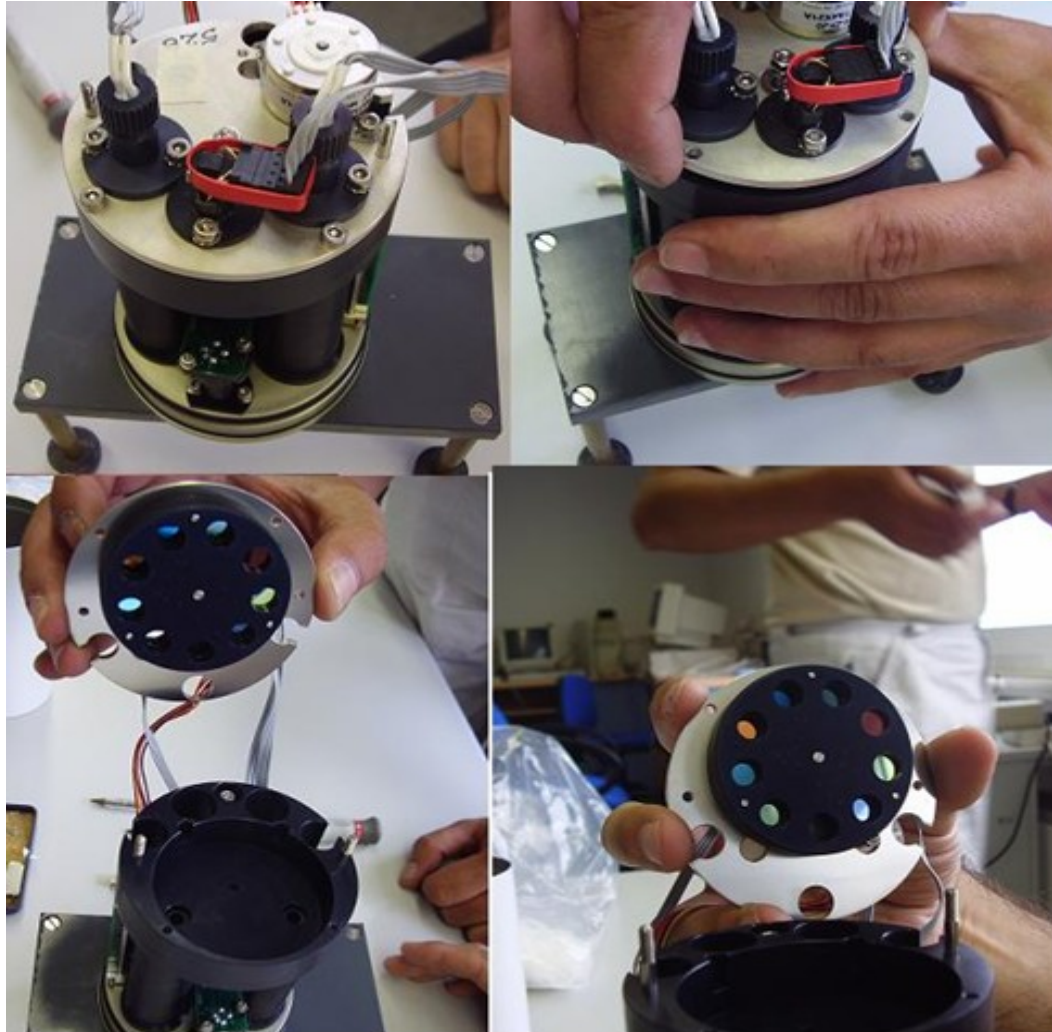
Calibration / Measurement cycle



Calibration / Measurement cycle



Filter Replacement inside the head



Data processing: Ancillary data

- Pressure:
NCEP Reanalysis
- Nitrogen Dioxide – NO₂:
V2: Monthly mean database from SCIAMACHY Satellite
V3: OMI Satellite data
- Ozone O₃ (Total Column):
Monthly Climatology (1978-2004) from TOMS
- Surface Reflectance: inversion
MODIS

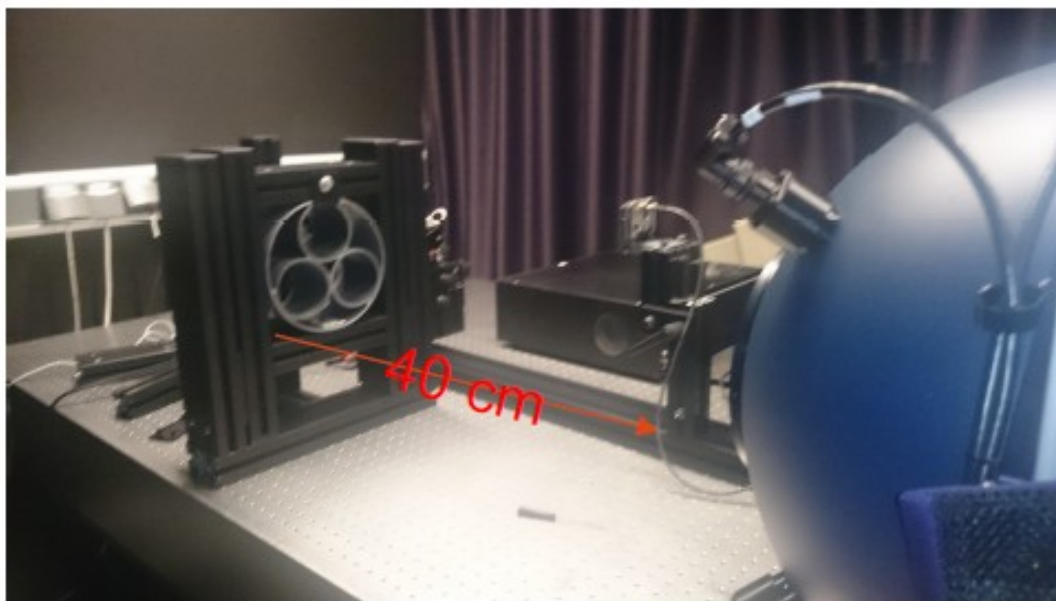
Overview GOA calibration facility



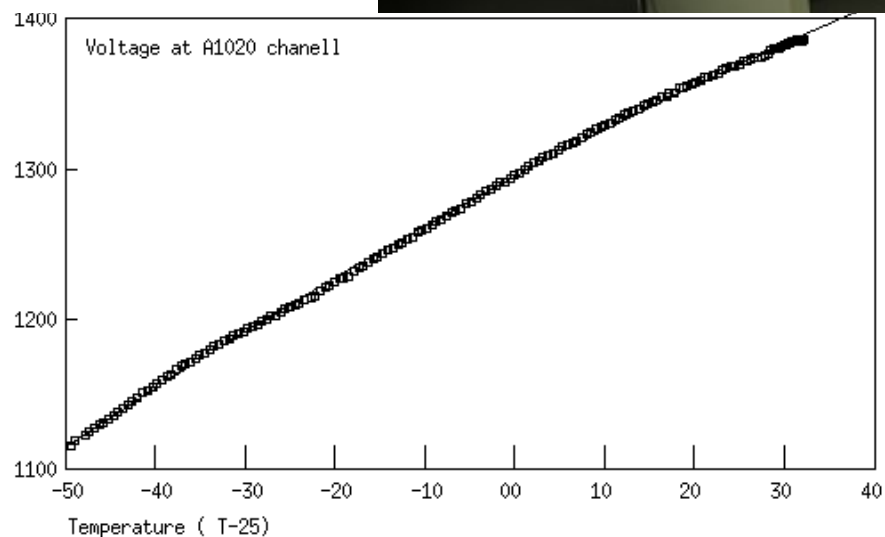
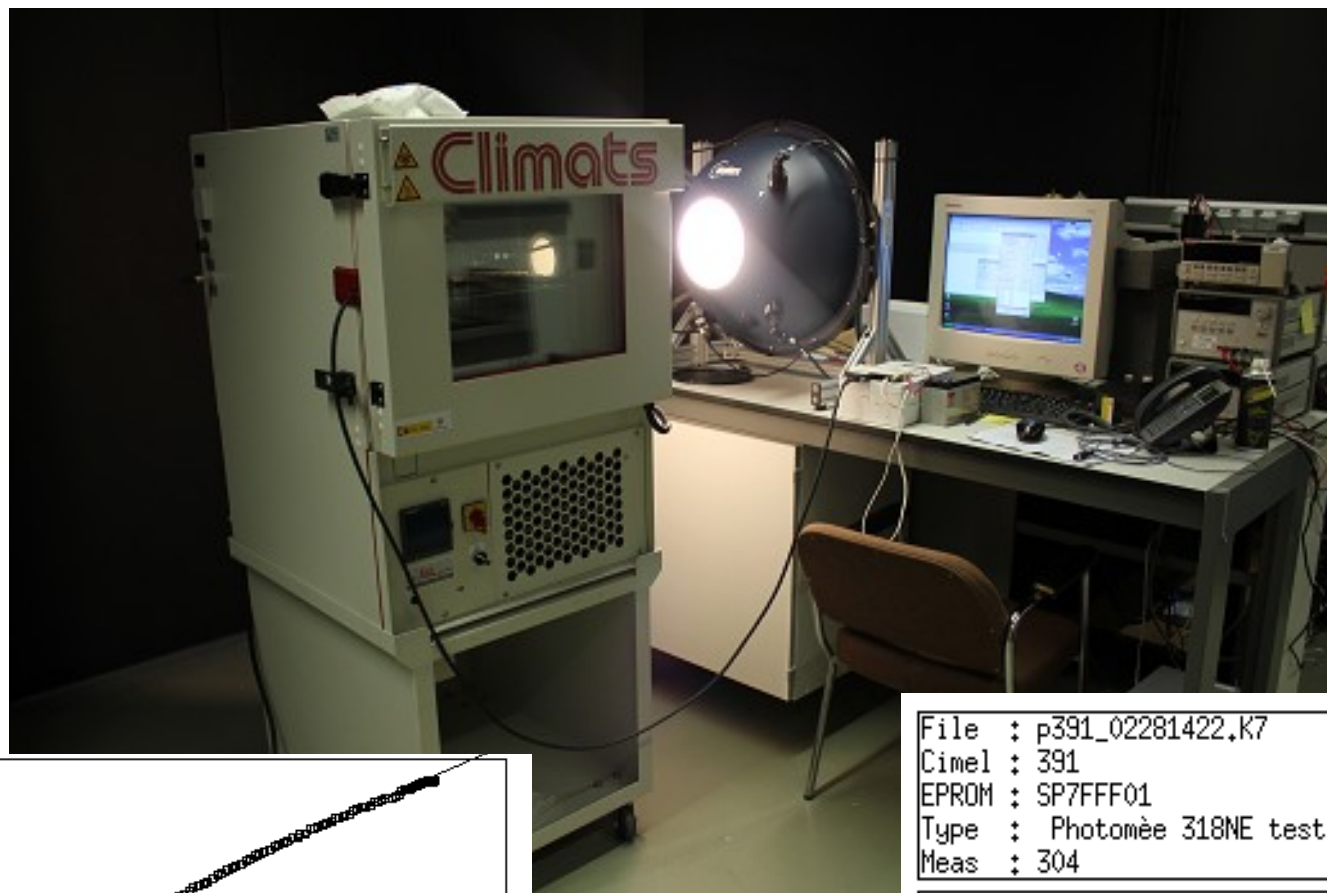
Intercal platform



Radiance calibration lab



Temperature characterization



```
File : p391_02281422.K7
Cimel : 391
EPROM : SP7FFF01
Type : Photom e 318NE test temp
Meas : 304
```

```
09:05:2012,00:00:00,10
1020,0.002468,-6.214558e-06,0.002468.
1640
870,-0.000657,-0.000657,-0.000657
675,-0.000611,-0.000611,-0.000611
440,-0.001311,-0.001311,-0.001311
500
1020
935
380
340
```

Master calibration: Izaña

- Latitude: 28°N
- Longitude: 16°W
- Elevation: 2390 mas



Sites (2014): 40



Instruments (2014)

- Analog Cimels v.4: 9
- Digital Cimels:
 - Standard: 15
 - Extended : 31
 - Polarized: 0
 - Dual polar: 0
- Triple Cimet 318-T: 1

TOTAL: 56

- Top Institutions:

Universidad de Valladolid	14
Spanish Met. Agency (AEMET)	7
Universidad de Granada	6
Finnish Met. Inst.	5
University of Evora	3
NERC Field Spectroscopy Facility	3
Universidad de Valencia	2
Deutscher Wetterdienst	2

CÆLIS - management tool

- Database
- Metadata: installation, parameters (gains, etc.), calibration, filters, temperature coeff.
- Revise basic K7 parameters before sending to GSFC for processing
- Flags
- Accessible to site managers
- Research at GOA

Compare with vicarious and previous coefficients

Consultar Calibracion: 198 RA01_Obelix (06/06/2013)

☐ Show internal amplification

med1 med2 Summary Data graph

	@1	@2	@3	@4	A1	A2	A3	A4
med1	1.4498E-05	1.7564E-05	2.6401E-05	6.7037E-05	1.2848E-04	1.9797E-04	3.5008E-04	5.7458E-04
med2	1.4480E-05	1.7562E-05	2.6403E-05	6.7017E-05	1.2840E-04	1.9803E-04	3.5028E-04	5.7414E-04
desvStd	1.2703E-08	9.0378E-10	1.8858E-09	1.4001E-08	5.3234E-08	3.5688E-08	1.3980E-07	3.1441E-07
Media	1.4489E-05	1.7563E-05	2.6402E-05	6.7027E-05	1.2844E-04	1.9800E-04	3.5018E-04	5.7436E-04
%	0.09%	0.01%	0.01%	0.02%	0.04%	0.02%	0.04%	0.05%
Ratio	previous	coefs						
med1	-0.0559%	0.2637%	0.2241%	0.4353%	0.5430%	0.5502%	0.6008%	1.9096%
med2	0.0681%	0.2709%	0.2140%	0.4647%	0.6013%	0.5249%	0.5446%	1.9855%
Ratio	vicarious	coefs						
med1	3.7745%	-0.6596%	3.9446%	-4.5006%	3.7745%	-0.6596%	3.9446%	-4.5006%
med2	3.7181%	-0.6339%	3.9988%	-4.5815%	3.7181%	-0.6339%	3.9988%	-4.5815%
Ratio	vicarious	coefs	each	channal				
med1	-0.0734%	0.9735%	1.3276%	-3.1098%	-0.0734%	0.9735%	1.3276%	-3.1098%
med2	-0.1321%	0.9988%	1.3833%	-3.1896%	-0.1321%	0.9988%	1.3833%	-3.1896%
Diferences	with	the	average					
med1	8.9826E-09	6.3907E-10	1.3335E-09	9.9000E-09	3.7642E-08	2.5235E-08	9.8852E-08	2.2232E-07
med2	8.9826E-09	6.3907E-10	1.3335E-09	9.9000E-09	3.7642E-08	2.5235E-08	9.8852E-08	2.2232E-07

Save Calibration 

Thank you!!