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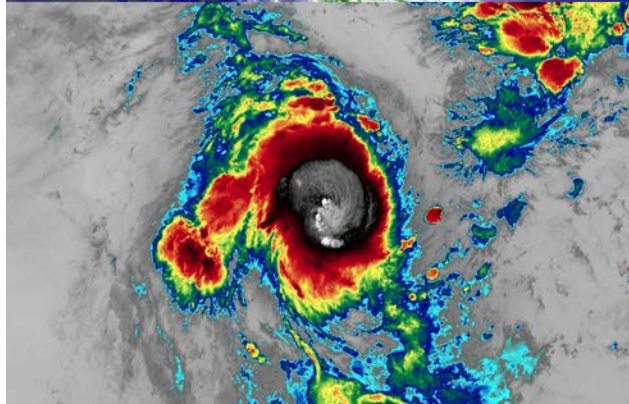
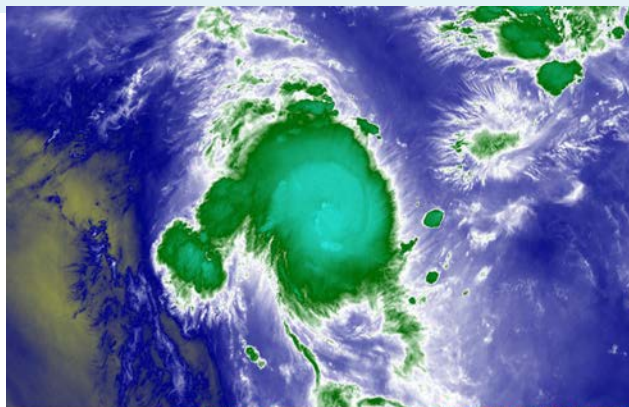
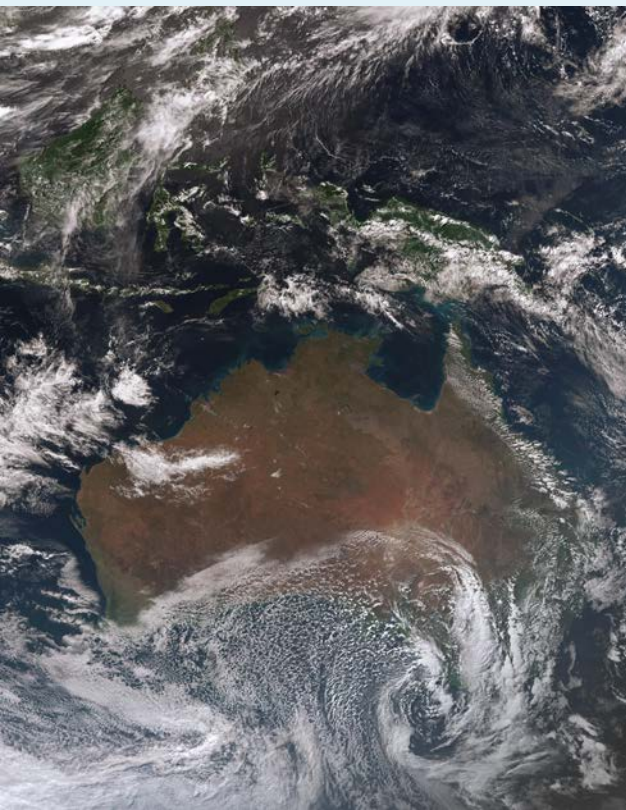
Bureau of Meteorology

# Metadata in Satellite Ocean Products

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Australian Bureau of Meteorology

Observations & Infrastructure, Passive Remote Sensing





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# Metadata

- Discovery, Access and Retrieval
  - Where and when it was observed
- Traceability & Reproducibility
  - Inputs, software used in product generation
  - Sampling features
- Machine to machine transactions
  - Enable automated access and assimilation
- Managing access/usage rights



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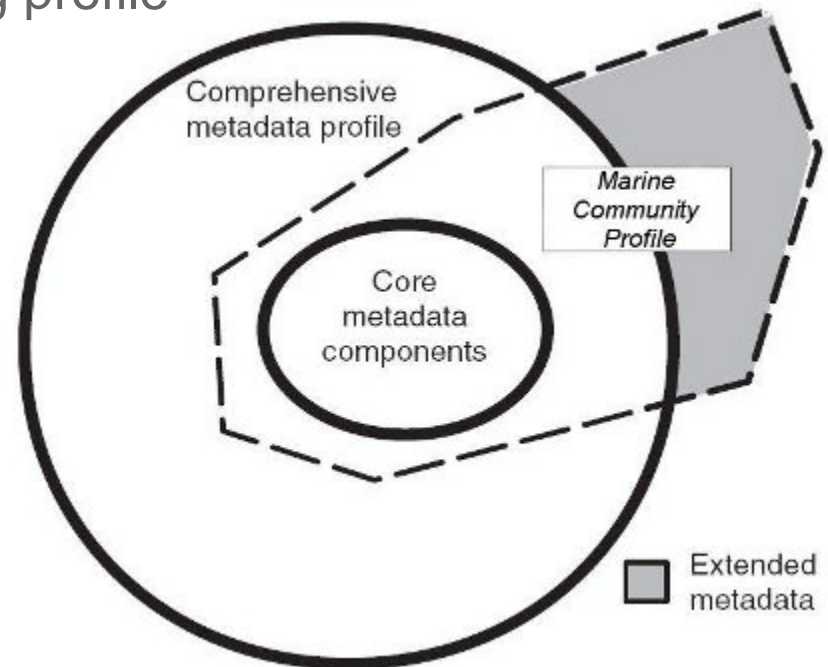
# Metadata Standards

- To extract most value providers need to adhere to standards
  - Climate and Forecast (CF)
  - Unidata Attribute Convention for Data Discovery (ACDD)
  - ISO 19115 Geographic Metadata
  - ISO 19156 Geographic Information: Observations & Measurements
- Which one should I provide?
  - Does it cover all my needs?
  - Does it cover all my communities' needs?



# Metadata Profiles

- It's not just standards, but profiles (implementations)
  - Anyone can create a profile...
  - ...but, it's better to use an existing profile
- Profiles
  - Marine Community Profile (MCP)
  - GHRSSST
  - INSPIRE
  - WMO WIGOS
- Crosswalks between standards (and profiles?)





# Crosswalk: CF to ISO 19115

<http://www.unidata.ucar.edu/software/thredds/current/tds/>

Catalog <http://dapds00.nci.org.au/thredds/catalog/rr5/satellite/obs/himawari8/FLDK/2015/11/06/0000/catalog.xml>

Dataset: 0000/20151106000000-P1S-ABOM\_BRF\_B01-PRJ\_GEOS141\_1000-HIMAWARI8-AHI.nc

- Data size: 62.62 Mbyte
- Data type: GRID
- ID: rr5/satellite/obs/him

**Documentation:**

- access rights: Register
- summary: Bureau of M

**Access:**

1. OPENDAP: <http://dapds00.nci.org.au/opendap/>
2. HTTP Server: <http://dapds00.nci.org.au/>
3. WMS: <http://dapds00.nci.org.au/wms/>
4. WCS: <http://dapds00.nci.org.au/wcs/>
5. NetcdfSubset: <http://dapds00.nci.org.au/netcdfsubset/>
6. NCML: <http://dapds00.nci.org.au/ncml/>
7. UDDC: <http://dapds00.nci.org.au/uddc/>
8. ISO: <http://dapds00.nci.org.au/iso/>

**Dates:**

- 2015-11-07T11:17:39Z (

```

- <gmi:MI_Metadata xsi:schemaLocation="http://www.isotc211.org/2005/gmi http://www.ngdc.noaa.gov/metadata/published/xsd/schema.xsd">
  - <gmd:fileIdentifier>
    - <gco:CharacterString>
      rr5/satellite/obs/himawari8/FLDK/2015/11/06/1000/20151106100000-P1S-ABOM_BRF_B06-PRJ_GEOS141_2000-HIMAWARI8-AHI.nc
    </gco:CharacterString>
  </gmd:fileIdentifier>
  - <gmd:language>
    <gmd:LanguageCode codeList="http://www.ngdc.noaa.gov/metadata/published/xsd/schema/resources/Codelist/gmxCodelists.xml#LanguageCode" codeListValue="en" />
  </gmd:language>
  - <gmd:characterSet>
    <gmd:MD_CharacterSetCode codeList="http://www.ngdc.noaa.gov/metadata/published/xsd/schema/resources/Codelist/gmxCodelists.xml#MD_CharacterSetCode" codeListValue="UTF8">UTF8</gmd:MD_CharacterSetCode>
  </gmd:characterSet>
  - <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode codeList="http://www.ngdc.noaa.gov/metadata/published/xsd/schema/resources/Codelist/gmxCodelists.xml#MD_ScopeCode" codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  - <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode codeList="http://www.ngdc.noaa.gov/metadata/published/xsd/schema/resources/Codelist/gmxCodelists.xml#MD_ScopeCode" codeListValue="service">service</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  + <gmd:contact />
  - <gmd:dateStamp>
    <gco>Date>2015-11-08</gco>Date>
  </gmd:dateStamp>
  - <gmd:metadataStandardName>
    - <gco:CharacterString>
      ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data
    </gco:CharacterString>
  </gmd:metadataStandardName>
  - <gmd:metadataStandardVersion>

```



# Verification Tools: THREDDS

<http://www.unidata.ucar.edu/software/thredds/current/tds/>

Catalog <http://dapds00.nci.org.au/thredds/catalog/rr5/satellite/obs/himawari8/FLDK/2015/11/06/0000/catalog.xml>

Dataset: 0000/20151106000000-P1S-ABOM\_BRF\_B01-PRJ\_GEOS141\_1000-HIMAWARI8-AHI.nc

- Data size: 62.62 Mbytes
- Data type: GRID
- ID: rr5/satellite/obs

**Documentation:**

- access rights: Re
- summary: Bureau

**Access:**

1. OPENDAP: <http://>
2. HTTP Server: [http](http://)
3. WMS: <http://dapds>
4. WCS: <http://dapds>
5. NetcdfSubset: [htt](http://)
6. NCML: <http://dapd>
7. UDDC: <http://dapd>
8. ISO: <http://dapds0>

**Dates:**

- 2015-11-07T11:17:

**Title: AGLS observations product suite**

**Total Score: 43/46**

**General File Characteristics**

- Number of Global Attrib
- Number of Variables
- Number of Variable Attrib
- Number of Standard Nam
- Number of Services
- Time Variable

- Spiral**
- [Total](#)
- [Identification](#)
- [Text Search](#)
- [Extent Search](#)
- [Other Extent Information](#)
- [Creator Search](#)
- [Contributor Search](#)
- [Publisher Search](#)
- [Other Attributes](#)
- [Identification](#) | [Text Search](#)

**Text Search Score: 6/7**

Text searches are a very important mechanism for data discovery. This group includes attributes that contain descriptive text that could be the target of these searches. Some of these attributes, for example title and summary, might also be displayed in the results of text searches.

Score	Attribute	Description	THREDDS	ISO 19115-2
1	<a href="#">title</a>	A short description of the dataset.	dataset@name	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:citation/gmd:CI_Citation/gmd:title/gco:CharacterString
1	<a href="#">summary</a>	A paragraph describing the dataset.	metadata/documentation[@type="summary"]	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:abstract/gco:CharacterString
1	<a href="#">keywords</a>	A comma separated list of key words and phrases.	metadata/keyword	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:descriptiveKeywords/gmd:MD_Keywords/gmd:keyword/gco:CharacterString
1	<a href="#">keywords_vocabulary</a>	If you are following a guideline for the words/phrases in your "keywords" attribute, put the name of that guideline here.	metadata/keyword@vocabulary	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:descriptiveKeywords/gmd:MD_Keywords/gmd:thesaurusName/gmd:CI_Citation/gmd:title/gco:CharacterString
1	<a href="#">standard_name_vocabulary</a>	The name of the controlled vocabulary from which variable standard names are taken.	metadata/variables@vocabulary	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:descriptiveKeywords/gmd:MD_Keywords/gmd:thesaurusName/gmd:CI_Citation/gmd:title/gco:CharacterString
0	<a href="#">history</a>	Provides an audit trail for modifications to the original data.		/gmi:MI_Metadata/gmd:dataQualityInfo/gmd:DQ_DataQuality/gmd:lineage/gmd:LI_Lineage/gmd:statement/gco:CharacterString
1	<a href="#">comment</a>	Miscellaneous information about the data.	metadata/documentation	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:supplementalInformation



# Verification Tools: PODAAC

<http://podaac-uat.jpl.nasa.gov/mcc/>

Results for 20151106100000-P1S-ABOM\_BRF\_B06-  
PRJ\_GEOS141\_2000-HIMAWARI8-AHI.nc

md5 d990de25446b32cc94ba9cd1e60e0885 6.17 MB NETCDF4\_CLASSIC

CF Check 64 out of 69 passed

Compliance Checker 64 out of 69 passed

Variable names all 6 passed

all\_features\_are\_same\_type all 0 passed

axis all 7 passed

time all 3 passed

consistent\_with\_coord\_type all 1 passed

is\_coordinate\_var all 1 passed

valid\_value all 1 passed

ACDD Check 64 out of 92 passed

Global Attributes 43 out of 50 passed

Highly Recommended 3 out of 4 passed

keywords 1 out of 2 passed

X check for a comma separated value failed because

- Value: EARTH SCIENCE

check for existence passed because "keywords"

- Description: A comma separated list of key words and phrases
- Value: EARTH SCIENCE

check for existence passed because "title" exists

- Description: A short description of the dataset.
- Value: AGLS observations product suite

check for existence passed because "summary" exists

- Description: A paragraph describing the dataset
- Value: AGLS observations product suite

Recommended 28 out of 32 passed

Suggested 12 out of 14 passed

The screenshot shows the NASA Jet Propulsion Laboratory California Institute of Technology website. The main heading is 'About Compliance Checker API'. Below the heading, it states: 'In addition to the web frontend, there is a queryable API frontend that you can use to perform validation. It returns a JSON response that is identical to the data that's used to generate the HTML templates. PDF and HTML responses are also available. Both GET (for remote URLs) and POST (for local file uploads) requests can be used.'

```
curl -F CF=on \
-F file-upload=@20151106100000-P1S-ABOM_BRF_B02-PRJ_GEOS141_2000-HIMAWARI8-AHI.nc \
-F response=json http://podaac-uat.jpl.nasa.gov/mcc/check
```



# Metadata Catalogues

**AODN 123**  
Australian Ocean Data Network

Home | Contact us | Links | About | Help |

English | Username | Password | Login

IMOS Integrated Marine Observing System

WGS84 (lat/lon)

3 item(s)

1 Select a Data Collection | 2 Create a Subset | 3 Download

**Step 2: Create a Subset**

Spatial Subset  
N -39.42  
Bounding Box W 119.11 E 131.2  
S -49.48  
Reset

IMOS - SRS Satellite - SST L3S - 03 day composite - day and night time composite  
IMOS - Argo Profiles  
IMOS - AATAMS Facility - Satellite Relay Tagging Program - Near real-time CTD profile data

Subset Info Layer

Temporal Extent  
From Min To Max  
Reset

Filters  
Age Class  
Deployment Site

Abstract  
Calibr Optic: <<Previous Next>>

Keywords  
Oceans | Salinity/density | Conductivity, Oceans | Ocean Temperature | Water Temperature, Oceans | Ocean Optics | Fluorescence, Oceans | Ocean Chemistry | Oxygen, Oceans | Ocean Optics | Photosynthetically Active Radiation, Oceans | Ocean Optics | Turbidity, Oceans | Ocean Circulation | Ocean Currents, Oceans | Ocean Chemistry | Nutrients, Oceans | Ocean Chemistry | Carbon Dioxide, Ocean...

Schema  
iso19139.mcp-2.0

Extent  
2011-07-01T16:00:00

meter developed by In situ Marine

Acknowledgement | Disclaimer | IMOS | AODN





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# Web Services and APIs

About EOSDIS • Science System Description • EOSDIS Components • Global Imagery Browse Services (GIBS)

### Global Imagery Browse Services (GIBS)

**Introduction**

The Global Imagery Browse Services (GIBS) system is a core EOSDIS component which provides a scalable, responsive, highly available, and community standards based set of imagery services. These services are designed with the goal of advancing user interactions with EOSDIS' inter-disciplinary data through enhanced visual representation and discovery. These advancements are realized in the following ways:

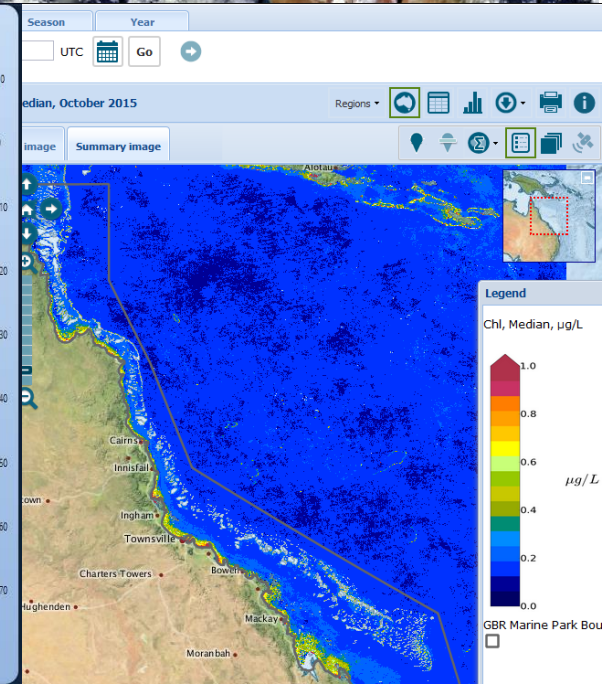
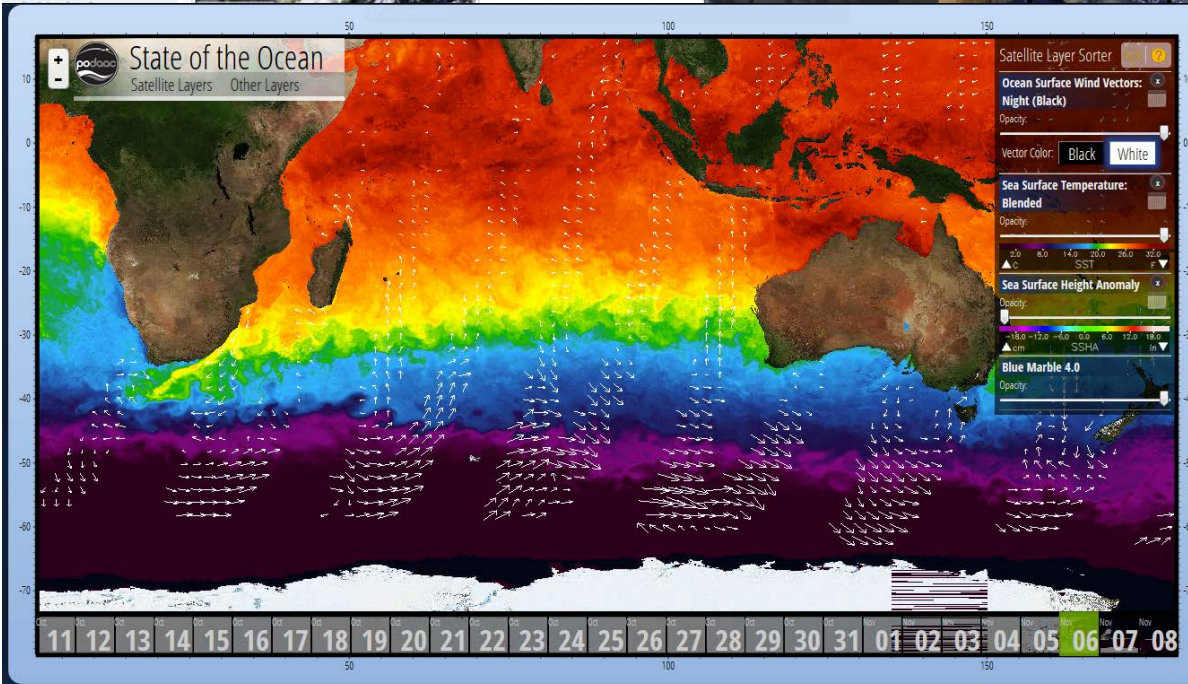
- Improved Approachability & Extended Reach** - Imagery greatly improves the usability of NASA Earth science data to new communities and improves cross-disciplinary data discovery through full-resolution, "no boundaries" (or "granule-free") interaction patterns.
- Cohesive Approach to Imagery** - As a core EOSDIS component, GIBS integrates with other core EOSDIS systems, components, and processes to provide a primary, authoritative source for EOSDIS imagery.
- Improved Cross-Discipline Research** - GIBS leverages science expertise and interoperable standards to provide science-based products that enhance cross-discipline discovery and analysis.

**BASE LAYERS**

- Global Reference (True Color) Terra / MODIS
- Corrected Reflectance (True Color) Terra / MODIS

**OVERLAYS**

- Area Labels
- Geospatial Reference (Contour, Natural Earth)
- Gridlines / Borders / Health
- OpenStreetMap (Natural Earth)
- Coastlines
- OpenStreetMap (license)





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# Increasing Importance

- Incorporate metadata into your research plan
  - Researchers are subject to ever greater scrutiny
  - Need to be transparent about the data you use
  - Desire reproducibility
- Funding models may be tied to use/uptake
  - Make it easy for people to find and use
- Data systems are becoming more interconnected
  - Catalogue of searchable catalogues
  - Making it easier to get what you need



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# Thanks. Questions or comments

Contact: [Leon.Majewski@bom.gov.au](mailto:Leon.Majewski@bom.gov.au)

