

ECMWF COPERNICUS REPORT

Copernicus Climate Change Service



Product User Guide and Specifications

CDR Fire Burned Area (brokered from CCI Fire Burned Area)

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History of modifications

Version	Date	Description of modification	Chapters / Sections
V1.0	30/04/2019	First issue	All
V/1 0 1	0.1 10/05/2019	Updated according to	Scope of the
V1.0.1		ECMWF RIDs	document

List of datasets covered by this document

Deliverable ID	Product title	Product type (CDR, ICDR)	Version number	Delivery date
D3.2.18-v1.0	FireCCI51	CDR	5.1cds	01/05/2019



Related documents

Reference ID	Document			
	J. Lizundia-Loiola, M.L. Pettinari, E. Chuvieco (2018) ESA CCI ECV Fire Disturbance:			
D1	D3.3.3 Product User Guide – MODIS, version 1.3. Available at: <u>https://www.esa-</u>			
	fire-cci.org/documents			
	Pettinari M.L., Chuvieco E., Padilla M., Storm T. (2017) ESA CCI ECV Fire			
D2	Disturbance: D1.4 Data Access Requirement Document, version 2.5. Available			
	from: <u>http://www.esa-fire-cci.org/documents</u>			
	J. Lizundia-Loiola, M.L. Pettinari, E. Chuvieco, T. Storm, J. Gomez-Dans (2018) ESA			
D3	CCI ECV Fire Disturbance: D2.1.3 Algorithm Theoretical Basis Document – MODIS,			
	version 2.0. Available at: <u>https://www.esa-fire-cci.org/documents</u>			
	CDM: Common data model specification v1.0. Available at:			
D4	https://confluence.ecmwf.int/display/COPSRV/CDM%3A+Common+data+model+			
	specification+-+v1.0			

Acronyms

Acronym	Definition		
BA	Burned Area		
BC	Brockmann Consult GmbH		
C3S	Copernicus Climate Change Service		
CCI	Climate Change Initiative		
ECV	Essential Climate Variable		
ESA	European Space Agency		
Fire_cci	CCI Fire Project		
MODIS	Moderate Resolution Imaging Spectroradiometer		
PUGS	Product User Guide and Specifications		
TR	Target requirement		



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Scope of the document

This document provides a description of the burned area product FireCCI51, also called MODIS Fire_cci version 5.1 (brokered as version 5.1cds), produced by the University of Alcala and Brockmann Consult from the MODIS instrument.

Because the dataset and its associated documentation has originally been generated in the ESA CCI, most of the information about the product is found in external documents which are referred to in this document.

Executive summary

The burned area product FireCCI51 comprises maps of global burned area developed and tailored for use by climate, vegetation and atmospheric modellers, as well as by fire researchers or fire managers interested in historical burned patterns. The dataset is comprised of two BA products at different spatial resolutions, the PIXEL product, at the original resolution of the MODIS sensor, and the GRID product, at 0.25-degree resolution, and derived from the pixel product. The characteristics of these two products are described in this document.



1. Introduction

1.1 Key Features of the MODIS images and BA algorithm

See the description in section 1.2 of [D1].

Further information can also be found in section 3.2 of [D2] regarding the MODIS images, and in [D3] regarding the BA algorithm.

1.2 Main modifications between the CCI and C3S products

Some adaptations to the dataset have been performed, in order to comply with the CDS requirements [D4]. These adaptations comprise small changes in the information provided in [D1], so it should be noted that the pixel product, which is distributed in CCI in GeoTIFF format, is now available in NetCDF4. When [D1] refers to GeoTIFF, it should be understood as NetCDF in the C3S CDS version.



2. Product description

2.1 Target requirements

The target requirements (TRs) are defined and updated according to the C3S, GCOS and the user needs. Requirements included in the C3S proposed service follow the GCOS requirements, but were adapted to the current state of technology, considering constraints of spatial-temporal and spectral resolution of Earth observing systems.

ECV	Products	Frequency	Horizontal resolution	Required measurement uncertainty	Stability (per decade)
Fire	Burned Areas	24 hours	300 m	25% (error of omission and commission), compared to 30 m observations	±10% accuracy, stability throughout the time series

The following table summarizes the agreed data quality key performance indicators (KPI) relating to the burned area product FireCCI51, also called MODIS Fire_cci version 5.1 (brokered as version 5.1cds).

КРІ	KPI title	Performance target as specified in contract	Comments trend
KPI.D19.1	Accuracy of CDR Fire – BA	Max Overall Error 10%,	Related to Landsat or S-2
	MODIS FireCCI51 V1	Omission and Commission	medium resolution fire
	(Brokered from CCI)	Errors of BA < 45%	parameter
KPI.D19.2	Stability of CDR Fire – BA	Max 15%	Annual variability of the time
	MODIS FireCCI51 V1		series
	(Brokered from CCI)		

2.2 Data usage information

2.2.1 Pixel BA product See the description in section 2 of [D1].

2.2.1.1 Temporal compositing See the description in section 2.1 of [D1].

2.2.1.2 Spatial resolution See the description in section 2.2 of [D1].

2.2.1.3 Product Projection System

The pixel product is stored in geographical coordinates. See the description in section 2.3 of [D1].



2.2.1.4 Pixel attributes See the description in section 2.4 of [D1].

2.2.1.4.1 Layer 1: Date of the first detection See the description in section 2.4.1 of [D1].

2.2.1.4.2 Layer 2: Confidence level See the description in section 2.4.2 of [D1].

2.2.1.4.3 Layer 3: Land cover of burned pixels See the description in section 2.4.3 of [D1].

2.2.1.5 File format

The MODIS Fire_cci BA v5.1cds products are delivered in compressed Network Common Data Form version 4 (netCDF4) files with metadata attributes compliant with version 1.6 of the Climate and Forecast conventions.

2.2.1.6 Geographical subsets See the description in section 2.6 of [D1].

2.2.1.7 Product file naming convention The pixel files are named as follows: <Indicative_Date>-ESACCI-L3S_FIRE-BA-<Indicative_sensor>-<Additional_Segregator>-fv<xx.x>.nc

<Indicative_Date>

The identifying date for this data set:

The format is YYYYMMDD, where YYYY is the four-digit year, MM is the two-digit month from 01 to 12 and DD, as the product is provided in monthly files, is 01.

<Indicative_sensor>

In this version of the product, it is MODIS.

<Additional_Segregator>

This is AREA_<TILE_NUMBER> being the tile number the subset index described in section 2.2.1.6. **fv<File_Version>**

File version number in the form n{1,}[.n{1,}cds] (That is 1 or more digits followed by optional . and another 1 or more digits). This version is fv5.1cds.

Example: 20160301-ESACCI-L3S_FIRE-BA-MODIS-AREA_2-fv5.1cds.nc

2.2.1.8 Land cover information

See the description in section 2.8 and in Annex 1 of [D1].

2.2.1.9 Product metadata

An example of the metadata of the product can be found in Annex 1.

2.2.2 Grid BA product

See the description in section 3 of [D1].



2.2.2.1 Temporal compositing See the description in section 3.1 of [D1].

2.2.2.2 Spatial resolution See the description in section 3.2 of [D1].

2.2.2.3 Product Projection SystemThe grid product is stored in geographical coordinates.See the description in section 3.3 of [D1].

2.2.2.4 Grid attributes See the description in section 3.4 of [D1].

2.2.2.4.1 Attribute 1: Sum of burned area See the description in section 3.4.1 of [D1].

2.2.2.4.2 Attribute 2: Standard error See the description in section 3.4.2 of [D1].

2.2.2.4.3 Attribute 3: Fraction of burnable area See the description in section 3.4.3 of [D1].

2.2.2.4.4 Attribute 4: Fraction of observed area See the description in section 3.4.4 of [D1].

2.2.2.4.5 Attribute 5: Number of patches See the description in section 3.4.5 of [D1].

2.2.2.4.6 Attributes 6-23: Sum of burned area for each land cover category See the description in section 3.4.6 of [D1].

2.2.2.5 File format

The Grid BA products are delivered in compressed Network Common Data Form version 4 (netCDF4) files with metadata attributes compliant with version 1.6 of the Climate and Forecast conventions.

2.2.2.6 Product file naming convention The grid files are named as follows: <Indicative_Date>-ESACCI-L3S_FIRE-BA-<Indicative_sensor>-fv<xx.x>.nc

<Indicative_Date>

The identifying date for this data set:

The format is YYYYMMDD, where YYYY is the four-digit year, MM is the two-digit month from 01 to 12 and DD is the two-digit day of the month from 01 to 31. For monthly files the day is set to 01. <Indicative_sensor>

In this version of the product, it is MODIS.

fv<File_Version>

File version number in the form $n\{1, [.n\{1, cds] \ (That is 1 or more digits followed by optional . and another 1 or more digits). This version is fv5.1cds.$



Example: 20160307-ESACCI-L3S_FIRE-BA-MODIS-fv5.1cds.nc

2.2.2.7 Product metadata

An example of the metadata of the product can be found in Annex 2.



3. Changes and improvements since last version

See the description in section 5 of [D1].

4. Known issues

See the description in section 6 of [D1].



5. Data access information

5.1 Access to the users through the CDS

The data can be accessed through the CDS using this link: <u>https://cds.climate.copernicus.eu</u> and searching for MODIS FireCCI v5.1cds.

5.2 Data provider

The MODIS FireCCI51 burned area product is a data set produced by the University of Alcala and Brockmann Consult GmbH. BC is responsible for the distribution of the data set.

The point of contact is:

- Email : <u>copernicus-support@ecmwf.int</u>
- Website: http://climate.copernicus.eu/contact-us



Annex 1: Example of metadata of the pixel product

The following is an example of the metadata information found in the pixel NetCDF product of the file 20010101-ESACCI-L3S_FIRE-BA-MODIS-AREA_1-fv5.1cds.nc.

```
dimensions:
        time = 1;
        bounds = 2;
        lon = 57888 ;
        lat = 28499 ;
variables:
        short JD(time, lat, lon);
                 string JD:long_name = "Date of the first detection";
                 string JD:units = "Day of the year";
                 string JD:comment = "Possible values: 0 when the pixel is not burned; 1 to 366 day of the first detection
                 when the pixel is burned; -1 when the pixel is not observed in the month; -2 when pixel is not burnable:
                 water bodies, bare areas, urban areas and permanent snow and ice.";
                 JD:_Storage = "chunked" ;
                 JD: ChunkSizes = 1, 2025, 2025;
                 JD:_DeflateLevel = 5 ;
                 JD: Shuffle = "true";
                 JD:_Endianness = "little";
        byte CL(time, lat, lon);
                 string CL:long_name = "Confidence Level" ;
                 string CL:units = "percent" ;
                 string CL:comment = "Probability of detecting a pixel as burned. Possible values: 0 when the pixel is not
                 observed in the month, or it is not burnable; 1 to 100 probability values when the pixel was observed.
                 The closer to 100, the higher the confidence that the pixel is actually burned.";
                 CL:_Storage = "chunked";
                 CL: ChunkSizes = 1, 2025, 2025;
                 CL:_DeflateLevel = 5;
                 CL:_Shuffle = "true";
        ubyte LC(time, lat, lon);
                 string LC:long_name = "Land cover of burned pixels";
                 string LC:units = "Land cover code" ;
                 string LC:comment = "Land cover of the burned pixel, extracted from the CCI LandCover v1.6.1 (LC). N
                 is the number of the land cover category in the reference map. It is only valid when JD > 0. Pixel value is
                 0 to N under the following codes: 10 = Cropland, rainfed; 20 = Cropland, irrigated or post-flooding; 30 =
                 Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%); 40 = Mosaic
                 natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%); 50 = Tree cover,
                 broadleaved, evergreen, closed to open (>15%); 60 = Tree cover, broadleaved, deciduous, closed to
                 open (>15%); 70 = Tree cover, needleleaved, evergreen, closed to open (>15%); 80 = Tree cover,
                 needleleaved, deciduous, closed to open (>15%); 90 = Tree cover, mixed leaf type (broadleaved and
                 needleleaved); 100 = Mosaic tree and shrub (>50%) / herbaceous cover (<50%); 110 = Mosaic
                 herbaceous cover (>50%) / tree and shrub (<50%); 120 = Shrubland; 130 = Grassland; 140 = Lichens and
                 mosses; 150 = Sparse vegetation (tree, shrub, herbaceous cover) (<15%); 160 = Tree cover, flooded,
                 fresh or brackish water; 170 = Tree cover, flooded, saline water; 180 = Shrub or herbaceous cover,
                 flooded, fresh/saline/brackish water.";
                 LC:_Storage = "chunked" ;
                 LC:_ChunkSizes = 1, 2025, 2025 ;
                 LC:_DeflateLevel = 5;
                 LC:_Shuffle = "true";
        double lon(lon);
```



```
string lon:standard_name = "longitude" ;
                 string lon:units = "degrees_east" ;
                 string lon:axis = "X" ;
                 string lon:long_name = "longitude" ;
                 string lon:bounds = "lon bounds";
                 lon:valid min = -180.;
                 lon:valid max = -49.9990018968783;
                 lon:_Storage = "chunked" ;
                 lon:_ChunkSizes = 57888 ;
                 lon: DeflateLevel = 5 ;
                 lon:_Shuffle = "true";
        double lat(lat);
                 string lat:standard name = "latitude";
                 string lat:units = "degrees_north" ;
                 string lat:axis = "Y" ;
                 string lat:long name = "latitude";
                 string lat:bounds = "lat_bounds" ;
                 lat:valid_min = 18.9989020860365;
                 lat:valid_max = 83.0000499051802;
                 lat:_Storage = "chunked" ;
                 lat: ChunkSizes = 28499;
                 lat: DeflateLevel = 5 ;
                 lat:_Shuffle = "true" ;
         double lat bounds(lat, bounds);
                 lat_bounds:_Storage = "chunked" ;
                 lat_bounds:_ChunkSizes = 28499, 2 ;
                 lat bounds: DeflateLevel = 5;
                 lat_bounds:_Shuffle = "true" ;
        double lon_bounds(lon, bounds);
                 lon_bounds:_Storage = "chunked" ;
                 lon_bounds:_ChunkSizes = 57888, 2;
                 lon_bounds:_DeflateLevel = 5 ;
                 lon bounds: Shuffle = "true" ;
        double time_bounds(time, bounds);
                 time_bounds:_Storage = "contiguous" ;
        double time(time) ;
                 string time:standard_name = "time" ;
                 string time:long name = "time";
                 string time:axis = "T" ;
                 string time:calendar = "standard";
                 string time:units = "days since 1970-01-01 00:00:00";
                 string time:bounds = "time bounds";
                 time:_Storage = "contiguous" ;
// global attributes:
                 string :title = "Fire_cci Pixel MODIS Burned Area product" ;
                 string :institution = "University of Alcala";
```

string :title = "Ine_certificer incerificer incertificer incertif



string :product_version = "v5.1cds" ;

```
string :summary = "The pixel product is a raster dataset consisting of three layers that together describe
the attributes of the BA product.It uses the following naming convention: ${Indicative Date}-ESACCI-
L3S FIRE-BA-${Indicative sensor}[-${Additional Segregator}]-fv${xx.x}.nc. ${Indicative Date} is the
identifying date for this data set. Format is YYYYMMDD, where YYYY is the four digit year, MM is the two
digit month from 01 to 12 and DD is the two digit day of the month from 01 to 31. For monthly products
the date is set to 01. ${Indicative sensor} is MODIS. ${Additional Segregator} is the AREA ${TILE CODE}
being the tile code described in the Product User Guide. ${File Version} is the File version number in the
form n{1,}[.n{1,}cds] (That is 1 or more digits followed by optional . and another 1 or more digits, and
the cds code to identify this product. An example is: 20050301-ESACCI-L3S_FIRE-BA-MODIS-AREA_5-
fv5.0cds.nc";
string :keywords = "Burned Area, Fire Disturbance, Climate Change, ESA, GCOS";
string :id = "20010101-ESACCI-L3S FIRE-BA-MODIS-AREA 1-fv5.1cds";
string :naming_authority = "org.esa-fire-cci" ;
string :keywords_vocabulary = "none" ;
string :cdm_data_type = "Grid" ;
string :comment = "These data were produced as part of the ESA Fire_cci programme" ;
string :creation_date = "20190502T131038Z" ;
string :creator_name = "University of Alcala";
string :creator_url = "www.esa-fire-cci.org" ;
string :creator email = "emilio.chuvieco@uah.es";
string :contact = "http://copernicus-support.ecmwf.int" ;
string :project = "Climate Change Initiative - European Space Agency";
string :geospatial lat min = "18.998902086036537";
string :geospatial_lat_max = "83.00004990518016";
string :geospatial_lon_min = "-180.0";
string :geospatial lon max = "-49.999001896878326";
string :time_coverage_start = "20010101T000000Z" ;
string :time_coverage_end = "20010131T235959Z" ;
string :time_coverage_duration = "P1M" ;
string :time_coverage_resolution = "P1M";
string :standard_name_vocabulary = "NetCDF Climate and Forecast (CF) Metadata Convention" ;
string :license = "ESA CCI Data Policy: free and open access";
string :platform = "Terra" ;
string :sensor = "MODIS";
string :spatial_resolution = "0.0022457331";
string :geospatial_lon_units = "degrees_east" ;
string :geospatial lat units = "degrees north";
string :geospatial lon resolution = "0.0022457331";
string :geospatial_lat_resolution = "0.0022457331";
: Format = "netCDF-4";
```

}



Annex 2: Example of metadata of the grid product

The following is an example of the metadata information found in the grid NetCDF product of the file 20160101-ESACCI-L4_FIRE-BA-MODIS-fv5.1cds.nc.

```
dimensions:
        vegetation class = 18;
        lat = 720 ;
        lon = 1440 ;
        strlen = 150 ;
        time = 1;
        bounds = 2;
variables:
        float burned_area(time, lat, lon) ;
                 string burned_area:long_name = "total burned_area";
                 string burned_area:units = "m2";
                 string burned area:standard name = "burned area";
                 string burned area:cell methods = "time: sum";
                 burned_area:_Storage = "chunked";
                 burned_area:_ChunkSizes = 1, 720, 1440;
                 burned area: DeflateLevel = 5;
                 burned_area:_Shuffle = "true" ;
        float standard_error(time, lat, lon) ;
                 string standard_error:long_name = "standard error of the estimation of burned area";
                 string standard error:units = "m2";
                 standard error: Storage = "chunked";
                 standard error: ChunkSizes = 1, 720, 1440;
                 standard error: DeflateLevel = 5 ;
                 standard_error:_Shuffle = "true" ;
        float fraction of burnable area(time, lat, lon);
                 string fraction_of_burnable_area:long_name = "fraction of burnable area";
                 string fraction_of_burnable_area:units = "1";
                 string fraction of burnable area:comment = "The fraction of burnable area is the fraction of the cell
                that corresponds to vegetated land covers that could burn. The land cover classes are those from CCI
                Land Cover, http://www.esa-landcover-cci.org/";
                 fraction_of_burnable_area:_Storage = "chunked";
                 fraction_of_burnable_area:_ChunkSizes = 1, 720, 1440;
                 fraction_of_burnable_area:_DeflateLevel = 5 ;
                 fraction_of_burnable_area:_Shuffle = "true";
        float fraction_of_observed_area(time, lat, lon);
                 string fraction_of_observed_area:long_name = "fraction of observed area";
                 string fraction of observed area:units = "1";
                 string fraction of observed area:comment = "The fraction of the total burnable area in the cell
                (fraction of burnable area variable of this file) that was observed during the time interval, and was not
                marked as unsuitable/not observable. The latter refers to the area where it was not possible to obtain
                observational burned area information for the whole time interval because of lack of input data (non-
                existing data for that location and period).";
                 fraction_of_observed_area:_Storage = "chunked";
                 fraction_of_observed_area:_ChunkSizes = 1, 720, 1440;
                 fraction of observed area: DeflateLevel = 5;
                 fraction_of_observed_area:_Shuffle = "true" ;
        float number_of_patches(time, lat, lon) ;
                 string number of patches:long name = "number of burn patches";
```



```
string number_of_patches:units = "1";
        string number of patches:comment = "Number of contiguous groups of burned pixels.";
        number_of_patches:_Storage = "chunked" ;
        number of patches: ChunkSizes = 1, 720, 1440;
        number of patches: DeflateLevel = 5;
        number of patches: Shuffle = "true";
float burned area in vegetation class(time, vegetation class, lat, lon);
        string burned_area_in_vegetation_class:units = "m2";
        string burned_area_in_vegetation_class:long_name = "burned area in vegetation class";
        string burned area in vegetation class:cell methods = "time: sum";
        string burned_area_in_vegetation_class:comment = "Burned area by land cover classes; land cover
        classes are from CCI Land Cover, http://www.esa-landcover-cci.org/";
        burned area in vegetation class: Storage = "chunked";
        burned_area_in_vegetation_class:_ChunkSizes = 1, 1, 720, 1440 ;
        burned_area_in_vegetation_class:_DeflateLevel = 5;
        burned_area_in_vegetation_class:_Shuffle = "true";
double lat(lat);
        string lat:units = "degree_north" ;
        string lat:standard_name = "latitude" ;
        string lat:long_name = "latitude";
        string lat:bounds = "lat bounds";
        string lat:axis = "Y" ;
        lat:_Storage = "contiguous" ;
double lat bounds(lat, bounds);
        lat bounds: Storage = "contiguous";
double lon(lon);
        string lon:units = "degree east";
        string lon:standard_name = "longitude" ;
        string lon:long_name = "longitude" ;
        string lon:bounds = "lon bounds";
        string lon:axis = "X" ;
        lon: Storage = "contiguous";
double lon bounds(lon, bounds);
        lon_bounds:_Storage = "contiguous" ;
double time(time);
        string time:units = "days since 1970-01-01 00:00:00";
        string time:standard_name = "time" ;
        string time:long_name = "time" ;
        string time:bounds = "time bounds";
        string time:calendar = "standard";
        string time:axis = "T";
        time: Storage = "contiguous";
double time_bounds(time, bounds);
        time_bounds:_Storage = "contiguous" ;
int vegetation_class(vegetation_class);
        string vegetation_class:units = "1";
        string vegetation class:long name = "vegetation class number";
        vegetation_class:_Storage = "contiguous";
        vegetation class: Endianness = "little";
char vegetation class name(vegetation class, strlen);
        string vegetation_class_name:units = "1";
        string vegetation_class_name:long_name = "vegetation class name";
        vegetation class name: Storage = "contiguous";
```



// global attributes: string :title = "Fire_cci Gridded MODIS Burned Area product" ; string :institution = "University of Alcala"; string :source = "MODIS MOD09GQ Collection 6, MODIS MOD09GA Collection 6, MODIS MCD14ML Collection 6, ESA CCI Land Cover dataset v2.0.7"; string :history = "Created on 2017-12-19 06:42:41; modified with lc-user-tools-4.4 on 2019-05-02 12:58:26"; string :references = "See www.esa-fire-cci.org"; string :tracking_id = "2ec0d9bc-e33b-4a7d-8e41-3e4b82a2cfce" ; string :Conventions = "CF-1.6"; string :product_version = "v5.1cds" ; string :summary = "The grid product is the result of summing up burned area pixels and their attributes, as extracted from their original sinusoidal projection, within each cell of 0.25 degrees in a regular grid covering the whole Earth in monthly composites. The attributes stored are sum of burned area, standard error, fraction of burnable area, fraction of observed area, number of patches and the burned area for 18 land cover classes of Land Cover CCI."; string :keywords = "Burned Area, Fire Disturbance, Climate Change, ESA, GCOS" ; string :id = "20160101-ESACCI-L4_FIRE-BA-MODIS-fv5.1cds" ; string :naming_authority = "org.esa-fire-cci"; string :keywords_vocabulary = "none" ; string :cdm data type = "Grid"; string :comment = "These data were produced as part of the ESA Fire cci programme."; string :creation_date = "20190502T125826Z" ; string :creator name = "University of Alcala"; string :creator_url = "www.esa-fire-cci.org" ; string :creator_email = "emilio.chuvieco@uah.es" ; string :project = "Climate Change Initiative - European Space Agency"; string :geospatial_lat_min = "-90" ; string :geospatial_lat_max = "90"; string :geospatial lon min = "-180"; string :geospatial lon max = "180"; string :time_coverage_start = "20160101T000000Z" ; string :time coverage end = "20160131T235959Z"; string :time_coverage_duration = "P31D" ; string :time_coverage_resolution = "P31D" ; string :standard_name_vocabulary = "NetCDF Climate and Forecast (CF) Metadata Convention" ; string :license = "ESA CCI Data Policy: free and open access" ; string :platform = "Terra" ; string :sensor = "MODIS" ; string :spatial_resolution = "0.25 degrees" ; string :geospatial lon units = "degrees east"; string :geospatial_lat_units = "degrees_north" ; string :geospatial_lon_resolution = "0.25"; string :geospatial_lat_resolution = "0.25" ; :_Format = "netCDF-4" ;

}

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