

SAO

SENTINEL ALPINE OBSERVATORY

ACCESS USER MANUAL

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1) Overview

Sentinel Alpine Observatory (SAO) is an initiative of the EURAC Institute for Applied Remote Sensing to foster ESA Sentinel based remote sensing applications for mountains and for the European Alps.

The resources at EURAC have been sized on the specific needs of the research on mountain environment, and both resources and Data (mainly Sentinel related, as well as MODIS, NPP, Landsat and in-situ and UAV) can be accessed with the help of two main components:

- Earth Observation – Environmental Data Archive
- Cloud Computing Services (Platform as a Service – PaaS)

Resources are accessible on the PaaS SAO platform via the *Spatial Data Infrastructure (SDI) Data catalogue*, the *Open Nebula Sunstone* self-service Computing Cluster portal, the *LoginApp* server and the *DMI (Data Management Interface)* server.

Earth Observation - Environmental Data Archive

EURAC EO and Environmental Archive is defined relying on a Software Defined Storage (SDS) based on CephFS, and has a RAW Capacity of 1,25 PB.

The Data are discoverable through a CSW compliant GeoNetwork catalogue and accessibility is granted according with specific and capillary policies.

<http://sdi.eurac.edu/>

Data Structure:

Base Data archive (MODIS, NPP, Landsat, SENTINEL-1, SENTINEL-2)

EURAC Product / SAO related added value products (SNOW, RGB, METEO)

COMPUTE_NFS/Project is a private NFS3 repository which can be used to store results. The Project name \$PROJECT is assigned along with the Login credentials:

```
projectdata.eurac.edu:/srv/compute/PROCESSING/DOMAINS/$PROJECT/
```

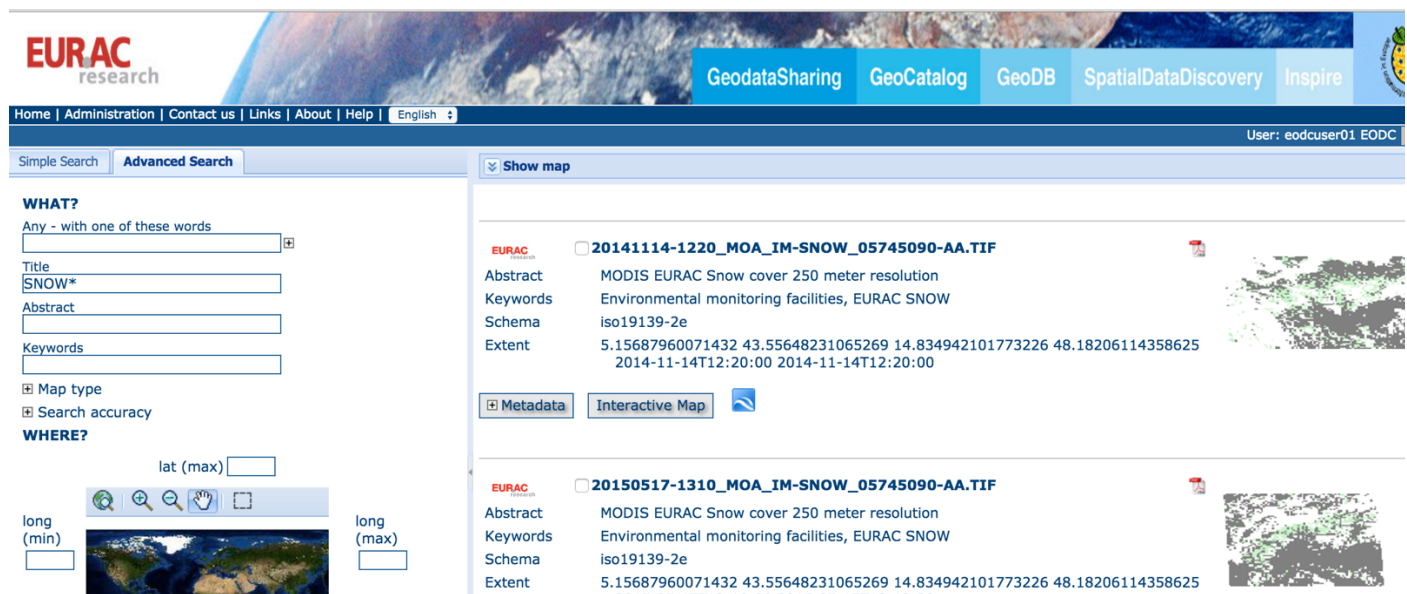
SDI Data catalogue (GeoNetwork)

The catalogue can be used to search for data registered inside the EURAC SDI

URL: sdi.eurac.edu

User: \$your_username

Pwd: (sent separately)



EURAC research

GeodataSharing GeoCatalog GeoDB SpatialDataDiscovery Inspire

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User: eodcuser01 EODC

Simple Search **Advanced Search** Show map

WHAT?
Any - with one of these words

Title
SNOW*

Abstract

Keywords

Map type

Search accuracy

WHERE?

lat (max)

long (min)

long (max)

EURAC ☐ **20141114-1220_MOA_IM-SNOW_05745090-AA.TIF**

Abstract MODIS EURAC Snow cover 250 meter resolution

Keywords Environmental monitoring facilities, EURAC SNOW

Schema iso19139-2e

Extent 5.15687960071432 43.55648231065269 14.834942101773226 48.18206114358625
2014-11-14T12:20:00 2014-11-14T12:20:00

Metadata Interactive Map

EURAC ☐ **20150517-1310_MOA_IM-SNOW_05745090-AA.TIF**

Abstract MODIS EURAC Snow cover 250 meter resolution

Keywords Environmental monitoring facilities, EURAC SNOW

Schema iso19139-2e

Extent 5.15687960071432 43.55648231065269 14.834942101773226 48.18206114358625
2015-05-17T13:10:00 2015-05-17T13:10:00

Fig. 2.1 EURAC SDI Catalog “Advanced Search” search example using “Title”

See APPENDIX 1.1 for short Catalog Documentation

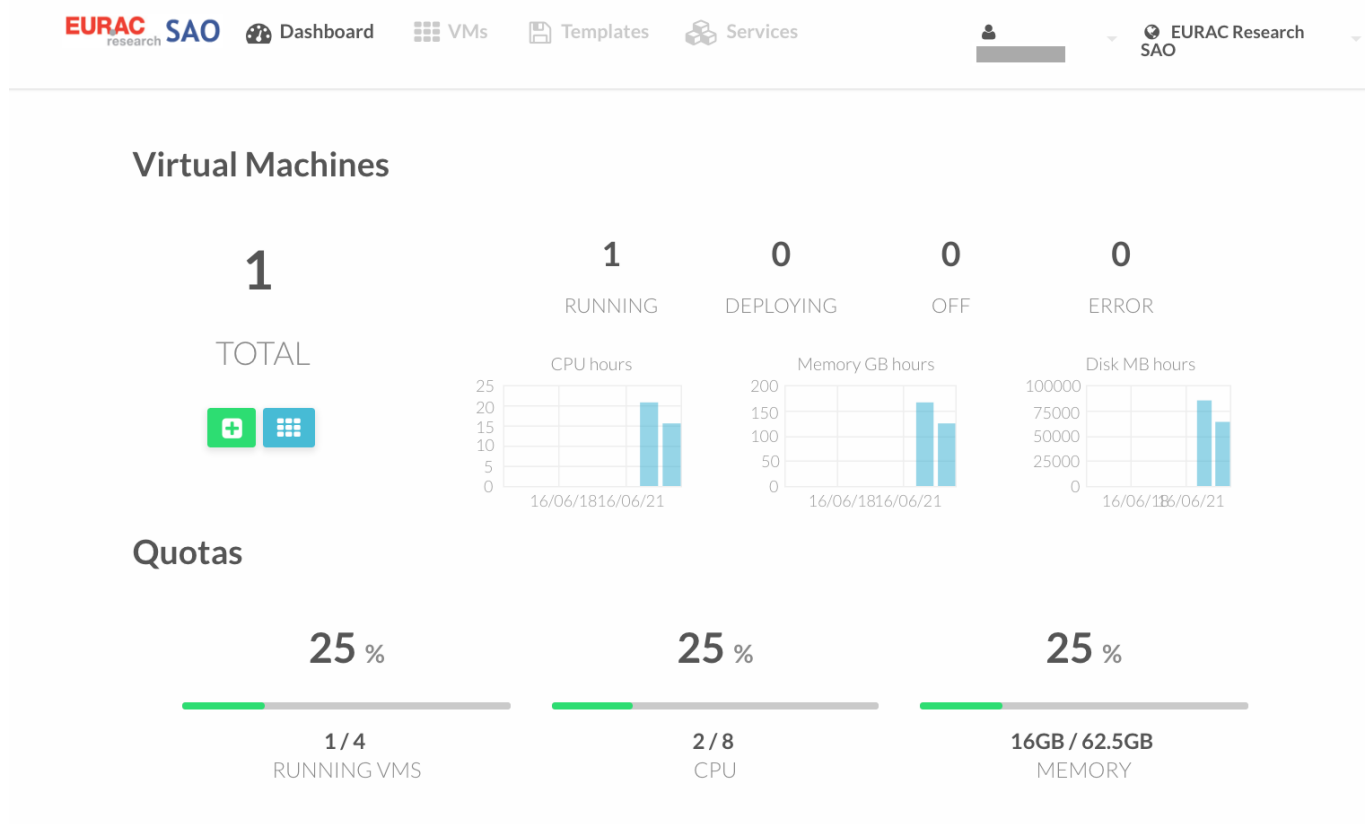
Cloud Computing Services (PaaS):

Computing Resources for processing Data available at EURAC are accessible via the Open Nebula Sunstone self-service portal.

Sunstone self-service portal (for Admin users)

The self-provisioning portal, allows to allocate resources and assign them to Virtual Machines.

Sunstone portal at EURAC:



See APPENDIX 2.1 for more screenshots

URL: http://saocompute.eurac.edu/opn_sunstone/

User: \$your_username

Pwd: (sent separately)

Quota: Typically 4 CPU (8 vCPU), 32 GB RAM, 100 GB NFS, CentOS 7.1 template

Note: Do not forget ending slash / in URL . Only Admins should access this service.

NOTE: EURAC Internal Users should access the following URL instead:

URL: <http://rseopn01.eurac.edu:9869/login> (VNC Viewer in VM works only here!!)

Once the resources are allocated through the Sunstone portal. The running VM's are accessible from the LoginApp with root@IP (no password required)

LoginApp

This server allows the external users to access allocated SAO resources. From here all created VMs are accessible with root@IP without password.

For security and network isolation issues there are two LoginApp's:

- For EURAC internal users (**rseloginapp01.eurac.edu**)
- For external users (**saocompute.eurac.edu**).

host: saocompute.eurac.edu OR 10.8.244.23

protocol: ssh

User: \$your_username

Pwd: (sent separately)

Note: External LoginApp accessible only for defined public IP's 193.170.203.0/24

DMI (Data Management Interface)

The Data Management Interface allows to mount provided sections of Base Data via SSHFS protocol.

host: abz01dmi.eurac.edu

protocol: sshfs

User: [\\$your_username@eurac.edu](mailto:$your_username@eurac.edu)

Pwd: (sent separately)

Data-Path: /mnt/CEPH_BASEDATA/Base_Data/SATELLITE/SENTINEL/

2) Meta Data and Data Access

Metadata can be searched using the EURAC SDI catalogue at

<http://sdi.eurac.edu/>

or using the CSW protocol with other client applications.

Data can be searched *by keywords, title, abstract, spatial extend and time frame*.
On request Metadata can be generated automatically when products are produced.
Also custom fields can be added to the metadata if required (ex. Cloud %, etc.)

NOTE: Keep in mind that the filename of a data entry is reported in the *Title*.
Therefor it's possible to make a fine grained query on the data by knowing the file naming convention. Here some examples:

Data naming conventions:

Product	Naming convention	Title field search pattern example
EURAC		
EURAC_RGB_P	EURAC_RGB_P.ALPS.H.2014.1216.1033.TIF	EURAC_RGB_P.ALPS.*
EURAC_SNOW_P	20140611-1155_MOA_IM-SNOW_05745090-AA.TIF	20140611*
EURAC_METEO_P	EURAC_METEO_P.ALPS.2015.0225.1039.DAYTIME.TIF	EURAC_METEO_P.ALPS.*
MODIS		
MCD15	MCD15A3.A2003053.H18V04.0052007278163122.hdf	MCD15A3*

MOD021KM	...	
....	...	
...	...	

Metadata will contain the path or OGC service to where data is located, under the TAG “*Online Resource*”

If the “Online Resource” is a file path, Data can be accessed via the **DMI** (Data Management Interface) server using the SSHFS protocol with the Eurac Domain User `gst_rseedc01`

2.1) Base Data

BaseData is organized in a hierarchical folder structure.

```
/mnt/CEPH_BASEDATA/Base_Data/
```

GIS GROUND METEO SATELLITE UAV

```
/mnt/CEPH_BASEDATA/Base_Data/SATELLITE/
```

ALOS ASTER BLUEMARBLE ENVISAT LANDSAT MODIS NPP RADARSAT
SENTINEL TERRASAR WORLDVIEW2
AMSRE AVNIR-2 COSMO IRS-6 MERIS MSG PRISM RAPIDEYE SPOT

In order to access BaseData sections from the allocated VMs, a user needs a valid EURAC Active Directory account to login on the DMI server, ex. `$your_user@eurac.edu`

The user may then mount via SSHFS, the BaseData sub folders where he has access to:
example:

```
sshfs -o allow_other $your_user@abz01dmi.eurac.edu:  
/mnt/CEPH_BASEDATA/Base_Data/SATELLITE/SENTINEL/SENTINEL-1/ /mnt/Sentinel/
```

3) Storage

A dedicated COMPUTE_NFS storage is available for storing output data.

Note: for writing data faster during processing, you should consider in first place the local drive(s), or available volatile RAM discs for storing processing data.

All created VM's have read-write NFS access to a defined computing share (ex. **\$PROJECT**) which can be mounted with NFS3 protocol

NFS Storage rw (2.9 TB)

add mount point to /etc/fstab

```
projectdata.eurac.edu:/srv/compute/PROCESSING/DOMAINS/$PROJECT /mnt/your mount_point  
nfs tcp,rw,soft,intr,rdirplus,rsize=1048576,wsiz=1048576,retrans=512,timeo=14 0 0
```

4) Guidelines

Data Access:

The access to data is regulated by Users and Groups.

AD User \$your_user@eurac.edu belongs to a specific group 'Sentiel Alpine Observatory'

Data Protection:

Sunstone:

Please consider the sunstone access should be used only for Administrative tasks, and should not be shared with scientific users

EURAC Data/Product List:

Raw

L1

L2

L3

Data Access Policy:

Raw and L1 L2 and L3 produced by EURAC are protected by read-only rights,

Capacità di archiviazione risultati/prodotti

Modalità di accesso ai risultati:

5) Security

IMPORTANT: Please keep the provided credentials secretly.

6) APPENDIX 1.1

Advanced Search Dialog example query

The screenshot displays the EURAC research Advanced Search interface. The top navigation bar includes links to GeodataSharing, GeoCatalog, GeoDB, SpatialDataDiscovery, and Inspire. The user is logged in as 'eodcuser01 EODC'. The search results are titled 'FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS'.

Search Criteria:

- WHAT?**
 - Any - with one of these words:
 - Title:
 - Abstract:
 - Keywords:
 - Map type: ☐
 - Search accuracy: ☐
- WHERE?**
 - lat (max):
 - long (min):
 - long (max):
 - lat (min):
 - Type:
 - Region:

Search Results:

Aggregated results matching search criteria : 1-10/1653 (page 1/166) , 0 selected Select : all, none actions on selection Sort by Change di

EURAC	Search Criteria	Abstract	Keywords	Schema	Extent	Metadata	Interactive Map
☐	EURAC_RGB_P.ALPS.H.2016.0607.1020.TIF	MODIS EURAC RGB product 250 meter resolution	Environmental monitoring facilities, EURAC MODIS RGB	iso19139-2e	3.8294020097387587 42.46384188297306 19.156513765883147 50.11888768696967 2016-06-07T10:20:00 2016-06-07T10:20:00	Metadata	Interactive Map
☐	EURAC_RGB_P.ALPS.H.2016.0606.1255.TIF	MODIS EURAC RGB product 250 meter resolution	Environmental monitoring facilities, EURAC MODIS RGB	iso19139-2e	3.8294020097387587 42.46384188297306 19.156513765883147 50.11888768696967 2016-06-06T12:55:00 2016-06-06T12:55:00	Metadata	Interactive Map

Metadata Result Detail

EURAC research

GeodataSharing GeoCatalog GeoDB SpatialDataDiscovery Inspire

Home | Administration | Contact us | Links | About | Help | English

User: eodcuser01 EODC

Default view
INSPIRE view
By Group
INSPIRE + EURAC
Community Profile view
ISO Core
ISO All
By Package
Metadata
Identification
Maintenance
Constraints
Spat. Info
Ref. system
Distribution
Data quality
App. schema
Catalog
Content Info
Acquisition Info
Ext. Info
XML view

EURAC_RGB_P.ALPS.H.2016.0607.1020.TIF

DEFAULT INFORMATION

Title: EURAC_RGB_P.alps.H.2016.0607.1020.tif
Abstract: MODIS EURAC RGB product 250 meter resolution

Data processing level
Text: 3

Product Level is the result processing at different levels before distribution to the users
Text: Level 3

Spatial resolution
Resolution
Pixel's size: 250.0 m

Extent
Geographic Element
Geographic Bounding Box

WGS 84 Google Mercator
North bound: 50.11889



Data extend and “Online Resource”

EURAC research

GeodataSharing GeoCatalog GeoDB SpatialDataDiscovery Inspire

Home | Administration | Contact us | Links | About | Help | English

User: eodcuser01 EODC

Simple Search Advanced Search

Reset
Options

- Applications
- Audio/Video
- Case studies, best practices
- Conference proceedings
- Datasets
- Directories
- Interactive resources
- Maps & graphics
- Other information resources
- Photo
- Registers
- Z3950 Servers

GeoRSS

- EURAC_METEO_P.alps.2016.0606.1255.daytime.tif
- 20160606-1255_MOA_IM-SNOW_05745090-AA.tif
- 20150909-1159_MOA_IM-SNOW_05745090-AA.tif
- 20150718-1000_MOT_IM-SNOW_05745090-AA.tif
- EURAC_RGB_P.alps.H.2016.0606.1255.tif
- EURAC_RGB_P.alps.H.2016.0607.1020.tif
- EURAC_METEO_P.alps.2016.0607.1020.daytime.tif
- EURAC_METEO_P.alps.2016.0606.1120.daytime.tif
- 20160606-1120_MOA_IM-SNOW_05745090-AA.tif
- EURAC_RGB_P.alps.H.2016.0606.1120.tif

Show map

West bound: 9.82940
East bound: 19.15651
South bound: 42.46384



Temporal Extent
Time position: 2016-06-07T10:20:00
Time position: 2016-06-07T10:20:00

OnLine resource
Interactive Map: **EURAC_RGB_P:EURAC_RGB_P**
(OGC-WMS Server: http://sdi.eurac.edu/geoserver/EURAC_RGB_P/wms?SERVICE=WMS&TIME=2016-06-07T10:20:00Z&)
View in Google Earth: **EURAC_RGB_P:EURAC_RGB_P**

Size of the dataset
Real: 29,784

IFF by clicking the “Online Resource” link you encounter this Error, please ZOOM IN the map, you should see the preview then

The screenshot displays the EURAC research Geoportal interface. At the top, the EURAC research logo is on the left, and navigation links for GeodataSharing, GeoCatalog, GeoDB, SpatialDataDiscovery, and Inspire are on the right. Below the header, a navigation bar includes links for Home, Administration, Contact us, Links, About, Help, and a language dropdown set to English. The user is identified as 'eodcuser01 EODC'.

The main interface is divided into several sections:

- Simple Search / Advanced Search:** Includes a 'Reset' button and a 'Options' icon.
- Left Panel (Dataset List):**
 - Applications
 - Audio/Video
 - Case studies, best practices
 - Conference proceedings
 - Datasets
 - Directories
 - Interactive resources
 - Maps & graphics
 - Other information resources
 - Photo
 - Registers
 - Z3950 Servers
- GeoRSS Section:**
 - EURAC_METEO_P.alps.2016.0606.1255.daytime.tif
 - 20160606-1255_MOA_IM-SNOW_05745090-AA.tif
 - 20150909-1159_MOA_IM-SNOW_05745090-AA.tif
 - 20150718-1000_MOT_IM-SNOW_05745090-AA.tif
 - EURAC_RGB_P.alps.H.2016.0606.1255.tif
 - EURAC_RGB_P.alps.H.2016.0607.1020.tif
 - EURAC_METEO_P.alps.2016.0607.1020.daytime.tif
 - EURAC_METEO_P.alps.2016.0606.1120.daytime.tif
 - 20160606-1120_MOA_IM-SNOW_05745090-AA.tif
 - EURAC_RGB_P.alps.H.2016.0606.1120.tif
- Map viewer:**
 - Buttons for Layer tree and Print.
 - Map controls including zoom in/out, pan, and a scale bar showing 1 : 69881841.
 - Error Message:**

```

Error rendering coverage on the fast path
org.geotools.references.operation.projection.ProjectionException: Latitude 440575*42.4'N is too cl
pole.
Latitude 440575*42.4'N is too close to a pole.
          
```
 - Legend:** A small legend box is visible at the bottom of the map viewer.

Data preview on Map via OCG services

The screenshot displays the EURAC research website's map viewer interface. The top navigation bar includes links to GeodataSharing, GeoCatalog, GeoDB, SpatialDataDiscovery, and Inspire. The main content area is divided into a left sidebar and a right map viewer.

Left Sidebar:

- Simple Search / Advanced Search:** Includes a "Reset" button and a "Options" link.
- Navigation Menu:**
 - Applications
 - Audio/Video
 - Case studies, best practices
 - Conference proceedings
 - Datasets
 - Directories
 - Interactive resources
 - Maps & graphics
 - Other information resources
 - Photo
 - Registers
 - Z3950 Servers
- GeoRSS Feed:**
 - EURAC_METEO_P.alps.2016.0606.1255.daytime.tif
 - 20160606-1255_MOA_IM-SNOW_05745090-AA.tif
 - 20150909-1159_MOA_IM-SNOW_05745090-AA.tif
 - 20150718-1000_MOT_IM-SNOW_05745090-AA.tif
 - EURAC_RGB_P.alps.H.2016.0606.1255.tif
 - EURAC_RGB_P.alps.H.2016.0607.1020.tif
 - EURAC_METEO_P.alps.2016.0607.1020.daytime.tif
 - EURAC_METEO_P.alps.2016.0606.1120.daytime.tif
 - 20160606-1120_MOA_IM-SNOW_05745090-AA.tif
 - EURAC_RGB_P.alps.H.2016.0606.1120.tif

Right Map Viewer:

- Map viewer:** Includes a "Layer tree" and a "Print" button.
- Map:** A satellite map of Europe with a snow overlay. The overlay is a white, textured area covering the Alps and surrounding regions.
- Legend:** A small legend box is visible at the bottom of the map viewer.
- Scale:** A scale bar at the bottom right indicates a scale of 1 : 17470460.

7) APPENDIX 2.1

SunStone Portal

Virtual Machine View

EURAC
research

SAO

Dashboard

VMs

Templates

Services

EURAC Research
SAO

Virtual Machines

Search VMs

ALL

test

x2 - 16GB - CentOS 7.2 - KVM SAO

10.8.245.20

eodcuser01 -3020s ago

6

Previous1Next

VM View Detail

EURAC
research

SAO

Dashboard

VMs

Templates

Services

EURAC Research
SAO

test

RUNNING

x2 - 16GB - CentOS 7.2 - KVM SAO

10.8.245.20

eodcuser01 4 Jun - ID: 23

CPU



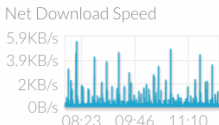
Net TX



Memory



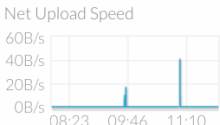
Net Download Speed



Net RX



Net Upload Speed



INSTITUTE FRO APPLIED REMOTE SENSING - TECHNOLOGY FOR ENVIRONMENTAL MONITORING

Sunstone web enabled VNC Viewer

