

Aerosols in the Virtual Observatory

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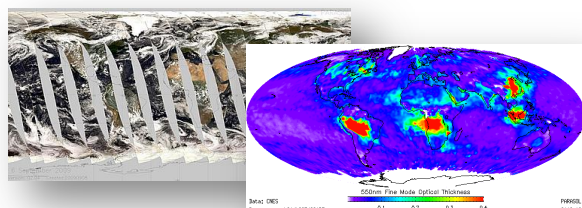
AERIS/ICARE Data Catalogue

Satellite database

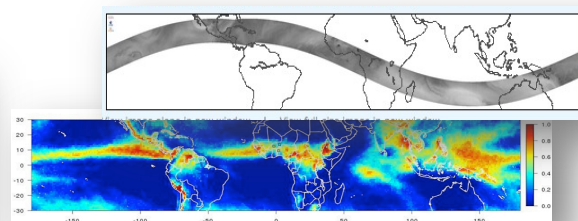
- 300 distinct products (400 GB/day) collected routinely
- 800 derived products and associated quicklooks (1 TB / day)
- Data sets from 50+ sensors
- 90 million files available online, volume 2600 TB

Ground Database

- 23 French observation sites (ACTRIS-FR) + AERONET (AERONET-Europe), 99 instruments
- 222 products, 13 million files, volume 3.2 TB

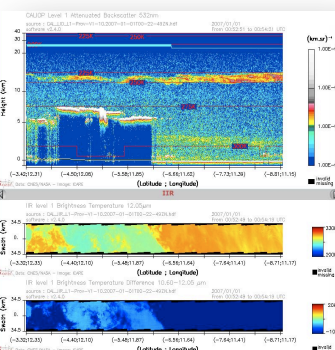


POLDER/PARASOL

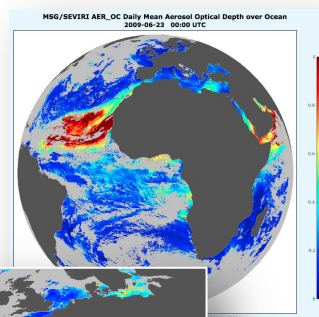
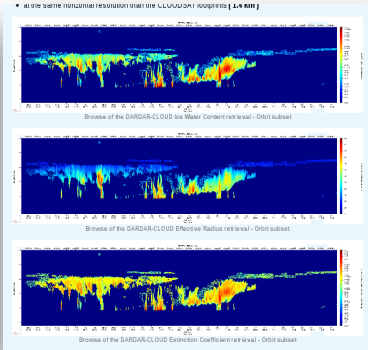


Megha-Tropiques / SAPHIR / ScaRaB

CALIPSO/CALIOP/IIR



DARDAR (CALIPSO/CloudSat)



Geostationary products

Satellite

Satellite Observations

Satellite Observations	Aerosol Properties	Cloud Properties	Radiative Budget	Water Vapor	Precipitation
PARASOL/POLDER-3, POLDER-1, POLDER-2	X	X	X	X	
Terra/Aqua/MODIS, Aqua/AIRS, MSG/SEVIRI, Suomi-NPP/VIIRS	X	X		X	
CALIPSO/CALIOP/IIR/WFC, Terra/MISR, Aura/OMI, Envisat/ATSR/AATSR	X	X			
CloudSat/CPR		X			
METEOSAT-7, GOES-E, GOES-W, GOES-SA, MTSAT, Himawari		X		X	
Megha-Tropiques/MADRAS, TRMM/TMI, DMSP/SSM/I, DMSP/SSM/I-S, Aqua/AMSR-E					X
Megha-Tropiques/SAPHIR, NOAA/AMSU-A, METOP/AMSU-A, NOAA/AMSU-B, METOP/AMSU-B/MHS, Aqua/HSB, NOAA/HIRS, METOP/HIRS, Suomi-NPP/ATMS				X	
Megha-Tropiques/ScaRaB, CERES			X		
Envisat/MERIS	X				
Ground-Based Observations					
AERONET, IAOS	X				
ACTRIS, ORAURE	X	X			
ROSEA				X	X
Model Analyses and Forecasts					
MACC	X		X		
ECMWF, GMAO		X		X	X

Ground-based

Ground-Based and In-situ Observations	Atmospheric Chemistry	Aerosol Properties	Cloud Properties	Radiative Budget	Water Vapor	Precipitation	Meteo
Particle Sizers (APS, OPS, SMPS)		X					
Particle Counters and Mass Concentration Meters (CPC, OPC, TEOM)		X					
Aethalometer, Nephelometer, MAAP		X					
On-line Spectrometers (AMS, WRAS)		X					
LIDARs (Aerosol, Wind, H ₂ O)		X	X		X		X
Sun Photometers		X					
ACSM		X	X				
GPS					X		
RADARs (UHF, VHF)				X			X
Sky Imagers			X				
Weather Station, Ultrasonic Anemometer							X
On-line CO, CO ₂ , NO _x , COV Analyzers	X						
Filter Collection Analysis	X						



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Candidate aerosol products for the VO

MODIS: 17-year data record – 2 daytime overpasses each day – AOD (inc. some uncertainty) + AE + typing

ATSR-2/AATSR: 17-year data record – AOD (inc. uncertainty) + FMAOD + AE + AAOD + SSA

PARASOL: 9-year data record – robust retrieval (polarization + directionality) – AOD + FMAOD + AE + non-sphericity – new advanced products under evaluation (GRASP) with new parameters (inc. AAOD, SSA, size distribution, uncertainty)

MSG/SEVIRI: 13-year data record – 15-min retrieval – AOD + AE – 3 operational algorithms

CALIPSO: 11-year data record – Vertical extinction profiles + aerosol characterization – Daytime and nighttime observations

AERONET sunphotometers (AOD + size distribution + SSA), including AERONET-Europe advanced products, **ACTRIS-FR** observation network (inc. lidar and in-situ)



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Satellite/Model/Ground co-location

Pinboard visualization tool

<http://www.icare.univ-lille1.fr/browse/gaia-clim>

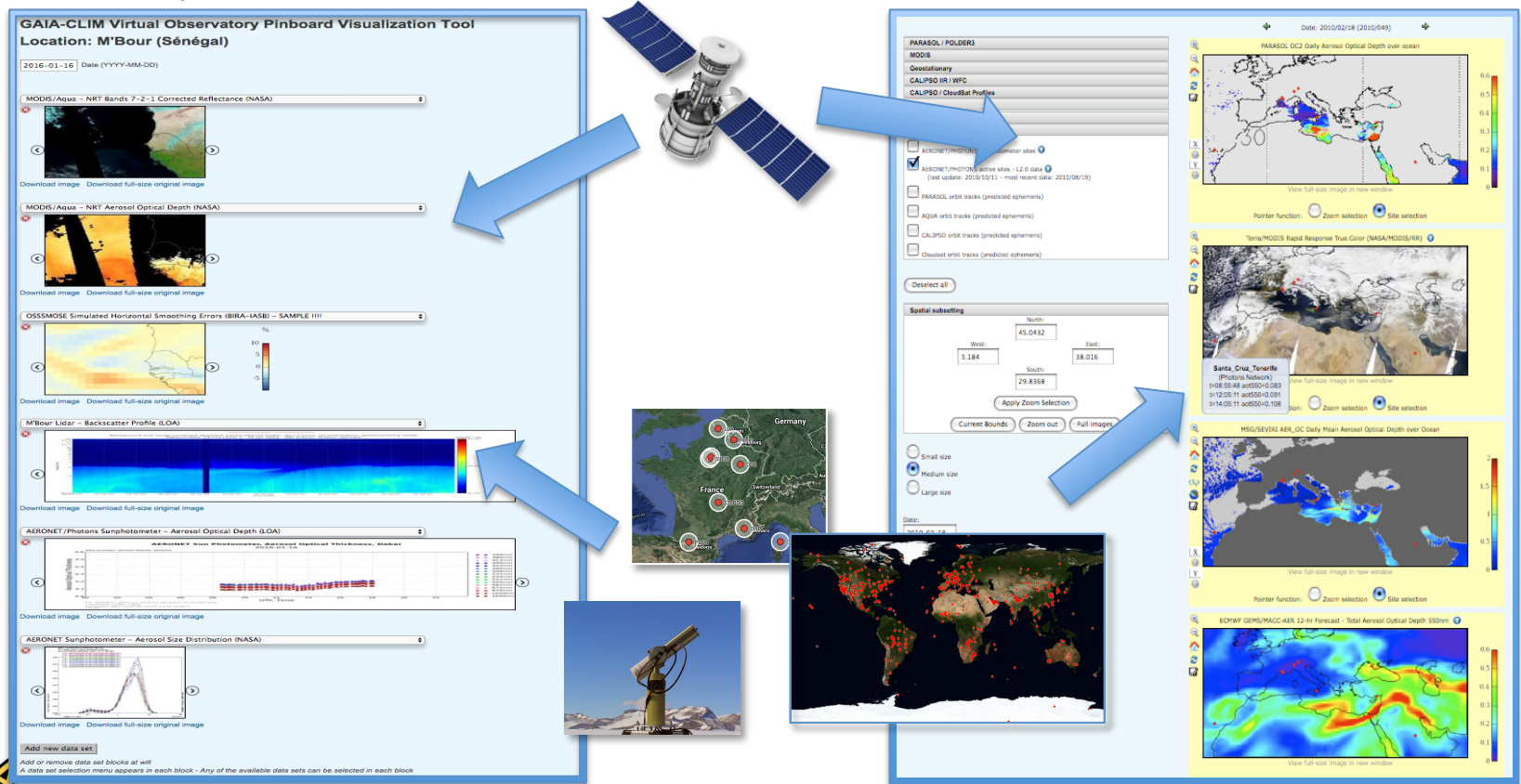
User-driven “pinboard” approach to visualize heterogeneous material available for a given geographic location or region (ground-based observations, satellite observations, model forecasts/analyses)

Multi-sensor browse interface

<http://www.icare.univ-lille1.fr/browse>

Designed for direct satellite-to-satellite or satellite-to-model comparisons (2D/2D) using re-gridded products

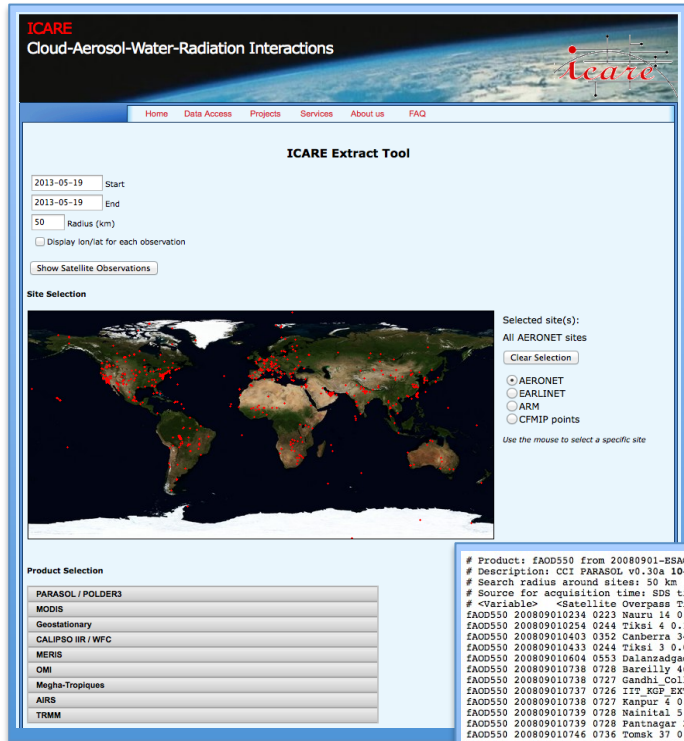
Direct access to AERONET-Europe sunphotometer observations



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Satellite-to-ground co-location



Extract tool

<http://www.icare.univ-lille1.fr/extract>

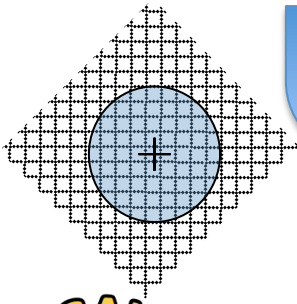
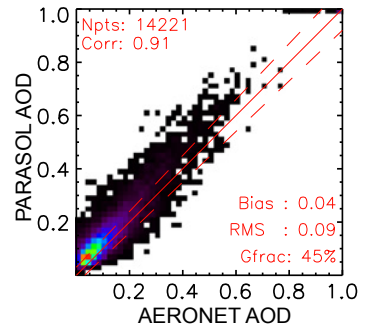
Designed for 2D/1D satellite to ground-based comparisons (one-site ground-based observation compared to surrounding satellite pixels)

User-specified parameters:

- Time range of sat. observations
- Extract radius around sites
- Extract site or network of sites

Output: all original satellite observations (i.e. native geometry) within the specified vicinity of any site of the selected network over the selected time period

```
# Product: FAOD550 from 20080901-ESACCI-L2P AEROSOL-AOD-FOLDER_PARASOL-LS2OC2_086089-v0.30.nc
# Description: CCI PARASOL v0.30a 10-km Daily Fine Mode AOD at 550nm
# Search radius around sites: 50 km
# Source for acquisition time: S05 time
# <Variable> <Satellite Overpass Time> <Site ID> <Number of Observations> <Sequence of Observations>
FAOD550 200809010234 0223 Nauru 14 0.02863 0.02863 0.02385 0.009542 0.01908 0.01908 0.02385 0.01431 0.01431 0.01908 0.01431 0.01431
FAOD550 200809010244 0244 Tiksi 4 0.1161 0.09580 0.09580 0.1211
FAOD550 200809010403 0352 Canberra 34 0.1069 0.1069 0.1069 0.1069 0.1175 0.1175 0.08485 0.1923 0.1923 0.08548 0.08548 0.08548 0.02263 0.08074
FAOD550 200809010433 0244 Tiksi 3 0.06587 0.06587 0.08014
FAOD550 200809010604 0553 Dalanzadgad 26 0.04264 0.07384 0.1527 0.1018 0.1018 0.1078 0.07384 0.07384 0.1527 0.1527 0.1018 0.1078 0.06712 0.067
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FAOD550 200809010738 0727 IIT RGP EKT_Rol 7 0.05656 0.05656 0.05656 0.05656 0 0 0 0 0 0 0 0 0 0 0 0
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FAOD550 200809010916 0906 Dhadnah 9 0.3028 0.3381 0.3381 0.2939 0.3381 0.1858 0.1858 0.1858
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