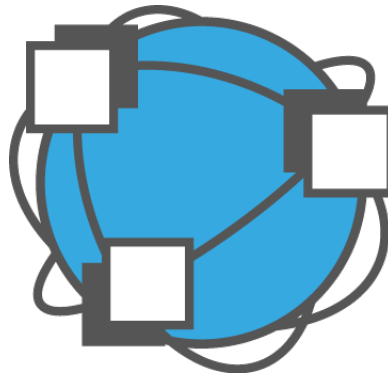


RadCalNet Status



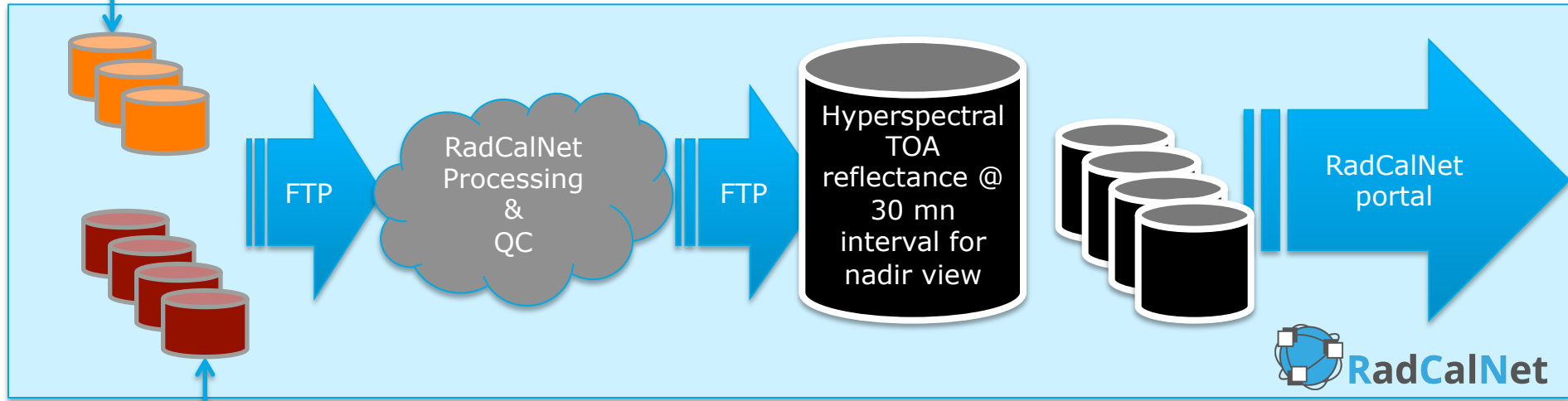
M. Bouvet on behalf of the RadCalNet WG



What is RadCalNet?

RadCalNet is a CEOS WGCV initiative to provide satellite operators with SI-traceable Top-of-Atmosphere (TOA) spectrally-resolved reflectances to aid in the post-launch radiometric calibration and validation of optical imaging sensors from a coordinated network of instrumented land-based test sites.

What is RadCalNet?



Timeline since last WGCV/IVOS meeting at Tucson



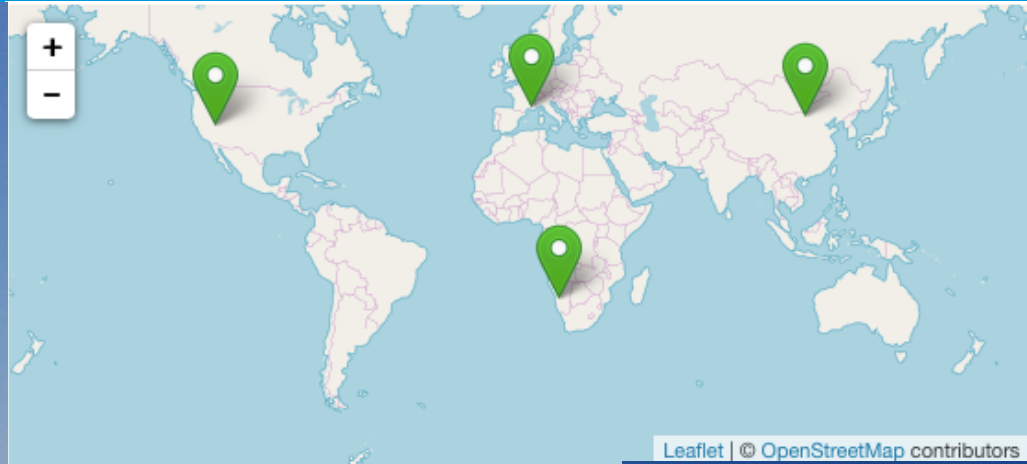
- March 2017: 1st RadCalNet beta user workshop and RadCalNet WG meeting #6 in Tucson
- July 2017: start of operation of new site Gobabeb
- Summer 2017: reprocessing of surface reflectance data from site owners to include additional quality indicators
- September 2017: full reprocessing of RadCalNet TOA reflectance data to propagate uncertainties
- November 2017: 2nd beta user workshop via webex
- March 2018: RadCalNet WG meeting #7 at ESTEC

The sites

- Since last year, efforts dedicated to:
 - ✓ Operationally running the existing sites and instrumentation updates / maintenance
 - ✓ Feeding surface and atmosphere measurements into the RadCalNet processing 'system'
 - ✓ Defining surface reflectance measurement uncertainties
 - ✓ Start operation at Gobabeb



The sites: Gobabeb



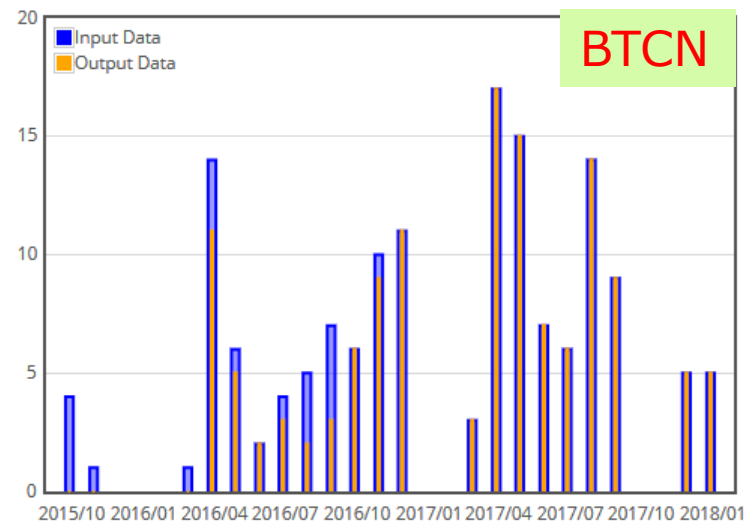
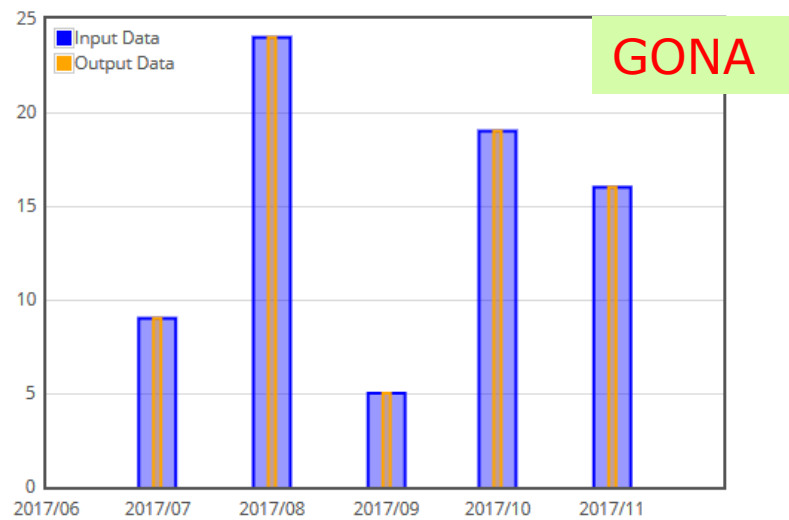
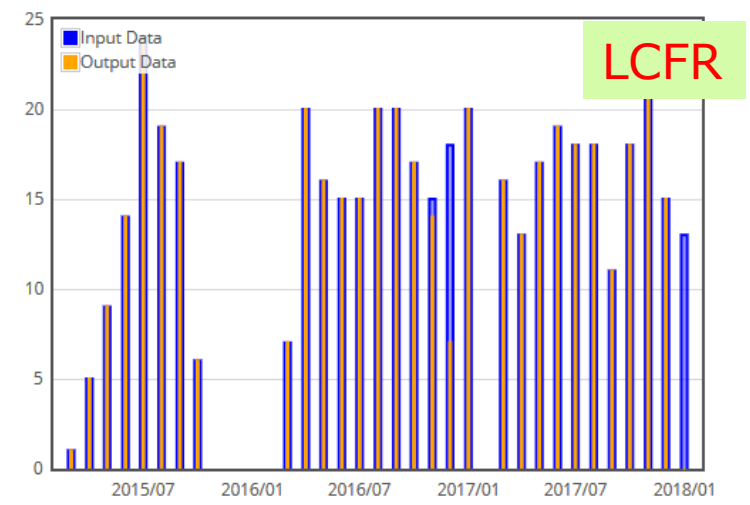
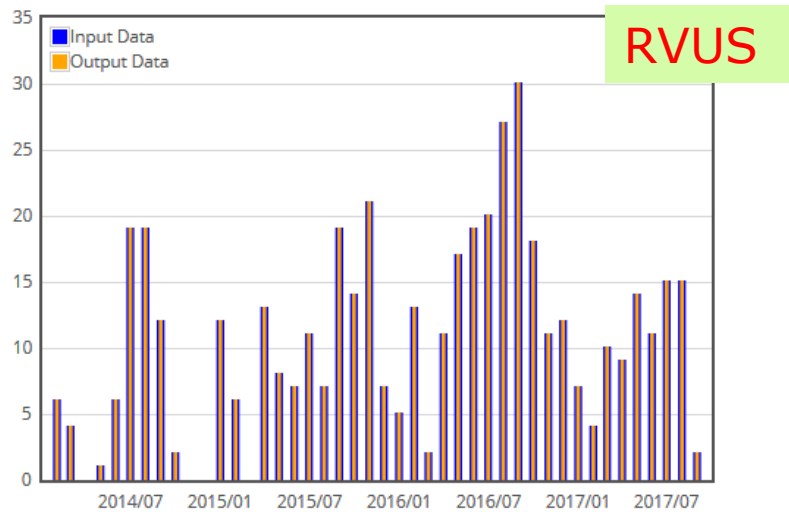
The data availability

1148 days with BOA reflectances
1104 days with TOA reflectances

| BOA | 2014 | 2015 | 2016 | 2017 | 2018 | Total |
|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| BTCN | 0 | 5 | 66 | 76 | 5 | 152 |
| GONA | 0 | 0 | 0 | 73 | 0 | 73 |
| LCFR | 0 | 95 | 163 | 186 | 13 | 457 |
| RVUS | 69 | 125 | 185 | 87 | 0 | 466 |

| TOA | 2014 | 2015 | 2016 | 2017 | 2018 | Total |
|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| BTCN | 0 | 0 | 52 | 76 | 5 | 133 |
| GONA | 0 | 0 | 0 | 73 | 0 | 73 |
| LCFR | 0 | 95 | 151 | 186 | 0 | 432 |
| RVUS | 69 | 125 | 185 | 87 | 0 | 466 |

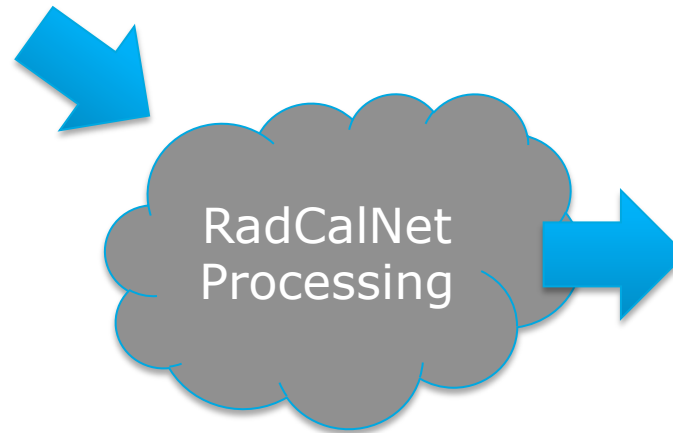
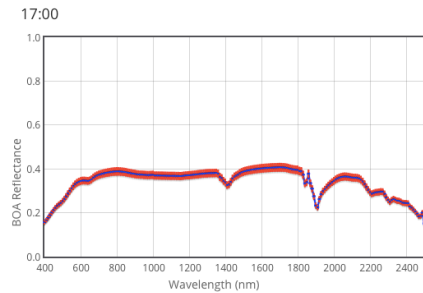
The data availability



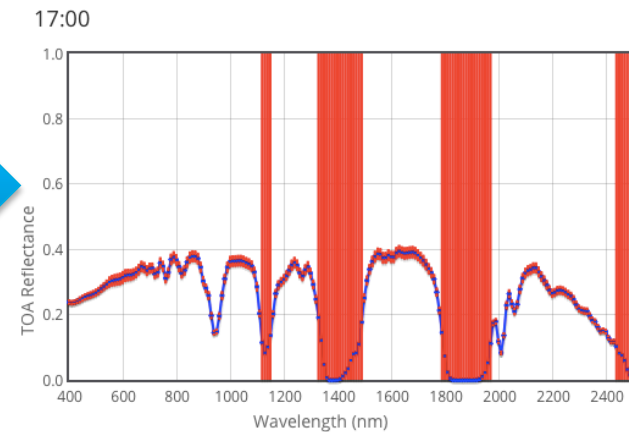
The RadCalNet processing

- MODTRAN 5
- TOA reflectance reprocessed last summer to include propagation of the surface / atmosphere uncertainties to TOA uncertainties via pre-computed LUT from Montecarlo MODTRAN runs

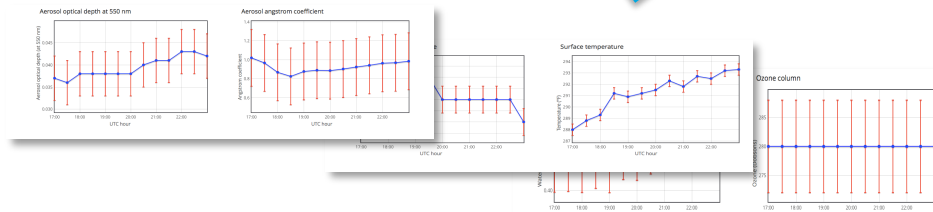
Surface reflectance



TOA reflectance

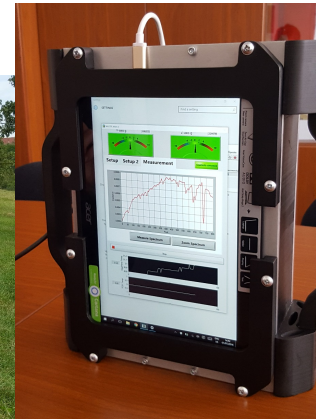
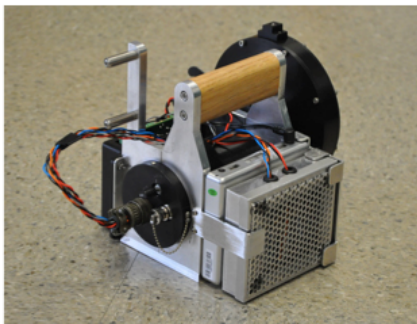


Atmospheric measurements



The BOA intercomparison of RadCalNet surface reflectance using portable transfer radiometers

- Objective: identify site-to-site radiometric differences at surface radiance (reflectance) level
- Status: site visits are in preparation by Univ. of Arizona and NPL



Documentation for users: site questionnaires

| Document title | Status |
|--|--|
| RadCalNet quick start guide | Available on RadCalNet portal |
| RadCalNet data format and processing | V7 available on RadCalNet portal |
| RadCalNet data policy | Done – Available on RadCalNet portal |
| CEOS site questionnaire – Template | V1 available on RadCalNet portal |
| CEOS site questionnaire - Baotou | Available on RadCalNet portal |
| CEOS site questionnaire - La Crau | Available on RadCalNet portal |
| CEOS site questionnaire – Railroad Valley Playa | Available on RadCalNet portal |
| CEOS site questionnaire – Gobabeb | Available on RadCalNet portal (version 28 Jun 2016) but being updated to reflect start of operations |
| Paper on measurement uncertainties - Baotou | Submitted version under review by RadCalNet WG |
| Paper on measurement uncertainties - La Crau | Submitted version under review by RadCalNet WG |
| Paper on measurement uncertainties – Railroad Valley Playa | Submitted version under review by RadCalNet WG |
| Paper on measurement uncertainties – Gobabeb | Submitted version under review by RadCalNet WG |

Documentation for candidate site owners: general documentation

| Document title | Status |
|---|------------------------------------|
| Requirement Document: membership criteria | Done – Available on RadCalNet site |
| Requirement Document : site data provision | In preparation |
| Good Practice Guide 1: site selection | In preparation |
| Good Practice Guide 2: site characterisation | In preparation |
| Good Practice Guide 3: site instrumentation and data processing | In preparation |
| Good Practice Guide 4: site quality assurance | In preparation |

The portal

Welcome to the Radiometric Calibration Network portal

The portal provides access to all RadCalNet datasets, allowing users to visualize and download data acquired by the four instrumented reference test sites.

- University of Arizona's site at Railroad Playa, Nevada, USA,
- AoE's site at Baotou, China,
- the CNES site at La Crau, France,
- the new ESA/CNES site in Gobabeb, Namibia.

These test sites provide nadir-view top-of-atmosphere reflectance at 30 minute intervals from 9am to 3pm local standard time at 10 nm intervals from 400 nm to 2500 nm. This is calculated from ground nadir-view reflectance measurements, and atmospheric measurements such as surface pressure, columnar water vapour, columnar ozone, aerosol optical depth and the Angstrom coefficient. Correction to top-of-atmosphere will be performed for all sites in the same way using Modtran.

The data are provided in a text format, defined in [RadCalNet_File_Specs_v7.pdf](#).

To download data from a site, please select a site.

To download complete data sets, please press the hyperlink [download all data](#). Users are also asked to consider RadCalNet data policies especially providing appropriate citations when displaying data downloaded from this site.

A quickstart guide for new users is available here : [RadCalNetQuickstartGuide_20180312.pdf](#).

20-Nov-2017

The RadCalNet project status was presented at Workshop #2. Presentations available on RadCalNet Documents/ Intercomparison Reports folder.

02-Feb-2017

RadCalNet file specification has been updated to describe the MODTRAN data processing.

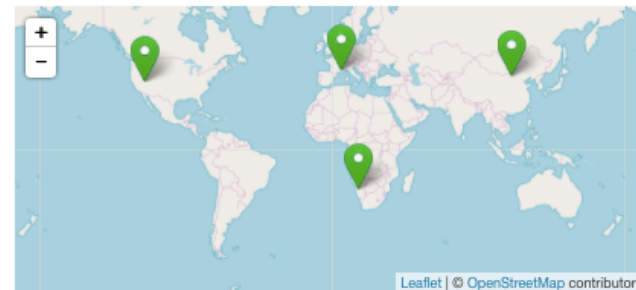
Please select a site :

Railroad Valley Playa

La Crau

Gobabeb

Baotou



[RadCalNet Documents](#)

The portal

Daily Data Access

Site Characteristics

Dataset monthly availability

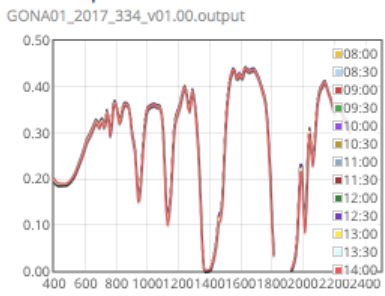
Last Spectrum

Site description

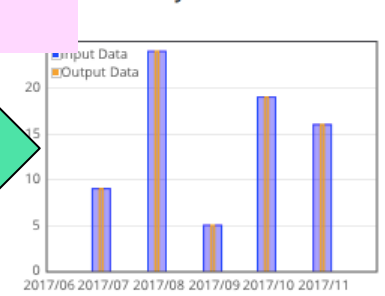
Site description

| | |
|-----------------|--|
| Gobabeb | Google earth site location : GONA.kmz |
| Latitude | -23.6002 |
| Longitude | 15.11956 |
| Altitude | 407m |
| Characteristics | The RadCalNet top-of-atmosphere reflectance spectra are representative of a disk of 30 m radius. |

Last output data



Data by month



Data file version

[Download version list](#)

Documentation

- Site Documentation
- Files
- [QA4EO-WGCY-IVO-CSP-002_GBNA.pdf](#)

The portal

Gobabeb

[return to site description](#)

Data



● All TOA simulations available for this day (every 30 mins between 9:00 and 15:00 Local Standard Time)

● TOA simulations only partially available for this day

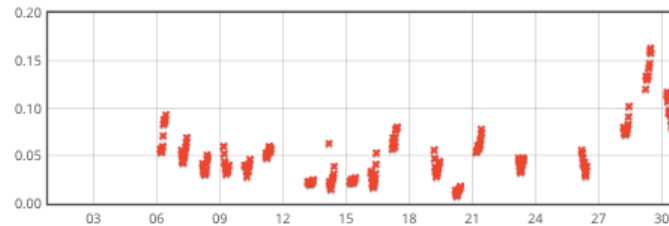
[Download daily data for all instruments](#)

Sensor : 01

Input version : 00

Output version : 01

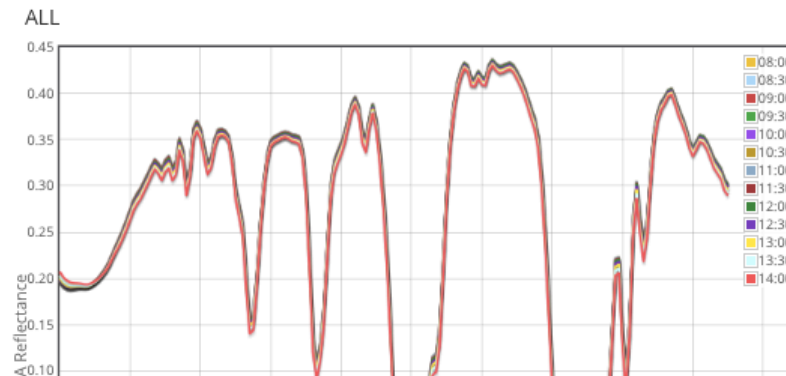
Monthly Aerosol Optical Depth at 550nm (Month 10)



[Atmospheric parameters](#)

[BOA Reflectance](#)

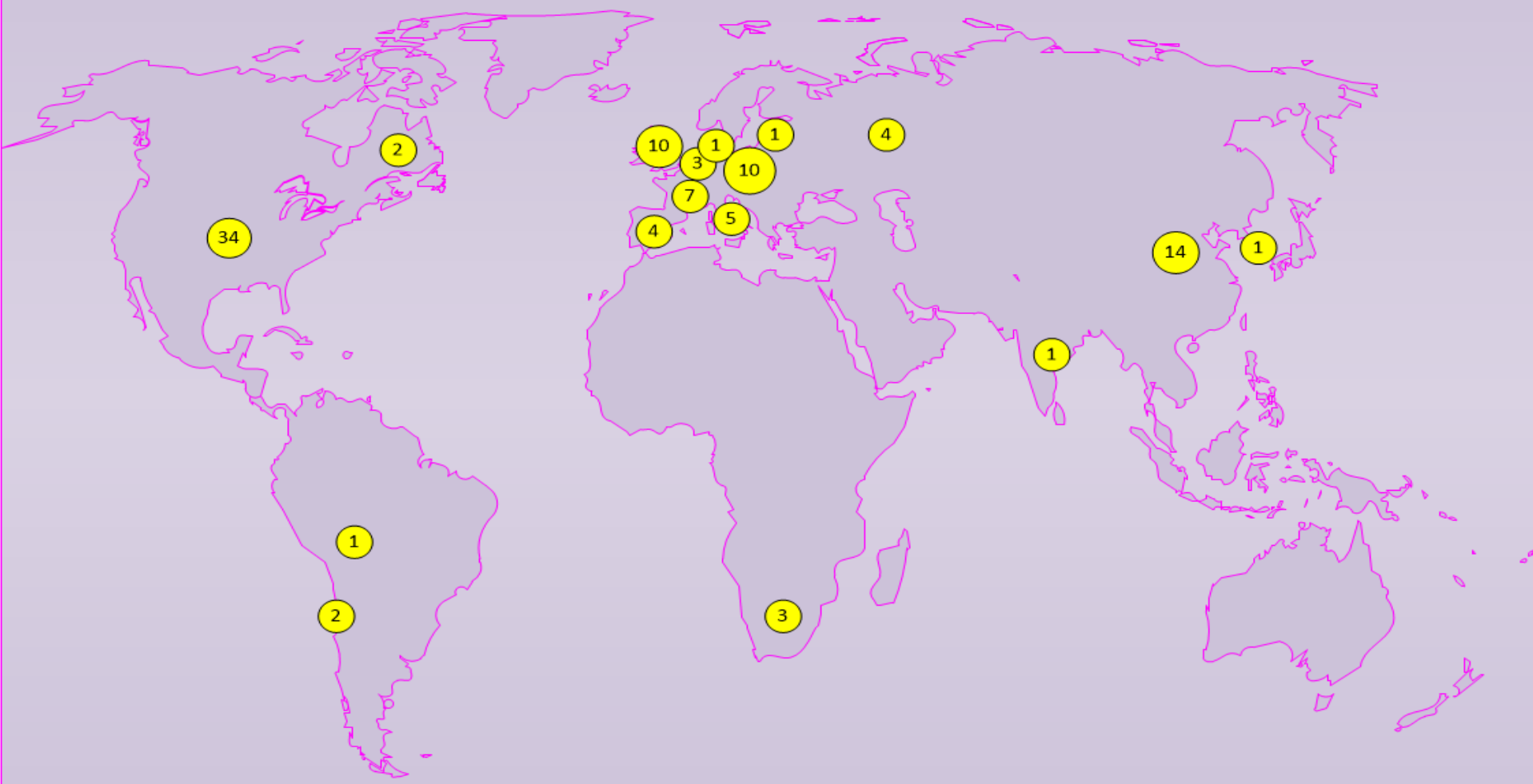
[TOA Reflectance](#)






Candidate public user

108 PUBLIC USER



Current beta users

18 Beta USER

- 
- ***Dove Constellation (N. Wilson)***
 - ***Proba-V (S. Adriaensen) (and S. Sterckx remotely)***
 - ***Sentinel-2 (B. Alhammoud)***
 - ***Rapideye Constellation (A. Brunn)***
 - ***GOES-13/15 (X. Wu)***
 - ***Landsat 7/Landsat 8/Sentinel-2 (D. Helder and X. Jing)***
 - ***CBERS04, ZY02C, ZY3, GF1 and GF2 satellites (Q. Han)***
 - ***Digital Globe sensors (T. Ochoa)***
 - ***MISR (C. Bruegge)***
 - ***...***



Beta Users Workshops Summary

- Beta users have expressed their interest in using RadCalNet data to support their operational sensor in-flight radiometric performance assessment (e.g.: Planet Labs)
- Beta users are being very instrumental in suggesting and pushing for improvements of what RadCalNet delivers
- Overall satisfied by the portal functionalities and documentation
- Beta users have carried out comparisons of RadCalNet TOA reflectance to space sensor measurements that give us some degree of confidence on RadCalNet data

Comparison of RadCalNet TOA reflectances to space sensor measurements

- Differences observed by beta users in indirect comparisons between RadCalNet TOA reflectance and sensor measurements are <10%
- Indirect comparisons suffer limitations due to BRDF effects and spectral sampling / resolution of the RadCalNet TOA reflectance in spectral regions with strong gaseous absorption
- Users are encouraged to look at TOA reflectance uncertainties and/or contact site owners when needing fitter for purpose data
- Ongoing discussions in RadCalNet WG on trade-off between making data directly useful for comparisons of RadCalNet data to all sensors vs. some sensors => Trade-off on: data volume, complexity of data processing and distribution, 'getting something out there or wait until it's perfect', providing working opportunities to site owners

Acceptance process for new sites



RadCalNet How to Become a RadCalNet Site



RadCalNet
RadCalNet operationally provides top-of-atmosphere reflectances from a set of instrumented land sites which can be used in the vicarious calibration / validation of satellite-borne sensors. Reflectances are provided every 30 minutes between 9 am and 3 pm site local time at 10 nm spectral intervals in the region 400 nm – 2500 nm. The RadCalNet WG is a technical group of site owners and other experts and is part of CEOS-WGCV-IVOS; the WGCV Review Panel makes recommendations to CEOS-WGCV on site admission.

Site Setup
The site owner initially sets up an instrumented land-based site. No communication with the RadCalNet working group is required, but guidance documents are available on site selection, characterisation and instrumentation and owners are welcome to contact the RadCalNet working group if desired.

- G1 – Site Selection
- G2 – Site Characterisation
- G3 – Site Instrumentation

Set up Site

Register Interest



Register

Site owners write a letter to the RadCalNet WG (contact below) with site details to register interest in becoming a RadCalNet site. This includes details of site location and site owner. A RadCalNet WG member will be assigned to help guide the site owner through the joining process. The requirements of RadCalNet are available and site operators should be confident they can meet these requirements before registering.

- R1 – Membership criteria
- Letter of Intent produced

Data

RadCalNet requires that 45 days of data are operationally provided to the portal (not yet public) before a site can be accepted. This data should be in the RadCalNet data format.

- R2 – Data specification
- 45 days' data

Documents

The site operator will need to submit to the working group documents describing the site, the instrumentation, processing and uncertainty analysis. Templates are available for all required documents.

- G4 – Uncertainties analysis
- T1 – Site questionnaire
- T2 – uncertainty summary

Submission



Peer-review
At this stage, in parallel with the provision of 45 days of data, the RadCalNet WG reviews the data and documents provided by the site and discusses this iteratively with the site owner. Site owners must provide evidence of the traceability to SI and uncertainty of their data and consequently consistency with other sites using existing or new comparisons and/or satellite observations.

- G5 – Peer review process

Submission

Following the RadCalNet WG's peer review of the site, the site's documentation and the peer review comments are submitted to the WGCV RadCalNet Review Panel for them to make a recommendation to CEOS WGCV on site admission.

Membership

Following approval by the CEOS WGCV, the site is a RadCalNet site, data is made public and the site-owner becomes a member of the RadCalNet WG.

- Process overseen by WGCV
- Through an acceptance pannel reporting to WGCV



Next steps

- Continue operation at the sites and on the portal for beta users
- Improve data latency
- Improve documentation: site data uncertainty statements, guideline documents for candidate sites.
- The 4 prototype sites are about to go through the formal RadCalNet acceptance process of WGCV
- RadCalNet open to the public

Questions?

