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Theia's Sentinel-2 data

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"Value-added data processed by CNES for the Theia data centre www.theia-land.fr using Copernicus products. The processing uses algorithms developed by Theia's Scientific Expertise Centres."

Product description

Level 2A

The level 2A products correct the data for atmospheric effects and detect the clouds and their shadows using MAJA (formerly known as MACCS). MAJA uses MUSCATE processing center at CNES, in the framework of THEIA land data center.
The full description of the product format is available here (https://theia.cnes.fr/atdistrib/documents/PSC-NT-411-0362-CNES_01_00_SENTINEL-2A_L2A_Products_Description.pdf). A more succinct one is also available here (http://www.cesbio.ups-tlse.fr/multitemp/?page_id=8352).
Data is processed by MAJA (http://www.cesbio.ups-tlse.fr/multitemp/?p=6203) (before called MACCS) for THEIA land data center.
Sentinel-2 level 1C data are downloaded from PEPS (https://peps.cnes.fr/).

Level 3A

The products of level 3A provide a monthly synthesis of surface reflectances from Theia's L2A products. The synthesis is based on a weighted arithmetic mean of clear observations. (CESBIO (http://www.cesbio.ups-tlse.fr/multitemp/?p=13976))

The full description of the product format is available here (https://theia.cnes.fr/atdistrib/documents/THEIA-ST-411-0419-CNES_01_04_Format_Specification_of_MUSCATE_Level-3A_Products-signed.pdf). A more succinct one is also available here (http://www.cesbio.ups-tlse.fr/multitemp/?page_id=14019). 3A products can be named 2A, 2B or 2X depending on their input files.

The data processing is produced by WASP (Weighted Average Synthesis Processor), by MUSCATE data center at CNES, in the framework of THEIA data center. The processing chain WASP is an adaptation of the monthly synthesis chain from the project Sen2Agri, (http://www.esa-sen2agri.org/) funded by ESA. This chain had been defined by CESBIO and initially developed by CS-Romania. It has been adjusted to the THEIA context by CNES.

Theia's Snow data

License

It is derived from Sentinel-2 L2A images generated by Theia and for this reason it is distributed with the same license: Français (https://theia.cnes.fr/atdistrib/documents/Licence-Theia-CNES-Sentinel-ETALAB-v2.0-fr.pdf) | English (https://theia.cnes.fr/atdistrib/documents/Licence-Theia-CNES-Sentinel-ETALAB-v2.0-en.pdf).

Product description

The Theia snow product indicates the snow presence or absence on the land surface every fifth day if there is no cloud. The product is distributed by Theia as a raster file (8 bits GeoTIFF) of 20 m resolution and a vector file (Shapefile polygons).

1. Raster files are named SENTINEL2A*SNW_R2.tif. Pixels are coded as follows:

- 0: No-snow
- 100: Snow
- 205: Cloud including cloud shadow
- 254: No data

2. Vector files are named SENTINEL2A*SNW_R2.{shp,shx,prj,dbf} and coded with the DN field:

- 0: No-snow
- 100: Snow
- 205: Cloud including cloud shadow
- 254: No data

More details about the snow products description: __Français__ (http://www.cesbio.ups-tlse.fr/multitemp /?page_id=10748#fr) | __English__ (http://www.cesbio.ups-tlse.fr/multitemp/?page_id=10748#en).

Theia's SPOT World Heritage data

Presentation

Announced by France at the ministerial session of the Group on Earth Observations in January 2014, Spot World Heritage (SWH) is a program of the Centre National d'Etudes Spatiales (CNES) in partnership with Airbus Defense and Space (ADS) to make useful images, acquired by the five satellites of the Europeen SPOT program dedicated to the observation of the Earth, accessible to the public. During the 30 years of lifetime, from 1986 to 2015, the SPOT projects (1 to 5) have acquired more than 25 million images all over the planet. This program, determined by France in 1977, has opened a host of applications: cartography, temporal monitoring of vegetation, land cover, natural disaster's impacts...

The program SPOT 1 to 5 has been closed in 2015 with the deorbiting of SPOT 5. On the other hand, the archive data is still meaningful and can complement the actual data. Besides, the CNES has started mass processing of SPOT 1-5 images. Simultaneously, a call was made to the interested institutions in order to contribute to the processing, in cooperation with the CNES, of images acquired on areas of their choice, allowing to enhance the SWH database.

Geographic coverage

The Spot World Heritage Service opened in June 2015 with the first dataset about France. Nowadays, two large areas are covered and the images are available for free for all users: French or not, public or private entity:

- Multispectral images* about metropolitan France and overseas between 1986 and the end of 2008
- Multispectral images* covering the 8 countries of Central and West Africa from the program OSFACO (Observation Spatiale des Forêts d'Afrique Centrale et de l'Ouest) acquired between 1986 and the end of 2012: Benin, Cameroon, Central African Republic, Côte d'Ivoire, Gabon, Guinea, Republic of Congo, Democratic Republic of Congo.

By the end of 2020, the complementary images acquired until 2015 on these two areas will be available.

License and products' format

The SWH program continues with new sets of images processed by the CNES, relying on national and international partners.__here__ (https://www.theia-land.fr/product/spot-world-heritage-2)

On-demand production

Awaiting the global availability of SWH products, the CNES implemented an access "on request" allowing users to benefit from images acquired on any other area of the world defined by the users themselves through the catalogue of SPOT images from ADS (__https://www.intelligence-airbusds.com/en/4871-geostore-ordering__ (https://www.intelligence-airbusds.com/en/4871-geostore-ordering)). To request the images, there is a dedicated form available by asking to __isis-pleiades@cnes.fr__ (isis-pleiades@cnes.fr)

Venµs data distributed by Theia

License

For any communication using this dataset, please include the following information:

"Value-added data processed by CNES for the Theia data centre www.theia-land.fr using data from the VENµS satellite of CNES and the Israel Space Agency. The processing uses algorithms developed by Theia's Scientific Expertise Centres."

Product description

Level 1

A light description of Venµs L1 data is available here (http://www.cesbio.ups-tlse.fr/multitemp/?page_id=12984).
More informations on geometrical image quality are available in this pdf (https://theia.cnes.fr/atdistrib/documents/2018_06_26_News_Venus.pdf) file or at the following address (http://www.cesbio.ups-tlse.fr/multitemp/?page_id=12984).
Additional information on solar irradiance and Earth-Sun distance are provided here (https://theia.cnes.fr/atdistrib/documents/Level_1_processing_Venus.pdf).
Venµs spectral characteristics are detailed here (http://www.cesbio.ups-tlse.fr/multitemp/?page_id=14229).

Level 2

Level2 products provide surface reflectances after atmospheric correction, along with masks of clouds and their shadows.
Data is processed by MAJA (http://www.cesbio.ups-tlse.fr/multitemp/?p=6203) (before called MACCS) for THEIA land data center.
MAJA Algorithm Theoretical Basis Document (http://www.theia-land.fr/sites/default/files/imce/produits/atbd_maja_071217.pdf) (ATBD).

RTU Pleiades data distributed by Theia

Background : The preparatory programme ORFEO

As part of the ORFEO Preparatory Programme (Pleiades + CosmoSkyMed) set up by CNES, Thematic Groups have been set up to prepare the institutional community, including scientists, for the use of Very High Resolution (VHR) spatial images of the Pleiades constellation as soon as they become available.

Framework: the User Thematic Recipe (RTU)

After the successful launch of Pleiades 1A (17 December 2011) and Pleiades 1B (1 December 2012), a Thematic Acceptance Phase (RTU) was set up by CNES, in cooperation with Airbus Defence and Space. The RTU took place over two years, from March 2012 to March 2014, with the objective of:

- test THR imagery and the capabilities of Pleiades satellites (agility, stereo/tri-stereo,...)
- benefit from the dedicated access policy for French institutions within the framework of the Delegation of Public Service (DSP)
- thematically «evaluate/validate» the value-added products and services defined through 130 thematic studies proposed by the various Working Groups. These studies covered 171 geographical sites, covering several fields (coastline, sea, cartography, geology, risks, hydrology, forestry, agriculture).
- evaluate the algorithms and tools developed through the Methodological Component of the ORFEO programme.

More than 650 Pleiades images representing a volume of nearly 170,000 km2 that were acquired by CNES and made available free of charge to some sixty French scientific and institutional laboratories. All images acquired within the specific framework of the RTU are considered as demonstration products for non-commercial use only.

Landsat 8 data distributed by Theia

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Product description

A description of Landsat 8 data is available here (http://www.cesbio.ups-tlse.fr/multitemp/?page_id=3487).

Land Water Quality data distributed by Theia

Product description

A description of the Land Water Quality collection is available here (https://theia.cnes.fr/atdistrib/documents /THEIA-ST-411-0477-CNES_01-03_Format_Specification_of_OBS2CO_WaterColor_Products.pdf).

OSO data distributed by Theia

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Product description

An overview of OSO data is given here (https://www.theia-land.fr/ceslist/ces-occupation-des-sols/).
The specific description of OSO products is available on this link (https://www.theia-land.fr/product/carte-doccupation-des-sols-de-la-france-metropolitaine/).

Further information

For more information visit the Theia land data services centre website : www.theia-land.fr (http://www.theia-land.fr/fr/produits-thematiques) or to the CESBIO (http://www.cesbio.ups-tlse.fr/multitemp/).
For the OSFACO project you will find further information on www.osfaco.org (http://www.osfaco.org/)