



Discovery and Downloading data from WIS2

Agenda

- ➔ Working with a GDC
- ➔ Different ways to download data

Working with a GDC

Discovery data from WIS2

Where to find the GDCs?

→ 3 Global Discovery Catalogs

→  Canada: <https://wis2-gdc.weather.gc.ca>

→  China: <https://gdc.wis.cma.cn>

→  Germany: <https://wis2.dwd.de/gdc>

→ <https://gisc.dwd.de/angular-frontend/home>

How to search for (meta)data?

→ <https://github.com/wmo-im/pywiscat/>

→ 🐍 Small Python tool for searching WMO metadata

→ 💻 Installation:

```
pip install pywiscat
```

→ 🔍 Search:

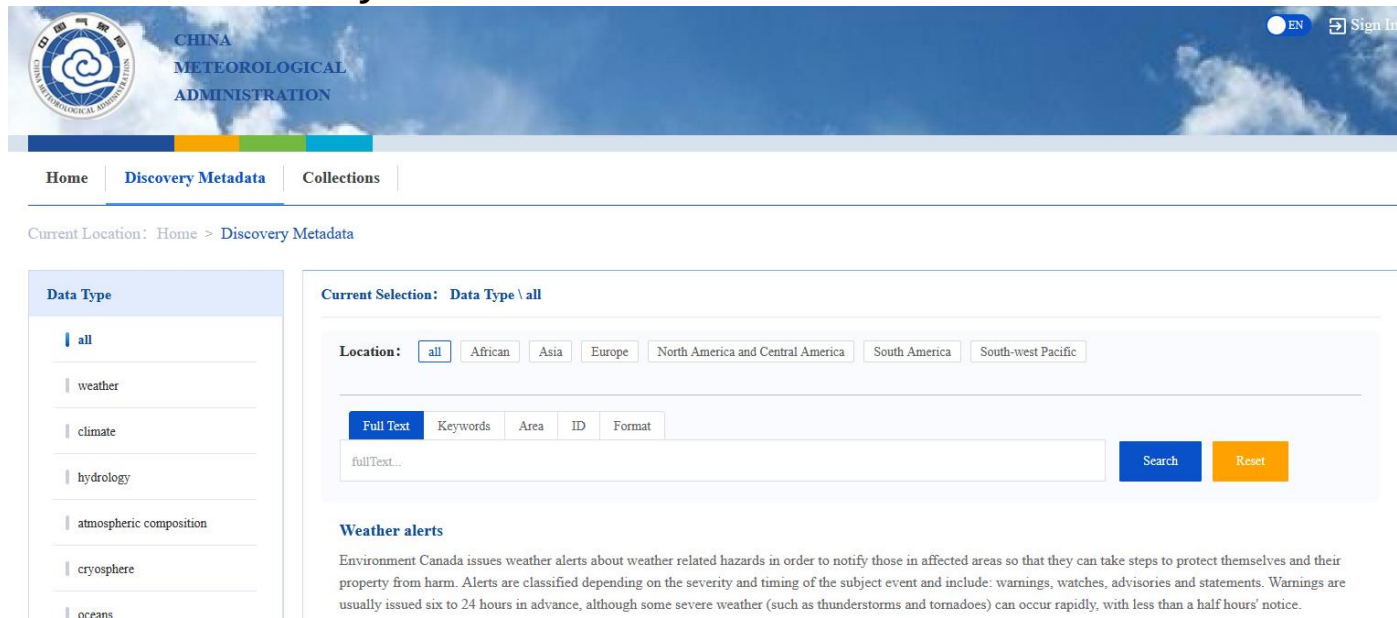
```
pywiscat search --query radar
```

```
pywiscat search --centre-id de-dwd
```

```
pywiscat get urn:wmo:md:can:eccc-msc:c7c9d726-c48a-49e3-98ab-78a1ab87cda8
```

How to search for (meta)data?

→ Use GDC directly:



The screenshot shows the CMA GDC search interface. At the top is the CMA logo and the text "CHINA METEOROLOGICAL ADMINISTRATION". Below this is a navigation bar with "Home", "Discovery Metadata", and "Collections". The "Discovery Metadata" section is active. Below the navigation bar, the "Current Location" is "Home > Discovery Metadata". On the left, the "Data Type" sidebar lists "all", "weather", "climate", "hydrology", "atmospheric composition", "cryosphere", and "oceans". The "Current Selection" is "Data Type \ all". The search area includes a "Location" filter with options: "all", "African", "Asia", "Europe", "North America and Central America", "South America", and "South-west Pacific". Below this is a search bar with a "Full Text" button and a text input field containing "fullText...". To the right of the search bar are "Search" and "Reset" buttons. Below the search bar, there is a section titled "Weather alerts" with a paragraph of text: "Environment Canada issues weather alerts about weather related hazards in order to notify those in affected areas so that they can take steps to protect themselves and their property from harm. Alerts are classified depending on the severity and timing of the subject event and include: warnings, watches, advisories and statements. Warnings are usually issued six to 24 hours in advance, although some severe weather (such as thunderstorms and tornadoes) can occur rapidly, with less than a half hours' notice."

How to search for (meta)data?

➔ Use GDC directly:

 Environment and Climate Change Canada
Environnement et Changement climatique Canada

Contact

Home / Collections / WIS2 discovery metadata / Items

json json-ld

WIS2 discovery metadata

Search

Start date

End date

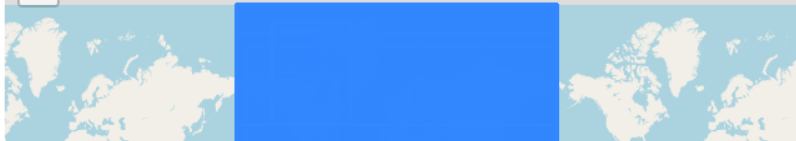
☐ Spatial filter

Search

Reset

+

-



title	description	themes	type	language	created
North American Radar Composite (1 km)	This mosaic is calculated over...	[{'concepts': [{'id': 'Radar'}],...]	dataset	{'code': 'en'}	2018-03-08T00:00

How to search for (meta)data?

➔ Use GISC-Portal:

**Deutscher Wetterdienst**
Wetter und Klima aus einer Hand

HOME GEOSS RSS ▶ SUBSCRIPTIONS METADATA ? SIGN IN/REGISTRATION

WIS-Portal

Search the WIS:

Full Text

Keywords

Area

Bulletin

Date

☐ combine search terms

Search

synop

wis2

wis1

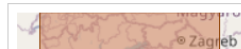
Showing results for: **Full Text Search (Terms combined with OR):** *synop*
76 matches - currently showing records 1 - 10
Filter by: [Region](#) | [Originator](#) | [Keywords](#) | [License](#) | [Metadata-Type](#) | [Creation Date](#) | ☐ Titles only | [≡](#) | [↻](#)

Result rows per page:

10

1

2345678Next »



Synop observations in BUFR
Product: urn:wmo:md:it-meteoam:observations.surface.synop-bufr

What to do with the search result?

Surface Weather Observations



Subscribe to data notifications

Property	Value
identifier	urn:wmo:md:de-dwd:weather.observations
type	dataset
created	2023-11-01T22:23:43Z
updated	2024-07-01T08:00:00Z
title	Surface Weather Observations
description	Surface Observations measured at the automatic and manual stations of Deutscher Wetterdienst, the German Weather Service
wmo:dataPolicy	core
keywords	
themes	concepts: id: meteorology scheme: http://wis.wmo.int/2012/codelists/WMOCodeLists#WMO_CategoryCode concepts: id: weather title: Weather url: https://codes.wmo.int/wis/topic-hierarchy/earth-system-discipline/weather scheme: https://codes.wmo.int/wis/topic-hierarchy/earth-system-discipline concepts: id: continual scheme: https://standards.iso.org/iso/19139/resources/gmxCodeLists.xml#MD_FrequencyCode

contacts	<i>name:</i> Kai-Thorsten Wirt <i>organization:</i> Deutscher Wetterdienst <i>emails:</i> value: wis@dwd.de <i>addresses:</i> <i>deliveryPoint:</i> Frankfurter Strasse 135 <i>city:</i> Offenbach <i>postalCode:</i> 63067 <i>country:</i> Germany <i>links:</i> <i>rel:</i> about <i>type:</i> text/html <i>href:</i> https://www.dwd.de/wmc <i>rel:</i> about <i>type:</i> text/html <i>href:</i> https://gisc.dwd.de <i>contactInstructions:</i> email <i>roles:</i> host
Links	• Stations associated with this dataset (application/json) • Surface Weather Information (text/html) • Raw data download (BUFR) (application/octet-stream) • The landing page of this server as JSON (application/json) • The landing page of this server as HTML (text/html) • This document as JSON (application/geo+json) • This document as RDF (JSON-LD) (application/ld+json) • This document as HTML (text/html) • WIS2 discovery metadata (application/json)

What to do with the search result?

Surface Weather Observations



Property	Value
identifier	urn:wmo:md:de-dwd:weather.observations
type	dataset
created	2023-11-01T22:23:43Z
updated	2024-07-01T08:00:00Z
title	Surface Weather Observations
description	Surface Observations measured at the automatic and manual stations of Deutscher Wetterdienst, the German Weather Service
wmo:dataPolicy	core
keywords	
themes	concepts: id: meteorology scheme: http://wis.wmo.int/2012/codelists/WMOCodeLists#WMO_CategoryCode concepts: id: weather title: Weather url: https://codes.wmo.int/wis/topic-hierarchy/earth-system-discipline/weather scheme: https://codes.wmo.int/wis/topic-hierarchy/earth-system-discipline concepts: id: continual scheme: https://standards.iso.org/iso/19139/resources/gmxCodeLists.xml#MD_FrequencyCode

contacts	<i>name:</i> Kai-Thorsten Wirt <i>organization:</i> Deutscher Wetterdienst <i>emails:</i> value: wis@dwd.de <i>addresses:</i> <i>deliveryPoint:</i> Frankfurter Strasse 135 <i>city:</i> Offenbach <i>postalCode:</i> 63067 <i>country:</i> Germany <i>links:</i> <i>rel:</i> about <i>type:</i> text/html <i>href:</i> https://www.dwd.de/wmc <i>rel:</i> about <i>type:</i> text/html <i>href:</i> https://gisc.dwd.de <i>contactInstructions:</i> email <i>roles:</i> host
Links	• Stations associated with this dataset (application/json) • Surface Weather Information (text/html) • Raw data download (BUFR) (application/octet-stream) • The landing page of this server as JSON (application/json) • The landing page of this server as HTML (text/html) • This document as JSON (application/geo+json) • This document as RDF (JSON-LD) (application/ld+json) • This document as HTML (text/html) • WIS2 discovery metadata (application/json)

What to do with the search result?

Subscribe to data notifications

[add to wis2downloader](#)

- Notifications from China Meteorological Agency, Global Broker Service (cn-cma-global-broker)
 - Broker: `mqtts://everyone:everyone@gb.wis.cma.cn:8883`
 - Topic: `cache/a/wis2/de-dwd/data/core/weather/surface-based-observations/synop`
[pywis-pubsub configuration](#)

- Notifications from Météo-France, Global Broker Service (fr-meteofrance-global-broker)
- Broker: `mqtts://everyone:everyone@globalbroker.meteo.fr:8883`
- Topic: `cache/a/wis2/de-dwd/data/core/weather/surface-based-observations/synop`
[pywis-pubsub configuration](#)
- Notifications from Instituto Nacional de Meteorologia (Brazil), Global Broker Service (br-inmet-global-broker)
- Broker: `mqtts://everyone:everyone@globalbroker.inmet.gov.br:8883`
- Topic: `cache/a/wis2/de-dwd/data/core/weather/surface-based-observations/synop`
[pywis-pubsub configuration](#)
- Notifications from National Oceanic and Atmospheric Administration, National Weather Service, Global Broker Service (us-noaa-nws-global-broker)
- Broker: `mqtts://everyone:everyone@wis2globalbroker.nws.noaa.gov:8883`
- Topic: `cache/a/wis2/de-dwd/data/core/weather/surface-based-observations/synop`
[pywis-pubsub configuration](#)

Close

What to do with the search result?

Subscribe to data notifications

add to wis2downloader

- Notifications from China Meteorological Agency, Global Broker Service (cn-cma-global-broker)
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 - [pywis-pubsub configuration](#)
- Notifications from Météo-France, Global Broker Service (fr-meteofrance-global-broker)
 - Broker: `mqtts://everyone:everyone@globalbroker.meteo.fr:8883`
 - Topic: `cache/a/wis2/de-dwd/data/core/weather/surface-based-observations/synop`
 - [pywis-pubsub configuration](#)
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 - [pywis-pubsub configuration](#)
- Notifications from National Oceanic and Atmospheric Administration, National Weather Service, Global Broker Service (us-noaa-nws-global-broker)
 - Broker: `mqtts://everyone:everyone@wis2globalbroker.nws.noaa.gov:8883`
 - Topic: `cache/a/wis2/de-dwd/data/core/weather/surface-based-observations/synop`
 - [pywis-pubsub configuration](#)

Close

manual download

pywis-pubsub

wis2downloader

Custom solution

GISC Portal

MQTT-Explorer

- ▼ wis2.dwd.de
 - ▶ 4gc (886 topics, 19013 messages)
 - ▼ cache
 - ▼ a
 - ▼ wis2
 - ▶ ca-eccc-msc (1 topic, 860 messages)
 - ▶ jp-jma-gts-to-wis2 (71 topics, 174 messages)
 - ▼ bf-anam
 - ▼ data
 - ▼ core
 - ▼ weather
 - ▼ surface-based-observations
 - synop = {"conformsTo": ["http://wis.wmo.int/spec/wnm/1/conf/core"]."
- ▶ de-dwd-gts-to-wis2 (63 topics, 180 messages)
- ▶ fr-meteofrance (2 topics, 7 messages)
- ▶ ve-inameh (1 topic, 1 message)
- ▶ uk-metoffice (1 topic, 2 messages)
- ▶ cv-inmg (1 topic, 2 messages)
- ▶ cy-dom (1 topic, 1 message)
- ▶ zm-zmd (1 topic, 1 message)
- ▶ us-noaa-nws (1 topic, 4 messages)
- ▶ ar-smn (1 topic, 1 message)
- ▶ origin (172 topics, 486 messages)

```
{
  "id": "b7f0c2f0-1e9a-4b0a-9e2a-000000000005",
  "conformsTo": [
    "http://wis.wmo.int/spec/wcmp/2/conf/core"
  ],
  "type": "Feature",
  "geometry": {
    "type": "Point",
    "coordinates": [
      -87.42188,
      44.83941,
      187
    ]
  },
  "properties": {
    "pubtime": "2026-08-05T12:03:00Z",
    "datetime": "2026-08-05T12:00:00Z",
    "data_id": "exercise/synop/ex05.bufr4",
    "metadata_id": "urn:wmo:md:xx-training-centre:observations.synop",
    "wigos_station_identifier": "0-20000-0-71628"
  },
  "links": [
    {
      "href": "https://example.org/data/ex05.bufr4",
      "rel": "canonical",
      "type": "application/bufr"
    }
  ]
}
```

pywis-pubsub

- <https://github.com/World-Meteorological-Organization/pywis-pubsub>
- 🐍 Small Python tool for validation, download, publication and subscription

- 💻 Installation:

```
pip install pywis-pubsub
```

- 🔍 Search:

```
pywis-pubsub bundle sync  
pywis-pubsub subscribe --config local.yml  
pywis-pubsub subscribe --config local.yml --download
```

pywis-pubsub - config

- Example config in github
- Create local config:
 - Broker
 - Topics
 - Storage directory
 - ...

```
broker: mqtt://username:password@localhost:1883

# list of topics to subscribe to
subscribe_topics:
  - '#'

# topic to publish to
publish_topic: foo/bar

# mqtt client id - randomly generated if not set
client_id: pywis-pubsub-testing

# clean mqtt session on connection. Set to false to start from server saved offset
clean_session: true

# whether to verify data
verify_data: true

# whether to validate message against schema
validate_message: true

# storage: filesystem
storage:
  type: fs
  options:
    basedir: /tmp/foo/bar
    # filepath can be one of:
    # - data_id: 'properties.data_id' in the message (default)
    # - link: the local path in the canonical link
    # - combined: data_id + file extension either from link or guessing the media type
    filepath: data_id
```

wis2downloader

- Dashboard
- Catalogue View**
- Tree View
- Manual Subscribe
- Manage Subscriptions
- Settings
- Documentation

Surface Weather Observations

core

CMA

DWD

ECCC

urn:wmo:md:de-dwd:weather.observations

Surface Observations measured at the automatic and manual stations of Deutscher Wetterdienst, the German Weather Service

 SHOW METADATA

 SELECT



wis2downloader

 Dashboard

 Catalogue View

 Tree View

 Manual Subscribe

 Manage Subscriptions

 Settings

 Documentation

Tree View

Filter topics
de-dwd

▼ cache

└─▼ a

└─└─▼ wis2

└─└─└─ de-dwd

► origin

Selected Topics

cache/a/wis2/de-dwd/#

Save directory

FILTERS

Datasets

Media types

☐ Bounding box

☐ Date & time range

PRIORITY QUEUE

☐ High Priority

☒ Small Files

☐ Large Files



wis2downloader

Manual Subscription

-  Dashboard
-  Catalogue View
-  Tree View
-  Manual Subscribe
-  Manage Subscriptions
-  Settings
-  Documentation

Enter a WIS2 topic, save directory, and optional filter.

Filter (JSON)

PRIORITY QUEUE

- ☐ High Priority ☒ Small Files ☐ Large Files

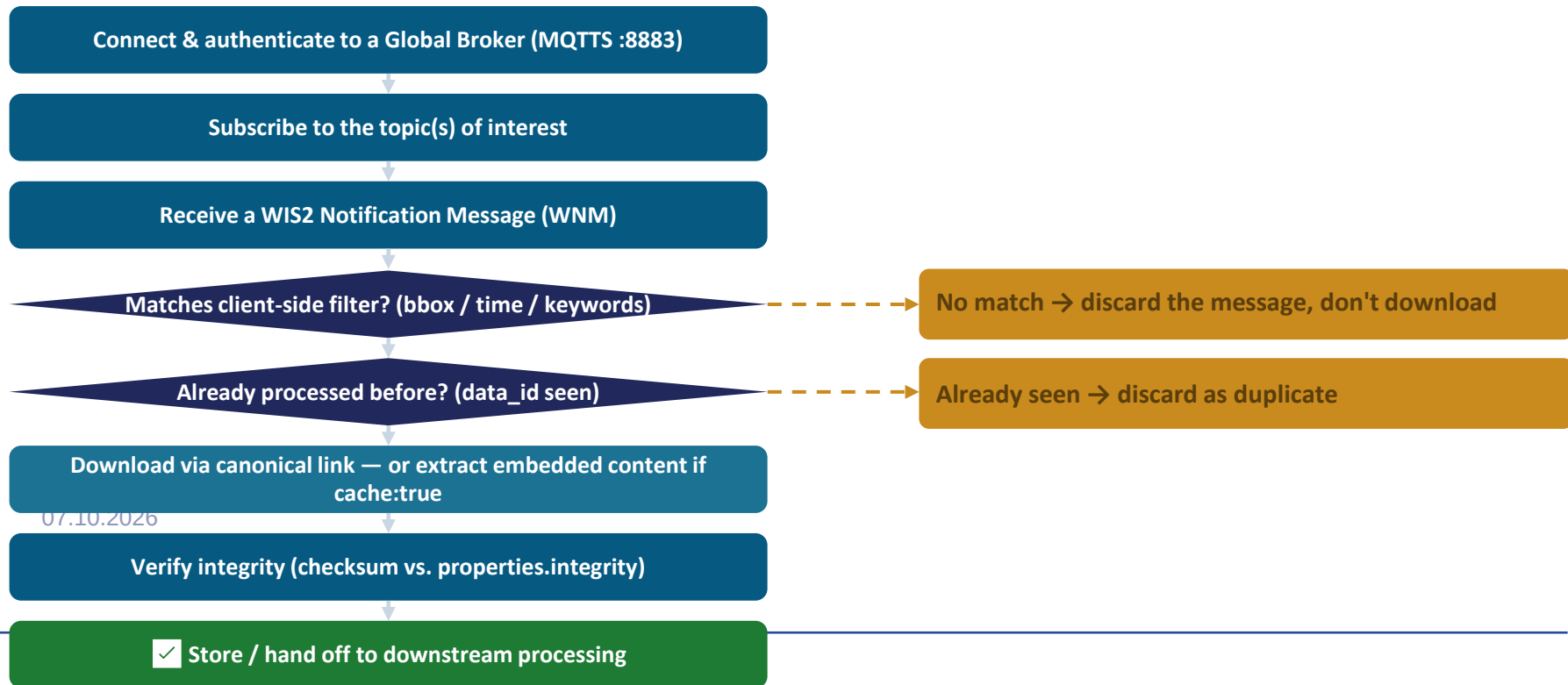
AUTHENTICATION

- ☒ None ☐ Basic HTTP ☐ Bearer Token

 SUBSCRIBE

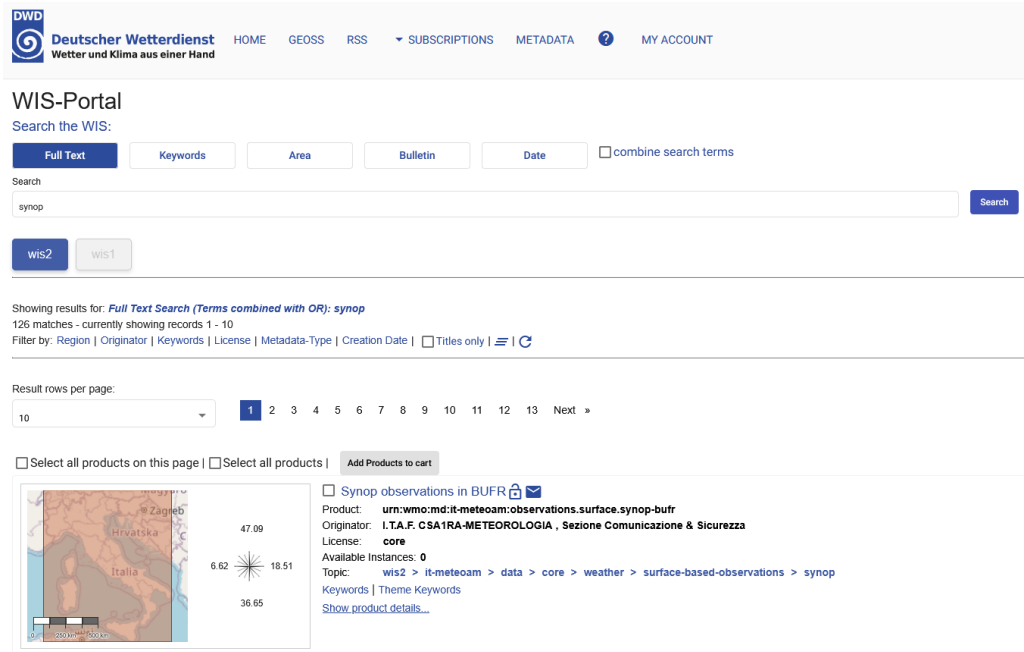


Custom Solution



GISC-Portal

- ➔ gisc.dwd.de
- ➔ Search for WIS2 and GTS data
- ➔ Subscription to WIS2 data (beta)
- ➔ Preview of BUFR data



The screenshot shows the DWD WIS-Portal search results for the query 'synop'. The page includes a navigation bar with links to HOME, GEOSS, RSS, SUBSCRIPTIONS, METADATA, and MY ACCOUNT. The search results section displays 126 matches, with the first 10 records shown. The results are filtered by Region, Originator, Keywords, License, Metadata-Type, and Creation Date. The first result is a map of Italy with a weather station location marked. The map shows the location of the station in the northern part of Italy, near the border with Slovenia. The station is identified as 'Zagreb' and 'Hrvatska'. The map includes a scale bar and a compass rose. The weather data for the station is displayed as a sun symbol with a wind speed of 6.62 m/s and a temperature of 18.51 °C. The map also shows the coordinates 47.09 and 36.65.

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

HOME GEOSS RSS SUBSCRIPTIONS METADATA ? MY ACCOUNT

WIS-Portal

Search the WIS:

Full Text Keywords Area Bulletin Date ☐ combine search terms

Search

synop

Search

wis2 wis1

Showing results for: **Full Text Search (Terms combined with OR): synop**
126 matches - currently showing records 1 - 10
Filter by: Region | Originator | Keywords | License | Metadata-Type | Creation Date | ☐ Titles only | [≡](#) | [C](#)

Result rows per page: 10

1 2 3 4 5 6 7 8 9 10 11 12 13 Next »

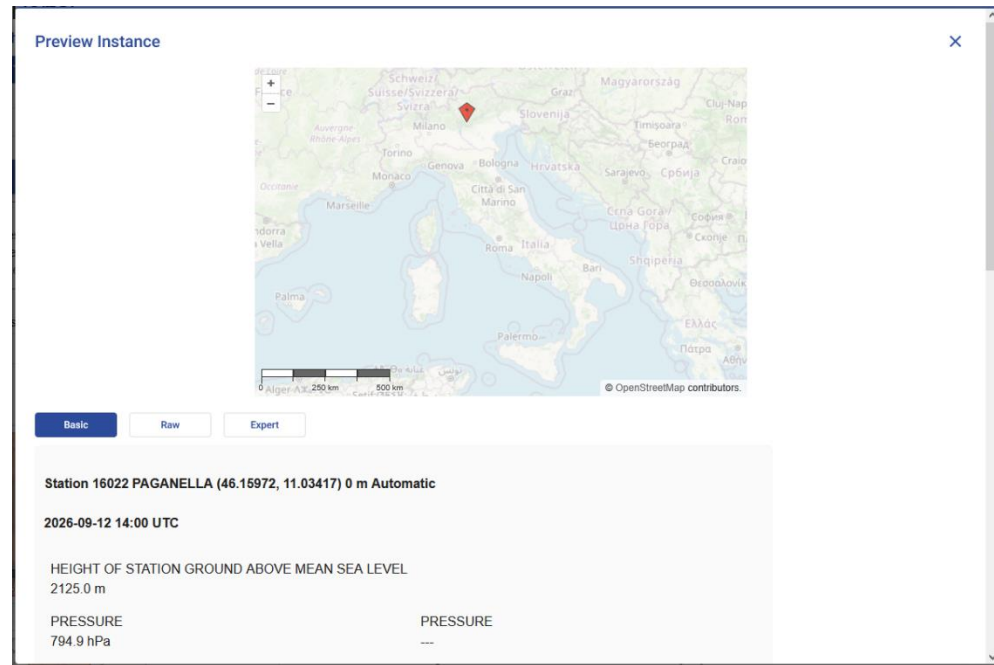
☐ Select all products on this page | ☐ Select all products | [Add Products to cart](#)

☐ Synop observations in BUFR [🔒](#) [📧](#)

Product: urn:wmo:md:it-meteoam:observations.surface.synop-bufr
Originator: I.T.A.F. CSA1RA-METEOROLOGIA, Sezione Comunicazione & Sicurezza
License: core
Available Instances: 0
Topic: wis2 > it-meteoam > data > core > weather > surface-based-observations > synop
Keywords | Theme Keywords
[Show product details...](#)

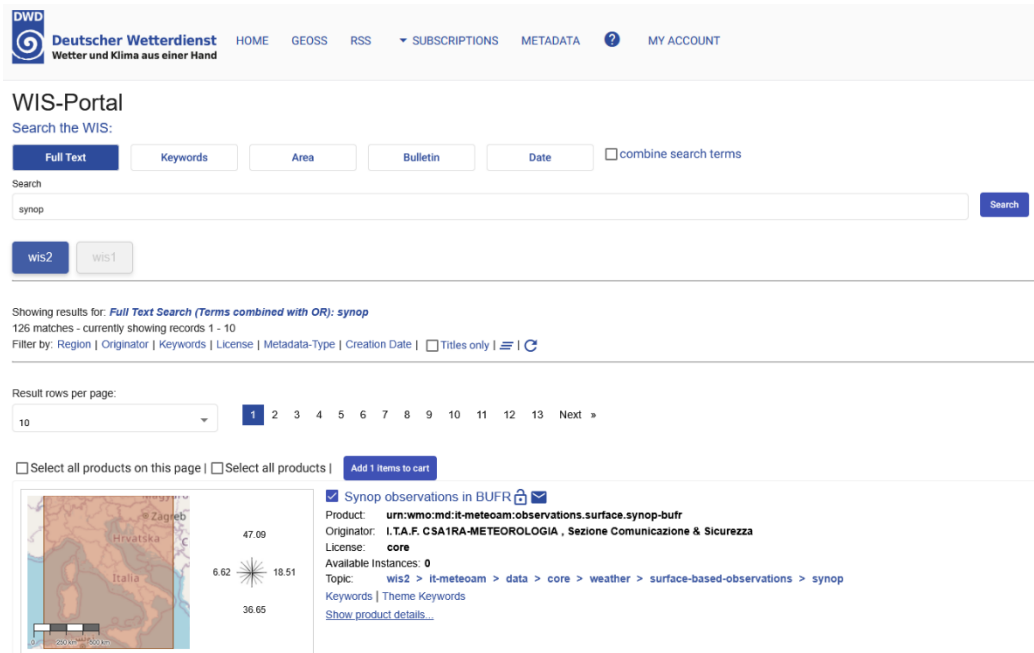
GISC-Portal

- ➔ gisc.dwd.de
- ➔ Search for WIS2 and GTS data
- ➔ Subscription to WIS2 data (beta)
- ➔ Preview of BUFR data



GISC-Portal

- ➔ gisc.dwd.de
- ➔ Search for WIS2 and GTS data
- ➔ Subscription to WIS2 data (beta)
 - ➔ Add items to cart



The screenshot shows the DWD WIS-Portal search results for the term 'synop'. The page includes a navigation bar with links to HOME, GEOSS, RSS, SUBSCRIPTIONS, METADATA, and MY ACCOUNT. The search results section shows 126 matches, with the first result being 'Synop observations in BUFR'. The result details include the product name, originator (I.T.A.F. CSA1RA-METEOROLOGIA), license (core), and available instances (0). A map of the region around Zagreb, Croatia, is displayed alongside the result details.

DWD Deutscher Wetterdienst Wetter und Klima aus einer Hand

HOME GEOSS RSS SUBSCRIPTIONS METADATA MY ACCOUNT

WIS-Portal

Search the WIS:

Full Text Keywords Area Bulletin Date ☐ combine search terms

Search

synop

Search

wis2 wis1

Showing results for: **Full Text Search (Terms combined with OR): synop**

126 matches - currently showing records 1 - 10

Filter by: Region | Originator | Keywords | License | Metadata-Type | Creation Date | ☐ Titles only | [≡](#) [C](#)

Result rows per page: 10

1 2 3 4 5 6 7 8 9 10 11 12 13 Next »

☐ Select all products on this page | ☐ Select all products | [Add 1 item to cart](#)

☒ Synop observations in BUFR [📄](#) [📧](#)

Product: urn:xmo:md:it-meteoam:observations.surface.synop-bufr

Originator: I.T.A.F. CSA1RA-METEOROLOGIA , Sezione Comunicazione & Sicurezza

License: core

Available Instances: 0

Topic: wis2 > it-meteoam > data > core > weather > surface-based-observations > synop

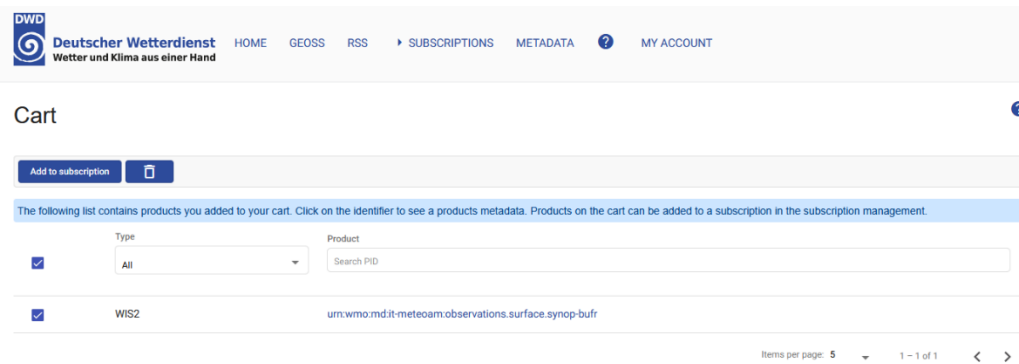
Keywords | Theme Keywords

[Show product details...](#)

Map showing the location of Zagreb, Croatia, with coordinates 47.09, 16.51, and 36.65.

GISC-Portal

- gisc.dwd.de
- Search for WIS2 and GTS data
- Subscription to WIS2 data (beta)
 - Add items to cart
 - Add items from card to subscription



The screenshot shows the 'Cart' page of the DWD GISC-Portal. The header includes the DWD logo and navigation links: HOME, GEOSS, RSS, SUBSCRIPTIONS, METADATA, and MY ACCOUNT. Below the header, there is a 'Cart' title and a button to 'Add to subscription'. A blue informational banner states: 'The following list contains products you added to your cart. Click on the identifier to see a products metadata. Products on the cart can be added to a subscription in the subscription management.' The main content area is a table with two columns: 'Type' and 'Product'. The first row shows 'All' in the 'Type' column and 'Search PID' in the 'Product' column. The second row shows 'WIS2' in the 'Type' column and 'urn:wmo.md:it-meteoam:observations.surface.synop-bufr' in the 'Product' column. At the bottom right, there is a pagination control showing 'Items per page: 5' and '1 - 1 of 1'.

| Type | Product |
|------|---|
| All | Search PID |
| WIS2 | urn:wmo.md:it-meteoam:observations.surface.synop-bufr |

GISC-Portal

- gisc.dwd.de
- Search for WIS2 and GTS data
- Subscription to WIS2 data (beta)
 - Add items to cart
 - Add items from card to subscription
 - Possible destinations:
Mail, (S)FTP, HTTP(S)

The screenshot shows the 'Cart' section of the DWD GISC-Portal. At the top, there is a navigation bar with the DWD logo and links for HOME, GEOSS, RSS, SUBSCRIPTIONS, METADATA, and MY ACCOUNT. Below the navigation bar, the title 'Cart' is displayed. A button labeled 'Add to subscription' is visible. A blue informational banner states: 'The following list contains products you added to your cart. Click on the identifier to see a products metadata. Products on the cart can be added to a subscription in the subscription management.' Below this, there is a table with two columns: 'Type' and 'Product'. The first row shows a checked checkbox, 'All' in the Type column, and a search input field in the Product column. The second row shows a checked checkbox, 'WIS2' in the Type column, and the identifier 'urn:wmo.md:it-meteoam:observations.surface.synop-bufr' in the Product column. At the bottom right, there is a pagination control showing 'Items per page: 5' and '1 - 1 of 1'.

| Type | Product |
|--|---|
| ☒ All | Search PID |
| ☒ WIS2 | urn:wmo.md:it-meteoam:observations.surface.synop-bufr |

GISC-Portal

- gisc.dwd.de
- Search for WIS2 and GTS data
- Subscription to WIS2 data (beta)
 - Add items to cart
 - Add items from card to subscription
 - Possible destinations:
Mail, (S)FTP, HTTP(S)
 - Attention: WIS2 contains a lot of small files, be prepared!

The screenshot shows the 'Cart' page of the DWD GISC-Portal. The header includes the DWD logo and navigation links: HOME, GEOSS, RSS, SUBSCRIPTIONS, METADATA, and MY ACCOUNT. Below the header, there is a 'Cart' section with a table of items. The table has columns for 'Type' and 'Product'. The first item is 'WIS2' with the product identifier 'urn:wmo.md:it-meteoam:observations.surface.synop-bufr'. There are checkboxes for each item. At the bottom right, there is a pagination control showing 'Items per page: 5' and '1 - 1 of 1'.

| Type | Product |
|------|---|
| All | Search PID |
| WIS2 | urn:wmo.md:it-meteoam:observations.surface.synop-bufr |

Thank you for your attention!