

COPERNICUS AUSTRALASIA REGIONAL DATA HUB

Hub Portal User Guide

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WORKING WITH THE HUB

There are multiple ways to access data from the Copernicus Australasia Regional Data Hub (the Hub). The Hub's web portal, its associated OData APIs, and the PyGSSearch (Python) Library, are the recommended pathways for users to search and download products from the Hub. These services require users to register in the portal before they can download data. Alternatively, data is also available via the NCI's THREDDS server and directly through the NCI's file system for registered NCI users.

NOTE: Users who have registered in the legacy SARA portal will need to re-register for the new Hub portal (see section 2.1).

NOTE: In the past, the Hub's file structure at NCI stored products in a folder structure based on product metadata (date, granule, etc). If you currently access Hub products directly from the filesystem at the NCI, the new Hub platform will change the folder structure where products can be found. This will impact workflow scripts that rely on predicting where new products are located. Recommended access is via the new command line tool and PyGSSearch (Python) Library.

1 The Portal Interface

The portal provides users an easy-to-use map-based data search and download web interface. It is recommended that users use Chrome, Edge or Firefox to access the portal. To download data using the portal interface, follow the instructions below. The instructions assume a basic level of computer literacy.

To access the test page for the new Hub portal go to <https://gss-vision-test.nci.org.au/> (Figure 1).

Once in production, the new interface will be also accessible from the Copernicus Australasia Regional Data Hub website home page (<http://www.copernicus.gov.au/>) click **Data Access**, then click the **Portal** interface link.

2 The Portal Home Page

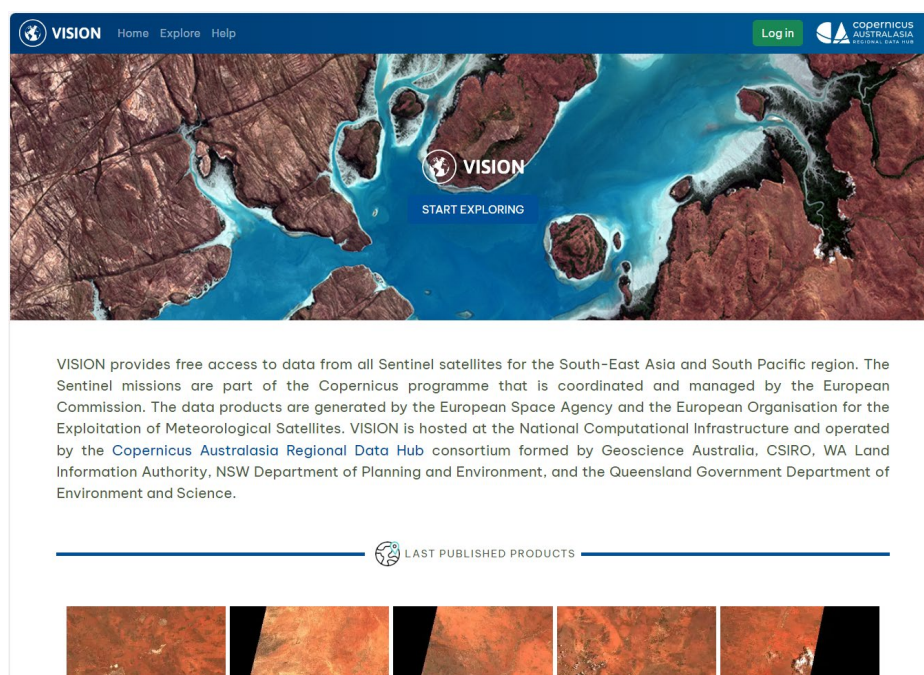


Figure 1. The portal Home page

2.1 Register/Login

The Login/Registration process in the portal is accessed via the green Login button on the right hand side of the top menu-bar (see Figure 1). This will display the User Details dialog (see Figure 2). If you have already registered, please enter your login details and click on the **Sign-in** button, otherwise click the **Register** button (see Appendix A). When registering, you will need to at least need to fill in all mandatory (*) fields and acknowledge the Hub's Copyright and Privacy policy.

NOTE: You may use the portal without registering or logging in, however, you will need to log in to be able to download products. It is recommended to login before conducting any searches as the Login process will reset any polygons and search parameters.

NOTE: Users who have used and registered in the legacy SARA portal will need to re-register for the new Hub as the two systems are separate and previous registration details are not able to be migrated.

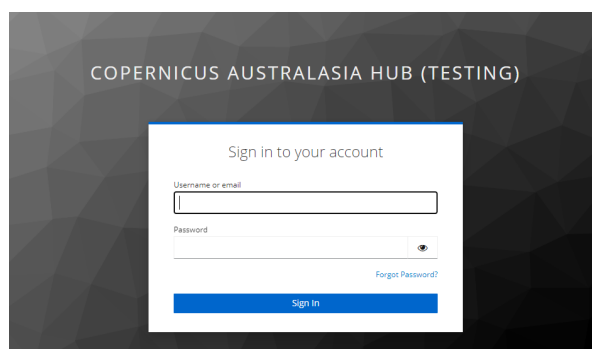


Figure 2. The portal sign in and registration link

2.2 Last Published Products

The Home Page provides access to the last 20 imagery published on the Hub. Clicking on any of the new product tiles will take you to the Explore page of the portal (Figure 3), with the selected product highlighted.

3 The Portal Explore Page

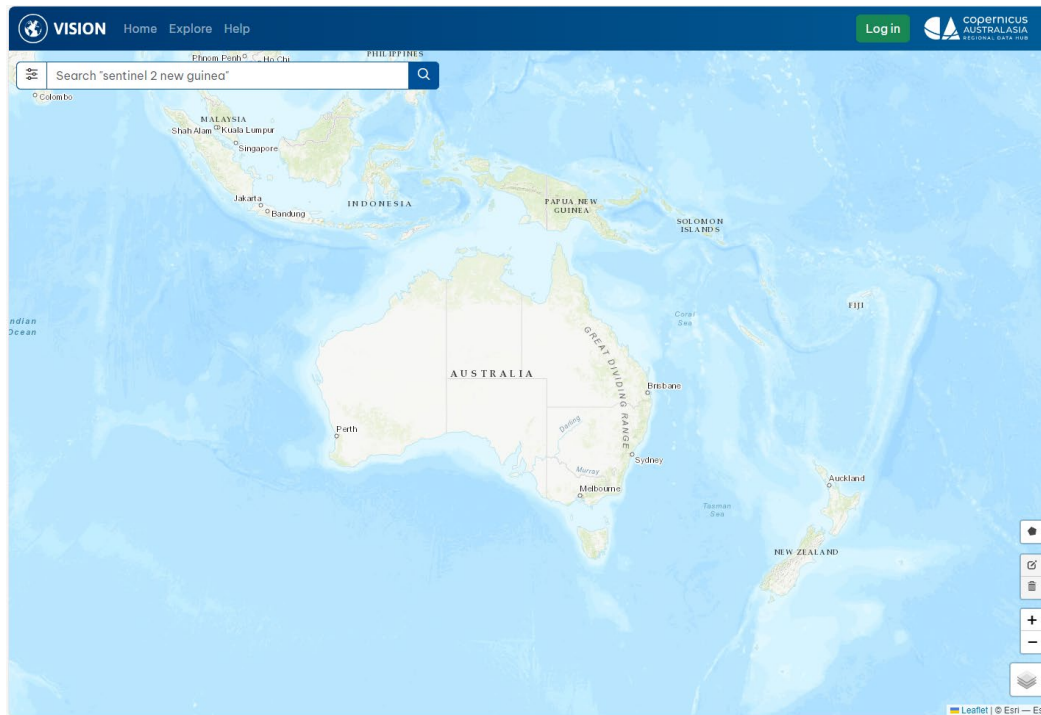


Figure 3. The portal Explore pane

3.1 Explore Data

Although the Home Page provides access to the latest imagery available, it is not the best place from which to search the entire archive. To do so, click on either the “Start Exploring” button or “Explore” in the top menu-bar. This will take you to the Explore Page of the portal (Figure 3), which allows you to spatially search for Sentinel products in the Hub’s archive.

3.2 Map Navigation

When you display the Explore Page, most of the background will be a map of the world. You can navigate around the map around by:

- Clicking and dragging to move the map around; or
- Zooming in/out using the +/- buttons in the bottom right corner of the map (magenta circle in Figure 4), or using the scroll wheel on the mouse.

The Layers button in the bottom right corner of the map (yellow circle in Figure 4) will let you select your preferred map format.



Figure 4. Map navigation icons

NOTE: While you can scroll left or right through several iterations of the world's countries, only the central portion of the map will be used to display product footprints.

3.3 Search Bar

The Search Bar is available at the top of the Spatial Search page, and is a shortcut to defining an Area of Interest and/or a product set. However, at this time, countries are the only recognised locations and the format for products is limited to mission (i.e. S1, S2, S3 or S5). For instance, “S5 Fiji” would return all Sentinel 5P products that intersect with the islands of Fiji.

3.4 Area of Interest

In order to limit the results of any searches for products in the portal, it is recommended to first define an Area of Interest (AOI).

3.4.1 Drawing an Area of Interest

To specify an AOI, click the **Polygon** button (indicated in Figure 5) so that the **Finish | Delete last point | Cancel** buttons appear. The cursor will now appear as a cross as it hovers over the map. Zoom (using the + and – buttons at the top left of the map or the scroll wheel on the mouse) to the region of interest and click on the map to draw a rough boundary of the area required. Each click creates a new vertex (corner). If you wish to cancel the drawing at any time, click on the **Cancel** button. When ready to complete the area, you can click on the first point, double click on the last point, or click on the **Finish** button. The selected area will be outlined and highlighted in blue to indicate the AOI has been defined.

All future searches using the Filters (see Section 3.1.5) will be restricted to the defined Area(s) of Interest.

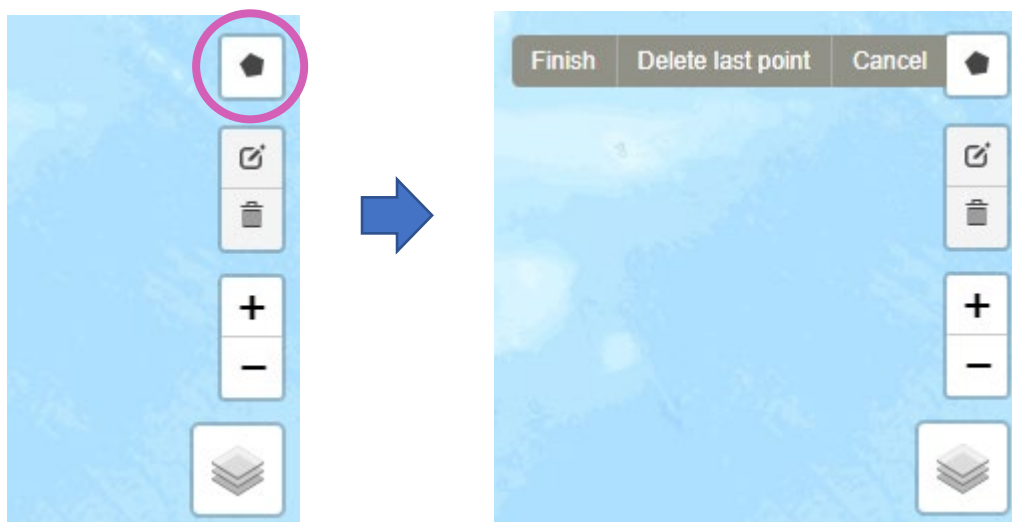


Figure 5. Drawing an area of interest

NOTE: multiple Areas of Interest can exist at any time. Creating a new Area of Interest will **not** erase a previously defined one.

NOTE: clicking on the search button after defining a new AOI will re-apply the current search to the defined AOI's.

NOTE: As mentioned in Section 3.2, only the central portion of the map will be used to display product footprints. Similarly, only the central portion of the map will be recognised for the AOI polygons. If you draw a polygon but unexpectedly get no search results, you may need to confirm you have drawn all AOI polygons on the central section of the map.

NOTE: There is currently a known issue when drawing polygons over the International Date Line (IDL). If you are defining an AOI in the vicinity of the IDL, please ensure you draw the polygon in a clockwise direction.

3.4.2 Editing an Area of Interest

You can edit an existing AOI polygon, by clicking on the Edit button (indicated icon in Figure 6) so that the **Save | Cancel** buttons appear. All AOI polygons will now display with dashed outlines, and boxes at each vertex and in the middle of each line edge. You can move a vertex by dragging a vertex box to a new location. You can delete a vertex by clicking in a vertex box. You can add an additional vertex by dragging a box in the middle of any line edge (the new line edges will now both have a box in the middle). If you decide not to make any changes (or you don't want to keep the changes you have made), you can click on the **Cancel** button.

Once you have made all changes you MUST click on the **Save** button to confirm the changes. If you do not click **Save**, then all changes will be lost when you click off the map.

NOTE: you cannot delete a vertex in a polygon with 3 or less vertices.

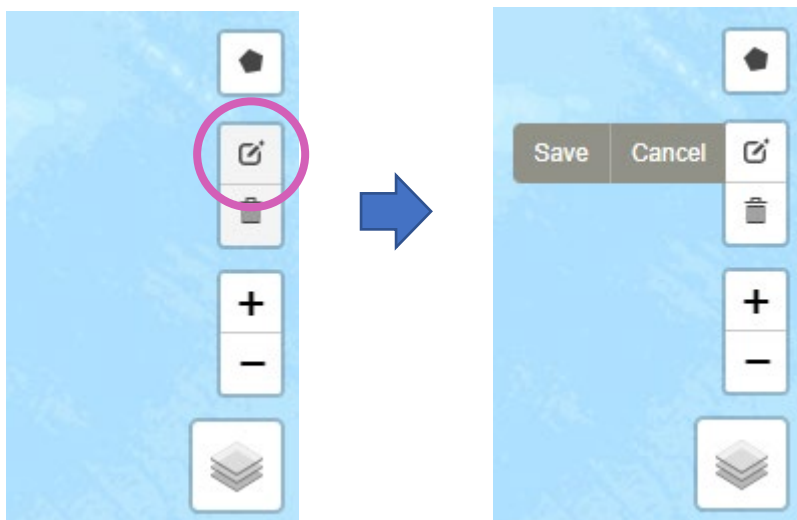


Figure 6. Editing an area of interest

3.4.3 Deleting an Area of Interest

You can delete an existing AOI, by clicking on the Trashcan button (indicated icon in Figure 7) so that the **Save | Cancel | Clear All** buttons appear. You can then delete any AOI by clicking on it (and the outline should disappear). If you decide not to make any changes (or you don't want to keep the deletions you have made), you can click on the **Cancel** button.

As with *Editing an AOI*, you MUST click on the **Save** button once you have finished in order to confirm the deletions. If you do not click **Save**, then all changes will be lost when you click off the map.

You can use the **Clear All** button to remove all the AOI polygons currently defined on the map.

NOTE: the **Clear All** button action does not require the **Save** button after using, and in addition, the **Clear All** action cannot be reversed.

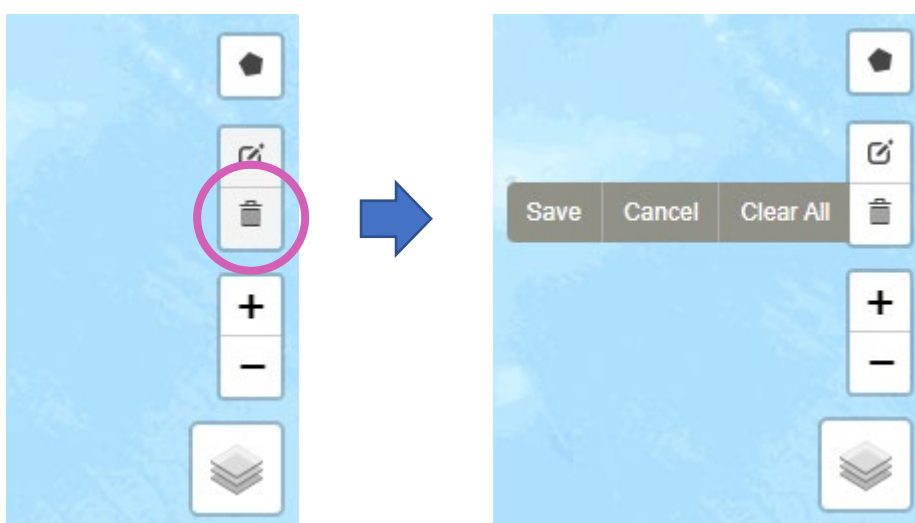


Figure 7. Deleting an area of interest

3.5 Filter Data

The Filter pane (Figure 8) is by far the most powerful option to search for relevant Copernicus Australasia products. Here, detailed search criteria can be selected to narrow the search results provided. It is recommended to set the Area of Interest (see previous Section 3.4) before using the Filter search tool.

You can access the Filter pane by selecting the Options button to the left of the Search Bar (indicated in Figure 8).

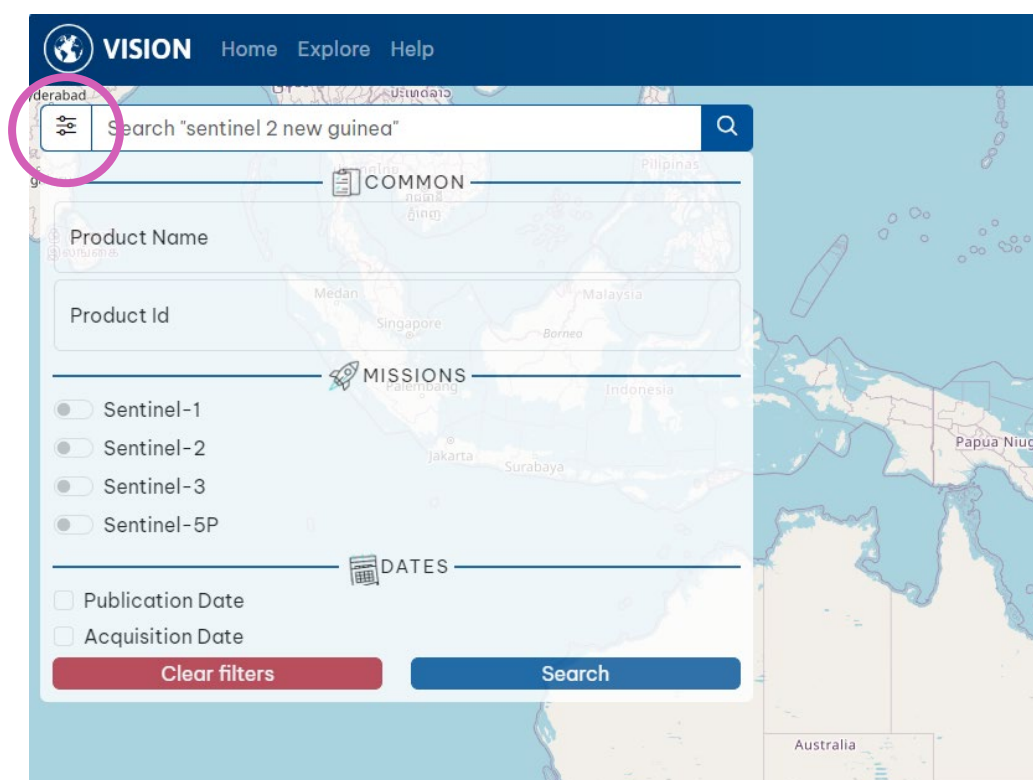


Figure 8. The Filter pane.

When you have selected all required filter options, click on the (blue) **Search** button to see the search results (see Section 3.6)

At any time, you can click on the **Clear filters** button to reset the filters back to a blank search.

NOTE: the Options button acts as a toggle between the Filter pane and the Results pane.

NOTE: all sections of the Filter Pane will apply to the Search, so it is important to ensure that any information entered in one section does not conflict with another section.

3.5.1 Background

It is very useful at this point to know a bit about the data to be downloaded (based on application). You can search on any combination of criteria (or no criteria). The more criteria provided, the more

targeted the results will be to requirements. The search criteria applicable to each mission are summarised in Table 1 and include:

- Collection filters – i.e. the Sentinel mission;
- Temporal filters – i.e. the acquisition dates of interest; and
- Spatial filters – i.e. broad regions of interest
- Other filters – such as:
 - the instrument type (especially if interested in Sentinel-3 which has multiple instruments);
 - the product name;
 - the processing level;
 - the sensor mode (applicable to Sentinel-1);
 - the orbit direction (applicable to Sentinel-1);
 - the polarisation (applicable to Sentinel-1);
 - the maximum cloud cover percentage allowable (applicable to Sentinel-2);

	Sentinel-1	Sentinel-2	Sentinel-3	Sentinel-5P
Acquisition Period	2014 – present	2015 – present	2016 - present	2018 - present
Sentinel Mission	S1	S2	S3	S5P
Platform	✓	✓	✓	X
Product Type	✓	✓	✓	✓
Sensor Mode	✓	X	X	X
Orbit Direction	✓	X	X	X
Polarisation	✓	X	X	X
Cloud Cover	X	✓	X	X
Timeliness	X	X	✓	X
Area of Interest	✓	✓	✓	✓
Publication Date	✓	✓	✓	✓
Acquisition Date	✓	✓	✓	✓

Table 1. Summary matrix of potential search criteria applicable to missions

3.5.2 Common Filters

The Common filters section of the Filter pane (Figure 8) is useful if you are familiar with the structure of a Sentinel product's name or ID format. In this section, you can search for specific text with the wildcards "*" and "?". You can also use this section if you already know the ID code for a specific product.

For instance, the string "S3?_OL_2_LRR*" under **Product Name** will find all Sentinel-3 reduced resolution OLCI Level 2 products.

3.5.3 Mission Filters

In most cases, you will want to limit your search results to a specific mission type. In order to do so, select the appropriate switch button icon. Once a switch button is selected, the underlying filter options (see Table 1) will be displayed and can be adjusted as required.

The products from multiple different missions can be included in the search by selecting the appropriate switches as required. The underlying filter options for each mission type will only be applied to the products for that mission (e.g. cloud cover restrictions will only be applied to Sentinel-2 products). For further information on the underlying mission filters please see Section 5.

If no switch buttons are selected, the search results will return all mission products that meet the remaining criteria.

3.5.4 Date Filters

The Dates section of the Filter pane will allow the restriction of the search to a specific date range. This date range can be applied to the date the product was published, and/or to the date the underlying raw data was acquired by the satellite. These two dates can differ substantially if the original product has been reprocessed since its initial release.

NOTE: *there is currently a known issue when filtering by Publication and/or Acquisition dates. If at any stage after entering a date range you untick and re-tick the option, the previously entered values are displayed but will not be included in the search API call.*

- *The workaround is to ensure you re-enter the values as soon as you re-select the date attribute (you may have to select another date, then re-select the original date).*

3.6 Search Results

Once a search has been executed, products matching the criteria will be listed in the Search Results pane, which is the same pane as the Filter pane. You can toggle between the Filter and Results panes by clicking on the **Options** button indicated in Figure 8. Initially, the first 50 products will be displayed, but an additional 50 products can be loaded by clicking on the **Load more products** button at the bottom of the Results pane. For all products listed in the Results pane, their corresponding footprint will be displayed on the map in blue (see Figure 9).

NOTE: *if you modify the Search parameters (e.g. by adding or moving an AOI) after clicking on the **Search** button, then **Load more products** will now show products that match the new criteria. It is recommended that you always use the **Search** button immediately after making any changes to the search parameters.*

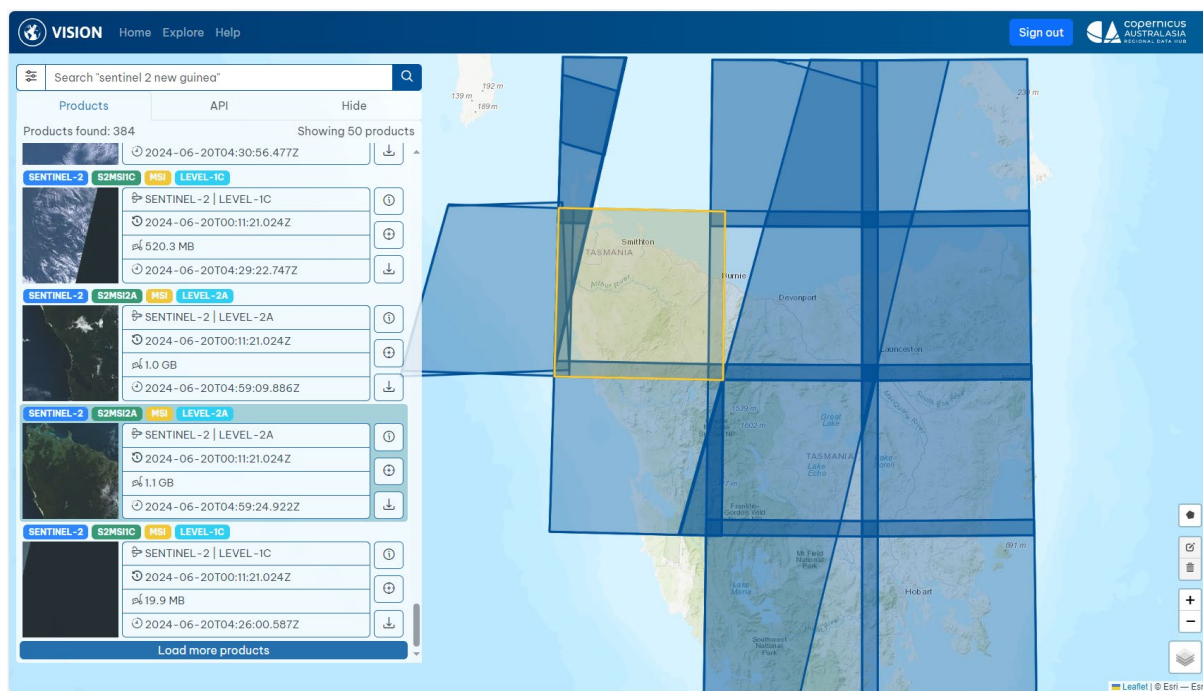





Figure 9 The portal Results pane and footprints.

Clicking on a footprint will highlight the respective product in the Results list (Figure 9). Using the icons to the right of each product, you can:

-  Get more information on the product, including available metadata (See Section 3.6.1).
-  Reorient the map window to display the selected product centred on the window.
-  Immediately download a zip file of all the product components.

3.6.1 Product Details

Clicking on the (i) information icon for a product in the Results pane, will display the Product Details pane providing access to more details of the product. Individual product components can be downloaded via the Structure section (see Section 3.6.1.4 below).

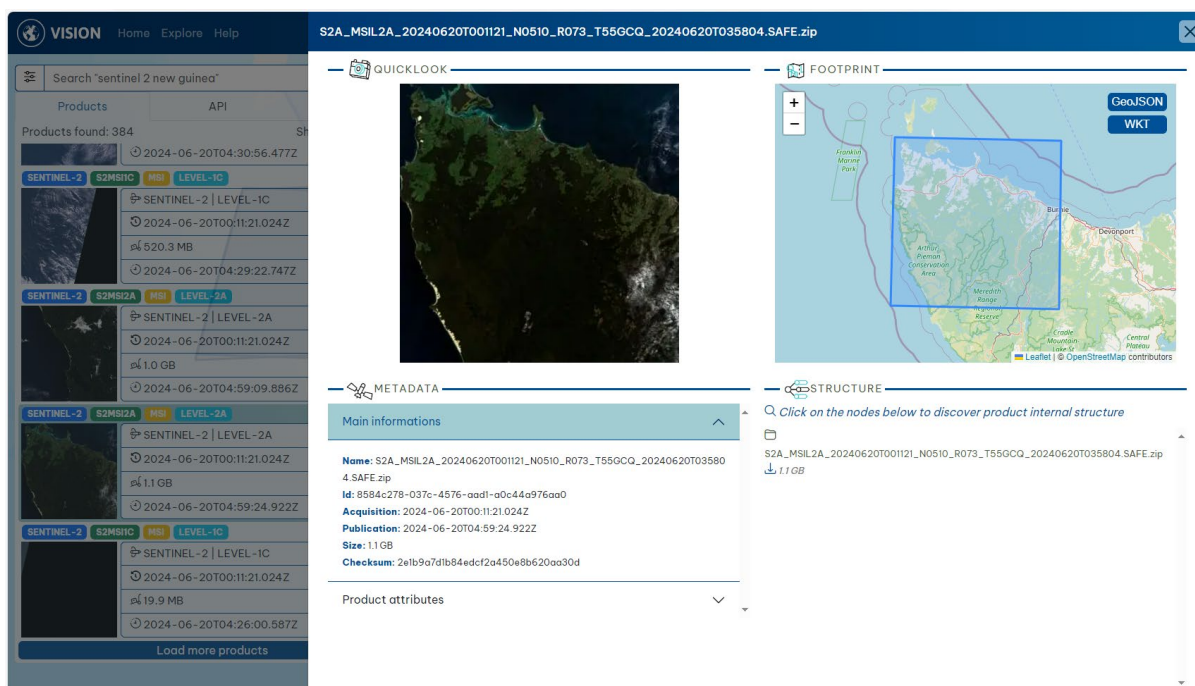


Figure 10. The portal Product details pane.

Clicking on the (X) in the top-right corner of the Product Details pane will close the pane and return to the map and Results pane.

NOTE: Closing the Product Details pane will deselect any active products on the map.

3.6.1.1 Quicklook

For some products (e.g. Sentinel-2), a low resolution quicklook image will be available and will be displayed in the top-left quadrant of the Product details pane. Clicking on the quicklook image, will display it in a separate browser tab which allows you to magnify it if required. This is especially useful for non-square or odd shaped footprints that appear distorted in the quicklook pane (e.g. Sentinel-3 OLCI products).

NOTE: The quicklook file can be downloaded as one of the product components (see Section 3.6.1.4).

3.6.1.2 Footprint


The footprint of the product will be displayed in the top-right quadrant of the Product Details pane. You can zoom in/out using the +/- buttons. The **GeoJSON** and **WKT** buttons will copy the coordinates into the clipboard in the respective formats.

3.6.1.3 Metadata

The Metadata section of the Product details pane provides the basic information of the product. For more information, including all metadata fields available for the product, click on the **Product attributes** tab.


Sentinel 1 vs 2 vs 3 vs 5P

3.6.1.4 Structure

If you are logged in, you will be able to drill down into the product SAFE file to see the individual components. The heading for any product component that has sub-components, will be clickable to display the sub-components. Any component in the tree with the download icon () can be downloaded separately by clicking on the icon.

3.6.2 API

The API tab in the Search Results pane will display the API call used for the search. More information on using API calls to the Hub can be found in Section 6.

Use the copy icon () in the top-right corner of the pane to place the API call in the clipboard so that it can be pasted into a browser (or *curl*) to execute.

NOTE: *The results of the provided API call will be in JSON format, but results can also be formatted as XML (see section 6.3.1)*

3.6.3 Hide tab

You can use the Hide tab to toggle the visibility of the Search Results (and also Filter) pane. This is useful if you need to quickly view the entire map window. Clicking on the Hide tab button again will restore the Search Results pane.

4 The Portal Help Page

The Help page provides a number of references to assist in the use of the portal's web interface, OData APIs and the PyGSSearch Python Library.

5 Detailed Filter Options

The detailed filter options available for each mission are as follows.

5.1 Platform

The Platform option allows you to specify the particular satellite for each mission, noting that in most cases this will be "A" or "B", however with the replacement missions now being launched, options "C" and "D" will become relevant.

5.2 Product Type

To specify the Sentinel product, use the **Product Type** filters under each specific mission as follows:

5.2.1 Sentinel-1 product types

S3_GRDH_1S	S1 C-SAR Level-1 Ground Range Detected (Stripmap mode 3)
S5_GRDH_1S	S1 C-SAR Level-1 Ground Range Detected (Stripmap mode 3)
IW_GRDH_1S	S1 C-SAR Level-1 Ground Range Detected (Interferometric Wide swath)
S3_GRDH_1S-COG	S1 C-SAR Level-1 Ground Range Detected – Cloud Optimised GeoTIFF (Stripmap mode 3)
S5_GRDH_1S-COG	S1 C-SAR Level-1 Ground Range Detected – Cloud Optimised GeoTIFF (Stripmap mode 5)
IW_GRDH_1S-COG	S1 C-SAR Level-1 Ground Range Detected – Cloud Optimised GeoTIFF (Interferometric Wide swath)
WV_SLC_1S	S1 C-SAR Level-1 Single Look Complex (Wave mode)
IW_SLC_1S	S1 C-SAR Level-1 Single Look Complex (Interferometric Wide swath)
S3_SLC_1S	S1 C-SAR Level-1 Single Look Complex (Stripmap mode 3)
S5_SLC_1S	S1 C-SAR Level-1 Single Look Complex (Stripmap mode 5)
WV_OCN_2S	S1 C-SAR Level-2 Ocean (Wave mode)
IW_OCN_2S	S1 C-SAR Level-2 Ocean (Interferometric Wide swath)
S3_OCN_2S	S1 C-SAR Level-2 Ocean (Stripmap mode 3)
S5_OCN_2S	S1 C-SAR Level-2 Ocean (Stripmap mode 5)

5.2.2 Sentinel-2 product types

To specify the Sentinel product, use the **Product Type** filters under each specific mission as follows:

S2MSIL1C	S2 MSI Level-1C Top-Of-Atmosphere reflectance
S2MSIL2A	S2 MSI Level-2A Bottom-Of-Atmosphere reflectance

5.2.3 Sentinel-3 product types

OL_1_EFR__	S3 OLCI Level-1 Earth Observation Full Resolution
OL_1_ERR__	S3 OLCI Level-1 Earth Observation Reduced Resolution
OL_2_LFR__	S3 OLCI Level-2 Land and atmosphere geophysical products in Full Resolution
OL_2_LRR__	S3 OLCI Level-2 Land and atmosphere geophysical products in Reduced Resolution
OL_2_WFR__	S3 OLCI Level-2 Water and atmosphere geophysical products in Full Resolution
OL_2_WRR__	S3 OLCI Level-2 Water and atmosphere geophysical products in Reduced Resolution
SR_1_SRA__	S3 SRAL/MWR Level-1 SAR RADAR Altimeter
SR_1_SRA_A	S3 SRAL/MWR Level-1A SAR RADAR Altimeter
SR_1_SRA_BS	S3 SRAL/MWR Level-1BS SAR RADAR Altimeter
SR_2_LAN__	S3 SRAL Level-2 Land products generated by the Land Centres
SR_2_WAT__	S3 SRAL Level-2 Water products generated by the Marine Centre

5.2.4 Sentinel-5P product types

L2__AER_AI__	S5P Level-2 UV Aerosol Index
L2__AER_LH__	S5P Level-2 Aerosol Layer Height (mid-level pressure)
L2__CH4__	S5P Level-2 Methane (CH4) total column
L2__CLOUD__	S5P Level-2 Cloud fraction, albedo, top pressure
L2__CO__	S5P Level-2 Carbon Monoxide (CO) total column
L2__HCHO__	S5P Level-2 Formaldehyde (HCHO) total column
L2__NO2__	S5P Level-2 Nitrogen Dioxide (NO2), total and tropospheric columns
L2__O3__PR__	S5P Level-2 Ozone (O3) profile
L2__O3__	S5P Level-2 Ozone (O3) total column
L2__SO2__	S5P Level-2 Sulfur Dioxide (SO2) total column

5.3 Sensor Mode

Sensor mode is only applicable to Sentinel-1. To specify the sensor mode of interest, select the relevant **Sensor Mode** option:

EW	Extra-wide swath
IW	Interferometric Wide swath
SM	Stripmap
WV	Wave

Refer to <https://sentiwiki.copernicus.eu/web/s1-products> for an explanation of S1 sensor modes.

5.4 Orbit Direction

Orbit direction is only applicable to Sentinel-1 and potentially Sentinel-3. To specify the orbit direction of interest, select the relevant **Orbit Direction** option:

Ascending	The pass of the satellite going from south to north
Descending	The pass of the satellite going from north to south

For a brief overview of S1 orbit direction, please see: <https://sentiwiki.copernicus.eu/web/s1-mission#S1-Mission-Orbit>.

5.5 Polarisation

Polarisation is only applicable to Sentinel-1. To specify the polarisation of interest, select the relevant **Polarisation** option:

HH	Single polarisation for horizontal transmit and horizontal receive
HH+HV	Dual polarisation for horizontal transmit and horizontal receive plus horizontal transmit and vertical receive
VV	Single polarisation for vertical transmit and vertical receive

For brief overview of S1 polarisation, please see: <https://sentiwiki.copernicus.eu/web/s1-mission#S1-Mission-Polarimetry> and <https://www.nrcan.gc.ca/earth-sciences/geomatics/satellite-imagery-air-photos/satellite-imagery-products/educational-resources/9275> for more details.

5.6 Cloud Cover

Cloud cover is only applicable to Sentinel-2. Use the **Cloud Cover** slider to specify the maximum acceptable level of cloud cover percentage allowable for the data (e.g. a value of 10% would mean only S2 products with a calculated cloud cover of less than 10% would be included in the search results).

Refer to the ESA Sentinel-2 Technical Guide for detail on cloud masks:
<https://sentiwiki.copernicus.eu/web/s2-processing#S2Processing-CloudMasks>.

5.7 Timeliness

Use this option to differentiate between Near Real Time (“NR”), Short Time Critical (“ST”), and Not Time Critical (“NT”) products. For more information on timeliness, please see <https://sentiwiki.copernicus.eu/web/olci-products#OLCIPRODUCTS-PRODUCTSDESCRIPTION> or <https://sentiwiki.copernicus.eu/web/slstr-products>.


6 APIs and programmatic access to the Hub

This section is by no means an exhaustive document on using OData API's, but is designed to give some ideas of what can be achieved using APIs to search for, and download, Sentinel products from the Copernicus Australasia Regional Data Hub via the API interface. As mentioned in section 3.6.2, you can view the exact call used for any search in the API tab of the Search pane as an example starting point.

More information on OData API's can be found here:
<https://documentation.dataspace.copernicus.eu/APIs/OData.html>.

NOTE: this link to the CDSE OData documentation is provided as reference. The Hub's implementation of the OData API is not identical and there may some differences or missing functionality. Examples are as follows:

CDSE OData implementation	Hub OData implementation
Collection/Name filter option	Not available
Default \$top value of 20	Not applicable (i.e. a value must be supplied)
Default \$skip value of 0	Not applicable (i.e. a value must be supplied)
\$count values: <i>True, true, 1, False, false, 0</i>	\$count values: <i>true, false</i>



<i>contains</i> , <i>endswith</i> or <i>startswith</i> can be used as operators for string values	Not available (i.e. only <i>eq</i> can be used)

6.1 Query structure

OData query consists of various elements. Some of these elements include:

- filter
- format
- orderby
- top
- skip
- count
- expand

These elements should always be preceded with \$ and if multiple elements are used, separated by &.

6.2 API \$filter element

The *\$filter* element is the main API query element that defines the search parameters. Consecutive options within the *\$filter* term should be separated with *and* or *or*. The *not* operator can also be used. For instance:

```
https://gss-catalogue-test.nci.org.au/odata/v1/Products?$filter=PublicationDate ge 2024-01-01T00:00:00.000Z and PublicationDate le 2024-06-30T00:00:00.000Z and not ((Attributes/any(a:a/Name eq %27platformShortName%27 and a/OData.CSC.StringAttribute/Value eq %27SENTINEL-5P%27)))
```

6.2.1 Query by Publication Date

To search for products that have been published between two dates:

```
https://gss-catalogue-test.nci.org.au/odata/v1/Products?$filter=PublicationDate ge 2024-01-01T00:00:00.000Z and PublicationDate le 2024-06-30T00:00:00.000Z
```

NOTE: the non-inclusive *gt* and *lt* parameters can also be used.

6.2.2 Query by Sensing Date

To search for products that have been acquired by the satellite between two dates:

```
https://gss-catalogue-test.nci.org.au/odata/v1/Products?$filter=ContentDate/Start ge 2024-01-01T00:00:00.000Z and ContentDate/Start le 2024-06-30T00:00:00.000Z
```

NOTE: there are two parameters describing the ContentDate (Acquisition Dates) for a product - Start and End. Depending on what is required, these parameters can be mixed:

`https://gss-catalogue-test.nci.org.au/odata/v1/Products?$filter=ContentDate/Start ge 2024-01-01T00:00:00.000Z and ContentDate/End le 2024-06-30T00:00:00.000Z`

NOTE: the non-inclusive gt and lt parameters can also be used.

6.2.3 Query by Geographic Criteria

To search for products intersecting the specified polygon:

`https://gss-catalogue-test.nci.org.au/odata/v1/Products?$filter=OData.CSC.Intersects(area=geography'SRID=4326;POLYGON((148.8 -34.8,148.8 -35.8,149.5 -35.8,149.5 -34.8,148.8 -34.8)))`

NOTE: the polygon coordinates provided must be given in the world geodetic system EPSG 4326 (WGS 84), and must start and end at the same point (i.e. be a closed polygon).

6.2.4 Query by attributes

To search for products by attributes, it is necessary to build a filter with the following structure:

`Attributes/OData.CSC.ValueTypeAttribute/any(a:a/Name eq '[Attribute.Name]' and a/OData.CSC.ValueTypeAttribute/Value eq [Attribute.Value])`

Where:

- **Attribute.Name** is the name of the parameter being queried (see section 6.5 for possible options for each mission).
- **ValueTypeAttribute** can be any of the values: *DoubleAttribute*, *IntegerAttribute*, *DateTimeOffsetAttribute*, or *StringAttribute*.
- **Attribute.Value** is the specific value required in the search.

For example:

`https://gss-catalogue-test.nci.org.au/odata/v1/Products?$filter=((Attributes/any(a:a/Name eq 'platformShortName' and a/OData.CSC.StringAttribute/Value eq 'SENTINEL-2') and Attributes/any(a:a/Name eq 'cloudCover' and a/OData.CSC.DoubleAttribute/Value le 10)))`

NOTE: where the **ValueTypeAttribute** is an Integer, Double or DateTimeOffset attribute type, you can also use le, lt, ge, or gt instead of the eq before **Attribute.Value**.

6.3 Other API elements:

6.3.1 \$format

By default, the results from an API search will be returned in XML format. To specify the results to be returned in JSON format, include the `$format=json` option.

6.3.2 \$orderby

The results from an API search are not ordered by default. The *\$orderby* option will order the products in an ascending (*asc*) or descending (*desc*) direction. If a direction is not specified, then the output will be ordered in ascending order.

The acceptable arguments for this option include: *ContentDate/Start*, *ContentDate/End*, *PublicationDate*, and *ModificationDate*.

NOTE: Using the *\$orderby* option will exclude potential duplicates from the search results.

6.3.3 \$top

To reduce the output from a search, you can use *\$top* to specify the maximum number of items to be returned from a query.

The acceptable arguments for this element are any integer between 1 and 1000.

6.3.4 \$skip

To facilitate pagination through the output of a search, *\$skip* can be used to jump over a specific number of results.

The acceptable arguments for this element are any integer between 0 and 1000.

6.3.5 \$count

The count option provides the exact number of products matching the query. This option is disabled by default to improve query performance.

The acceptable arguments for this option are *true* or *false*.

6.3.6 \$expand

By default, only the base level product metadata is supplied in search results. In order to view all product metadata, the *\$expand=Attributes* term needs to be added to the API query.

6.4 API Examples

All Sentinel-2 level 2 products over Tasmania with a cloud cover less than 10% acquired in June 2024 (output in JSON format):

```
https://gss-catalogue-  
test.nci.org.au/odata/v1/Products?$format=json&$filter=OData.CSC.Intersects(area=geography  
'SRID=4326;POLYGON((144.327393 -40.472024,145.83252 -43.659924,148.051758 -  
43.333169,148.458252 -40.763901,144.327393 -40.472024)))' and ContentDate/Start ge 2024-  
06-01T00:00:00.000Z and ContentDate/Start le 2024-06-30T00:00:00.000Z and  
((Attributes/any(a:a/Name eq 'platformShortName' and a/OData.CSC.StringAttribute/Value eq  
'SENTINEL-2') and Attributes/any(a:a/Name eq 'cloudCover' and
```

a/OData.CSC.DoubleAttribute/Value le 10) and Attributes/any(a:a/Name eq 'productType' and a/OData.CSC.StringAttribute/Value eq 'S2MSI2A'))))

The top fifty Sentinel-1 'Wave' products published since August 2024 and sorted with the most recently modified first (including all metadata and output in JSON format):

https://gss-catalogue-test.nci.org.au/odata/v1/Products?\$expand=Attributes&\$format=json&\$top=50&\$filter=PublicationDate ge 2024-08-01T00:00:00.000Z and ((Attributes/any(a:a/Name eq 'platformShortName' and a/OData.CSC.StringAttribute/Value eq 'SENTINEL-1') and Attributes/any(a:a/Name eq 'operationalMode' and a/OData.CSC.StringAttribute/Value eq 'WV')))&\$orderby=ModificationDate desc

The count of Sentinel-3 Level 2 OLCI products published in July 2024:

https://gss-catalogue-test.nci.org.au/odata/v1/Products?\$count=true&\$filter=PublicationDate ge 2024-07-01T00:00:00.000Z and PublicationDate le 2024-07-31T00:00:00.000Z and ((Attributes/any(a:a/Name eq 'platformShortName' and a/OData.CSC.StringAttribute/Value eq 'SENTINEL-3') and Attributes/any(a:a/Name eq 'processingLevel' and a/OData.CSC.StringAttribute/Value eq '2') and Attributes/any(a:a/Name eq 'instrumentShortName' and a/OData.CSC.StringAttribute/Value eq 'OLCI'))))


6.5 Mission applicable attribute names

The following is a list of potential attributes that can be used to search via API.

NOTE: specific values available under each attribute have not been provided and will need to be known before applying the search.

6.5.1 Sentinel 1 attributes


Name	Value Type	Values
productType	String	(see section 5.1)
origin	String	
dataakeID	Integer	
timeliness	String	
coordinates	String	
cycleNumber	Integer	
orbitNumber	Integer	
sliceNumber	Integer	
totalSlices	Integer	
productClass	String	
processorName	String	
orbitDirection	String	(see section 5.3)



processingDate	DateTimeOffset	
operationalMode	String	(see section 5.2)
processingLevel	String	
swathIdentifier	String	
processingCenter	String	
processorVersion	String	
segmentStartTime	DateTimeOffset	
sliceProductFlag	Boolean	
platformShortName	String	'SENTINEL-1'
productGeneration	DateTimeOffset	
processingBaseline	String	
productComposition	String	
instrumentShortName	String	
relativeOrbitNumber	Integer	
polarisationChannels	String	(see section 5.4)
productConsolidation	String	
platformSerialIdentifier	String	
instrumentConfigurationID	Integer	
startTimeFromAscendingNode	Double	
completionTimeFromAscendingNode	Double	

6.5.2 Sentinel 2 attributes


Name	Value Type	Values
productType	String	(see section 5.1)
origin	String	
tileId	String	
cloudCover	Double	(see section 5.5)
coordinates	String	
datastripId	String	
orbitNumber	Integer	
qualityInfo	Integer	
qualityStatus	String	
sourceProduct	String	
processingDate	DateTimeOffset	



productGroupId	String	
lastOrbitNumber	Integer	
operationalMode	String	
processingLevel	String	
processingCenter	String	
processorVersion	String	
granuleIdentifier	String	
platformShortName	String	'SENTINEL-2'
processingBaseline	String	
instrumentShortName	String	
relativeOrbitNumber	Integer	
illuminationZenithAngle	Double	
sourceProductOriginDate	String	
platformSerialIdentifier	String	

6.5.3 Sentinel 3 attributes

Name	Value Type	Values
productType	String	(see section 5.1)
landCover	Double	
cloudCover	Double	(see section 5.5)
timeliness	String	{“NR”, “ST”, “NT”}
brightCover	Double	
coordinates	String	
cycleNumber	Integer	
orbitNumber	Integer	
coastalCover	Double	
processorName	String	
closedSeaCover	Integer	
openOceanCover	Integer	
orbitDirection	String	(see section 5.3)
processingDate	DateTimeOffset	
snowOrIceCover	Double	
lastOrbitNumber	Integer	
operationalMode	String	



processingLevel	String	{‘1’, ‘2’}
processingCenter	String	
processorVersion	String	
salineWaterCover	Double	
tidalRegionCover	Double	
platformShortName	String	‘SENTINEL-3’
baselineCollection	String	
lastOrbitDirection	String	
processingBaseline	String	
continentallceCover	Integer	
instrumentShortName	String	{‘OLCI’, ‘SRAL’, ‘SLSTR’, ‘SYNERGY’}
relativeOrbitNumber	Integer	
freshInlandWaterCover	Double	
lastRelativeOrbitNumber	Integer	
platformSerialIdentifier	String	

6.5.4 Sentinel 5P attributes

Name	Value Type	Values
productType	String	(see section 5.1)
doi	String	
identifier	String	
coordinates	String	
orbitNumber	Integer	
productClass	String	
processorName	String	
qualityStatus	String	
processingDate	DateTimeOffset	
processingMode	String	
acquisitionType	String	
processingLevel	String	
parentIdentifier	String	
processingCenter	String	
processorVersion	String	
platformShortName	String	‘SENTINEL-5P’



baselineCollection	String	
processingBaseline	String	
instrumentShortName	String	
platformSerialIdentifier	String	