



IRIDE S2 Air Quality service

IRIDE Service Segment Lot 1

S2 Exploitation Tool & APIs User Guide

Updated at April 2024

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Next Generation EU (NGEU) is a programme of the European Union - Next Generation EU - funded by the Presidency of the Council of Ministers of the Italian Republic pursuant to Article 1 paragraph 2 of the Italian Law 30 March 2023 n. 14 (Conversione in legge del decreto legislativo 14 February 2023 n. 10 and article 1 of the Italian Law 28 February 2023 n. 10) and the European Union Recovery Instrument (EURI) of the European Union. The NGEU is managed by the Italian Government through the Ministry of Economic Affairs and Finance.



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DI RIPRESA E RESILIENZA



SECTION 1 – IRIDE S2 User Interface

Please consider that the Exploitation Tool of the S2 Air Quality service can be reached in two ways:

1) With the direct link to the S2 Exploitation Tool (ET)

<https://explorer.iride.adamplatform.eu>

(here the current User Guide is available see the on-line icon )

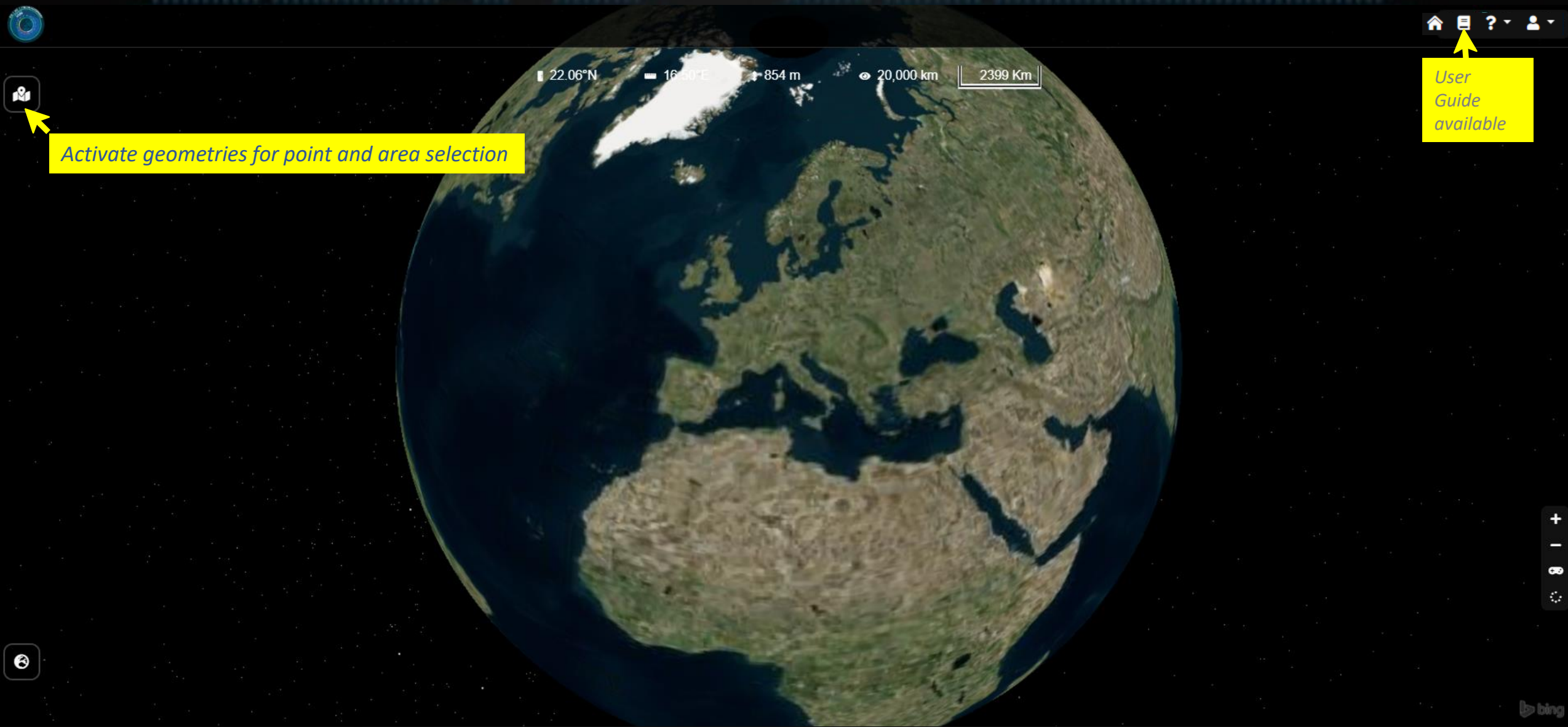
Access the IRIDE ET with the
IRIDE SSO account

or

2) Starting from IRIDE Catalogue:

<https://dev-portal.irideservices.earth>

S2-01 ET data viewer



Activate geometries for point and area selection

User Guide available

S2-01 ET data viewer

The screenshot shows the 'iride' interface for 'SE-S2 Air Quality'. The main view is a satellite image of Europe. On the left, there is a 'Geometries: 4' panel with a list of items: 'Point_Romapoint.geojson Point #1', 'Point_Modenapoint.geojson Point #1', 'Point_Bolognapoint.geojson Point #1', and 'Polygon_Italy.geojson Polygon #1'. Three yellow arrows point to the first three items. A yellow callout box above the list says: '1. Select Italy area and the desired points of interest to show the timeseries on those points'. Another yellow callout box above the map says: 'You could also add new point. Design a polygon or upload new geometries (geojson files)'. At the top right of the interface, there are navigation icons (home, list, help, user) and a title 'SE-S2 Air Quality'. A zoom control shows '20,000 km' and '2399 Km'. A Bing logo is visible in the bottom right corner of the interface.

You could also (from left to right):

- come back to home
- Read the **User Guide**
- have information on the **ET technology**
- have information on the **user profile** and extract the **API Key and the Token**

S2-01 ET data viewer

iride **SE-S2 Air Quality** 34.87°N 17.60°W -4,076 m 4,530 km 198 Km

- Point_Romapoint.geojson Point #1
- Point_Bolognapoint.geojson Point #1
- Polygon_Italy.geojson Polygon #1

- Keanalysis-PM10_S2-03-02 *0ug/m3*
- Reanalysis-PM25_S2-03-02 *0ug/m3*
- Sentinel3-AOD_S2-01-01 *0.003000000026077032*
- Sentinel5p-CloudTopHeight-NRT_S2-01-02 *0*
- Sentinel5p-CO-NRT_S2-01-02 *0.013250847347000000*
- Sentinel5p-HCHO-NRT_S2-01-02 *-0.004252300000000000*
- Sentinel5p-NO2-NRT_S2-01-02 *0.001879579649330000*

Datasets: 21 +

You could also:

- zoom in/out
- Change the background layer
- Activate the terrain exaggeration up/down
- Spin the globe

Open the product list

S2-01 ET data viewer: S2-01-02 Sentinel 5p NO2 (NRT)

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SE-S2 Air Quality

34.87°N 17.60°W -4,076 m 4,530 km 198 Km

Point_Romapoint.geojson Point #1
Point_Bolognapoint.geojson Point #1
Polygon_Italy.geojson Polygon #1

Available products on the Data Viewer

Product name	Dataset name on the ET Data viewer To visualize and download 2D data (.COG for maps and .csv for time series)
S2-01-01: S3-Satellite air quality data (EO ARD) From Sentinel 3 , not available on the Sentinel hub EO data sources as ARD.	Sentinel3-AOD_S2-01-01 (it includes historical and NRT data)
S2-01-02: S5p-Satellite air quality data (ARD) (from Sentinel 5p , not available on the Sentinel hub EO data sources as ARD)	Sentinel5p-O3-NRT_S2-01-02 / Sentinel5p-O3-OFFL_S2-01-02 Sentinel5p-CO-NRT_S2-01-02 / Sentinel5p-CO-OFFL_S2-01-02 Sentinel5p-HCHO-NRT_S2-01-02 / Sentinel5p-HCHO-OFFL_S2-01-02 Sentinel5p-NO2-NRT_S2-01-02 / Sentinel5p-NO2-OFFL_S2-01-02 Sentinel5p-SO2-NRT_S2-01-02 / Sentinel5p-SO2-OFFL_S2-01-02 Sentinel5p-cloudTopHeight-NRT_S2-01-02 / Sentinel5p-cloudTopHeight-OFFL_S2-01-02
kAIROS AQ forecast models visualization of 2D data and access to 2D and 3D data	2D data: kAIROS-model-PM10_S2-01-03 kAIROS-model-PM25_S2-01-03 kAIROS-model-NO2_S2-01-03
SVC-03 output (re-analysis products) visualization and dissemination	S2-03-01: Reanalysis-AQI_S2-03-01 Reanalysis-NO2_S2-03-01 Reanalysis-O3_S2-03-01 S2-03-02: Reanalysis-PM10_S2-03-02 Reanalysis-PM25_S2-03-02

Reanalysis-PM10_S2-03-02
Reanalysis-PM25_S2-03-02
Sentinel3-AOD_S2-01-01
Sentinel5p-CloudTopHeight-NRT_S2-01-02
Sentinel5p-CO-NRT_S2-01-02
Sentinel5p-HCHO-NRT_S2-01-02
Sentinel5p-NO2-NRT_S2-01-02

Select a product: S5p NO2 NRT

Datasets: 21

S2-01 ET data viewer: S2-01-02 Sentinel 5p NO2 (NRT)

Systematic product (NRT) over Italy, daily update.

Map visualization (the most recent of the day is shown in case of more than 1 images acquired per day)

Map subset (with download option)

Time series showed by default on the last 10 days (selected date + 9 previous days), with download option

You could also open the color table

You could change year/month/day

Open the Equalizer to change the colortable and range

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

10/10 < Mar 11 2024 >

35.71°N 17.49°W -4,406 m 4,484 km 196 Km

Point_Romapoint.geojson Point #1
Point_Bolognapoint.geojson Point #1
Polygon_Italy.geojson Polygon #1

reanalysis-PM2.5_S2-01-02
Sentinel3-AOD_S2-01-01
Sentinel5p-CloudTopHeight-NRT_S2-01-02
Sentinel5p-CO-NRT_S2-01-02
Sentinel5p-HCHO-NRT_S2-01-02
Sentinel5p-NO2-NRT_S2-01-02
Sentinel5p-O3-NRT_S2-01-02
Sentinel5p-SO2-NRT_S2-01-02

Datasets: 21

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esa

S2-01 ET data viewer: S2-01-02 Sentinel 5p NO2 (NRT)

Systematic product (NRT) over Italy, daily update.

31.63°N 16.38°W -4,438 m 4,484 km 196 Km

Point_Romapoint.geojson Point #1
Point_Bolognapoint.geojson Point #1
Polygon_Italy.geojson Polygon #1

Sentinel5p-NO2-NRT_S2-01-02
-0.000187957964353

Opacity: Colortable: 1. Close the Equalizer

Min: -0,0001879579 Max: 0,0015000562
Dataset Id Product Identifier

Datasets: 21

Sentinel5p-NO2-NRT_S2-01-02
Polygon_Italy.geojson Polygon #1

10/10 < Mar 11 2024 >

Sentinel5p-NO2-NRT_S2-01-02
Point_Romapoint.geojson Point #1

Sentinel5p-NO2-NRT_S2-01-02
Point_Bolognapoint.geojson Point #1

2. Click on the time series window to zoom-in

You could download the product files of the visualized period of time

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

S2-01 ET data viewer: S2-01-02 Sentinel 5p NO2 (NRT)

Systematic product (NRT) over Italy, daily update.

36.26°N 15.23°W -1.835 m 4,484 km 196 Km

Point_Romapoint.geojson Point #1
 Point_Bolognapoint.geojson Point #1
 Polygon_Italy.geojson Polygon #1

reanalysis-17m23_24-03-02
 Ouglm3

Sentinel3-AOD_S2-01-01
 0.630000000026077032 3.6766998767952783

Sentinel5p-CloudTopHeight-NRT_S2-01-02
 0 15445.0576171875

Sentinel5p-CO-NRT_S2-01-02
 0.013250847347000000 0.0055360002219677

Sentinel5p-HCHO-NRT_S2-01-02
 -0.0042523000001630023 0.0048162126913666725

Sentinel5p-NO2-NRT_S2-01-02
 0.00187957964935000000 0.015000562416389585

Sentinel5p-O3-NRT_S2-01-02
 0.11450396478176117 0.24122172594070435

Sentinel5p-SO2-NRT_S2-01-02

Datasets: 21 +

Here the zoomed-in the time series on Rome point

1. Download the .csv of the time series of the last 10 days

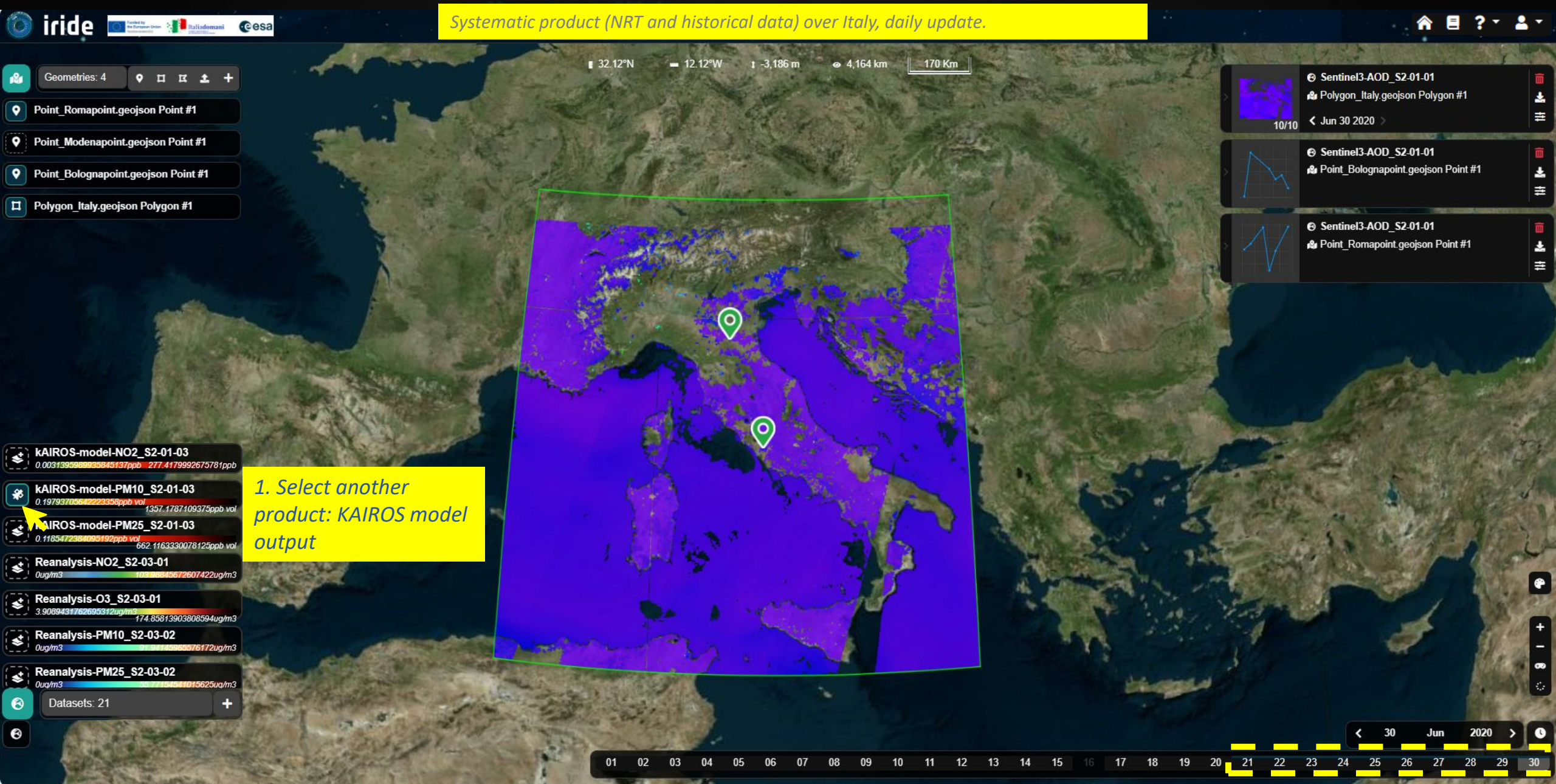
1	Point_Romapoint.geojson Point #1,"{'type': 'Point', 'coordinates': [
2	2024-03-02T11:27:48Z,0.00010758119606180117,
3	2024-03-02T11:32:48Z,0.0001075804975698702,
4	2024-03-02T13:12:48Z,5.12790575157851e-05,
5	2024-03-03T11:12:48Z,5.719166074413806e-05,
6	2024-03-03T12:52:48Z,5.978146873530932e-05,
7	2024-03-04T12:32:48Z,9.970846440410241e-05,
8	2024-03-05T12:12:48Z,0.0001664527808316052,
9	2024-03-06T11:52:48Z,7.000456389505416e-05,
10	2024-03-06T11:57:48Z,7.000520417932421e-05,
11	2024-03-07T11:37:48Z,9.909152140608057e-05,
12	2024-03-08T11:17:48Z,0.00011094669753219932,
13	2024-03-08T12:57:48Z,7.939992065075785e-05,
14	2024-03-09T10:57:48Z,0.0001042018920998089,
15	2024-03-09T12:37:48Z,8.076847734628245e-05,
16	2024-03-10T12:17:48Z,7.774506229907274e-05,
17	2024-03-10T12:22:48Z,7.774453843012452e-05,
18	2024-03-11T12:02:48Z,8.21558351162821e-05,

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

3. Select another product

2. De-select the current product (or keep it selected if you want to overlap it with another map)

S2-01 ET data viewer: S2-01-01 Sentinel 3 AOD



Modelled by the European Union. The IRIDE model is a programme of the European Union - Next Generation EU. It is funded by the Presidency of the Council of Ministers of the Italian Republic pursuant to Article 1 paragraph 24a of the Italian Law 98/2013 of 11 July 2013, in the framework of the National Recovery and Resilience Plan (NRRP) 2021-2026, Mission 4, Component 1, Investment 1.1 - Digitalisation of the Public Administration, funded by the European Union under the Next Generation EU Programme. The model is developed by the Italian Institute of Atmospheric Pollution Research (ISPRA) in collaboration with the Italian Ministry of the Environment, Land and Energy Security (MASE).



S2-01 ET data viewer: S2-01-03 Model output - kAIROS

Systematic product (NRT and historical data) over Italy, daily update.

45.75°N 4.21°E 506 m 4,345 km 241 Km

Point_Romapoint.geojson Point #1
Point_Bolognapoint.geojson Point #1
Polygon_Italy.geojson Polygon #1

kAIROS-model-NO2_S2-01-03
0.0031395989935845137ppb 277.4179992675781ppb

kAIROS-model-PM10_S2-01-03
0.19793705642223358ppb vol 1357.1787109375ppb vol

kAIROS-model-PM25_S2-01-03
0.1185472384095192ppb vol 662.1163330078125ppb vol

Reanalysis-NO2_S2-03-01
0ug/m3 103.98845672607422ug/m3

Reanalysis-O3_S2-03-01
3.9089431762695312ug/m3 174.85813903808594ug/m3

Reanalysis-PM10_S2-03-02
0ug/m3 93.94149889576172ug/m3

Reanalysis-PM25_S2-03-02
0ug/m3 53.77154041015625ug/m3

Datasets: 21

kAIROS-model-PM10_S2-01-03
Polygon_Italy.geojson Polygon #1
Mar 13 2024

kAIROS-model-PM10_S2-01-03
Point_Romapoint.geojson Point #1

kAIROS-model-PM10_S2-01-03
Point_Bolognapoint.geojson Point #1

Select another product: Re-analysis of PM2.5

The last three forecasted days are available (reflecting the retention policy of the kAIROS server)

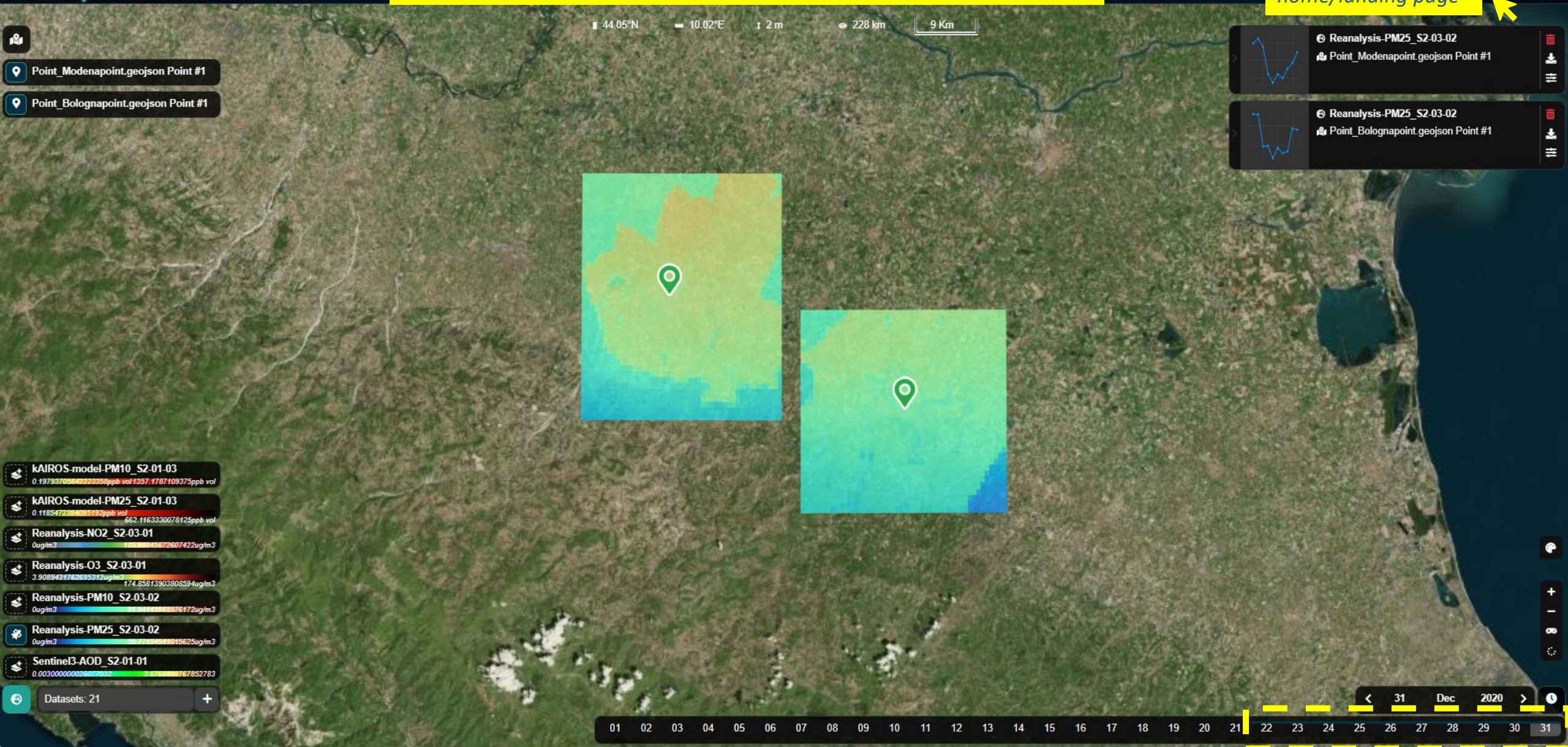
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

S2-01 ET data viewer: S2-01-03 Reanalysis-PM25



On-demand product (historical data) over Rome, Bologna and Modena.

Come back to the home/landing page



- Point_Modenapoint.geojson Point #1
- Point_Bolognapoint.geojson Point #1

- Reanalysis-PM25_S2-03-02
Point_Modenapoint.geojson Point #1
- Reanalysis-PM25_S2-03-02
Point_Bolognapoint.geojson Point #1

- kAIROS-model-PM10_S2-01-03
0.197937056422335ppb vol f357.1787109375ppb vol
- kAIROS-model-PM25_S2-01-03
0.1185472384095192ppb vol 662.116330078125ppb vol
- Reanalysis-NO2_S2-03-01
0ug/m3 105.88943672607422ug/m3
- Reanalysis-O3_S2-03-01
3.9089431762685312ug/m3 174.85813903808594ug/m3
- Reanalysis-PM10_S2-03-02
0ug/m3 3.9143365376172ug/m3
- Reanalysis-PM25_S2-03-02
0ug/m3 3.9143365376172ug/m3
- Sentinel3-AOD_S2-01-01
0.003000000000000000 3.678989767852783

Datasets: 21



Modelled PM25 concentration. The PM25 modelled data is a product of the European Union - Next GenerationEU funded by the Presidency of the Council of Ministers of the Italian Republic pursuant to Article 1 paragraph 2(a) of the Italian Law 98/2013 of 30 August 2013 in the framework of the project of the Italian Republic for the development of the national PM25 model. The modelled data is available for the period from 01/01/2020 to 31/12/2020.



S2-01 ET for on-line archive data access



SE-S2 Air Quality



Welcome to the IRIDE S2 Air Quality Service

User
Guide
available

The purpose is to support the operational users, in charge of the generation of the products and model outputs for the management of air quality in using EO based services, to improve air quality model results.

You are now on the web application that is a unique point of access for:

- (i) collecting and orchestrating air quality data from heterogeneous sources
- (ii) visualizing 2D air quality data maps
- (iii) disseminating forecast model output, co-located EO+ground data and re-analysis model output.

Available Case Studies:

S2-01 Data viewer
AQ Monitoring and Forecast data (Satellite, AQ model output, re-analysis results)

No Login Required

S2 Products On-line Archive
3D AQ model output, AQ co-located Satellite&Ground-based Remote Sensing data, AQ re-analysis products

Login Required

S2 Jupyter Notebook
Time Series statistics on Air Quality model output

Login Required

Select the On-line archive to access the other data (3D data and .nc)



S2-01 ET for on-line archive data access



SE-S2 Air Quality

S2 Air Quality Service On-line Archive

The archive contains the downloadable S2 Air Quality products not visualized by the Data Viewer:

- 3D AQ model output from kAIROS and FORAIR-IT (S2-01 output)
- AQ co-located Satellite and Ground-based Remote Sensing data (S2-02 output)
- AQ re-analysis model results at national scale (S2-03 level-2 output)

- [S2-01 AQ model output by ARPAE](#) [kAIROS AQ model output]
- [S2-01 AQ model output by ENEA](#) [FORAIR-IT AQ model output]
- [S2-02 output on-line archive](#) [AQ co-located SATellite and Ground-based Remote Sensing data]
- [S2-03 output on-line archive](#) [AQ re-analysis model results at national scale]

Available products on the On-line archive	
Product name	Files on the ET on-line archive/ftp server To access and download 3D data and .nc files (.nc, .tif, .geojson)
S2-01 AQ model output by ARPAE/SNPA kAIROS AQ forecast models visualization of 2D data and access to 2D and 3D data	2D NRT and historical (3D data till 3 Nov 2023): /ftp/ARPAE/NRT/ (last forecasted 3 days) /ftp/ARPAE/asi-ispra-qa.datamb.it/ (2019/2020)
S2-01 AQ model output by ENEA FORAIR-IT AQ forecast models Access to 3D data	3D NRT data: /ftp/ENEA/3D (last forecasted 3 days)
SVC-02 output (co-located EO+ground data) Access to data (structured as 3D data)	NRT and historical data (S2-02-01 for PM10 and PM2.5, S2-02-02 for NO2, O3, CO, HCHO, SO2): /ftp/SERCO/Historical_data_S2-02/ /ftp/SERCO/NRT_S2-02/
SVC-03 output (re-analysis products) visualization and dissemination	Historical data: /ftp/ST/Combined-trace-gases-reanalysis_S2-03-01/ /ftp/ST/Combined-PM-reanalysis_S2-03-02/



Modellele, mivno apne ha nante use in to may be able to find the exact use under the European Union...
 Govern...
 Govern...
 Govern...







S2-01 ET for on-line archive data access

S2 Air Quality Service On-line Archive

The archive contains the downloadable S2 Air Quality products not visualized by the Data Viewer:

- 3D AQ model output from kAIROS and FORAIR-IT (S2-01 output)
- AQ co-located Satellite and Ground-based Remote Sensing data (S2-02 output)
- AQ re-analysis model results at national scale (S2-03 level-2 output)

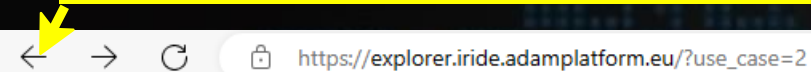
- 
[S2-01 AQ model output by ARPAE](#) [kAIROS AQ model output]

Select S2-01-03
AQ kAIROS model
output
- 
[S2-01 AQ model output by ENEA](#) [FORAIR-IT AQ model output]
- 
[S2-02 output on-line archive](#) [AQ co-located SATellite and Ground-based data]
- 
[S2-03 output on-line archive](#) [AQ re-analysis model results at national scale]



S2-01 AQ FORAIR-IT 3D model output

3. Use the BACK button of the toolbar of your browser to come back to the On-line archive home page



Index of /ftp/ENEA/

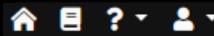
3D/ 22-Nov-2023 13:08
 1. access the S2-01 3D ENEA model output

Index of /ftp/ENEA/3D/

..		
FARM_conc_g2_20231120_D1.nc	22-Nov-2023 12:47	12948511943
FARM_conc_g2_20231120_D2.nc	22-Nov-2023 13:08	12948511943
FARM_conc_g2_20231120_D3.nc	22-Nov-2023 13:18	12948511943
FARM_conc_g2_20231121_D3.nc	22-Nov-2023 12:33	12948511943
FARM_conc_g2_20231122_D1.nc	22-Nov-2023 10:24	12948511943
FARM_conc_g2_20231122_D2.nc	22-Nov-2023 10:39	12948511943
FARM_conc_g2_20231122_D3.nc	22-Nov-2023 10:59	12948511943

2. download the .nc file by selecting one of it

S2-01 ET for on-line archive data access



S2 Air Quality Service On-line Archive

The archive contains the downloadable S2 Air Quality products not visualized by the Data Viewer:

- 3D AQ model output from kAIROS and FORAIR-IT (S2-01 output)
- AQ co-located Satellite and Ground-based Remote Sensing data (S2-02 output)
- AQ re-analysis model results at national scale (S2-03 level-2 output)

[S2-01 AQ model output by ARPAE](#) [kAIROS AQ model output]

[S2-01 AQ model output by ENEA](#) [FORAIR-IT AQ model output]

[S2-02 output on-line archive](#) [AQ co-located SATellite and Ground-based Remote Sensing data]

[S2-03 output on-line archive](#) [AQ re-analysis model results at national scale]

Select S2-02 output folder for co-located EO and Ground based remote sensing data



S2-02 output

Index of /ftp/SERCO/

Historical data S2-02/	28-Feb-2024 15:29	-
NRT S2-02/	28-Feb-2024 14:58	-

Index of /ftp/SERCO/NRT_S2-02/

AOD-satellite and groundbased S2-02-01/	28-Feb-2024 14:57	-
Pollutants-satellite and groundbased S2-02-02/	28-Feb-2024 14:58	-

Index of /ftp/SERCO/NRT_S2-02/Pollutants-satellite_and_groundbased_S2-02-02/

CO-sat-gb S2-02-02/	07-Mar-2024 10:00	-
HCHO-sat-gb S2-02-02/	07-Mar-2024 10:08	-
NO2-sat-gb S2-02-02/	07-Mar-2024 13:39	-
O3-sat-gb S2-02-02/	07-Mar-2024 10:04	-
SO2-sat-gb S2-02-02/	07-Mar-2024 10:06	-

NO2-sat-gb-20240201 S2-02-02.geojson	29-Feb-2024 17:49	1628344
NO2-sat-gb-20240201 S2-02-02.nc	29-Feb-2024 17:49	200689
NO2-sat-gb-20240202 S2-02-02.geojson	29-Feb-2024 17:49	2207926
NO2-sat-gb-20240202 S2-02-02.nc	29-Feb-2024 17:49	258153
NO2-sat-gb-20240203 S2-02-02.geojson	29-Feb-2024 17:49	2243435
NO2-sat-gb-20240203 S2-02-02.nc	29-Feb-2024 17:49	259665
NO2-sat-gb-20240204 S2-02-02.geojson	29-Feb-2024 17:49	2326313
NO2-sat-gb-20240204 S2-02-02.nc	29-Feb-2024 17:49	267289
NO2-sat-gb-20240205 S2-02-02.geojson	29-Feb-2024 17:49	3520874
NO2-sat-gb-20240205 S2-02-02.nc	29-Feb-2024 17:49	404209
NO2-sat-gb-20240206 S2-02-02.geojson	29-Feb-2024 17:49	2093727
NO2-sat-gb-20240206 S2-02-02.nc	29-Feb-2024 17:49	253281
NO2-sat-gb-20240207 S2-02-02.geojson	29-Feb-2024 17:49	1738811
NO2-sat-gb-20240207 S2-02-02.nc	29-Feb-2024 17:49	209489
NO2-sat-gb-20240208 S2-02-02.geojson	29-Feb-2024 17:49	1538052
NO2-sat-gb-20240208 S2-02-02.nc	29-Feb-2024 17:49	180441
NO2-sat-gb-20240209 S2-02-02.geojson	29-Feb-2024 17:49	635148
NO2-sat-gb-20240209 S2-02-02.nc	29-Feb-2024 17:49	94801
NO2-sat-gb-20240210 S2-02-02.geojson	29-Feb-2024 17:49	134293
NO2-sat-gb-20240210 S2-02-02.nc	29-Feb-2024 17:49	29685
NO2-sat-gb-20240211 S2-02-02.geojson	29-Feb-2024 17:49	2061882
NO2-sat-gb-20240211 S2-02-02.nc	29-Feb-2024 17:49	235553
NO2-sat-gb-20240212 S2-02-02.geojson	29-Feb-2024 17:49	2066184
NO2-sat-gb-20240212 S2-02-02.nc	29-Feb-2024 17:49	235721
NO2-sat-gb-20240213 S2-02-02.geojson	29-Feb-2024 17:49	1979274
NO2-sat-gb-20240213 S2-02-02.nc	29-Feb-2024 17:49	232025
NO2-sat-gb-20240214 S2-02-02.geojson	29-Feb-2024 17:49	2136824
NO2-sat-gb-20240214 S2-02-02.nc	29-Feb-2024 17:49	246937
NO2-sat-gb-20240215 S2-02-02.geojson	29-Feb-2024 17:49	2444738
NO2-sat-gb-20240215 S2-02-02.nc	9-Feb-2024 17:49	276425
NO2-sat-gb-20240216 S2-02-02.geojson	9-Feb-2024 17:49	71272
NO2-sat-gb-20240216 S2-02-02.nc	9-Feb-2024 17:49	24280
NO2-sat-gb-20240217 S2-02-02.geojson	9-Feb-2024 17:49	2452333
NO2-sat-gb-20240217 S2-02-02.nc	9-Feb-2024 17:49	280857
NO2-sat-gb-20240218 S2-02-02.geojson	9-Feb-2024 17:49	1813820
NO2-sat-gb-20240218 S2-02-02.nc	9-Feb-2024 17:49	216777
NO2-sat-gb-20240219 S2-02-02.geojson	9-Feb-2024 17:49	2054273
NO2-sat-gb-20240219 S2-02-02.nc	9-Feb-2024 17:49	235217
NO2-sat-gb-20240220 S2-02-02.geojson	9-Feb-2024 17:49	2637649
NO2-sat-gb-20240220 S2-02-02.nc	9-Feb-2024 17:49	325617
NO2-sat-gb-20240221 S2-02-02.geojson	9-Feb-2024 17:49	3327679
NO2-sat-gb-20240221 S2-02-02.nc	9-Feb-2024 17:49	391881
NO2-sat-gb-20240222 S2-02-02.geojson	9-Feb-2024 17:49	1427689
NO2-sat-gb-20240222 S2-02-02.nc	9-Feb-2024 17:49	179833

NO2-sat-gb-20240224 S2-02-02.geojson
NO2-sat-gb-20240224 S2-02-02.nc
NO2-sat-gb-20240225 S2-02-02.geojson
NO2-sat-gb-20240225 S2-02-02.nc
NO2-sat-gb-20240227 S2-02-02.geojson
NO2-sat-gb-20240227 S2-02-02.nc

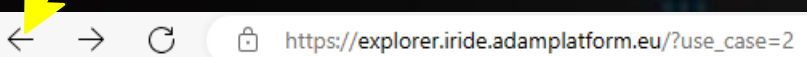
4. Download the .nc or .geojson file by selecting one of it

NO2-sat-gb-20240302 S2-02-02.geojson
NO2-sat-gb-20240302 S2-02-02.nc
NO2-sat-gb-20240303 S2-02-02.geojson
NO2-sat-gb-20240303 S2-02-02.nc
NO2-sat-gb-20240304 S2-02-02.geojson
NO2-sat-gb-20240304 S2-02-02.nc
NO2-sat-gb-20240305 S2-02-02.geojson
NO2-sat-gb-20240305 S2-02-02.nc
NO2-sat-gb-20240306 S2-02-02.geojson
NO2-sat-gb-20240306 S2-02-02.nc

```

20240302_NO2_11A.geojson
File Modifica Visualizza
},
"satellite_data": {
  "value": 2.33277e-05,
  "Long Name": "Vertical column",
  "Units": "mol m-2",
  "FillValue": 999.0
},
"satellite_data_uncertainty": {
  "value": 1.367718e-05,
  "Long Name": "Vertical column uncertainty",
  "Units": "mol m-2",
  "FillValue": 999.0
},
"mpa_data": {
  "value": 0.48,
  "Long Name": "In-situ concentration",
  "Units": "ug8hcg m-3",
  "FillValue": 999.0
},
"mpa_data_validity": {
  "value": 1.0,
  "Long Name": "In-situ concentration validity",
  "FillValue": 999.0
},
"mpa_data_verification": {
  "value": 1.0,
  "Long Name": "In-situ concentration verification",
  "FillValue": 999.0
},
"pandora_n_observations": {
  "value": 999.0,
  "Long Name": "Number of observations in the time interval",
  "FillValue": 999.0
},
"pandora_data_mean": {
  "value": 999.0,
  "Long Name": "Mean vertical column",
  "Units": "mol m-2",
  "FillValue": 999.0
},
"pandora_data_std": {
  "value": 999.0,
  "Long Name": "Standard deviation of the mean vertical column",
  "Units": "mol m-2",
  "FillValue": 999.0
}
    
```

5. Use the BACK button of the toolbar of your browser to come back to the On-line archive home page



S2-02 output

Open the downloaded product using QGIS and navigate through different satellite and ground-based co-locations

The screenshot shows the QGIS interface with a map of Europe. The map displays various cities and regions, with a yellow highlight on a specific location in the Alps. The Identify Results panel on the right shows detailed metadata for the selected feature, including network name, site name, coordinates, and various data fields.

Feature	Value
NO2-sat-gb-20240304_S2-02-02	
network_name	Long Name: Acronym of the in-situ/ground-based network used in the record, value: SNPA
site_name	Long Name: Name/identification code of the site of in-situ/ground-based network, value: IT1163A
longitude	Long Name: Longitude of the in-situ/ground-based network site, Units: degrees_east, value: 11.41639
latitude	Long Name: Latitude of the in-situ/ground-based network site, Units: degrees_north, value: 44.47222
satellite_sensing_time	Long Name: Time of observation as ISO 8601 date-time string (YYYY-mm-ddTHH:MM:SSZ), value: 2024-03-04T12:36:06Z
distance_site_pixel_center	Long Name: Distance between the in-situ/ground-based site and center of the satellite pixel, Units: km, value: 2.1538
satellite_data	Long Name: Vertical column, Units: mol m-2, _FillValue: 999, value: 0.0001456824
satellite_data_uncertainty	Long Name: Vertical column uncertainty, Units: mol m-2, _FillValue: 999, value: 8.414898e-05
snpa_data	Long Name: In-situ concentration, Units: ug m-3, _FillValue: 999, value: 11
snpa_data_validity	Long Name: In-situ concentration validity, _FillValue: 999, value: 1
snpa_data_verification	Long Name: In-situ concentration verification, _FillValue: 999, value: 3
pandora_n_observations	Long Name: Number of observations in the time interval centered on the satellite overpass, _FillValue: 999, value: 999
pandora_data_mean	Long Name: Mean vertical column, Units: mol m-2, _FillValue: 999, value: 999
pandora_data_std	Long Name: Standard deviation of the mean vertical column, Units: mol m-2, _FillValue: 999, value: 999
pandora_data_uncertainty	Long Name: Mean uncertainty of the vertical column, Units: mol m-2, _FillValue: 999, value: 999

S2-03 re-analysis output

Index of /ftp/ST/Combined-trace-gases-reanalysis_S2-03-01/Reanalysis-NO2_S2-03-01/Reanalysis-NO2_S2-03-01_nc/

../		
2018/	29-Feb-2024 10:24	-
2019/	29-Feb-2024 10:24	-

1

Index of /ftp/ST/Combined-trace-gases-reanalysis_S2-03-01/Reanalysis-NO2_S2-03-01/Reanalysis-NO2_S2-03-01_nc/2018/

../		
01/	29-Feb-2024 10:24	-
02/	29-Feb-2024 10:24	-
03/	29-Feb-2024 10:24	-
04/	29-Feb-2024 10:24	-
05/	29-Feb-2024 10:24	-
06/	29-Feb-2024 10:24	-
07/	29-Feb-2024 10:24	-
08/	29-Feb-2024 10:24	-
09/	29-Feb-2024 10:24	-
10/	29-Feb-2024 10:24	-
11/	29-Feb-2024 10:24	-
12/	29-Feb-2024 10:24	-

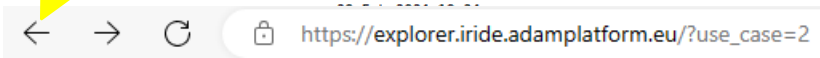
2

Index of /ftp/ST/Combined-trace-gases-reanalysis_S2-03-01/Reanalysis-NO2_S2-03-01/Reanalysis-NO2_S2-03-01_nc/2018/09/

../		
01/	29-Feb-2024 10:24	-
02/	29-Feb-2024 10:24	-
03/	29-Feb-2024 10:24	-
04/	29-Feb-2024 10:24	-
05/	29-Feb-2024 10:24	-
06/	29-Feb-2024 10:24	-
07/	29-Feb-2024 10:24	-
08/	29-Feb-2024 10:24	-
09/	29-Feb-2024 10:24	-
10/	29-Feb-2024 10:24	-
11/	29-Feb-2024 10:24	-
12/	29-Feb-2024 10:24	-
13/	29-Feb-2024 10:24	-
14/	29-Feb-2024 10:24	-
15/	29-Feb-2024 10:24	-
16/	29-Feb-2024 10:24	-
17/	29-Feb-2024 10:24	-
18/	29-Feb-2024 10:24	-
19/	29-Feb-2024 10:24	-
20/	29-Feb-2024 10:24	-
21/	29-Feb-2024 10:24	-
22/	29-Feb-2024 10:24	-
23/	29-Feb-2024 10:24	-
24/	29-Feb-2024 10:24	-
25/	29-Feb-2024 10:24	-
26/	29-Feb-2024 10:24	-
27/	29-Feb-2024 10:24	-
28/	29-Feb-2024 10:24	-
29/	29-Feb-2024 10:24	-
30/	29-Feb-2024 10:24	-

3

5. Use the BACK button of the toolbar of your browser to come back to the On-line archive home page



Index of /ftp/ST/Combined-trace-gases-reanalysis_S2-03-01/Reanalysis-NO2_S2-03-01/Reanalysis-NO2_S2-03-01_nc/2018/09/18/

../		
processed-no2_roma_20180918000000_20180918230000...	29-Feb-2024 10:24	589128

4. Download the .nc file by selecting one of it

OU-S2-01-01 web application for time series statistics

iride SE-S2 Air Quality 🏠 📄 ? 👤

Welcome to the IRIDE S2 Air Quality Service

The purpose is to support the operational users, in charge of the generation of the products and model outputs for the management of air quality in using EO based services, to improve air quality model results.

You are now on the web application that is a unique point of access for:

- (i) collecting and orchestrating air quality data from heterogeneous sources
- (ii) visualizing 2D air quality data maps
- (iii) disseminating forecast model output, co-located EO+ground data and re-analysis model output.

Available Case Studies:

Case Study	Description	Login Required
	S2-01 Data viewer AQ Monitoring and Forecast data (Satellite, AQ model output, re-analysis results)	No Login Required
	S2 Products On-line Archive 3D AQ model output, AQ co-located Satellite&Ground-based Remote Sensing data, AQ re-analysis products	Login Required
	S2 Jupyter Notebook Time Series statistics on Air Quality model output	Login Required

LOGIN

Login to access the Jupyter Notebook

OU-S2-01-01 web application for time series statistics

The screenshot shows a GitHub repository page for 'marcofole/notebooks'. The repository is public and has 0 forks and 0 stars. The main content is a Jupyter notebook named 'timeSeries.ipynb', which was changed by user 'fazzini' 2 hours ago. The notebook is displayed in 'Preview' mode, showing 791 lines of code and a size of 273 KB. A yellow callout box points to the notebook with the text 'source code on GitHub'. The notebook content includes a logo for 'iride' (GOVERNO ITALIANO | ASI | ESA) and a title 'Time Series statistics on Air Quality model output'. Below the title is a light blue box containing the following text:

How to compute statistics (minimum, maximum and average) on single point time series and the plot visualization for a specific dataset in the Adam catalogue, in this case applied to the Air Quality model output provided by ARPAE, by using searching and filtering functionalities provided through the API.

The notebook also includes an 'Introduction' section that states: 'This notebook shows how to implement an advanced search operation for a specific dataset, by using the functionalities provided in the Adam API, by defining a search operation using the filters enabled for a dataset selected in the catalogue. It extracts minimum, maximum and average values from a time series, by using searching and filtering functionalities provided through the Adam API. This notebook shows how to implement an advanced search operation for a specific dataset, by using the functionalities provided in the Adam API, by defining a'.

source code on GitHub



Time Series statistics on Air Quality model output

How to compute statistics (minimum, maximum and average) on single point time series and the plot visualization for a specific dataset in the Adam catalogue, in this case applied to the Air Quality model output provided by ARPAE, by using searching and filtering functionalities provided through the API.

Introduction

This notebook shows how to implement an advanced search operation for a specific dataset, by using the functionalities provided in the Adam API, by defining a search operation using the filters enabled for a dataset selected in the catalogue. It extracts minimum, maximum and average values from a time series, by using searching and filtering functionalities provided through the Adam API. This notebook shows how to implement an advanced search operation for a specific dataset, by using the functionalities provided in the Adam API, by defining a

From IRIDE Catalogue <https://dev-portal.irideservices.earth> to S2 ET



Catalog Contact

Thematic Areas



Coastal and Marine Monitoring



Air Quality



Ground Motion



Monitoring of land cover and use



Hydro-meteorology climate



Water Management



Emergency



Security

Access the S2 Air quality IRIDE service

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Italiadomani
PIANO NAZIONALE DI RIPRESA E RESILIENZA



From IRIDE Catalogue <https://dev-portal.irideservices.earth> to S2 ET

Example of SVC on-demand (SVC S2-03)

iride

Catalog Contact



Air Quality Monitoring and Forecast
[SE-S2-01]

Monitoring and assessment of pollutant emissions
[SE-S2-02]

Re-analysis of air quality at national scale
[SE-S2-03]

S2-02-03

Air quality

The main contribution of the IRIDE Service Segment in this application domain is a web service that provides 3D maps from prediction models, generated by institutional bodies. This platform allows access to all federated model data and satellite information necessary to support air quality monitoring and modeling activities. Moreover, the Service Segment of IRIDE provides geospatial products derived from satellite in support of pollutant monitoring.

The geospatial services of IRIDE dedicated to this application domain are:

- Support for monitoring and forecasting air quality
- Support for monitoring and evaluation of pollutant emissions
- Reanalysis of air quality on a national scale

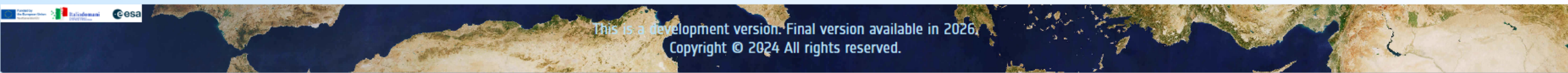
Stefania Pasetti (pasetti@meeo.it) ha eseguito l'accesso

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From IRIDE Catalogue <https://dev-portal.irideservices.earth> to S2 ET

Example of SVC on-demand (SVC S2-03)

The screenshot shows the IRIDE Catalogue interface. On the left, there is a sidebar with the 'Air quality' category selected, containing three sub-items: 'Air Quality Monitoring and Forecast [SE-S2-01]', 'Monitoring and assessment of pollutant emissions [SE-S2-02]', and 'Re-analysis of air quality at national scale [SE-S2-03]'. The main content area is titled 'Re-analysis of air quality at national scale' and includes a table with columns for 'GSP Products Catalogue', 'Description', and 'Precursor Phase Service Delivery Plan'. The table lists two products: '[OU-S2-03-01] Combined trace gases: NO2, O3, AOTI' and '[OU-S2-03-02] Combined PM: PM10, PM2.5'. A yellow callout box highlights the 'New Service Request' button and provides instructions: 'Use this button to request the generation of new re-analysis products on a new Aol and time window (the instruction to proceed will be provided by Planetek)'. Other buttons for 'Access to Products' are also visible.



From IRIDE Catalogue <https://dev-portal.irideservices.earth> to S2 ET

Example of a systematic SVC (SVC S2-01)



Air Quality Monitoring and Forecast
[SE-S2-01]

Open the Air quality
SVC S2-01-01

Monitoring and assessment
[SE-S2-02]

Re-analysis of air quality at national scale
[SE-S2-03]

Air quality

The main contribution of the IRIDE Service Segment in this application domain is a web service that provides 3D maps from prediction models, generated by institutional bodies. This platform allows access to all federated model data and satellite information necessary to support air quality monitoring and modeling activities. Moreover, the Service Segment of IRIDE provides geospatial products derived from satellite in support of pollutant monitoring.

The geospatial services of IRIDE dedicated to this application domain are:

- Support for monitoring and forecasting air quality
- Support for monitoring and evaluation of pollutant emissions
- Reanalysis of air quality on a national scale

Stefania Pasetti (pasetti@meco.it) ha eseguito l'accesso

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From IRIDE Catalogue <https://dev-portal.irideservices.earth> to S2 ET

Click outside the information box to close it

[OU-S2-01-02] Pollutants EO products

General	
Description & Content	Pollutants EO products (from Sentinel 5p) ready to be ingested and fused with Model output (not available on the Sentinel hub EO data sources as ARD). Available over Italy, covering the historical period 2018-2020 and in NRT starting from March to June 2024.
Classes or range values	SO2: - mol/m2 O3: 0-1 mol/m2 NO2: - mol/m2 CO: - mol/m2 HCHC: - mol/m2
Number of classes	NA
Format	Raster
Format Specifications	COG
Spatail Details	
Spatial Resolution (m)	3500-7000
Area of Interest	Italy (regions and urban areas)
Projection	EPSG: 4326
Temporal details	
Temporal Extent	[01-05-18; 31-12-20] - [01-03-24; 29-06-24]
Multitemporal-stack or single layer	Single layer
Temporal Resolution	Daily
Update Frequency	Daily
Production Time	12 solar hours
Operational details	
Activation Mode	Systematic

- Access to Products
- Access to Products
- Access to Products

From IRIDE Catalogue <https://dev-portal.irideservices.earth> to S2 ET



Air quality

Air Quality Monitoring and Forecast
[SE-S2-01]

Monitoring and assessment of pollutant emissions
[SE-S2-02]

Re-analysis of air quality at national scale
[SE-S2-03]

Air Quality Monitoring and Forecast.

GSP Products Catalogue

Description

Precursor Phase Service Delivery Plan

The Products are accessible clicking on the Access to Products button.

ATTENTION: "The geospatial contents included in the Living Lab may still be partially validated"

[OU-S2-01-01] [AOD EO products](#)

[OU-S2-01-02] [Pollutants EO products](#)

[OU-S2-01-03] [Web application](#)

Access to Products

Access to Products

Access to Products

Select the related tab
ACCESS TO PRODUCT
to access it

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From IRIDE Catalogue <https://dev-portal.irideservices.earth> to S2 ET

Iride Product Catalogue
Esa User
UTENTE REGISTRATO
Italiano ▾

✕
🔍
🏠

📄 ▾
« < 1 Risultati ▾ > »
Ordina per titolo (descending) ▾
🏠 ▾

	Titolo	Stato	Azioni
<input type="checkbox"/>	S2-01-02: S5p-Satellite air quality data (EO ARD), Italy, 12/07/2018		

« < 1 Risultati ▾ > »

▼ Map

OpenStreetMap contributors.

Filtri attivi ✕

Parole chiave [PROD_ID:S2-01-02](#)

▼ Filtro ▶ ▾

Aree Tematiche ▾

- TA:S2 (1)

SVCs ▾

- SVC:S2-01 (1)

Prodotti ▾

- PROD_ID:S2-01-02 (1)

Start temporal extent ▾

Note: the S2 catalogue is a project of the European Union - Next Generation EU funded by the Presidency of the Council of the Ministers of the Italian Republic pursuant to Article 1 paragraph 2(a) of the Italian Law 30/2017 of 28 February 2017 (Law of Conversion of the Decree-Law 101/2016 of 18 July 2016) and by the Italian Republic pursuant to Article 100 of the Italian Constitution.

The Italian Republic is the only beneficiary of the Italian Republic's contribution to the European Union's Next Generation EU. The Italian Republic is the only beneficiary of the Italian Republic's contribution to the European Union's Next Generation EU. The Italian Republic is the only beneficiary of the Italian Republic's contribution to the European Union's Next Generation EU.

41

Note: the S2 catalogue is a project of the European Union - Next Generation EU funded by the Presidency of the Council of the Ministers of the Italian Republic pursuant to Article 1 paragraph 2(a) of the Italian Law 30/2017 of 28 February 2017 (Law of Conversion of the Decree-Law 101/2016 of 18 July 2016) and by the Italian Republic pursuant to Article 100 of the Italian Constitution.

Funded by
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NextGenerationEU

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esa

From IRIDE Catalogue <https://dev-portal.irideservices.earth> to S2 ET

S2-01-02: S5p-Satellite air quality data (EO ARD), Italy, 12/07/2018

Satellite Air pollution observations from Sentinel 5p Tropomi instrument. Six products are available on the exploitation tool, one per each pollutant: O3, NO2, SO2, HCHO, CO vertical column density and Cloud Top Height

Estensione temporale
12-07-2018T00:00:00 → 28-02-2024T00:59:59

Discover data

API

<https://das.iride.adamplatform.eu/vmts?VERSION=1.1.1&REQUEST=GetCapabilities&SERVICE=WMS&>

Available link for GetCapabilities that shows the list of available WMS products

Scicare

https://explorer.iride.adamplatform.eu/?use_case=1

Available link to download the products (the same of the ET link)

Collegamenti

https://explorer.iride.adamplatform.eu/?use_case=1

Select this link to go to the S2 ET

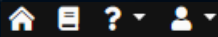
Access and use constraints

Access restricted to Pilot Users for Lot 1, Industrial Team for Lot 1, ESA IPT and authorized people by ESA IPT
Public access to spatial data sets and services would adversely affect the confidentiality of commercial or industrial information that is not generally known or that is confidential or otherwise protected by law.

S2-01-01 web application <https://explorer.iride.adamplatform.eu>



SE-S2 Air Quality



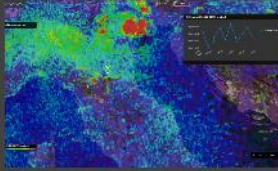
Welcome to the IRIDE S2 Air Quality Service

The purpose is to support the operational users, in charge of the generation of the products and model outputs for the management of air quality in using EO based services, to improve air quality model results.

You are now on the web application that is a unique point of access for:

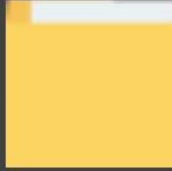
- (i) collecting and orchestrating air quality data from
- (ii) visualizing 2D air quality data maps
- (iii) disseminating forecast model output, co-located

Available Cases



S2-01 Data viewer
AQ Monitoring and Forecast data (Satellite, AQ model output, re-analysis results)

Login Required



S2 Products On-line
3D AQ model output, Satellite&Ground-based Sensing data, AQ products

Login Required



S2 Products On-line
3D AQ model output, Satellite&Ground-based Sensing data, AQ products

Login Required

LOGIN

Welcome back to S2 ET

you can go back to slide n.4 or, as alternative, if you want to visualize the products into your webGIS system, please follow the next instructions

From IRIDE Catalogue <https://dev-portal.irideservices.earth> to visualize WMS layers

IRIDE catalogue metadata

S2-01-02: S5p-Satellite air quality data (EO ARD), Italy, 12/07/2018

Satellite Air pollution observations from Sentinel 5p Tropomi instrument. Six products are available on the exploitation tool, one per each pollutant: O3, NO2, SO2, HCHO, CO vertical column density and Cloud Top Height

Estensione temporale
12-07-2018T00:00:00 → 28-02-2024T00:59:59

Discover data

API

WMS <https://das.iride.adamplatform.eu/vmts?VERSION=1.1.1&REQUEST=GetCapabilities&SERVICE=WMS&> **Aggiungi strato di servizio alla mappa**

Sc caricare

https://explorer.iride.adamplatform.eu/?use_case=1 **Scaricare**

Collegamenti

https://explorer.iride.adamplatform.eu/?use_case=1 **Apri link**

Access and use constraints

Access restricted to Pilot Users for Lot 1, Industrial Team for Lot 1, ESA IPT and authorized people by ESA IPT
Public access to spatial data sets and services would adversely affect the confidentiality of commercial or industrial information that is not generally known.

Copy the GetCapabilities link and open your webGIS system

Instruction on how to use the WMS link: example on QGIS

1. Open the Data Source Manager of QGIS

2. Create a new WMS connection

The screenshot shows the QGIS interface with the 'Data Source Manager' dialog box open. The 'WMS/WMTS' section is selected, and the 'Nuovo' button is highlighted. The dialog box contains the following fields and options:

- Layer:** test1getcap
- Buttons:** Cgnetti, Nuovo, Modifica, Rimuovi, Carica, Salva
- Table:** A table with columns: ID, Nome, Titolo, Riassunto.
- Codifica Immagine:** (Empty field)
- Opzioni:**
 - Dimensione tassello: (Empty field)
 - Richiedi dimensione passo: (Empty field)
 - Numero massimo di risultati GetFeatureInfo: 10
 - Coordinate di Riferimento Spaziale: EPSG:4326 - WGS 84
 - Usa la legenda WMS contestuale
- Nome layer:** (Empty field)
- Seleziona il/i layer:** (Empty field)
- Buttons:** Chiudi, Aggiungi, Aiuto

Instruction on how to use the WMS link: example on QGIS

1. Name the connection as you prefer

2. Paste the API/WMS link (copied from the IRIDE catalogue) but a token is required to be added...

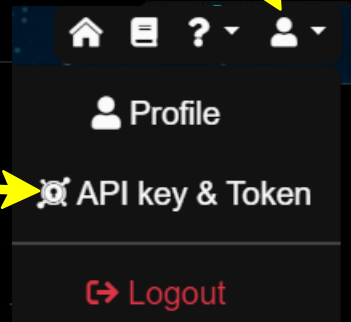
IRIDE catalogue metadata

3. To retrieve your token, login to ET from IRIDE catalogue (or directly <https://explorer.iride.adamplatform.eu>)

OK Annulla Aiuto

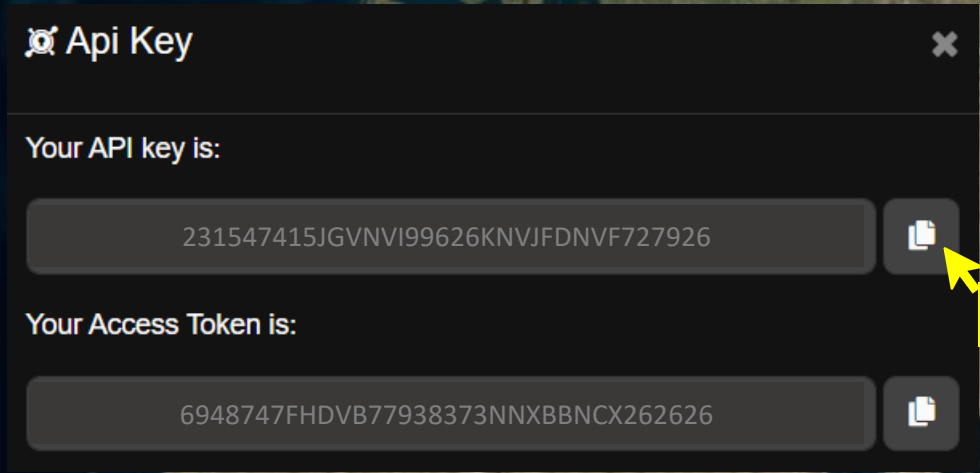
Token retrieval from ET panel

2. Access the user panel



A dropdown menu with a user icon at the top. It contains three items: 'Profile', 'API key & Token', and 'Logout'.

3. Request for your key



A dialog box titled 'Api Key' with a close button. It contains two sections: 'Your API key is:' with a text field containing '231547415JGVNVI99626KNVJFDNVF727926' and a copy icon; and 'Your Access Token is:' with a text field containing '6948747FHDVB77938373NNXBBCX262626' and a copy icon.

4. Copy your API key

Instruction on how to use the WMS link: example on QGIS

Crea una Nuova WMS/WMTS Connessione

Dettagli Connessione

Nome: iride-tokenOK

URL: `https://das.iride.adamplatform.eu/wmts?VERSION=1.1.1&token=1e665bd7fe56a2a4f2b98588b356dc`

Autenticazione

Configurazioni: Base

Scegli o crea una nuova configurazione di autenticazione

Nessuna Autenticazione

Le configurazioni memorizzano le credenziali criptate nel database di autenticazione di QGIS.

HTTP

Riferimento:

Opzioni WMS/WMTS

Modalità DPI: tutto

- Ignora la URI GetMap/GetTile/GetLegendGraphic riportata nelle capabilities
- Ignora la URI GetFeatureInfo riportata nelle capabilities
- Ignora orientamento assi (WMS 1.3/WMTS)
- Ignora estensioni riportate del layer
- Inverti l'orientazione degli assi
- Trasformazione con allisciamento

OK Annulla Aiuto

1. Add the string "&token=" to the URL and paste after the "=" the token retrieved from ET

2. Flag the first WMS option

3. Close the created connection

Api Key

Your API key is:

231547415JGVNVI99626KNVJFDNV727926

Your Access Token is:

6948747FHDVB77938373NNXBBCX262626

Please be sure to copy the most updated token from the ET platform as it has been refreshed every hour

Instruction on how to use the WMS link: example on QGIS

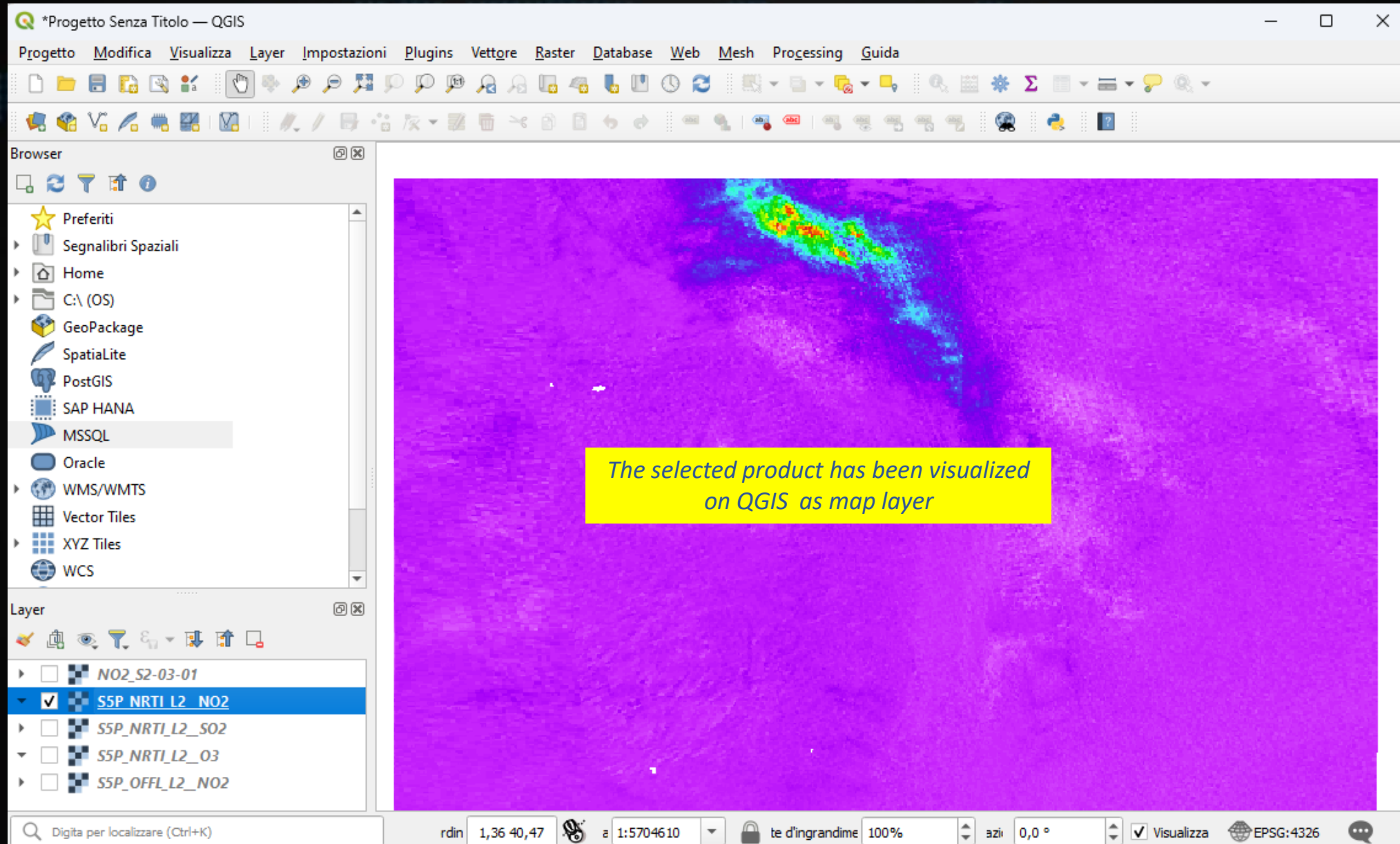
1. Activate the WMS connection from the Data Source Manager window

2. Select a product from the WMS list

3. Add the layer to visualize it

ID	Nome	Titolo	Riassunto
17	SSP_NRTI_L2_SO2	S5P_NRTI_L2_SO2	
19	SSP_NRTI_L2_CO	S5P_NRTI_L2_CO	
21	SSP_OFFL_L2_O3	S5P_OFFL_L2_O3	
23	SSP_NRTI_L2_O3	S5P_NRTI_L2_O3	
25	SSP_NRTI_L2_HCHO	S5P_NRTI_L2_HCHO	
27	SSP_NRTI_L2_NO2	S5P_NRTI_L2_NO2	
29	SSP_OFFL_L2_SO2	S5P_OFFL_L2_SO2	
31	S3_SY_2_AOD_	S3_SY_2_AOD_	
33	O3_S2-03-01	O3_S2-03-01	
35	NO2_S2-03-01	NO2_S2-03-01	
37	AQI_S2-03-01	AQI_S2-03-01	
39	PM10_S2-03-02	PM10_S2-03-02	

Instruction on how to use the WMS link: example on QGIS



From IRIDE Catalogue <https://dev-portal.irideservices.earth> to S2 ET

S2-01-02: S5p-Satellite air quality data (EO ARD), Italy, 12/07/2018

Satellite Air pollution observations from Sentinel 5p Tropomi instrument. Six products are available on the exploitation tool, one per each pollutant: O3, NO2, SO2, HCHO, CO vertical column density and Cloud Top Height

Estensione temporale
12-07-2018T00:00:00 → 28-02-2024T00:59:59

Discover data

API

<https://das.iride.adamplatform.eu/vmts?VERSION=1.1.1&REQUEST=GetCapabilities&SERVICE=WMS&>

Scaricare

https://explorer.iride.adamplatform.eu/?use_case=1

Collegamenti

https://explorer.iride.adamplatform.eu/?use_case=1

Access and use constraints

Access restricted to Pilot Users for Lot 1, Industrial Team for Lot 1, ESA IPT and authorized people by ESA IPT
Public access to spatial data sets and services would adversely affect the confidentiality of commercial or industrial information which is of a confidential nature.

You can go back to the IRIDE catalogue to explore the metadata or you can go back to the S2 ET from the catalogue or directly <https://explorer.iride.adamplatform.eu>

Hands-on session (S2-01-01 web application) <https://explorer.iride.adamplatform.eu>

Welcome to the IRIDE S2 Air Quality Service

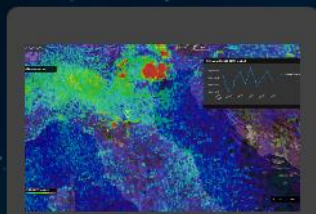
The purpose is to support the operational users, in charge of the generation of the products and model outputs for the management of air quality in using EO based services, to improve air quality model results.

You are now on the web application that is a unique point of access for:

- (i) collecting and orchestrating air quality data from
- (ii) visualizing 2D air quality data maps
- (iii) disseminating forecast model output, co-located

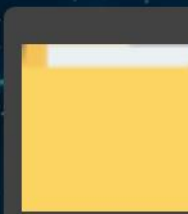
*Welcome back to S2 ET
To proceed, you can go back to slide n.4
Thank you for your attention and enjoy the
IRIDE S2 products!*

Available Case



S2-01 Data viewer
AQ Monitoring and Forecast data
(Satellite, AQ model output, re-analysis results)

Login Required



S2 Products On-line Archive
3D AQ model output, AQ co-located
Satellite&Ground-based Remote
Sensing data, AQ re-analysis
products

Login Required



S2 Jupyter Notebook
Time Series statistics on Air Quality
model output

Login Required

LOGIN



SECTION 2 – IRIDE S2 APIs (ADAMAPI) for machine-to-machine data access

The IRIDE S2 APIs are based on the **available ADAMAPI** and they allow:

- access to the complete list of datasets
- access to the products contained by such dataset
- access to datasets metadata
- access to the datasets and their download
 - in native size
 - through sub-setting
 - through the product Identifier



Please remind that the APIs of the S2 Service are available **to access the products registered on the WMS,**
so for ALL the data available on the S2 Data Viewer

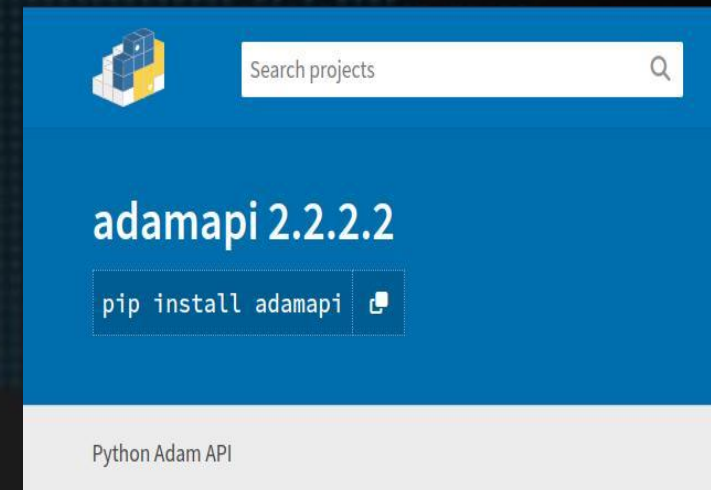
(while 3D data like 3D output of FORAIR-IT, 3D output of KAIROS and the S2-02 output are accessible via ftp service and not through APIs)

IRIDE S2 API – ADAMAPI Installation (tested on Ubuntu 20.04 and Ubuntu 22.04)

1. Access service : <https://pypi.org/project/adamapi/>

At this link you can find:

- Instructions for the installation
- Description of the 4 available modules (Auth, Datasets, Search, GetData)
- Examples
- Data format



2. Install with pip

```

VENVNAME="adamapi"
python3 -m venv "${VENVNAME}"
source "${VENVNAME}/bin/activate";
python3 -m pip install --upgrade pip;
pip install adamapi
ln -s "/usr/lib/python3/dist-packages/osgeo" "${VENVNAME}/lib/python3.8/site-packages/osgeo"
  
```

IRIDE S2 API - Modules of ADAMAPI

Modules to be installed:

- A. **Auth** - authorization module
- B. **Dataset** - list of datasets
- C. **Search** - list of products including associated metadata
- D. **GetData** - to retrieve products (subsetting in space and time, downloading data in native granularity and with reduced processing capacity)

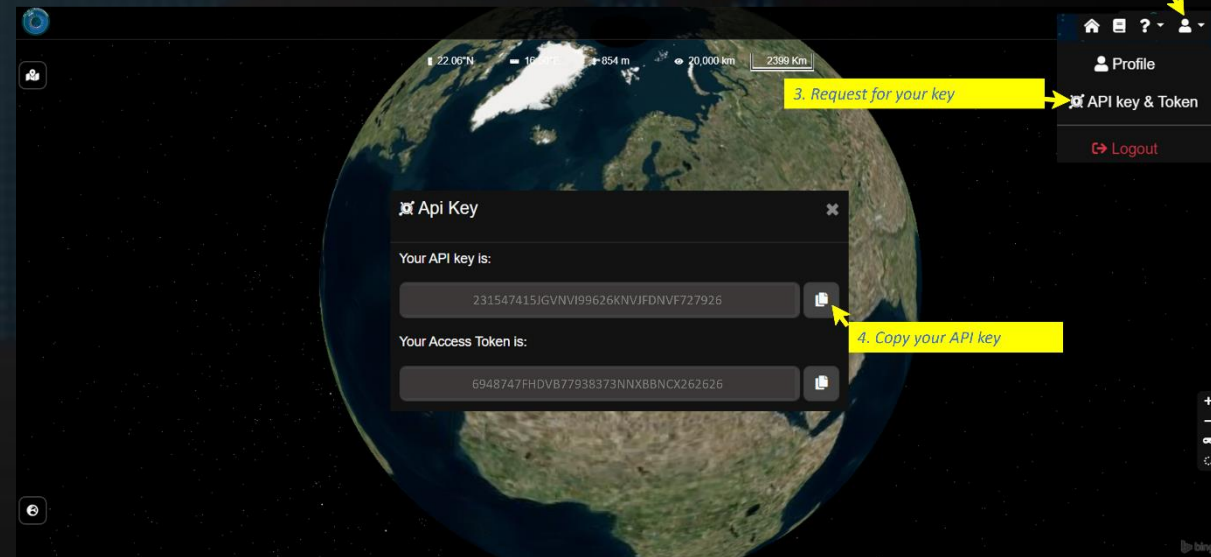
How to use IRIDE S2 APIs - STEP 1 APIKEY retrieval

The authorization step requires the user to retrieve his/her own APIKEY, an alphanumeric string uniquely associated with the user on the endpoint.

1. Go to the IRIDE S2 ET



2. Access the user panel
3. Request for API Key
4. Copy your key



How to use IRIDE S2 APIs - STEP 2 getAuthorization

- Retrieve APIKEY from IRIDE S2 ADAM instance
- Set IRIDE S2 ET URL (<https://explorer.iride.adamplatform.eu>) and your APIKEY

STEP 2 getAuthorization

```
[3]: API_Key = input('Type your ADAM API Key : ')
      clear_output(wait=True)
      Endpoint_URL = input('Type the URL for the selected endpoint : ')
      clear_output(wait=True)
```

```
[4]: auth = Auth()
      auth.setKey(API_Key)
      auth.setAdamCore(Endpoint_URL)
      auth.authorize()
```

(by using Jupyter Notebook)

How to use IRIDE S2 APIs – STEP 3 Dataset discovery

Working on datasets by the DATASET module:

- to retrieve the list of available IRIDE S2 datasets on Italy Aol on 18 April 2024

STEP 3 Dataset discovery

```
datasets = Datasets(auth)
listdata = datasets.getDatasets()

total = listdata['properties']['totalResults']

print(Style.BRIGHT + Fore.BLUE + '\033[1m' + f"List of {total} Datasets retrieved by ADAM API:")
print ('\033[0m')
for dataset in listdata['features']:
    datasets.getDatasets(dataset['datasetId'], page = 0, maxRecords = 10)
    print("Data Provider: ", dataset['license']['dataProviderName'])
    print("Title: ", dataset['title'])
    print("DatasetId: ", dataset['datasetId'])
    print("From: ", dataset['minDate'])
    print("To: ", dataset['maxDate'])
    print("Geometry: ", dataset['geometry'])
    print(Style.BRIGHT + "-----")
    print ('\033[0m')
```

(by using Jupyter Notebook)

IRIDE S2 API - Dataset example

Output example of the STEP3 for IRIDE dataset retrieval on 18 April 2024

List of 21 Datasets retrieved by ADAM API:

Data Provider: MEE0

Title: Reanalysis-AQI_S2-03-01

DatasetId: 65e061bc438a52c7c6d12c43:AQI_S2-03-01

From: 2018-01-01T00:00:00Z

To: 2019-12-31T00:00:00Z

Geometry: {'type': 'Polygon', 'coordinates': [[[12.3333627, 41.7842812], [12.6921652, 41.7842812], [12.6921652, 42.033883], [12.3333627, 42.033883], [12.3333627, 41.7842812]]]}

Data Provider: MEE0

Title: kAIROS-model-N02_S2-01-03

DatasetId: 6544b70a14ecf9c6d835831b:ARPAE_2D_N02

From: 2024-04-21T23:00:00Z

(by using Jupyter Notebook)

How to use IRIDE S2 APIs - STEP 5 Product access/download

Working on datasets by the GETDATA module:

- to download the 4 products in their native format over the defined geometry

STEP 5 Product access/download

```
filters = {
    "startDate":start_date,
    "endDate":end_date,
    "geometry":geometry
}
```

```
data = GetData(auth)
print("Downloading products over a defined area and date")
image = data.getData(datasetId, "GetFile", asynchronous=False, compress=False, rest = False, filters=filters, outputDir=f'S5P_NRTI_L2_NO2')
```

Downloading products over a defined area and date

100% |██████████| 4/4 [00:06<00:00, 1.59s/it]

(by using Jupyter Notebook)



For any questions or comments on S2
do not hesitate to contact MEEO

pasetti@meeo.it

folegani@meeo.it

Modello di legge 2016: L'Ente nazionale è un organismo dell'Unione Europea...
 finanziato dal Parlamento della Repubblica Italiana...
 L'Ente nazionale è un organismo dell'Unione Europea...
 finanziato dal Parlamento della Repubblica Italiana...