**GSFC ESDIS CMO**

**October 6, 2021**

**Released**

National Aeronautics and

Space Administration

**Goddard Space Flight Center**

**Greenbelt, Maryland**

Earth Science Data and Information Systems (ESDIS) Project, Code 423

**Appendix C. Metadata Requirements Base Reference for Unified Metadata Model - Granule (UMM-G)**

Signature/Approval Page

|  |  |  |
| --- | --- | --- |
| **Prepared by:** |  |  |
|  |  |  |
| Name |  | Date |
| Title/Role |  |  |
| Organization |  |  |
|  |  |  |
| **Reviewed by:** |  |  |
|  |  |  |
| Name |  | Date |
| Title/Role |  |  |
| Organization |  |  |
|  |  |  |
| **Approved by:** |  |  |
|  |  |  |
| Name |  | Date |
| Title/Role |  |  |
| Organization |  |  |
|  |  |  |
| **Concurred by:** |  |  |
|  |  |  |
| Name |  | Date |
| Title/Role |  |  |
| Organization |  |  |

**[Electronic] Signatures available in B32 Room E148**

**online at: /** **https://ops1-cm.ems.eosdis.nasa.gov/cm2/**

Preface

This document is under ESDIS Project configuration control. Once this document is approved, ESDIS approved changes are handled in accordance with Class I and Class II change control requirements described in the ESDIS Configuration Management Procedures, and changes to this document shall be made by change bars or by complete revision.

Any questions should be addressed to: esdis-esmo-cmo@lists.nasa.gov

ESDIS Configuration Management Office (CMO)
NASA/GSFC

Code 423

Greenbelt, Md. 20771

Abstract

This document describes the Unified Metadata Model for Granules (UMM-G) to be used by the National Aeronautics and Space Administration (NASA) Earth Science community. This model takes into account standards and specifications (Earth Observing System (EOS) Clearing House (ECHO) 10, International Organization for Standardization (ISO) 19115-2 Metadata Evolution for NASA Data Systems (MENDS) and Soil Moisture Active Passive (SMAP)) used by this community. Implementers of Earth Science Data and Information System's (ESDIS) Common Metadata Repository (CMR), its clients, and data providers should reference this document and the Unified Metadata Model (UMM) as a guide while implementing the system, its clients, or generating metadata.

***Keywords:*** UMM-G, UMM-Common, UMM-C, Granules, NASA Earthdata Search, Tools, EOSDIS, ESDIS, CMR, GCMD

 Change History Log

|  |  |  |
| --- | --- | --- |
| **Revision** | **Effective Date** | **Description of Changes**(Reference the CCR & CCB Approval Date) |
|  |  | CCR 423-ESDIS-XXX; CCB ApprovedPages:  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Table of Contents

[C.1. Introduction 1](#_Toc102658943)

[C.1.1 Purpose 1](#_Toc102658944)

[C.1.2 Scope 1](#_Toc102658945)

[C.1.3 Related Documentation 1](#_Toc102658946)

[C.1.3.1 Applicable Documents 2](#_Toc102658947)

[C.1.3.2 Reference Documents 2](#_Toc102658948)

[C.1.4 Impact 2](#_Toc102658949)

[C.1.5 Copyright Notice 2](#_Toc102658950)

[C.1.6 Feedback 2](#_Toc102658951)

[C.1.7 Document Conventions 3](#_Toc102658952)

[C.2. Granule Metadata Conceptual Model 3](#_Toc102658953)

[C.2.1 GranuleUR [R] 4](#_Toc102658954)

[C.2.2 Provider Dates [R] 7](#_Toc102658955)

[C.2.3 Collection Reference [R] 11](#_Toc102658956)

[C.2.4 Access Constraints 17](#_Toc102658957)

[C.2.5 Data Granule 19](#_Toc102658958)

[C.2.6 PGE Version Class 33](#_Toc102658959)

[C.2.7 Temporal Extent 35](#_Toc102658960)

[C.2.8 Spatial Extent 38](#_Toc102658961)

[C.2.9 Orbit Calculated Spatial Domains 53](#_Toc102658962)

[C.2.10 Measured Parameters 55](#_Toc102658963)

[C.2.11 Platforms 70](#_Toc102658964)

[C.2.12 Projects 81](#_Toc102658965)

[C.2.13 Additional Attributes 85](#_Toc102658966)

[C.2.14 Input Granules 92](#_Toc102658967)

[C.2.15 Tiling Identification System 94](#_Toc102658968)

[C.2.16 Cloud Cover 96](#_Toc102658969)

[C.2.17 Related Urls 97](#_Toc102658970)

[C.2.18 Native Projection Names 104](#_Toc102658971)

[C.2.19 Grid Mapping Names 106](#_Toc102658972)

[C.2.20 Metadata Specification [R] 108](#_Toc102658973)

[Appendix A Tags Glossary 109](#_Toc102658974)

[Appendix B Abbreviations and Acronyms 110](#_Toc102658975)

List of Figures

[Figure C-1. Overall Granule Model 4](#_Toc102658977)

List of Tables

[Table C-1. Cardinality 3](#_Toc102659045)

# C.1. Introduction

Earth Observing System (EOS) Data and Information System (EOSDIS) generates, archives, and distributes enormous amounts of Earth Science data via its Distributed Active Archive Centers (DAACs). These data are accessed and employed by a broad user community. It is therefore imperative that reliable, consistent, and high-quality metadata be maintained in order to enable accurate cataloging, discovery, accessibility, and interpretation. To increase the level of quality and consistency among its metadata holdings, EOSDIS has developed a model for various metadata concepts that it archives and maintains. This model aims to document vital elements that may be represented across various metadata formats and standards and unify them through core fields useful for data discovery and service invocations. This unified model, aptly named the Unified Metadata Model (UMM), was developed as part of the EOSDIS Metadata Architecture Studies (MAS) I and II conducted between 2012 and 2013.

The UMM will be used by the CMR and will drive search and retrieval of metadata cataloged within that system.

This document is intended to serve as a reference profile - a part of the UMM model - for geospatial science metadata for individual granules that are part of a larger data collection. This reference profile is referred to as the UMM-G, where 'G' indicates that this is the granule profile. The UMM-G attempts to unify several metadata specifications (ECHO 10 and ISO 19115-2:2009 MENDS and SMAP). Links to more information about the standards and specifications used in this document can be found in Related Documents section.

## C.1.1 Purpose

This document provides information to the NASA Earth Science community. Distribution is unlimited.

## C.1.2 Scope

This document describes the UMM Granule (UMM-G) model version 1.6.4.

## C.1.3 Related Documentation

The ISO 19115-2 mapping paths and extracts of Extensible Markup Language (XML) encoding of this standard used in this document are derived from the NASA Best Practices ISO translation from ECHO to 19115-2 translation. The translation files can be found online at this site: https://cdn.earthdata.nasa.gov/iso/resources/transforms. These translations resulted from efforts of the group assembled for the Metadata Evolution for NASA Data Systems (MENDS). More information on the Base Metadata Requirements established by the MENDS group can be found online at: https://wiki.earthdata.nasa.gov/display/NASAISO/NASA+Base+Metadata+Requirements.

The latest versions of all documents below should be used. The latest ESDIS Project documents can be obtained from Uniform Resource Locator (URL): https://ops1-cm.ems.eosdis.nasa.gov. ESDIS documents have a document number starting with either 423 or 505. Other documents are available for reference in the ESDIS project library website at: http://esdisfmp01.gsfc.nasa.gov/esdis\_lib/default.php unless indicated otherwise.

### C.1.3.1 Applicable Documents

The following documents are referenced within or are directly applicable, or contain policies or other directive matters that are binding upon the content of this document.

|  |  |
| --- | --- |
| **Document Number** | **Document Title** |
| N/A | CMR Life Cyclehttps://wiki.earthdata.nasa.gov/display/CMR/CMR+Documents |
| N/A | ECHO 10https://wiki.earthdata.nasa.gov/display/echo/Earth+Observing+System+Clearing+House+-+ECHOhttps://cdn.earthdata.nasa.gov/echo/ |
| N/A | ISO 19115-2 (MENDS)http://www.iso.org/iso/catalogue\_detail.htm?csnumber=39229https://cdn.earthdata.nasa.gov/iso/ |

### C.1.3.2 Reference Documents

The following documents are not binding on the content but referenced herein and, amplify or clarify the information presented in this document.

|  |  |
| --- | --- |
| **Document Number** | **Document Title** |
| N/A | Tagshttp://en.wikipedia.org/wiki/Tag\_%28metadata%29 |
| N/A | XPathXPath is a language for addressing parts of an XML document, designed for use with XSLT. |
| N/A | MENDSMore information on the Base Metadata Requirements established by the MENDS group: https://wiki.earthdata.nasa.gov/display/NASAISO/NASA+Base+Metadata+Requirements |

## C.1.4 Impact

This document outlines a profile intended to be backward compatible with existing NASA Earth Science metadata implementations. It will impact providers from NASA DAAC[s], CMR client developers, metadata catalog developers, and users.

## C.1.5 Copyright Notice

The contents of this document are not protected by copyright in the United States and may be used without obtaining permission from NASA.

## C.1.6 Feedback

Questions, comments and recommendations concerning this model should be directed to support@earthdata.nasa.gov

## C.1.7 Document Conventions

Each section of this document describes an element of the model and includes the following components:

* Element Name: Specifies the element name.
* Element Specification: Provides the sub-elements, cardinality of the sub-elements within (), any valid values within <>, applicable comments and notes within {}, and any other major factors that make up the element.
* Description: Provides background information on the purpose of the element and its intended use. Furthermore, any information about the element's current usage, recommendations for usage, or unresolved issues is also documented here.
* Cardinality: Indicates the expectation of counts for this element, summarized in Table 1:
* Tags: Provide specific, related categorical values associated with this element, which are defined in Appendix A Tags Glossary.
* Sample Mapping/Mapping: Gives an XPath mapping for this element in ECHO 10, ISO 19115-2 MENDS and SMAP XML representations. This can be considered as the crosswalk for this element. For links to more information on Xpaths please see the introduction's reference documents section.
* Examples: XML snippets from cross-walked data formats documenting sample values for the element.

With the exception of Element Name each of the element's sections are that are included are listed in bold to make it easier for the reader to distinguish between the element's section headings and the descriptions.

Table C-1. Cardinality

| **Value** | **Description** |
| --- | --- |
| 1 | Exactly one of this element is required |
| 0..N | This element is optional; up to and including N number of this element may be present |
| 0..\* | Optionally, many of this element may be present |
| 1..\* | At least one of this element is required, many may be present |

The [R] after an element name indicates that the element is required.

# C.2. Granule Metadata Conceptual Model

Figure one shows the overall granule model as a class diagram. This document breaks down this model into its elements and describes them in more detail.



Figure C-1. Overall Granule Model

## C.2.1 GranuleUR [R]

**Element Specification**

GranuleUR

**Description**

This element describes the Universal Reference (UR) Identifier (ID) of the granule referred to by the data provider. This ID is unique per data provider.

**Cardinality**

1

**Tags**

*Required, Free Text Search, Search API*

**Sample Mappings**

ECHO 10 Granule:

/Granule/GranuleUR

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier/ [=>

[=>gmd:code/gco:CharacterString {the actual value}

[=>gmd:codeSpace/gco:CharacterString= gov.nasa.esdis.umm.granuleur

[=>gmd:description/gco:CharacterString = GranuleUR

ISO 19115-2 SMAP:

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:title/gco:CharacterString {the actual value}

where

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:purpose/gco:CharacterString = GranuleUR

**Examples**

UMM-G:

{

  "GranuleUR": "Unique\_Granule\_UR",

 ...

}

ECHO 10 Granule:

<Granule>

  <GranuleUR>Unique\_Granule\_UR</GranuleUR>

...

</Granule>

ISO 19115-2 MENDS:

<gmi:MI\_Metadata ...>

   <gmd:identificationInfo>

      <gmd:MD\_DataIdentification>

         <!-- This section holds the granule MetadataProviderDates, and the granule identifiers -->

         <gmd:citation>

            <gmd:CI\_Citation>

...

              <gmd:identifier>

                <gmd:MD\_Identifier>

                   <gmd:code>

                     <gco:CharacterString>Unique\_Granule\_UR</gco:CharacterString>

                   </gmd:code>

                   <gmd:codeSpace>

                     <gco:CharacterString>gov.nasa.esdis.umm.granuleur</gco:CharacterString>/p>

                   </gmd:codeSpace>

                   <gmd:description>

                      <gco:CharacterString>GranuleUR</gco:CharacterString>

                   </gmd:description>

                 </gmd:MD\_Identifier>

               </gmd:identifier>

...

ISO 19115-2 SMAP:

<gmd:DS\_Series ...>

   <gmd:composedOf xlink:type="simple">

        <gmd:DS\_DataSet>

            <gmd:has xlink:type="simple">

                <gmi:MI\_Metadata>

...

                 <gmd:identificationInfo>

                   <gmd:MD\_DataIdentification>

                            <gmd:citation>

                                <gmd:CI\_Citation>

                                    <gmd:title>

                                    <gco:CharacterString>Unique\_Granule\_UR</gco:CharacterString>

                                    </gmd:title>

                                    <gmd:date>

                                    <gmd:CI\_Date>

                                    <gmd:date>

                                    <gco:DateTime>2016-04-27T12:02:25.450Z</gco:DateTime>

                                    </gmd:date>

                                    <gmd:dateType>

                                    <gmd:CI\_DateTypeCode

                                    codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#CI\_DateTypeCode"

                                    codeListValue="creation" xmlns="">creation</gmd:CI\_DateTypeCode>

                                    </gmd:dateType>

                                    </gmd:CI\_Date>

                                    </gmd:date>

                                </gmd:CI\_Citation>

                            </gmd:citation>

                            <gmd:abstract>

                                <gco:CharacterString>GranuleUR</gco:CharacterString>

                            </gmd:abstract>

                            <gmd:purpose>

                                <gco:CharacterString>GranuleUR</gco:CharacterString>

                            </gmd:purpose>

                            <gmd:language>

                                <gco:CharacterString>eng</gco:CharacterString>

                            </gmd:language>

                        </gmd:MD\_DataIdentification>

                    </gmd:identificationInfo>

...

## C.2.2 Provider Dates [R]

**Element Specification**

ProviderDates/Date (1)

ProviderDates/Type (1) <Create, Insert, Update, Delete>

**Description**

Dates related to activities involving the the granule and the data provider database with the exception for Delete. For Create, Update, and Insert the date is the date that the granule file is created, updated, or inserted into the provider database by the provider. Delete is the date that the CMR should delete the granule metadata record from its repository.

**Cardinality**

1..4

**Tags**

*Required (Only 1 Date is required)*

**Sample Mappings**

ECHO 10 Granule:

/Granule/InsertTime

/Granule/LastUpdate

/Granule/DeleteTime

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:date/gmd:CI\_Date/gmd:date/gco:DateTime {the actual time}

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:date/gmd:CI\_Date/gmd:dateType/gmd:CI\_DateTypeCode codeList= "https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#CI\_DateTypeCode" codeListValue="creation" = creation

where the codeListValue and actual value creation, revision for Create and Update respectively, and codeListValue is blank but the value is insertion or deletion for Insert and Delete.

ISO 19115-2 SMAP:

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:date/gmd:CI\_Date/gmd:date/gco:DateTime

where

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:title/gco:CharacterString = InsertTime

or

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:date/gmd:CI\_Date/gmd:date/gco:DateTime

where

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:title/gco:CharacterString = UpdateTime

**Examples**

UMM-G:

{

...,

  "ProviderDates": [{

    "Date": "2018-07-19T00:00:00Z",

    "Type": "Create"

  }, {

    "Date": "2018-08-19T01:00:00Z",

    "Type": "Insert"

  }, {

    "Date": "2018-09-19T02:00:00Z",

    "Type": "Update"

  }, {

    "Date": "2030-08-19T03:00:00Z",

    "Type": "Delete"

  }],

ECHO 10 Granule:

<Granule>

  ...

  <InsertTime>2018-08-19T01:00:00Z</InsertTime>

  <LastUpdate>2018-09-19T02:00:00Z</LastUpdate>

  <DeleteTime>2030-08-19T03:00:00Z</DeleteTime>

 ...

ISO 19115-2 MENDS:

<gmi:MI\_Metadata...>

...

   <gmd:identificationInfo>

      <gmd:MD\_DataIdentification>

         <!-- This section holds the granule ProviderDates, and the granule identifiers -->

         <gmd:citation>

            <gmd:CI\_Citation>

               <!-- The granule doesn't have a title -->

               <gmd:title gco:nilReason="inapplicable"/>

               <!-- This is the data providers date of when they last updated the granule -->

               <gmd:date>

                  <gmd:CI\_Date>

                     <gmd:date>

                        <gco:DateTime>2018-09-19T02:00:00Z</gco:DateTime>

                     </gmd:date>

                     <gmd:dateType>

                        <gmd:CI\_DateTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#CI\_DateTypeCode" codeListValue="revision">revision</gmd:CI\_DateTypeCode>

                     </gmd:dateType>

                  </gmd:CI\_Date>

               </gmd:date>

               <!-- The date/time that data provider created the granule info on data provider's database.-->

               <gmd:date>

                  <gmd:CI\_Date>

                     <gmd:date>

                        <gco:DateTime>2018-07-19T00:00:00Z</gco:DateTime>

                     </gmd:date>

                     <gmd:dateType>

                        <gmd:CI\_DateTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#CI\_DateTypeCode" codeListValue="creation">creation</gmd:CI\_DateTypeCode>

                     </gmd:dateType>

                  </gmd:CI\_Date>

               </gmd:date>

               <!-- The date/time this granule was inserted into the data provider's database.-->

               <gmd:date>

                  <gmd:CI\_Date>

                     <gmd:date>

                        <gco:DateTime>2018-08-19T01:00:00Z</gco:DateTime>

                     </gmd:date>

                     <gmd:dateType>

                        <gmd:CI\_DateTypeCode codeList="" codeListValue="">insertion</gmd:CI\_DateTypeCode>

                     </gmd:dateType>

                  </gmd:CI\_Date>

               </gmd:date>

               <!-- The date/time this granule should be deleted from the CMR. This date must be in the future. -->

               <gmd:date>

                  <gmd:CI\_Date>

                     <gmd:date>

                        <gco:DateTime>2030-08-19T03:00:00Z</gco:DateTime>

                     </gmd:date>

                     <gmd:dateType>

                        <gmd:CI\_DateTypeCode codeList="" codeListValue="">deletion</gmd:CI\_DateTypeCode>

                     </gmd:dateType>

                  </gmd:CI\_Date>

               </gmd:date>

ISO 19115-2 SMAP:

<gmd:DS\_Series ...>

   <gmd:composedOf xlink:type="simple">

        <gmd:DS\_DataSet>

            <gmd:has xlink:type="simple">

                <gmi:MI\_Metadata>

...

                     <gmd:identificationInfo>

                        <gmd:MD\_DataIdentification>

                            <gmd:citation>

                                <gmd:CI\_Citation>

                                    <gmd:title>

                                    <gco:CharacterString>InsertTime</gco:CharacterString>

                                    </gmd:title>

                                    <gmd:date>

                                    <gmd:CI\_Date>

                                    <gmd:date>

                                    <gco:DateTime>2016-04-27T12:02:25.450Z</gco:DateTime>

                                    </gmd:date>

                                    <gmd:dateType>

                                    <gmd:CI\_DateTypeCode

                                    codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#CI\_DateTypeCode"

                                    codeListValue="creation" xmlns="">creation</gmd:CI\_DateTypeCode>

                                    </gmd:dateType>

                                    </gmd:CI\_Date>

                                    </gmd:date>

                                </gmd:CI\_Citation>

                            </gmd:citation>

                            <gmd:abstract>

                                <gco:CharacterString>InsertTime</gco:CharacterString>

                            </gmd:abstract>

                            <gmd:purpose>

                                <gco:CharacterString>InsertTime</gco:CharacterString>

                            </gmd:purpose>

                            <gmd:language>

                                <gco:CharacterString>eng</gco:CharacterString>

                            </gmd:language>

                        </gmd:MD\_DataIdentification>

                    </gmd:identificationInfo>

                    <gmd:identificationInfo>

                        <gmd:MD\_DataIdentification>

                            <gmd:citation>

                                <gmd:CI\_Citation>

                                    <gmd:title>

                                    <gco:CharacterString>UpdateTime</gco:CharacterString>

                                    </gmd:title>

                                    <gmd:date>

                                    <gmd:CI\_Date>

                                    <gmd:date>

                                    <gco:DateTime>2017-02-21T11:09:02.152Z</gco:DateTime>

                                    </gmd:date>

                                    <gmd:dateType>

                                    <gmd:CI\_DateTypeCode

                                    codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#CI\_DateTypeCode"

                                    codeListValue="revision" xmlns="">revision</gmd:CI\_DateTypeCode>

                                    </gmd:dateType>

                                    </gmd:CI\_Date>

                                    </gmd:date>

                                </gmd:CI\_Citation>

                            </gmd:citation>

                            <gmd:abstract>

                                <gco:CharacterString>UpdateTime</gco:CharacterString>

                            </gmd:abstract>

                            <gmd:purpose>

                                <gco:CharacterString>UpdateTime</gco:CharacterString>

                            </gmd:purpose>

                            <gmd:language>

                                <gco:CharacterString>eng</gco:CharacterString>

                            </gmd:language>

                        </gmd:MD\_DataIdentification>

                    </gmd:identificationInfo>

## C.2.3 Collection Reference [R]

**Element Specification**

One of the following:

1) ShortName (1)

    Version (1)

2) EntryTitle (1)

**Description**

Each granule has an associated parent collection. The relationship between the granule and its parent can be specified in two ways. First, through the collections short name and version or second, through the collections entry title.

**Cardinality**

1

**Tags**

*Required, Free Text Search, Search API, Validated*

**Sample Mappings**

ECHO 10 Granule:

One of the following:

1) /Granule/Collection/ShortName

    /Granule/Collection/VersionId

2) /Granule/Collection/DataSetId

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:aggregationInfo/gmd:MD\_AggregateInformation [=>

[=>/gmd:associationType/gmd:DS\_AssociationTypeCode  codeList= "https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#DS\_AssociationTypeCode" codeListValue="LargerWorkCitation"  = LargerWorkCitation

with one of the following:

1)

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString = {the actual Collection ShortName}

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString=gov.nasa.esdis.umm.collectionshortname

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = CollectionShortName

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString = {the actual Collection Version}

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString=gov.nasa.esdis.umm.collectionversion

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = CollectionVersion

For shortname and version 2 of the following paths need to be used for ISO MENDS: /gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:aggregationInfo/ The short name will be in one and the version will exist in the other.

2)

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString = {the actual Collection EntryTitle}

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString=gov.nasa.esdis.umm.entrytitle

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = EntryTitle

ISO 19115-2 SMAP:

One of the following:

1)

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString

where

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = The ECS Short Name

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString

where

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = The ECS Version ID

2)

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:aggregationInfo/gmd:MD\_AggregateInformation/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString

where

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:title/gco:CharacterString = DataSetId

**Examples**

UMM-G:

  "CollectionReference": {

      "ShortName": "CollectionShortName",

      "Version": "Version"

  },

or

  "CollectionReference": {

      "EntryTitle": "CollectionTitle"

  },

ECHO 10 Granule:

  <Collection>

    <ShortName>CollectionShortName</ShortName>

    <VersionId>Version</VersionId>

  </Collection>

or

<Collection>

  <DataSetId>

    CollectionTitle

  </DataSetId>

</Collection>

ISO 19115-2:

         <gmd:aggregationInfo>

            <gmd:MD\_AggregateInformation>

               <gmd:aggregateDataSetIdentifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>CollectionShortName</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.collectionshortname</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>CollectionShortName</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmd:aggregateDataSetIdentifier>

               <gmd:associationType>

                  <gmd:DS\_AssociationTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#DS\_AssociationTypeCode" codeListValue="LargerWorkCitation">LargerWorkCitation</gmd:DS\_AssociationTypeCode>

               </gmd:associationType>

            </gmd:MD\_AggregateInformation>

         </gmd:aggregationInfo>

         <!-- This is the granules collection version. If this is used then the Collection Short Name must also exist. Only this and Collection Short Name or Collection Entry Id are required. -->

         <gmd:aggregationInfo>

            <gmd:MD\_AggregateInformation>

               <gmd:aggregateDataSetIdentifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>Version</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.collectionversion</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>CollectionVersion</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmd:aggregateDataSetIdentifier>

               <gmd:associationType>

                  <gmd:DS\_AssociationTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#DS\_AssociationTypeCode" codeListValue="LargerWorkCitation">LargerWorkCitation</gmd:DS\_AssociationTypeCode>

               </gmd:associationType>

            </gmd:MD\_AggregateInformation>

         </gmd:aggregationInfo>

or

        <gmd:aggregationInfo>

            <gmd:MD\_AggregateInformation>

               <gmd:aggregateDataSetIdentifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>CollectionTitle</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.entrytitle</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>EntryTitle</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmd:aggregateDataSetIdentifier>

               <gmd:associationType>

                  <gmd:DS\_AssociationTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#DS\_AssociationTypeCode" codeListValue="LargerWorkCitation">LargerWorkCitation</gmd:DS\_AssociationTypeCode>

               </gmd:associationType>

            </gmd:MD\_AggregateInformation>

         </gmd:aggregationInfo>

ISO 19115-2 SMAP:

                    <gmd:identificationInfo xlink:type="simple">

                        <gmd:MD\_DataIdentification>

                            <gmd:citation xlink:type="simple">

                                <gmd:CI\_Citation>

                                    ...

                                    <gmd:identifier xlink:type="simple">

                                      <gmd:MD\_Identifier>

                                        <gmd:code>

                                          <gco:CharacterString>CollectionShortName</gco:CharacterString>

                                        </gmd:code>

                                        <gmd:codeSpace>

                                          <gco:CharacterString>http://smap.jpl.nasa.gov</gco:CharacterString>

                                        </gmd:codeSpace>

                                        <gmd:description>

                                          <gco:CharacterString>The ECS Short Name</gco:CharacterString>

                                        </gmd:description>

                                      </gmd:MD\_Identifier>

                                    </gmd:identifier>

                                    <gmd:identifier xlink:type="simple">

                                      <gmd:MD\_Identifier>

                                        <gmd:code>

                                          <gco:CharacterString>Version</gco:CharacterString>

                                        </gmd:code>

                                      <gmd:codeSpace>

                                        <gco:CharacterString>gov.nasa.esdis</gco:CharacterString>

                                      </gmd:codeSpace>

                                      <gmd:description>

                                        <gco:CharacterString>The ECS Version ID</gco:CharacterString>

                                      </gmd:description>

                                     </gmd:MD\_Identifier>

                                    </gmd:identifier>

or

                    <gmd:identificationInfo>

                        <gmd:MD\_DataIdentification>

                            <gmd:citation>

                                <gmd:CI\_Citation>

                                    <gmd:title>

                                    <gco:CharacterString>DataSetId</gco:CharacterString>

                                    </gmd:title>

                                    <gmd:date>

                                    <gmd:CI\_Date>

                                    <gmd:date>

                                    <gco:DateTime>2017-02-21T11:09:02.152Z</gco:DateTime>

                                    </gmd:date>

                                    <gmd:dateType>

                                    <gmd:CI\_DateTypeCode

                                    codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#CI\_DateTypeCode"

                                    codeListValue="revision" xmlns="">revision</gmd:CI\_DateTypeCode>

                                    </gmd:dateType>

                                    </gmd:CI\_Date>

                                    </gmd:date>

                                </gmd:CI\_Citation>

                            </gmd:citation>

                            <gmd:abstract>

                                <gco:CharacterString>DataSetId</gco:CharacterString>

                            </gmd:abstract>

                            <gmd:aggregationInfo>

                                <gmd:MD\_AggregateInformation>

                                    <gmd:aggregateDataSetIdentifier>

                                    <gmd:MD\_Identifier>

                                    <gmd:code>

                                    <gco:CharacterString>CollectionTitle</gco:CharacterString>

                                    </gmd:code>

                                    </gmd:MD\_Identifier>

                                    </gmd:aggregateDataSetIdentifier>

                                    <gmd:associationType/>

                                </gmd:MD\_AggregateInformation>

                            </gmd:aggregationInfo>

                            <gmd:language>

                                <gco:CharacterString>eng</gco:CharacterString>

                            </gmd:language>

                        </gmd:MD\_DataIdentification>

                    </gmd:identificationInfo>

## C.2.4 Access Constraints

**Element Specification**

AccessConstraints/Description (0..1)

AccessConstraints/Value (1)

**Description**

The Description sub-element allows the author to provide information concerning accessing constraints. This includes any special restrictions, legal prerequisites, limitations, and/or warnings on obtaining the data. The Value sub-element is used for special access control list (ACL) rules (http://en.wikipedia.org/wiki/Access\_control\_list) - for example, to hide metadata when it isn't ready for public consumption. Providers use the AccessConstraint/Value element to specify various restriction levels with ACLs. For example: A provider might specify a service Level ACL that hides all items (collections for this example) with a value element set to "15.0". There is no controlled mapping for what the values represent.

**Cardinality**

0..1

**Tags**

*Recommended*

**Sample Mappings**

ECHO 10 Granule:

/Granule/RestrictionComment

/Granule/RestrictionFlag

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:resourceConstraints/gmd:MD\_LegalConstraints/gmd:accessConstraints/gmd:MD\_RestrictionCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_RestrictionCode" codeListValue="otherRestrictions" = otherRestrictions

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:resourceConstraints/gmd:MD\_LegalConstraints/gmd:otherConstraints/gco:CharacterString (prefix: 'AccessConstraintsDescription: ' ) {the actual description}

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:resourceConstraints/gmd:MD\_LegalConstraints/gmd:otherConstraints/gco:CharacterString (prefix: 'AccessConstraintsValue: ' ) {the actual value}

ISO 19115-2 SMAP:

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:resourceConstraints/gmd:MD\_LegalConstraints/gmd:otherConstraints/gco:CharacterString

where

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:title/gco:CharacterString = RestrictionFlag

**Examples**

ECHO 10 Granule:

<RestrictionFlag>0</RestrictionFlag>

<RestrictionComment>

      This product has full public access

 </RestrictionComment>

ISO 19115-2 MENDS:

<gmd:resourceConstraints>

   <gmd:MD\_LegalConstraints>

      <gmd:accessConstraints>

         <gmd:MD\_RestrictionCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_RestrictionCode" codeListValue="otherRestrictions">otherRestrictions</gmd:MD\_RestrictionCode>

      </gmd:accessConstraints>

      <gmd:otherConstraints>

         <gco:CharacterString>AccessConstraintsDescription: Public Access</gco:CharacterString>

       </gmd:otherConstraints>

       <gmd:otherConstraints>

          <gco:CharacterString>AccessConstraintsValue: 42</gco:CharacterString>

       </gmd:otherConstraints>

   </gmd:MD\_LegalConstraints>

</gmd:resourceConstraints>

ISO SMAP:

<gmd:resourceConstraints>

    <gmd:MD\_LegalConstraints>

       <gmd:useLimitation>

          <gco:CharacterString>Restriction Comment: There are no fees for training, materials, rubrics, and assessments. Each

   participant must complete the online form  to access materials.</gco:CharacterString>

       </gmd:useLimitation>

       <gmd:otherConstraints>

          <gco:CharacterString>Restriction Flag:0</gco:CharacterString>

       </gmd:otherConstraints>

    </gmd:MD\_LegalConstraints>

</gmd:resourceConstraints>

## C.2.5 Data Granule

**Element Specification**

DataGranule/ArchiveAndDistributionInformation (0..\*)

{This section describes a file package such as ZIP or tar }

DataGranule/ArchiveAndDistributionInformation/Name (1)

DataGranule/ArchiveAndDistributionInformation/SizeInBytes (0..1)

DataGranule/ArchiveAndDistributionInformation/Size (0..1)

DataGranule/ArchiveAndDistributionInformation/SizeUnit (0..1, 1 if Size exists) <KB, MB, GB, TB, PB, NA>

DataGranule/ArchiveAndDistributionInformation/Format (0..1) <see below>

DataGranule/ArchiveAndDistributionInformation/MimeType (0..1) <see below>

DataGranule/ArchiveAndDistributionInformation/Checksum (0..1)

DataGranule/ArchiveAndDistributionInformation/Checksum/Value (1)

DataGranule/ArchiveAndDistributionInformation/Checksum/Algorithm (1) <Adler-32, BSD checksum, Fletcher-32, Fletcher-64, MD5, POSIX, SHA-1, SHA-2, SHA-256, SHA-384, SHA-512, SM3, SYSV>

DataGranule/ArchiveAndDistributionInformation/Files (0..\*)

{This section describes a single file that can be standalone or as a child of the "Files" sub-element above signifying that this file is part of the file package (for example a tar or zip file.}

DataGranule/ArchiveAndDistributionInformation/Name (1)

DataGranule/ArchiveAndDistributionInformation/SizeInBytes (0..1)

DataGranule/ArchiveAndDistributionInformation/Size (0..1)

DataGranule/ArchiveAndDistributionInformation/SizeUnit (0..1, 1 if Size exists) <KB, MB, GB, TB, PB, NA>

DataGranule/ArchiveAndDistributionInformation/Format (0..1) <see below>

DataGranule/ArchiveAndDistributionInformation/FormatType (0..1) <Native, Supported, NA>

DataGranule/ArchiveAndDistributionInformation/MimeType (0..1) <see below>

DataGranule/ArchiveAndDistributionInformation/Checksum (0..1)

DataGranule/ArchiveAndDistributionInformation/Checksum/Value (1)

DataGranule/ArchiveAndDistributionInformation/Checksum/Algorithm (1) <Adler-32, BSD checksum, Fletcher-32, Fletcher-64, MD5, POSIX, SHA-1, SHA-2, SHA-256, SHA-384, SHA-512, SM3, SYSV>

ReprocessingPlanned (0..1)

ReprocessingActual (0..1)

DayNightFlag (1) <Day, Night, Both, Unspecified>

ProductionDateTime (1)

Identifiers (0..\*)

Identifiers/Identifier (1)

Identifiers/IdentifierType (1) <ProducerGranuleId, LocalVersionId, FeatureId, CRID, Other>

IdentifiersIdentifierName (0..1 - 1 if IdentifierType = Other)

Format enumerations:

Defined at 'https://gcmd.earthdata.nasa.gov/kms/concepts/concept\_scheme/GranuleDataFormat?format=csv'

MimeType enumerations:

application/json, application/xml, application/x-netcdf, application/x-hdfeos, application/gml+xml, application/vnd.google-earth.kml+xml, image/gif, image/tiff, image/bmp, text/csv, text/xml, application/pdf, application/x-hdf, application/xhdf5, application/octet-stream, application/vnd.google-earth.kmz, image/jpeg, image/png, image/vnd.collada+xml, text/html, text/plain, application/zip, application/gzip, application/tar, application/tar+gzip, application/tar+zip, application/vnd.opendap.dap4.dmrpp+xml, Not provided

**Description**

This element and its sub-elements store the basic descriptive characteristics associated with a granule which includes the actual granule file(s) along with granule identifiers and other properties of the granule.  The ProductionDateTime is the date and time a specific granule was produced by a Product Generation Executive (PGE).

**Cardinality**

0..1

**Tags**

*Recommended, Search API, Controlled Vocabulary*

**Sample Mappings**

ECHO 10 Granule:

/Granule/DataGranule/DataGranuleSizeInBytes

/Granule/DataGranule/SizeMBDataGranule

/Granule/DataGranule/Checksum/Value

/Granule/DataGranule/Checksum/Algorithm

/Granule/DataGranule/ReprocessingPlanned

/Granule/DataGranule/ReprocessingActual

/Granule/DataGranule/ProducerGranuleId

/Granule/DataGranule/DayNightFlag

/Granule/DataGranule/ProductionDateTime

/Granule/DataGranule/LocalVersionId

/Granule/DataFormat

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier [=>

[=>/gmd:code/gco:CharacterString = {the actual ID}

[=>/gmd:codeSpace/gco:CharacterString=gov.nasa.esdis.umm.producergranuleid

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = ProducerGranuleId

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier [=>

[=>/gmd:code/gco:CharacterString = {the actual ID}

[=>/gmd:codeSpace/gco:CharacterString=gov.nasa.esdis.umm.localversionid

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = LocalVersionId

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier [=>

[=>/gmd:code/gco:CharacterString = {the actual ID}

[=>/gmd:codeSpace/gco:CharacterString=gov.nasa.esdis.umm.featureid

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = FeatureId

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier [=>

[=>/gmd:code/gco:CharacterString = {the actual ID}

[=>/gmd:codeSpace/gco:CharacterString=gov.nasa.esdis.umm.crid

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = CRID

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:identifier/gmd:MD\_Identifier [=>

[=>/gmd:code/gco:CharacterString = {the actual ID}

[=>/gmd:codeSpace/gco:CharacterString=gov.nasa.esdis.umm.otherid

[=>/gmd:aggregateDataSetIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = OtherId: {the identifiers name}

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:resourceMaintenance/gmd:MD\_MaintenanceInformation/gmd:maintenanceAndUpdateFrequency/gmd:MD\_MaintenanceFrequencyCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_MaintenanceFrequencyCode" codeListValue="asNeeded" = asNeeded /gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:resourceMaintenance/gmd:MD\_MaintenanceInformation/gmd:maintenanceNote/gco:CharacterString = "ReprocessingPlanned: " {the actual value}

/gmi:MI\_Metadata/gmd:dataQualityInfo/gmd:DQ\_DataQuality/gmd:lineage/gmd:LI\_Lineage/gmd:processStep/gmi:LE\_ProcessStep/gmd:description/gco:CharacterString = "ReprocessingActual: " {The actual value}

(different contentInfo than MeasurementParameters and AdditionalAttributes)

/gmi:MI\_Metadata/gmd:contentInfo/gmd:MD\_CoverageDescription [=>

[=>/gmd:attributeDescription/gco:RecordType = DayNightFlag

[=>/gmd:contentType/gmd:MD\_CoverageContentTypeCode  codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_CoverageContentTypeCode" codeListValue="physicalMeasurement" = physicalMeasurement

[=>/gmd:dimension/gmd:MD\_Band/gmd:otherProperty/gco:Record/eos:AdditionalAttributes [===>

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue=""contentInformation"" = contentInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString = DayNightFlag

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:dataType/eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="string" = string

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

/gmi:MI\_Metadata/gmd:dataQualityInfo/gmd:DQ\_DataQuality/gmd:lineage/gmd:LI\_Lineage/gmd:processStep/gmi:LE\_ProcessStep/gmd:description/gco:CharacterString = ProductionDateTime

/gmi:MI\_Metadata/gmd:dataQualityInfo/gmd:DQ\_DataQuality/gmd:lineage/gmd:LI\_Lineage/gmd:processStep/gmi:LE\_ProcessStep/gmd:dateTime/gco:DateTime

/gmi:MI\_Metadata/gmd:describes/gmx:MX\_DataSet [=>

[=> /gmd:has/

[=> /gmx:dataFile/gmx:MX\_DataFile id="{the actual package file name}" [==>

the id attribute is only used if the file is a package file.

[==>/gmx:fileName/gmx:FileName {the actual package file name}

[==> /gmx:fileDescription/gco:CharacterString = "SizeInBytes: " {the actual size in Bytes}

[==> /gmx:fileDescription/gco:CharacterString = "Size: " {the actual size}

[==> /gmx:fileDescription/gco:CharacterString = "SizeUnit: " {the actual size unit}

[==> /gmx:fileFormat/gmd:MD\_Format/gmd:name/gco:CharacterString {the actual format}

[==> /gmx:fileFormat/gmd:MD\_Format/gmd:version gco:nilReason="unknown"

[==> /gmx:fileType/gmx:MimeFileType type="{actual MimeType}" {actual MimeType}

[==> /gmx:fileDescription/gco:CharacterString = "ChecksumValue: " {the actual checksum}

[==> /gmx:fileDescription/gco:CharacterString = "ChecksumAlgorithm: " {the actual algorithm}

[=> /gmx:dataFile xlink:href="#{the actual package file name this file belongs to."}/gmx:MX\_DataFile [==>

Only use the xlink:href="#..." attribute if the file belongs to a package file.

[==>/gmx:fileName/gmx:FileName {the actual package file name}

[==> /gmx:fileDescription/gco:CharacterString = "SizeInBytes: " {the actual size in Bytes}

[==> /gmx:fileDescription/gco:CharacterString = "Size: " {the actual size}

[==> /gmx:fileDescription/gco:CharacterString = "SizeUnit: " {the actual size unit}

[==> /gmx:fileFormat/gmd:MD\_Format/gmd:name/gco:CharacterString {the actual format}

[==> /gmx:fileFormat/gmd:MD\_Format/gmd:version gco:nilReason="unknown"

[==> /gmx:fileType/gmx:MimeFileType type="{actual MimeType}" {actual MimeType}

[==> /gmx:fileDescription/gco:CharacterString = "ChecksumValue: " {the actual checksum}

[==> /gmx:fileDescription/gco:CharacterString = "ChecksumAlgorithm: " {the actual algorithm}

[==> /gmx:fileDescription/gco:CharacterString = "FormatType: " {the actual format type}

ISO 19115-2 SMAP:

ProducerGranuleId

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:citation/gmd:CI\_Citation/gmd:title/gmx:FileName

ProductionDateTime

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:dataQualityInfo/gmd:DQ\_DataQuality/gmd:lineage/gmd:LI\_Lineage/gmd:processStep/gmi:LE\_ProcessStep/gmd:dateTime/gco:DateTime

**Examples**

UMM-G:

  "DataGranule": {

    "ArchiveAndDistributionInformation": [{

      "Name": "GranuleZipFile",

      "SizeInBytes": 23000,

      "Size": 23,

      "SizeUnit": "KB",

      "Format": "ZIP",

      "MimeType": "application/zip",

      "Checksum": {

        "Value": "E51569BF48DD0FD0640C6503A46D4753",

        "Algorithm": "MD5"

      },

      "Files": [{

        "Name": "GranuleFileName1",

        "SizeInBytes": 10000,

        "Size": 10,

        "SizeUnit": "KB",

        "Format": "NETCDF-4",

        "MimeType": "application/x-netcdf",

        "FormatType": "Native",

        "Checksum": {

          "Value": "E51569BF48DD0FD0640C6503A46D4754",

          "Algorithm": "MD5"

        }

      }, {

        "Name": "GranuleFileName2",

        "SizeInBytes": 1000,

        "Size": 1,

        "SizeUnit": "KB",

        "Format": "ASCII",

        "MimeType": "text/plain",

        "FormatType": "NA"

      }]

    }, {

      "Name": "SupportedGranuleFileNotInPackage",

      "SizeInBytes": 11000,

      "Size": 11,

      "SizeUnit": "KB",

      "Format": "NETCDF-CF",

      "FormatType": "Supported",

      "MimeType": "application/x-netcdf",

      "Checksum": {

        "Value": "E51569BF48DD0FD0640C6503A46D4755",

        "Algorithm": "MD5"

      }

    }],

    "ReprocessingPlanned": "The Reprocessing Planned Statement Value",

    "ReprocessingActual": "The Reprocessing Actual Statement Value",

    "DayNightFlag" : "Unspecified",

    "ProductionDateTime" : "2018-07-19T12:01:01Z",

    "Identifiers": [{

      "Identifier": "SMAP\_L3\_SM\_P\_20150407\_R13080\_001.h5",

      "IdentifierType": "ProducerGranuleId"

    }, {

      "Identifier": "LocalVersionIdValue",

      "IdentifierType": "LocalVersionId"

    }, {

      "Identifier": "FeatureIdValue1",

      "IdentifierType": "FeatureId"

    }, {

      "Identifier": "FeatureIdValue2",

      "IdentifierType": "FeatureId"

    }, {

      "Identifier": "1234",

      "IdentifierType": "Other",

      "IdentifierName": "SomeIdentifier"

    },{

      "Identifier": "CRIDValue",

      "IdentifierType": "CRID"

    }]

  },

ECHO 10 Granule:

  <DataGranule>

    <DataGranuleSizeInBytes>23000<\DataGranuleSizeInBytes>

    <SizeMBDataGranule>0.023</SizeMBDataGranule>

    <Checksum>

      <Value>E51569BF48DD0FD0640C6503A46D4753</Value>

      <Algorithm>MD5</Algorithm>

    </Checksum>

    <ReprocessingPlanned>The Reprocessing Planned Statement Value</ReprocessingPlanned>

    <ReprocessingActual>The Reprocessing Actual Statement Value</ReprocessingActual>

    <ProducerGranuleId>SMAP\_L3\_SM\_P\_20150407\_R13080\_001.h5</ProducerGranuleId>

    <DayNightFlag>UNSPECIFIED</DayNightFlag>

    <ProductionDateTime>2018-07-19T12:01:01Z</ProductionDateTime>

    <LocalVersionId>LocalVersionIdValue</LocalVersionId>

  </DataGranule>

...

  <DataFormat>ZIP</DataFormat>

...

ISO 19115-2 MENDS:

      <!-- This secton holds the ReprocessingPlanned value -->

      <gmd:resourceMaintenance>

            <gmd:MD\_MaintenanceInformation>

               <gmd:maintenanceAndUpdateFrequency>

                  <gmd:MD\_MaintenanceFrequencyCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_MaintenanceFrequencyCode" codeListValue="asNeeded">asNeeded</gmd:MD\_MaintenanceFrequencyCode>

               </gmd:maintenanceAndUpdateFrequency>

               <gmd:maintenanceNote>

                  <gco:CharacterString>"ReprocessingPlanned:" The Reprocessing Planned Statement Value</gco:CharacterString>

               </gmd:maintenanceNote>

            </gmd:MD\_MaintenanceInformation>

         </gmd:resourceMaintenance>

   <!-- This section describes the UMM-G DataGranule ArchiveAndDistributionInformation section where the files are listed. -->

   <gmd:describes>

      <gmx:MX\_DataSet>

         <gmd:has/>

         <!-- This file is a standalone file that happens to be a zip file. Use the id={package file name} to state that this file a package file so that

              the child files can be linked to it. If the id is not present then it is assumed that this is a regular file.-->

         <gmx:dataFile>

            <gmx:MX\_DataFile id="GranuleZipFile">

               <gmx:fileName>

                  <gmx:FileName>GranuleZipFile</gmx:FileName>

               </gmx:fileName>

               <gmx:fileDescription>

                  <gco:CharacterString>SizeInBytes: 23000 Size: 23 SizeUnit: KB ChecksumValue: E51569BF48DD0FD0640C6503A46D4753 ChecksumAlgorithm: MD5 Description: Some wanted description</gco:CharacterString>

               </gmx:fileDescription>

               <gmx:fileType>

                  <gmx:MimeFileType type="application/zip">application/zip</gmx:MimeFileType>

               </gmx:fileType>

               <gmx:fileFormat>

                  <gmd:MD\_Format>

                     <gmd:name>

                        <gco:CharacterString>ZIP</gco:CharacterString>

                     </gmd:name>

                     <gmd:version gco:nilReason="unknown"/>

                  </gmd:MD\_Format>

               </gmx:fileFormat>

            </gmx:MX\_DataFile>

         </gmx:dataFile>

         <!-- This file exists in the above defined ZIP file. Use the xlink:href="#{package file name}" to state that this file is in the zip file.

              If this isn't used then it is assumed that this file is standalone.-->

         <gmx:dataFile xlink:href="#GranuleZipFile">

            <gmx:MX\_DataFile>

               <gmx:fileName>

                  <gmx:FileName>GranuleFileName1</gmx:FileName>

               </gmx:fileName>

               <gmx:fileDescription>

                  <gco:CharacterString>SizeInBytes: 10000 Size: 10 SizeUnit: KB ChecksumValue: E51569BF48DD0FD0640C6503A46D4754 ChecksumAlgorithm: MD5 FormatType: Native Description: Some file description</gco:CharacterString>

               </gmx:fileDescription>

               <gmx:fileType>

                  <gmx:MimeFileType type="application/x-netcdf">application/x-netcdf</gmx:MimeFileType>

               </gmx:fileType>

               <gmx:fileFormat>

                  <gmd:MD\_Format>

                     <gmd:name>

                        <gco:CharacterString>NETCDF-4</gco:CharacterString>

                     </gmd:name>

                     <gmd:version gco:nilReason="unknown"/>

                  </gmd:MD\_Format>

               </gmx:fileFormat>

            </gmx:MX\_DataFile>

         </gmx:dataFile>

         <!-- This file exists in the above defined ZIP file. Use the xlink:href=#{id} to state that this file is in the zip file.

              If this isn't used then it is assumed that this file is standalone.-->

         <gmx:dataFile xlink:href="#GranuleZipFile">

            <gmx:MX\_DataFile>

               <gmx:fileName>

                  <gmx:FileName>GranuleFileName2</gmx:FileName>

               </gmx:fileName>

               <gmx:fileDescription>

                  <gco:CharacterString>SizeInBytes 1000 Size: 1 SizeUnit: KB FormatType: NA</gco:CharacterString>

               </gmx:fileDescription>

               <gmx:fileType>

                  <gmx:MimeFileType type="text/plain">text/plain</gmx:MimeFileType>

               </gmx:fileType>

               <gmx:fileFormat>

                  <gmd:MD\_Format>

                     <gmd:name>

                        <gco:CharacterString>ASCII</gco:CharacterString>

                     </gmd:name>

                     <gmd:version gco:nilReason="unknown"/>

                  </gmd:MD\_Format>

               </gmx:fileFormat>

            </gmx:MX\_DataFile>

         </gmx:dataFile>

         <!-- This file is a standalone file and not part of the zip file.-->

         <gmx:dataFile>

            <gmx:MX\_DataFile>

               <gmx:fileName>

                  <gmx:FileName>SupportedGranuleFileNotInPackage</gmx:FileName>

               </gmx:fileName>

               <gmx:fileDescription>

                  <gco:CharacterString>SizeInBytes: 11000 Size: 11 SizeUnit: KB ChecksumValue: E51569BF48DD0FD0640C6503A46D4755 ChecksumAlgorithm: MD5 FormatType: Supported</gco:CharacterString>

               </gmx:fileDescription>

               <gmx:fileType>

                  <gmx:MimeFileType type="application/x-netcdf">application/x-netcdf</gmx:MimeFileType>

               </gmx:fileType>

               <gmx:fileFormat>

                  <gmd:MD\_Format>

                     <gmd:name>

                        <gco:CharacterString>NETCDF-CF</gco:CharacterString>

                     </gmd:name>

                     <gmd:version gco:nilReason="unknown"/>

                  </gmd:MD\_Format>

               </gmx:fileFormat>

            </gmx:MX\_DataFile>

         </gmx:dataFile>

      </gmx:MX\_DataSet>

   </gmd:describes>

   <gmd:dataQualityInfo>

      <gmd:DQ\_DataQuality>

         <!-- this lists that the scope for the data quality section pertains to the data set - the granule. -->

         <gmd:scope>

            <gmd:DQ\_Scope>

               <gmd:level>

                  <gmd:MD\_ScopeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_ScopeCode" codeListValue="dataset">dataset</gmd:MD\_ScopeCode>

               </gmd:level>

            </gmd:DQ\_Scope>

         </gmd:scope>

...

         <gmd:lineage>

            <gmd:LI\_Lineage>

               <!-- This section contains the ReprocessingActual information -->

               <gmd:processStep>

                  <gmi:LE\_ProcessStep>

                     <gmd:description>

                        <gco:CharacterString>ReprocessingActual: The Reprocessing Actual Statement Value</gco:CharacterString>

                     </gmd:description>

                  </gmi:LE\_ProcessStep>

               </gmd:processStep>

               <!-- This is the production date time -->

               <gmd:processStep>

                  <gmi:LE\_ProcessStep>

                     <gmd:description>

                        <gco:CharacterString>ProductionDateTime</gco:CharacterString>

                     </gmd:description>

                     <gmd:dateTime>

                        <gco:DateTime>2018-07-19T12:01:01Z</gco:DateTime>

                     </gmd:dateTime>

                  </gmi:LE\_ProcessStep>

               </gmd:processStep>

   <!-- This is the DayNightFlag section - it needs to be in its own contentInfo section - not within Additional Attributes, MeasuredParameters, or CloudCover -->

   <gmd:contentInfo>

      <gmd:MD\_CoverageDescription>

         <gmd:attributeDescription>

            <gco:RecordType>DayNightFlag</gco:RecordType>

         </gmd:attributeDescription>

         <gmd:contentType>

            <gmd:MD\_CoverageContentTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_CoverageContentTypeCode" codeListValue="physicalMeasurement">physicalMeasurement</gmd:MD\_CoverageContentTypeCode>

         </gmd:contentType>

         <gmd:dimension>

            <gmd:MD\_Band>

               <gmd:otherProperty>

                  <gco:Record>

                     <eos:AdditionalAttributes>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="contentInformation">contentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>DayNightFlag</gco:CharacterString>

                                 </eos:name>

                                 <eos:dataType>

                                    <eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="string">string</eos:EOS\_AdditionalAttributeDataTypeCode>

                                 </eos:dataType>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>Unspecified</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                     </eos:AdditionalAttributes>

                  </gco:Record>

               </gmd:otherProperty>

            </gmd:MD\_Band>

         </gmd:dimension>

      </gmd:MD\_CoverageDescription>

   </gmd:contentInfo>

   <gmd:identificationInfo>

      <gmd:MD\_DataIdentification>

         <!-- This section holds the granule ProviderDates, and the granule identifiers -->

         <gmd:citation>

            <gmd:CI\_Citation>

               ...

               <!-- This is the producer granule id -->

               <gmd:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>SMAP\_L3\_SM\_P\_20150407\_R13080\_001.h5</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.producergranuleid</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>ProducerGranuleId</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmd:identifier>

               <!-- This is the local version id -->

               <gmd:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>LocalVersionIdValue</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.localversionid</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>LocalVersionId</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmd:identifier>

               <!-- This is a feature id -->

               <gmd:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>FeatureIdValue1</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.featureid</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>FeatureId</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmd:identifier>

               <!-- This is another feature id -->

               <gmd:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>FeatureIdValue2</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.featureid</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>FeatureId</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmd:identifier>

               <!-- This is a CRID -->

               <gmd:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>CRIDValue</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.crid</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>CRID</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmd:identifier>

               <!-- This is a UMM-G non identified identifier -->

               <gmd:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>1234</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.otherid</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>OtherId: SomeIdentifier</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmd:identifier>

               <gmd:otherCitationDetails>

                  <gco:CharacterString/>

               </gmd:otherCitationDetails>

            </gmd:CI\_Citation>

         </gmd:citation>

ISO 19115-2 SMAP:

<gmd:DS\_Series ...>

    <gmd:composedOf xlink:type="simple">

        <gmd:DS\_DataSet>

            <gmd:has xlink:type="simple">

                <gmi:MI\_Metadata>

...

                    <!-- This is the ProducerGranuleId -->

                    <gmd:identificationInfo xlink:type="simple">

                        <gmd:MD\_DataIdentification>

                            <gmd:citation xlink:type="simple">

                                <gmd:CI\_Citation>

                                    <gmd:title>

                                    <gmx:FileName>SMAP\_L3\_SM\_P\_20150407\_R13080\_001.h5</gmx:FileName>

...

                   <gmd:dataQualityInfo xlink:type="simple">

                        <gmd:DQ\_DataQuality>

...

                           <!-- This is the ProductionDateTime -->

                            <gmd:lineage xlink:type="simple">

                                <gmd:LI\_Lineage>

                                    <gmd:processStep xlink:type="simple">

                                    <gmi:LE\_ProcessStep>

                                    <gmd:description>

                                    <gco:CharacterString>Soil moisture retrieved using default retrieval algorithm from brightness temperatures acquired by the SMAP radiometer during the spacecraft descending pass.  Level 2 granule data are then mosaicked on a daily basis to form the Level 3 product.</gco:CharacterString>

                                    </gmd:description>

                                    <gmd:dateTime>

                                    <gco:DateTime>2018-07-19T12:01:01Z</gco:DateTime>

...

## C.2.6 PGE Version Class

**Element Specification**

PGEVersionClass/PGEName (0..1)
PGEVersionClass/PGEVersion (1)

**Description**

This element provides the name and version of the product generation executive (PGE) that was applied when producing a granule.

**Cardinality**

0..1

**Tags**

*Recommended*

**Sample Mappings**

ECHO 10 Granule:

/Granule/PGEVersionClass/PGEName

/Granule/PGEVersionClass/PGEVersion

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmd:dataQualityInfo/gmd:DQ\_DataQuality/gmd:lineage/gmd:LI\_Lineage/gmd:processStep/gmi:LE\_ProcessStep [=>

[=>/gmd:description/gco:CharacterString = PGEVersionClass

[=>/gmi:processingInformation/eos:EOS\_Processing/gmi:identifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString = "PGEName: " {the actual PGEName} " PGEVersion: " {the actual PGEVersion}

[=>/gmi:processingInformation/eos:EOS\_Processing/gmi:identifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.pgeversionclass

[=>/gmi:processingInformation/eos:EOS\_Processing/gmi:identifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = PGEVersionClass

(CMR write only)

[=>/gmi:processingInformation/eos:EOS\_Processing/gmi:softwareReference/gmd:CI\_Citation/gmd:title/gco:CharacterString {PGEName}

[=>/gmi:processingInformation/eos:EOS\_Processing/gmi:softwareReference/gmd:CI\_Citation/gmd:date gco:nilReason="unknown"

[=>/gmi:processingInformation/eos:EOS\_Processing/gmi:softwareReference/gmd:CI\_Citation/gmd:edition/gco:CharacterString {PGEVersion}

**Examples**

UMM-G:

  "PGEVersionClass": {

    "PGEName": "A PGE Name",

    "PGEVersion": "6.0.27"

  },

ECHO 10 Granule:

  <PGEVersionClass>

    <PGEName>A PGE Name</PGEName>

    <PGEVersion>6.0.27</PGEVersion>

  </PGEVersionClass>

ISO 19115-2 MENDS:

   <gmd:dataQualityInfo>

      <gmd:DQ\_DataQuality>

         <!-- this lists that the scope for the data quality section pertains to the data set - the granule. -->

         <gmd:scope>

            <gmd:DQ\_Scope>

               <gmd:level>

                  <gmd:MD\_ScopeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_ScopeCode" codeListValue="dataset">dataset</gmd:MD\_ScopeCode>

               </gmd:level>

            </gmd:DQ\_Scope>

         </gmd:scope>

...

         <gmd:lineage>

            <gmd:LI\_Lineage>

...

               <!-- This section contains the PGEVersionClass -->

               <gmd:processStep>

                  <gmi:LE\_ProcessStep>

                     <gmd:description>

                        <gco:CharacterString>PGEVersionClass</gco:CharacterString>

                     </gmd:description>

                     <gmi:processingInformation>

                        <eos:EOS\_Processing>

                           <gmi:identifier>

                              <gmd:MD\_Identifier>

                                 <gmd:code>

                                    <gco:CharacterString>PGEName: A PGE NAME PGEVersion: 6.0.27</gco:CharacterString>

                                 </gmd:code>

                                 <gmd:codeSpace>

                                    <gco:CharacterString>gov.nasa.esdis.umm.pgeversionclass</gco:CharacterString>

                                 </gmd:codeSpace>

                                 <gmd:description>

                                    <gco:CharacterString>PGEVersionClass</gco:CharacterString>

                                 </gmd:description>

                              </gmd:MD\_Identifier>

                           </gmi:identifier>

                           <!-- this section the CMR software will only write and not read -->

                           <gmi:softwareReference>

                              <gmd:CI\_Citation>

                                 <gmd:title>

                                    <gco:CharacterString>A PGE NAME</gco:CharacterString>

                                 </gmd:title>

                                 <gmd:date gco:nilReason="unknown"/>

                                 <gmd:edition>

                                    <gco:CharacterString>6.0.27</gco:CharacterString>

                                 </gmd:edition>

                              </gmd:CI\_Citation>

                           </gmi:softwareReference>

                        </eos:EOS\_Processing>

                     </gmi:processingInformation>

                  </gmi:LE\_ProcessStep>

               </gmd:processStep>

## C.2.7 Temporal Extent

**Element Specification**{Choice of 1}
1) TemporalExtent/RangeDateTime (1)

     TemporalExtent/RangeDateTime/BeginningDateTime  (1)

     TemporalExtent/RangeDateTime/EndingDateTime  (1)

2) TemporalExtent/SingleDateTime  (1)

**Description**

This element contains sub-elements which describe the time period in which the data set was acquired or when the measurements occurred for a specific granule. This extent can be represented in two ways: RangeDateTime or SingleDateTime. The dates use the ISO 8601 format. The temporal extent is validated against the collection's temporal extent to make sure that it exists within the collection's temporal extent.

**Cardinality**

0..1

**Tags**

*Recommended, Search API, Validated*

**Sample Mappings**

ECHO 10 Granule:

{Choice of one}

1)/Granule/Temporal/RangeDateTime/BeginningDateTime

    /Granule/Temporal/RangeDateTime/EndingDateTime

2)/Granule/Temporal/SingleDateTime

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:extent/gmd:EX\_Extent/gmd:temporalElement/gmd:EX\_TemporalExtent  id="boundingTemporalExtent"/ [=>

1) Range

[=>/gmd:extent/gml:TimePeriod  gml:id="{unique ID within record - example = d11e38"}"/gml:beginPosition

[=>/gmd:extent/gml:TimePeriod  gml:id="{unique ID within record - example = d11e38"}"/gml:endPosition

2) Single

[=>/gmd:extent/gmd:TimeInstant gml:id="{unique ID}"/gmd:timePosition

ISO 19115-2 SMAP:

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:extent/gmd:EX\_Extent/gmd:temporalElement/gmd:EX\_TemporalExtent [=>

[=>/gmd:extent/gml:TimePeriod frame="#ISO-8601" gml:id="{unique ID within record - example = JPL\_ID\_3}"/

1) Range

[=>/gmd:extent/gml:TimePeriod  gml:id="{unique ID}"/gml:beginPosition

[=>/gmd:extent/gml:TimePeriod  gml:id="{unique ID}"/gml:endPosition

2) Single

[=>/gmd:extent/gmd:TimeInstant gml:id="{unique ID}"/gmd:timePosition

**Examples**

UMM-G:

  "TemporalExtent": {

    "RangeDateTime": {

      "BeginningDateTime": "2018-07-17T00:00:00.000Z",

      "EndingDateTime": "2018-07-17T23:59:59.999Z"

    }

  },

or

  "TemporalExtent": {

    "SingleDateTime": "2018-07-17T00:00:00.000Z"

  },

ECHO 10 Granule:

  <Temporal>

    <RangeDateTime>

      <BeginningDateTime>2018-07-17T00:00:00.000Z</BeginningDateTime>

      <EndingDateTime>2018-07-17T23:59:59.999Z</EndingDateTime>

    </RangeDateTime>

  </Temporal>

or

<SingleDateTime>2018-07-17T00:00:00.000Z</SingleDateTime>

ISO 19115-2:

<gmd:extent>

            <gmd:EX\_Extent id="boundingExtent">

...

               <gmd:temporalElement>

                  <!--RangeDateTime-->

                  <gmd:EX\_TemporalExtent id="boundingTemporalExtent">

                     <gmd:extent>

                        <!-- This is an example of a single date time

                        <gml:TimeInstant gml:id="id">

                           <gml:timePosition>2018-07-17T00:00:00.000Z</gml:timePosition>

                        </gml:TimeInstant>

                        -->

                        <gml:TimePeriod gml:id="d11e38">

                           <gml:beginPosition>2018-07-17T00:00:00.000Z</gml:beginPosition>

                           <gml:endPosition>2018-07-17T23:59:59.999Z</gml:endPosition>

                        </gml:TimePeriod>

                     </gmd:extent>

                  </gmd:EX\_TemporalExtent>

               </gmd:temporalElement>

            </gmd:EX\_Extent>

         </gmd:extent>

ISO 19115-2 SMAP:

<gmd:extent>

            <gmd:EX\_Extent>

...

              <gmd:temporalElement>

                <gmd:EX\_TemporalExtent>

                  <gmd:extent>

                        <!-- This is an example of a single date time

                        <gml:TimeInstant gml:id="id">

                           <gml:timePosition>2018-07-17T00:00:00.000Z</gml:timePosition>

                        </gml:TimeInstant>

                        -->

                    <gml:TimePeriod frame="#ISO-8601" gml:id="JPL\_ID\_3">

                      <gml:beginPosition frame="#ISO-8601">2018-07-17T00:00:00.000Z</gml:beginPosition>

                      <gml:endPosition frame="#ISO-8601">2018-07-17T23:59:59.999Z</gml:endPosition>

                    </gml:TimePeriod>

                  </gmd:extent>

                </gmd:EX\_TemporalExtent>

              </gmd:temporalElement>

            </gmd:EX\_Extent>

         </gmd:extent>

## C.2.8 Spatial Extent

**Element Specification**

{At least one must be present}

1) SpatialExtent/GranuleLocalities (0..\*)
2) SpatialExtent/HorizontalSpatialDomain (0..1)

    SpatialExtent/HorizontalSpatialDomain/ZoneIdentifier (0..1)

    {choice of 1}
    1) SpatialExtent/HorizontalSpatialDomain/Geometry (1)

        {choice of 1..\*}

        1) SpatialExtent/HorizontalSpatialDomain/Geometry/Points

            SpatialExtent/HorizontalSpatialDomain/Geometry/Points/Longitude (1) <-180..180>

            SpatialExtent/HorizontalSpatialDomain/Geometry/Points/Latitude (1) <-90..90>

        2) SpatialExtent/HorizontalSpatialDomain/Geometry/BoundingRectangles

            SpatialExtent/HorizontalSpatialDomain/Geometry/BoundingRectangles/WestBoundingCoordinate (1) <-180..180>

            SpatialExtent/HorizontalSpatialDomain/Geometry/BoundingRectangles/NorthBoundingCoordinate (1) <-90..90>

            SpatialExtent/HorizontalSpatialDomain/Geometry/BoundingRectangles/EastBoundingCoordinate (1) <-180..180>

            SpatialExtent/HorizontalSpatialDomain/Geometry/BoundingRectangles/SouthBoundingCoordinate (1) <-90..90>

        3) SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons

            SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons/Boundary

            SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons/Boundary/Points (3..\*)

            SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons/Boundary/Points/Longitude (1) <-180..180>

            SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons/Boundary/Points/Latitude (1) <-90..90>

            SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons/ExclusiveZone

            SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons/ExclusiveZone/Boundaries (1..\*)

            SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons/ExclusiveZone/Boundaries/Points (3..\*)

            SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons/ExclusiveZone/Boundaries/Points/Longitude (1) <-180..180>

            SpatialExtent/HorizontalSpatialDomain/Geometry/GPolygons/ExclusiveZone/Boundaries/Points/Latitude (1) <-90..90>

        4) SpatialExtent/HorizontalSpatialDomain/Geometry/Lines

            SpatialExtent/HorizontalSpatialDomain/Geometry/Lines/Points (2..\*)

            SpatialExtent/HorizontalSpatialDomain/Geometry/Lines/Points/Longitude (1) <-180..180>

            SpatialExtent/HorizontalSpatialDomain/Geometry/Lines/Points/Latitude (1) <-90..90>

    2) SpatialExtent/Orbit

        SpatialExtent/Orbit/AscendingCrossing (1) <-180..180>

        SpatialExtent/Orbit/StartLatitude (1) <-90..90>

        SpatialExtent/Orbit/StartDirection (1) <A,D>

        SpatialExtent/Orbit/EndLatitude (1) <-90..90>

        SpatialExtent/Orbit/EndDirection (1) <A,D>

    Track (0..1)

    Track/Cycle (1)

    TrackPasses (1..\*)

    Track/Passes/Pass (1)

    Track/Passes/Tiles (1..\*)

3) SpatialExtent/VerticalSpatialDomains (0..\*)

    SpatialExtent/VerticalSpatialDomain/Type (1) <Atmosphere Layer, Pressure, Altitude, Depth>

    {choice of 1}

    1) SpatialExtent/VerticalSpatialDomain/Value (1)

    2) SpatialExtent/VerticalSpatialDomain/MinimumValue (1)

        SpatialExtent/VerticalSpatialDomain/MaximumValue (1)

    SpatialExtent/VerticalSpatialDomain/Unit (0..1) <Fathoms, Feet, HectoPascals, Kilometers, Meters, Millibars, PoundsPerSquareInch, Atmosphere, InchesOfMercury, InchesOfWater>

**Description**

This element and its sub-elements specify the geographic and vertical coverage of the data.

**Cardinality**

0..1

**Tags**

*Recommended, Search API, Validated*

**Sample Mappings**

ECHO 10 Granule:

/Granule/Spatial/GranuleLocality/LocalityValue

/Granule/Spatial/HorizontalSpatialDomain/ZoneIdentifier

/Granule/Spatial/HorizontalSpatialDomain/Geometry/Point/PointLongitude

/Granule/Spatial/HorizontalSpatialDomain/Geometry/Point/PointLatitude

/Granule/Spatial/HorizontalSpatialDomain/Geometry/BoundingRectangle/WestBoundingCoordinate

/Granule/Spatial/HorizontalSpatialDomain/Geometry/BoundingRectangle/NorthBoundingCoordinate

/Granule/Spatial/HorizontalSpatialDomain/Geometry/BoundingRectangle/EastBoundingCoordinate

/Granule/Spatial/HorizontalSpatialDomain/Geometry/BoundingRectangle/SouthBoundingCoordinate

/Granule/Spatial/HorizontalSpatialDomain/Geometry/GPolygon/Boundary/Point/PointLongitude

/Granule/Spatial/HorizontalSpatialDomain/Geometry/GPolygon/Boundary/Point/PointLatitude

/Granule/Spatial/HorizontalSpatialDomain/Geometry/GPolygon/ExclusiveZone/Boundary/Point/PointLongitude

/Granule/Spatial/HorizontalSpatialDomain/Geometry/GPolygon/ExclusiveZone/Boundary/Point/PointLatitude

/Granule/Spatial/HorizontalSpatialDomain/Geometry/Line/Point/PointLongitude

/Granule/Spatial/HorizontalSpatialDomain/Geometry/Line/Point/PointLatitude

/Granule/Spatial/HorizontalSpatialDomain/Orbit/AscendingCrossing

/Granule/Spatial/HorizontalSpatialDomain/Orbit/StartLat

/Granule/Spatial/HorizontalSpatialDomain/Orbit/StartDirection

/Granule/Spatial/HorizontalSpatialDomain/Orbit/EndLat

/Granule/Spatial/HorizontalSpatialDomain/Orbit/EndDirection

/Granule/Spatial/VerticalSpatialDomains/VerticalSpatialDomain/Type

/Granule/Spatial/VerticalSpatialDomains/VerticalSpatialDomain/Value

ISO 19115-2 MENDS:

(Granule Locality)

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gco:CharacterString

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gmd:type/gmd:MD\_KeywordTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_KeywordTypeCode" codeListValue="place" = place

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:extent/gmd:EX\_Extent id="boundingExtent" [=>

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription id="ZoneIdentifier"/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString {the actual ZoneIdentifier}

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.zoneidentifier

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = ZoneIdentifier

[=>/gmd:geographicElement/gmd:EX\_BoundingPolygon/gmd:polygon/gml:Point gml:id="{unique ID within record}"/gml:pos>Latitude + " " + Longitude

[=>/gmd:geographicElement/gmd:EX\_GeographicBoundingBox [==>

[==>/gmd:westBoundLongitude/gco:Decimal

[==>/gmd:northBoundLongitude/gco:Decimal

[==>/gmd:eastBoundLongitude/gco:Decimal

[==>/gmd:southBoundLongitude/gco:Decimal

[=>/gmd:geographicElement/gmd:EX\_BoundingPolygon/gmd:polygon/gml:Polygon "gml:id="{unique ID within record}" [==>

[==>/gml:exterior/gml:LinearRing/gml:posList  {latitude first then longitude for every point - no commas just spaces. ex: -10 -10 -10 10 10 10 10 -10 -10 -10

(counter clockwise order and must be closed)

[==>/gml:interior/gml:LinearRing/gml:posList  {latitude first then longitude for every point - no commas just spaces. ex: -10 -10 -10 10 10 10 10 -10 -10 -10

(counter clockwise order and must be closed)

[=>/gmd:geographicElement/gmd:EX\_BoundingPolygon/gmd:polygon/gml:LineString "gml:id="{unique ID within record}"/gml:posList>lat-1 long-1 lat-2 long-2 etc.</gml:posList>

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription id="Orbit"/gmd:geographicIdentifier/gmd:MD\_Identifier[==>

[==>/gmd:description/gco:CharacterString = Orbit

and

[==>/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.orbit

[==>/gmd:code/gco:CharacterString = "AscendingCrossing: " {value}

[==>/gmd:code/gco:CharacterString = "StartLatitude: "  {value}

[==>/gmd:code/gco:CharacterString = "StartDirection: " {value}

[==>/gmd:code/gco:CharacterString = "EndLatitude: "  {value}

[==>/gmd:code/gco:CharacterString = "EndDirection: " {value}

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription id="Track"/gmd:geographicIdentifier/gmd:MD\_Identifier[==>

[==>/gmd:description/gco:CharacterString = Track

and

[==>/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.track

[==>/gmd:code/gco:CharacterString = "Cycle: " {value}

[==>/gmd:code/gco:CharacterString = "Passes: " [ {pass number} Tiles: [{Tile string list}] {pass number2} Titles: [{Tile string list}]]

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription id="VerticalSpatialDomain\*"/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString

= Type: {Type} Value: {Value} Unit: {Unit}

or

=  Type: {Type} MinimumValue: {MinimumValue} MaximumValue: {MaximumValue} Unit: {Unit}

with

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription id="VerticalSpatialDomain\*"/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.verticalspatialdomain

and

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription id="VerticalSpatialDomain\*" /gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = VerticalSpatialDomain

Where \* = 1, 2, etc.

ISO 19115-2 SMAP:

/gmd:DS\_Series/gmd:composedOf/gmd:DS\_DataSet/gmd:has/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:extent/gmd:EX\_Extent [=>

[=>/gmd:geographicElement/gmd:EX\_GeographicBoundingBox [==>

[==>/gmd:westBoundLongitude/gco:Decimal

[==>/gmd:northBoundLongitude/gco:Decimal

[==>/gmd:eastBoundLongitude/gco:Decimal

[==>/gmd:southBoundLongitude/gco:Decimal

[=>/gmd:geographicElement/gmd:EX\_BoundingPolygon/gmd:polygon/gml:Polygon "gml:id="{unique ID within record}" [==>

[==>/gml:exterior/gml:LinearRing/gml:posList  {latitude first then longitude for every point - no commas just spaces. ex: -10 -10 10 -10 10 10 -10 10 -10 -10

(clockwise order and must be closed)

**Examples**

UMM-G:

  "SpatialExtent": {

    "GranuleLocalities": ["GranuleLocality1", "GranuleLocality2"],

    "HorizontalSpatialDomain": {

      "ZoneIdentifier": "ZoneIdentifier 1",

      "Geometry": {

        "Points": [{

          "Longitude": -77,

          "Latitude": 88

        }, {

          "Longitude":10,

          "Latitude": 10

        }],

        "BoundingRectangles": [{

          "WestBoundingCoordinate": -180,

          "NorthBoundingCoordinate": 85.04450225830078,

          "EastBoundingCoordinate": 180,

          "SouthBoundingCoordinate": -85.04450225830078

        }],

        "GPolygons": [{

          "Boundary" : {

            "Points": [ {"Longitude":-10, "Latitude":-10}, {"Longitude":10, "Latitude":-10}, {"Longitude":10, "Latitude":10}, {"Longitude":-10, "Latitude":10}, {"Longitude":-10, "Latitude":-10}]

          },

          "ExclusiveZone": {

            "Boundaries": [{

              "Points": [{"Longitude":-5, "Latitude":-5}, {"Longitude":-1, "Latitude":-5}, {"Longitude":-1, "Latitude":-1}, {"Longitude":-5, "Latitude":-1}, {"Longitude":-5, "Latitude":-5}]

            }, {

              "Points": [{"Longitude":0, "Latitude":0}, {"Longitude":5, "Latitude":0}, {"Longitude":5, "Latitude":5}, {"Longitude":0, "Latitude":5}, {"Longitude":0, "Latitude":0}]

            }]

          }

        }],

        "Lines": [{

          "Points": [ {"Longitude":-100, "Latitude":-70}, {"Longitude":-88, "Latitude":-66}]

        }]

      },

      "Track": {

        "Cycle": 1,

        "Passes": [{

          "Pass": 1,

          "Tiles": ["1L", "1R", "2F"]

        }, {

          "Pass": 2,

          "Tiles": ["3L", "3R", "4F"]

        }]

      }

    },

    "VerticalSpatialDomains": [{

      "Type": "Atmosphere Layer",

      "Value": "Atmosphere Profile"

    }, {

      "Type": "Pressure",

      "Value": "100",

      "Unit": "hectoPascals"

    }, {

      "Type": "Altitude",

      "MinimumValue": "10",

      "MaximumValue": "100",

      "Unit": "Meters"

    }]

  },

or Orbit Instead of Geometry

  "SpatialExtent": {

    "GranuleLocalities": ["GranuleLocality1", "GranuleLocality2"],

    "HorizontalSpatialDomain": {

      "ZoneIdentifier": "1",

      "Orbit": {

        "AscendingCrossing":88.92,

        "StartLatitude":-76.555340,

        "StartDirection": "D",

        "EndLatitude":-78.209954,

        "EndDirection": "D"

      },

      "Track": {

        "Cycle": 1,

        "Passes": [{

          "Pass": 1,

          "Tiles": ["1L", "1R", "2F"]

        }, {

          "Pass": 2,

          "Tiles": ["3L", "3R", "4F"]

        }]

      }

    },

    "VerticalSpatialDomains": [{

      "Type": "Atmosphere Layer",

      "Value": "Atmosphere Profile"

    }, {

      "Type": "Pressure",

      "Value": "100",

      "Unit": "hectoPascals"

    }, {

      "Type": "Altitude",

      "MinimumValue": "10",

      "MaximumValue": "100",

      "Unit": "Meters"

    }]

  },

ECHO 10 Granule:

  <Spatial>

    <GranuleLocality>

      <LocalityValue>GranuleLocality1</LocalityValue>

      <LocalityValue>GranuleLocality2</LocalityValue>

    </GranuleLocality>

    <VerticalSpatialDomains>

      <VerticalSpatialDomain>

        <Type>Atmosphere Layer</Type>

        <Value>Atmosphere Profile</Value>

      </VerticalSpatialDomain>

      <VerticalSpatialDomain>

        <Type>Pressure</Type>

        <Value>100 hectoPascals</Value>

      </VerticalSpatialDomain>

      <VerticalSpatialDomain>

        <Type>Maximum Altitude</Type>

        <Value>100 Meters</Value>

      </VerticalSpatialDomain>

      <VerticalSpatialDomain>

        <Type>Minimum Altitude</Type>

        <Value>10 Meters</Value>

      </VerticalSpatialDomain>

    </VerticalSpatialDomains>

    <HorizontalSpatialDomain>

      <ZoneIdentifier>ZoneIdentifier 1</ZoneIdentifier>

      <Geometry>

        <Point>

          <PointLongitude>-77</PointLongitude>

          <PointLatitude>88</PointLatitude>

        </Point>

        <BoundingRectangle>

          <WestBoundingCoordinate>-180</WestBoundingCoordinate>

          <NorthBoundingCoordinate>85.04450225830078</NorthBoundingCoordinate>

          <EastBoundingCoordinate>180</EastBoundingCoordinate>

          <SouthBoundingCoordinate>-85.04450225830078</SouthBoundingCoordinate>

        </BoundingRectangle>

        <GPolygon>

          <Boundary>

            <Point>

              <PointLongitude>-10</PointLongitude>

              <PointLatitude>-10</PointLatitude>

            </Point>

            <Point>

              <PointLongitude>-10</PointLongitude>

              <PointLatitude>10</PointLatitude>

            </Point>

            <Point>

              <PointLongitude>10</PointLongitude>

              <PointLatitude>10</PointLatitude>

            </Point>

            <Point>

              <PointLongitude>10</PointLongitude>

              <PointLatitude>-10</PointLatitude>

            </Point>

          </Boundary>

          <ExclusiveZone>

            <Boundary>

              <Point>

                <PointLongitude>-5</PointLongitude>

                <PointLatitude>-5</PointLatitude>

              </Point>

              <Point>

                <PointLongitude>-5</PointLongitude>

                <PointLatitude>-1</PointLatitude>

              </Point>

              <Point>

                <PointLongitude>-1</PointLongitude>

                <PointLatitude>-1</PointLatitude>

              </Point>

              <Point>

                <PointLongitude>-1</PointLongitude>

                <PointLatitude>-5</PointLatitude>

              </Point>

            </Boundary>

            <Boundary>

              <Point>

                <PointLongitude>0</PointLongitude>

                <PointLatitude>0</PointLatitude>

              </Point>

              <Point>

                <PointLongitude>0</PointLongitude>

                <PointLatitude>5</PointLatitude>

              </Point>

              <Point>

                <PointLongitude>5</PointLongitude>

                <PointLatitude>5</PointLatitude>

              </Point>

              <Point>

                <PointLongitude>5</PointLongitude>

                <PointLatitude>0</PointLatitude>

              </Point>

            </Boundary>

          </ExclusiveZone>

        </GPolygon>

        <Line>

          <Point>

            <PointLongitude>-100</PointLongitude>

            <PointLatitude>-70</PointLatitude>

          </Point>

          <Point>

            <PointLongitude>-88</PointLongitude>

            <PointLatitude>-66</PointLatitude>

          </Point>

        </Line>

      </Geometry>

      <!--

      <Orbit>

        <AscendingCrossing>88.92</AscendingCrossing>

        <StartLat>-76.555340</StartLat>

        <StartDirection>D</StartDirection>

        <EndLat>78.209954</EndLat>

        <EndDirection>D</EndDirection>

      </Orbit>

      -->

    </HorizontalSpatialDomain>

  </Spatial>

ISO 19115-2 MENDS:

         <!-- This is where Spatial/GranuleLocalities are described. -->

         <gmd:descriptiveKeywords>

            <gmd:MD\_Keywords>

               <gmd:keyword>

                  <gco:CharacterString>GranuleLocality1</gco:CharacterString>

               </gmd:keyword>

               <gmd:keyword>

                  <gco:CharacterString>GranuleLocality2</gco:CharacterString>

               </gmd:keyword>

               <gmd:type>

                  <gmd:MD\_KeywordTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_KeywordTypeCode" codeListValue="place">place</gmd:MD\_KeywordTypeCode>

               </gmd:type>

            </gmd:MD\_Keywords>

         </gmd:descriptiveKeywords>

         <gmd:extent>

            <!-- the EX\_Extent id must exist with boundingExtent -->

            <gmd:EX\_Extent id="boundingExtent">

               <!--This section describes a spatial extent point. -->

               <gmd:geographicElement>

                  <gmd:EX\_BoundingPolygon>

                     <gmd:polygon>

                        <!-- The id must exist and be unique within the record -->

                        <gml:Point gml:id="d11e64">

                           <!-- Latitude is written first followed by a space and then longitude -->

                           <gml:pos>88 -77</gml:pos>

                        </gml:Point>

                     </gmd:polygon>

                  </gmd:EX\_BoundingPolygon>

               </gmd:geographicElement>

               <!--This section describes a spatial extent line. -->

               <gmd:geographicElement>

                  <gmd:EX\_BoundingPolygon>

                     <gmd:polygon>

                        <gml:LineString gml:id="d11e143">

                           <gml:posList>-70 -100 -66 -88</gml:posList>

                        </gml:LineString>

                     </gmd:polygon>

                  </gmd:EX\_BoundingPolygon>

               </gmd:geographicElement>

               <!--This section describes a spatial extent gpolygon. -->

               <gmd:geographicElement>

                  <gmd:EX\_BoundingPolygon>

                     <gmd:polygon>

                        <!-- the unique ID within the record must exist -->

                        <gml:Polygon gml:id="d11e78">

                           <gml:exterior>

                              <!-- latitude first then longitude for every point - no commas just spaces - so latitude1 longitude1 latitude2 longitude2 ...

                                   The points must be in counter clockwise order and closed (first point must match the last point). -->

                              <gml:LinearRing>

                                 <gml:posList>-10 -10 -10 10 10 10 10 -10 -10 -10</gml:posList>

                              </gml:LinearRing>

                           </gml:exterior>

                           <!-- This section lists the holes within the polygon. -->

                           <!-- This is the GPolygon ExclusiveZone - there are 2 of them. -->

                           <gml:interior>

                              <gml:LinearRing>

                                 <gml:posList>-5 -5 -5 -1 -1 -1 -1 -5 -5 -5</gml:posList>

                              </gml:LinearRing>

                           </gml:interior>

                           <gml:interior>

                              <gml:LinearRing>

                                 <gml:posList>0 0 0 5 5 5 5 0 0 0</gml:posList>

                              </gml:LinearRing>

                           </gml:interior>

                        </gml:Polygon>

                     </gmd:polygon>

                  </gmd:EX\_BoundingPolygon>

               </gmd:geographicElement>

               <!--This section describes a spatial extent bounding rectangle. -->

               <gmd:geographicElement>

                  <!--Bounding Rectangle-->

                  <gmd:EX\_GeographicBoundingBox>

                     <gmd:westBoundLongitude>

                        <gco:Decimal>-180</gco:Decimal>

                     </gmd:westBoundLongitude>

                     <gmd:eastBoundLongitude>

                        <gco:Decimal>180</gco:Decimal>

                     </gmd:eastBoundLongitude>

                     <gmd:southBoundLatitude>

                        <gco:Decimal>-85.04450225830078</gco:Decimal>

                     </gmd:southBoundLatitude>

                     <gmd:northBoundLatitude>

                        <gco:Decimal>85.04450225830078</gco:Decimal>

                     </gmd:northBoundLatitude>

                  </gmd:EX\_GeographicBoundingBox>

               </gmd:geographicElement>

               <!-- This section documents the ZoneIdentifier -->

               <gmd:geographicElement>

                  <gmd:EX\_GeographicDescription id="ZoneIdentifier">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>ZoneIdentifier 1</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.zoneidentifier</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>ZoneIdentifier</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

               <!-- This section documents the Orbit information -->

               <gmd:geographicElement>

                  <gmd:EX\_GeographicDescription id="Orbit">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>AscendingCrossing: 88.92 StartLatitude: -76.555340 StartDirection: D EndLatitude: 78.209954 EndDirection: D</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.orbit</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>Orbit</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

               <!-- This section documents the Track information -->

               <gmd:geographicElement>

                  <gmd:EX\_GeographicDescription id="Track">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Cycle: 1 Passes: [1 [1L 1R 2L 2R] 2 [3R 3L 4R 4L]]</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.track</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>Track</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

               <!-- This section documents the VerticalSpatialDomain information -->

               <!-- Vertical Domain with a value -->

               <gmd:geographicElement>

                  <!-- Must use VerticalSpatialDomain\* where \* = 1, 2, 3, 4, etc. -->

                  <gmd:EX\_GeographicDescription id="VerticalSpatialDomain1">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Type: Atmosphere Layer Value: Atmosphere Profile</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.verticalspatialdomain</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>VerticalSpatialDomain</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

               <!-- Vertical Domain with a value and a unit -->

               <gmd:geographicElement>

                  <!-- Must use VerticalSpatialDomain\* where \* = 1, 2, 3, 4, etc. -->

                  <gmd:EX\_GeographicDescription id="VerticalSpatialDomain2">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Type: Pressure Value: 100 Unit: hectoPascals</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.verticalspatialdomain</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>VerticalSpatialDomain</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

               <!-- Vertical Domain with a min and max value and a unit -->

               <gmd:geographicElement>

                  <!-- Must use VerticalSpatialDomain\* where \* = 1, 2, 3, 4, etc. -->

                  <gmd:EX\_GeographicDescription id="VerticalSpatialDomain3">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Type: Altitude MaximumValue: 100 MinimumValue: 10 Unit: Meters</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.verticalspatialdomain</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>VerticalSpatialDomain</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

ISO 19115-2 SMAP:

         <gmd:extent>

            <!-- the EX\_Extent id must exist with boundingExtent -->

            <gmd:EX\_Extent id="boundingExtent">

               <!--This section describes a spatial extent gpolygon. -->

               <gmd:geographicElement>

                  <gmd:EX\_BoundingPolygon>

                     <gmd:polygon>

                        <!-- the unique ID within the record must exist -->

                        <gml:Polygon gml:id="d11e78">

                           <gml:exterior>

                              <!-- latitude first then longitude for every point - no commas just spaces - so latitude1 longitude1 latitude2 longitude2 ...

                                   The points must be in counter clockwise order and closed (first point must match the last point). -->

                              <gml:LinearRing>

                                 <gml:posList>-10 -10 -10 10 10 10 10 -10 -10 -10</gml:posList>

                              </gml:LinearRing>

                           </gml:exterior>

                           <!-- This section lists the holes within the polygon. -->

                           <!-- This is the GPolygon ExclusiveZone - there are 2 of them. -->

                           <gml:interior>

                              <gml:LinearRing>

                                 <gml:posList>-5 -5 -5 -1 -1 -1 -1 -5 -5 -5</gml:posList>

                              </gml:LinearRing>

                           </gml:interior>

                           <gml:interior>

                              <gml:LinearRing>

                                 <gml:posList>0 0 0 5 5 5 5 0 0 0</gml:posList>

                              </gml:LinearRing>

                           </gml:interior>

                        </gml:Polygon>

                     </gmd:polygon>

                  </gmd:EX\_BoundingPolygon>

               </gmd:geographicElement>

               <!--This section describes a spatial extent bounding rectangle. -->

               <gmd:geographicElement>

                  <!--Bounding Rectangle-->

                  <gmd:EX\_GeographicBoundingBox>

                     <gmd:westBoundLongitude>

                        <gco:Decimal>-180</gco:Decimal>

                     </gmd:westBoundLongitude>

                     <gmd:eastBoundLongitude>

                        <gco:Decimal>180</gco:Decimal>

                     </gmd:eastBoundLongitude>

                     <gmd:southBoundLatitude>

                        <gco:Decimal>-85.04450225830078</gco:Decimal>

                     </gmd:southBoundLatitude>

                     <gmd:northBoundLatitude>

                        <gco:Decimal>85.04450225830078</gco:Decimal>

                     </gmd:northBoundLatitude>

                  </gmd:EX\_GeographicBoundingBox>

               </gmd:geographicElement>

## C.2.9 Orbit Calculated Spatial Domains

**Element Specification**

{At least one element must be present}

OrbitCalculatedSpatialDomains/OrbitalModelName (0..1)

{Choice of 1}

1) OrbitCalculatedSpatialDomains/OrbitNumber (1)

2) OrbitCalculatedSpatialDomains/BegnOrbitNumber (1)

    OrbitCalculatedSpatialDomains/EndOrbitNumber (1)

OrbitCalculatedSpatialDomains/EquatorCrossingLongitude <-180..180>

OrbitCalculatedSpatialDomains/EquatorCrossingDateTime

**Description**

This element is used to store the characteristics of the orbit calculated spatial domain to include the model name, orbit number, start and stop orbit number, equator crossing date and time, and equator crossing longitude.

**Cardinality**

0..1

**Tags**

*Recommended*

**Sample Mappings**

ECHO 10 Granule:

/Granule/OrbitCalculatedSpatialDomains/OrbitCalculatedSpatialDomain/OrbitalModelName

/Granule/OrbitCalculatedSpatialDomains/OrbitCalculatedSpatialDomain/OrbitNumber

/Granule/OrbitCalculatedSpatialDomains/OrbitCalculatedSpatialDomain/StartOrbitNumber

/Granule/OrbitCalculatedSpatialDomains/OrbitCalculatedSpatialDomain/StopOrbitNumber

/Granule/OrbitCalculatedSpatialDomains/OrbitCalculatedSpatialDomain/EquatorCrossingLongitude

/Granule/OrbitCalculatedSpatialDomains/OrbitCalculatedSpatialDomain/EquatorCrossingDateTime

ISO 19115-2 MENDS:

(Use the same gmd:extent as with SpatialExtent)

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:extent/gmd:EX\_Extent [=>

with gmd:EX\_Extent attribute id=""boundingExtent""

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription id="OrbitCalculatedSpatialDomainsN"/gmd:geographicIdentifier/gmd:MD\_Identifier[==>

[==>/gmd:description/gco:CharacterString = OrbitCalculatedSpatialDomains

and

[==>/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.orbitcalculatedspatialdomains

Where OrbitCalculatedSpatialDomainsN = OrbitCalculatedSpatialDomains0, OrbitCalculatedSpatialDomains1, ... OrbitCalculatedSpatialDomainsN.

[==>/gmd:code/gco:CharacterString = "OrbitalModelName: " {value}

[==>/gmd:code/gco:CharacterString = "OrbitNumber: "  {value}

[==>/gmd:code/gco:CharacterString = "BegnOrbitNumber: " {value}

[==>/gmd:code/gco:CharacterString = "EndOrbitNumber: "  {value}

[==>/gmd:code/gco:CharacterString = "EquatorCrossingLongitude: " {value}

[==>/gmd:code/gco:CharacterString = "EquatorCrossingDateTime: " {value}

**Examples**

UMM-G:

  "OrbitCalculatedSpatialDomains": [{

    "OrbitalModelName": "OrbitalModelName",

    "BeginOrbitNumber": 99263,

    "EndOrbitNumber": 99263,

    "EquatorCrossingLongitude":88.92,

    "EquatorCrossingDateTime": "2018-08-16T16:22:21.000Z"

  }],

ECHO 10 Granule:

  <OrbitCalculatedSpatialDomains>

    <OrbitCalculatedSpatialDomain>

      <OrbitalModelName>OrbitalModelName</OrbitalModelName>

      <OrbitNumber>99263</OrbitNumber>

      <StartOrbitNumber>99263</StartOrbitNumber>

      <StopOrbitNumber>99263</StopOrbitNumber>

      <EquatorCrossingLongitude>88.92</EquatorCrossingLongitude>

      <EquatorCrossingDateTime>2018-08-16T16:22:21.000Z</EquatorCrossingDateTime>

    </OrbitCalculatedSpatialDomain>

  </OrbitCalculatedSpatialDomains>

ISO 19115-2 MENDS:

               <!-- This section documents the OrbitCalculatedSpatialDomains information -->

               <gmd:geographicElement>

                  <!-- Must use OrbitCalculatedSpatialDomains\* where \* = 1, 2, 3, 4, etc. -->

                  <gmd:EX\_GeographicDescription id="OrbitCalculatedSpatialDomains1">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <!-- instead of BeginOrbitNumber and EndOrbitNumber, OrbitNumber can be used -->

                           <gmd:code>

                              <gco:CharacterString>OrbitalModelName: OrbitalModelName BeginOrbitNumber: 99263 EndOrbitNumber: 99263 EquatorCrossingLongitude: 88.92 EquatorCrossingDateTime: 2018-08-16T16:22:21.000Z</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.orbitcalculatedspatialdomains</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>OrbitCalculatedSpatialDomains</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

## C.2.10 Measured Parameters

**Element Specification**

MeasuredParameters/ParameterName (1)

MeasuredParameters/QAStats (0..1)

{One of the following is required}

  MeasuredParameters/QAStats/QAPercentMissingData (0..1) <0..100>

  MeasuredParameters/QAStats/QAPercentOutOfBoundsData (0..1) <0..100>

  MeasuredParameters/QAStats/QAPercentInterpolatedData (0..1) <0..100>

  MeasuredParameters/QAStats/QAPercentCloudCover (0..1) <0..100>

MeasuredParameters/QAFlags (0..1)

MeasuredParameters/QAFlags/AutomaticQualityFlag (0..1) <Passed, Failed, Suspect>

MeasuredParameters/QAFlags/AutomaticQualityFlagExplanation (0..1)

MeasuredParameters/QAFlags/OperationalQualityFlag (0..1) <Passed, Failed, Being Investigated, Not Investigated, Inferred Passed, Inferred Failed, Suspect>

MeasuredParameters/QAFlags/OperationalQualityFlagExplanation (0..1)

MeasuredParameters/QAFlags/ScienceQualityFlag (0..1)

MeasuredParameters/QAFlags/ScienceQualityFlagExplanation (0..1)

**Description**

This element contains the name of the geophysical parameter expressed in the data as well as associated quality flags and quality statistics. The quality statistics element contains measures of quality for the granule. The parameters used to set these measures are not preset and will be determined by the data producer. Each set of measures can occur many times either for the granule as a whole or for individual parameters. The quality flags contain the science, operational and automatic quality flags which indicate the overall quality assurance levels of specific parameter values within a granule.

**Cardinality**

0..\*

**Tags**

*Recommended*

**Sample Mappings**

ECHO 10 Granule:

MeasuredParameters/MeasuredParameter/ParameterName

MeasuredParameters/MeasuredParameter/QAStats

MeasuredParameters/MeasuredParameter/QAStats/QAPercentMissingData

MeasuredParameters/MeasuredParameter/QAStats/QAPercentOutOfBoundsData

MeasuredParameters/MeasuredParameter/QAStats/QAPercentInterpolatedData

MeasuredParameters/MeasuredParameter/QAStats/QAPercentCloudCover

MeasuredParameters/MeasuredParameter/QAFlags

MeasuredParameters/MeasuredParameter/QAFlags/AutomaticQualityFlag

MeasuredParameters/MeasuredParameter/QAFlags/AutomaticQualityFlagExplanation

MeasuredParameters/MeasuredParameter/QAFlags/OperationalQualityFlag

MeasuredParameters/MeasuredParameter/QAFlags/OperationalQualityFlagExplanation

MeasuredParameters/MeasuredParameter/QAFlags/ScienceQualityFlag

MeasuredParameters/MeasuredParameter/QAFlags/ScienceQualityFlagExplanation

ISO 19115-2 MENDS:

(different contentInfo than DayNightFlag, AdditionalAttributes, and CloudCover)

/gmi:MI\_Metadata/gmd:contentInfo/gmd:MD\_CoverageDescription [=>

[=>/gmd:attributeDescription/gco:RecordType = MeasuredParameters

[=>/gmd:contentType/gmd:MD\_CoverageContentTypeCode  codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_CoverageContentTypeCode" codeListValue="physicalMeasurement" = physicalMeasurement

(CMR write only)

(different dataQualityInfo than ReprocessingActual, ProductionDateTime, PGEVersionClass, Some AdditionalAttributes, and InputGranules)

/gmi:MI\_Metadata/gmd:DQ\_DataQuality/gmd:scope/gmd:DQ\_Scope/gmd:level/gmd:MD\_ScopeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_ScopeCode" codeListValue="dataset" = dataset

[=>/gmd:dimension/gmd:MD\_Band [==>

[==>/gmd:sequenceIdentifier/gco:MemberName/gco:aName/gco:CharacterString {the value}

[==>/gmd:sequenceIdentifier/gco:MemberName/gco:attributeType/gco:TypeName/gco:aName/gco:CharacterString = MeasuredParameters

(CMR write only)

/gmi:MI\_Metadata/gmd:DQ\_DataQuality/gmd:scope/gmd:DQ\_Scope/gmd:levelDescription/gmd:MD\_ScopeDescription/gmd:attributes/gco:CharacterString = ParameterName

[==>/gmd:otherProperty/gco:Record/eos:AdditionalAttributes [===>

(CMR write only)

/gmi:MI\_Metadata/gmd:DQ\_DataQuality/gmd:report \\>

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation" = qualityInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString = QAPercentMissingData

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:dataType/eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="float" = float

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:nameOfMeasure/gco:CharacterString = QAPercentMissingData

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult \\=>

\\=>/gmd:valueUnit gco:nilReason="missing"

\\=>/gmd:value/gco:Record xsi:type="gco:Real\_PropertyType"/gco:Real {the actual value}

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation" = qualityInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString = QAPercentOutOfBoundsData

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:dataType/eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="float" = float

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:nameOfMeasure/gco:CharacterString = QAPercentOutOfBoundsData

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult \\=>

\\=>/gmd:valueUnit  gco:nilReason="missing"

\\=>/gmd:value/gco:Record xsi:type="gco:Real\_PropertyType"/gco:Real {the actual value}

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation" = qualityInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString = QAPercentInterpolatedData

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:dataType/eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="float" = float

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:nameOfMeasure/gco:CharacterString = QAPercentInterpolatedData

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult \\=>

\\=>/gmd:valueUnit gco:nilReason="missing"

\\=>/gmd:value/gco:Record xsi:type="gco:Real\_PropertyType"/gco:Real {the actual value}

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation" = qualityInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString = QAPercentInterpolatedData

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:dataType/eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="float" = float

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:nameOfMeasure/gco:CharacterString = QAPercentInterpolatedData

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult \\=>

\\=>/gmd:valueUnit gco:nilReason="missing"

\\=>/gmd:value/gco:Record xsi:type="gco:Real\_PropertyType"/gco:Real {the actual value}

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation" = qualityInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString = QAPercentCloudCover

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:dataType/eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="float" = float

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:nameOfMeasure/gco:CharacterString = QAPercentCloudCover

\\>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult \\=>

\\=>/gmd:valueUnit gco:nilReason="missing"

\\=>/gmd:value/gco:Record xsi:type="gco:Real\_PropertyType"/gco:Real {the actual value}

[==>/gmd:otherProperty/gco:Record/eos:AdditionalAttributes [===>

(CMR write only)

/gmi:MI\_Metadata/gmd:DQ\_DataQuality/gmd:report \\>

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation" = qualityInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString = AutomaticQualityFlag

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:dataType/eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="string" = string

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_NonQuantitativeAttributeAccuracy/gmd:nameOfMeasure/gco:CharacterString = AutomaticQualityFlag

\\>/gmd:DQ\_NonQuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult \\=>

\\=>/gmd:valueUnit gco:nilReason="missing"

\\=>/gmd:value/gco:Record xsi:type="gco:CharacterString\_PropertyType"/gco:CharacterString {the actual value}

Put the following just after name in the above cell

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:description/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_NonQuantitativeAttributeAccuracy/gmd:measureDescription/gco:CharacterString {Automatic Quality Flag Explanation}

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation" = qualityInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString = OperationalQualityFlag

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:dataType/eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="string" = string

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_NonQuantitativeAttributeAccuracy/gmd:nameOfMeasure/gco:CharacterString = OperationalQualityFlag

\\>/gmd:DQ\_NonQuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult \\=>

\\=>/gmd:valueUnit gco:nilReason="missing"

\\=>/gmd:value/gco:Record xsi:type="gco:CharacterString\_PropertyType"/gco:CharacterString {the actual value}

Put the following just after name in the above cell

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:description/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_NonQuantitativeAttributeAccuracy/gmd:measureDescription/gco:CharacterString {Operational Quality Flag Explanation}

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation" = qualityInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString = ScienceQualityFlag

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:dataType/eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="string" = string

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_NonQuantitativeAttributeAccuracy/gmd:nameOfMeasure/gco:CharacterString = ScienceQualityFlag

\\>/gmd:DQ\_NonQuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult \\=>

\\=>/gmd:valueUnit gco:nilReason="missing"

\\=>/gmd:value/gco:Record xsi:type="gco:CharacterString\_PropertyType"/gco:CharacterString {the actual value}

Put the following just after name in the above cell

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:description/gco:CharacterString {the actual value}

(CMR write only)

\\>/gmd:DQ\_NonQuantitativeAttributeAccuracy/gmd:measureDescription/gco:CharacterString {Science Quality Flag Explanation}

**Examples**

UMM-G:

  "MeasuredParameters": [{

    "ParameterName": "Parameter Name",

    "QAStats": {

      "QAPercentMissingData": 10,

      "QAPercentOutOfBoundsData": 20,

      "QAPercentInterpolatedData": 30,

      "QAPercentCloudCover": 40

    },

    "QAFlags": {

      "AutomaticQualityFlag": "Passed",

      "AutomaticQualityFlagExplanation": "Automatic Quality Flag Explanation",

      "OperationalQualityFlag": "Passed",

      "OperationalQualityFlagExplanation": "Operational Quality Flag Explanation",

      "ScienceQualityFlag": "Passed",

      "ScienceQualityFlagExplanation": "Science Quality Flag Explanation"

    }

  }],

ECHO 10 Granule:

  <MeasuredParameters>

    <MeasuredParameter>

      <ParameterName>ParameterName</ParameterName>

      <QAStats>

        <QAPercentMissingData>10</QAPercentMissingData>

        <QAPercentOutOfBoundsData>20</QAPercentOutOfBoundsData>

        <QAPercentInterpolatedData>30</QAPercentInterpolatedData>

        <QAPercentCloudCover>40</QAPercentCloudCover>

      </QAStats>

      <QAFlags>

        <AutomaticQualityFlag>Passed</AutomaticQualityFlag>

        <AutomaticQualityFlagExplanation>Automatic Quality Flag Explanation</AutomaticQualityFlagExplanation>

        <OperationalQualityFlag>Passed</OperationalQualityFlag>

        <OperationalQualityFlagExplanation>Operational Quality Flag Explanation</OperationalQualityFlagExplanation>

        <ScienceQualityFlag>Passed</ScienceQualityFlag>

        <ScienceQualityFlagExplanation>Science Quality Flag Explanation</ScienceQualityFlagExplanation>

      </QAFlags>

    </MeasuredParameter>

  </MeasuredParameters>

ISO 19115-2 MENDS:

   <!-- This is the Measured Parameters section - it needs to be in its own contentInfo section - not within Additional Attributes, DayNightFlag, or CloudCover -->

   <gmd:contentInfo>

      <gmd:MD\_CoverageDescription>

         <gmd:attributeDescription>

            <gco:RecordType>MeasuredParameters</gco:RecordType>

         </gmd:attributeDescription>

         <gmd:contentType>

            <gmd:MD\_CoverageContentTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_CoverageContentTypeCode" codeListValue="physicalMeasurement">physicalMeasurement</gmd:MD\_CoverageContentTypeCode>

         </gmd:contentType>

         <gmd:dimension>

            <gmd:MD\_Band>

               <gmd:sequenceIdentifier>

                  <gco:MemberName>

                     <gco:aName>

                        <gco:CharacterString>ParameterName</gco:CharacterString>

                     </gco:aName>

                     <gco:attributeType>

                        <gco:TypeName>

                           <gco:aName>

                              <gco:CharacterString>MeasuredParameters</gco:CharacterString>

                           </gco:aName>

                        </gco:TypeName>

                     </gco:attributeType>

                  </gco:MemberName>

               </gmd:sequenceIdentifier>

               <gmd:otherProperty>

                  <gco:Record>

                     <eos:AdditionalAttributes>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation">qualityInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>QAPercentMissingData</gco:CharacterString>

                                 </eos:name>

                                 <eos:dataType>

                                    <eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="float">float</eos:EOS\_AdditionalAttributeDataTypeCode>

                                 </eos:dataType>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>10</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation">qualityInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>QAPercentOutOfBoundsData</gco:CharacterString>

                                 </eos:name>

                                 <eos:dataType>

                                    <eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="float">float</eos:EOS\_AdditionalAttributeDataTypeCode>

                                 </eos:dataType>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>20</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation">qualityInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>QAPercentInterpolatedData</gco:CharacterString>

                                 </eos:name>

                                 <eos:dataType>

                                    <eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="float">float</eos:EOS\_AdditionalAttributeDataTypeCode>

                                 </eos:dataType>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>30</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation">qualityInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>QAPercentCloudCover</gco:CharacterString>

                                 </eos:name>

                                 <eos:dataType>

                                    <eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="float">float</eos:EOS\_AdditionalAttributeDataTypeCode>

                                 </eos:dataType>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>40</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation">qualityInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>AutomaticQualityFlag</gco:CharacterString>

                                 </eos:name>

                                 <eos:description>

                                    <gco:CharacterString>Automatic Quality Flag Explanation</gco:CharacterString>

                                 </eos:description>

                                 <eos:dataType>

                                    <eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="string">string</eos:EOS\_AdditionalAttributeDataTypeCode>

                                 </eos:dataType>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>Passed</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation">qualityInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>OperationalQualityFlag</gco:CharacterString>

                                 </eos:name>

                                 <eos:description>

                                    <gco:CharacterString>Operational Quality Flag Explanation</gco:CharacterString>

                                 </eos:description>

                                 <eos:dataType>

                                    <eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="string">string</eos:EOS\_AdditionalAttributeDataTypeCode>

                                 </eos:dataType>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>Passed</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation">qualityInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>ScienceQualityFlag</gco:CharacterString>

                                 </eos:name>

                                 <eos:description>

                                    <gco:CharacterString>Science Quality Flag Explanation</gco:CharacterString>

                                 </eos:description>

                                 <eos:dataType>

                                    <eos:EOS\_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="string">string</eos:EOS\_AdditionalAttributeDataTypeCode>

                                 </eos:dataType>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>Passed</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                     </eos:AdditionalAttributes>

                  </gco:Record>

               </gmd:otherProperty>

            </gmd:MD\_Band>

         </gmd:dimension>

      </gmd:MD\_CoverageDescription>

   </gmd:contentInfo>

   <!-- This section describes the parameter names in the granule. The CMR will not read this section, just write it.-->

   <gmd:dataQualityInfo>

      <gmd:DQ\_DataQuality>

         <!-- this lists that the scope for the data quality section pertains to the data set - the granule. -->

         <gmd:scope>

            <gmd:DQ\_Scope>

               <gmd:level>

                  <gmd:MD\_ScopeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_ScopeCode" codeListValue="dataset">dataset</gmd:MD\_ScopeCode>

               </gmd:level>

               <gmd:levelDescription>

                  <gmd:MD\_ScopeDescription>

                     <gmd:attributes>

                        <gco:CharacterString>ParameterName</gco:CharacterString>

                     </gmd:attributes>

                  </gmd:MD\_ScopeDescription>

               </gmd:levelDescription>

            </gmd:DQ\_Scope>

         </gmd:scope>

         <gmd:report>

            <gmd:DQ\_QuantitativeAttributeAccuracy>

               <gmd:nameOfMeasure>

                  <gco:CharacterString>QAPercentMissingData</gco:CharacterString>

               </gmd:nameOfMeasure>

               <gmd:result>

                  <gmd:DQ\_QuantitativeResult>

                     <gmd:valueUnit gco:nilReason="missing"/>

                     <gmd:value>

                        <gco:Record xsi:type="gco:Real\_PropertyType">

                           <gco:Real>10</gco:Real>

                        </gco:Record>

                     </gmd:value>

                  </gmd:DQ\_QuantitativeResult>

               </gmd:result>

            </gmd:DQ\_QuantitativeAttributeAccuracy>

         </gmd:report>

         <gmd:report>

            <gmd:DQ\_QuantitativeAttributeAccuracy>

               <gmd:nameOfMeasure>

                  <gco:CharacterString>QAPercentOutOfBoundsData</gco:CharacterString>

               </gmd:nameOfMeasure>

               <gmd:result>

                  <gmd:DQ\_QuantitativeResult>

                     <gmd:valueUnit gco:nilReason="missing"/>

                     <gmd:value>

                        <gco:Record xsi:type="gco:Real\_PropertyType">

                           <gco:Real>20</gco:Real>

                        </gco:Record>

                     </gmd:value>

                  </gmd:DQ\_QuantitativeResult>

               </gmd:result>

            </gmd:DQ\_QuantitativeAttributeAccuracy>

         </gmd:report>

         <gmd:report>

            <gmd:DQ\_QuantitativeAttributeAccuracy>

               <gmd:nameOfMeasure>

                  <gco:CharacterString>QAPercentInterpolatedData</gco:CharacterString>

               </gmd:nameOfMeasure>

               <gmd:result>

                  <gmd:DQ\_QuantitativeResult>

                     <gmd:valueUnit gco:nilReason="missing"/>

                     <gmd:value>

                        <gco:Record xsi:type="gco:Real\_PropertyType">

                           <gco:Real>30</gco:Real>

                        </gco:Record>

                     </gmd:value>

                  </gmd:DQ\_QuantitativeResult>

               </gmd:result>

            </gmd:DQ\_QuantitativeAttributeAccuracy>

         </gmd:report>

         <gmd:report>

            <gmd:DQ\_QuantitativeAttributeAccuracy>

               <gmd:nameOfMeasure>

                  <gco:CharacterString>QAPercentCloudCover</gco:CharacterString>

               </gmd:nameOfMeasure>

               <gmd:result>

                  <gmd:DQ\_QuantitativeResult>

                     <gmd:valueUnit gco:nilReason="missing"/>

                     <gmd:value>

                        <gco:Record xsi:type="gco:Real\_PropertyType">

                           <gco:Real>40</gco:Real>

                        </gco:Record>

                     </gmd:value>

                  </gmd:DQ\_QuantitativeResult>

               </gmd:result>

            </gmd:DQ\_QuantitativeAttributeAccuracy>

         </gmd:report>

         <gmd:report>

            <gmd:DQ\_NonQuantitativeAttributeAccuracy>

               <gmd:nameOfMeasure>

                  <gco:CharacterString>AutomaticQualityFlag</gco:CharacterString>

               </gmd:nameOfMeasure>

               <gmd:measureDescription>

                  <gco:CharacterString>Automatic Quality Flag Explanation</gco:CharacterString>

               </gmd:measureDescription>

               <gmd:result>

                  <gmd:DQ\_QuantitativeResult>

                     <gmd:valueUnit gco:nilReason="missing"/>

                     <gmd:value>

                        <gco:Record xsi:type="gco:CharacterString\_PropertyType">

                           <gco:CharacterString>Passed</gco:CharacterString>

                        </gco:Record>

                     </gmd:value>

                  </gmd:DQ\_QuantitativeResult>

               </gmd:result>

            </gmd:DQ\_NonQuantitativeAttributeAccuracy>

         </gmd:report>

         <gmd:report>

            <gmd:DQ\_NonQuantitativeAttributeAccuracy>

               <gmd:nameOfMeasure>

                  <gco:CharacterString>OperationalQualityFlag</gco:CharacterString>

               </gmd:nameOfMeasure>

               <gmd:measureDescription>

                  <gco:CharacterString>Operational Quality Flag Explanation</gco:CharacterString>

               </gmd:measureDescription>

               <gmd:result>

                  <gmd:DQ\_QuantitativeResult>

                     <gmd:valueUnit gco:nilReason="missing"/>

                     <gmd:value>

                        <gco:Record xsi:type="gco:CharacterString\_PropertyType">

                           <gco:CharacterString>Passed</gco:CharacterString>

                        </gco:Record>

                     </gmd:value>

                  </gmd:DQ\_QuantitativeResult>

               </gmd:result>

            </gmd:DQ\_NonQuantitativeAttributeAccuracy>

         </gmd:report>

         <gmd:report>

            <gmd:DQ\_NonQuantitativeAttributeAccuracy>

               <gmd:nameOfMeasure>

                  <gco:CharacterString>ScienceQualityFlag</gco:CharacterString>

               </gmd:nameOfMeasure>

               <gmd:measureDescription>

                  <gco:CharacterString>Science Quality Flag Explanation</gco:CharacterString>

               </gmd:measureDescription>

               <gmd:result>

                  <gmd:DQ\_QuantitativeResult>

                     <gmd:valueUnit gco:nilReason="missing"/>

                     <gmd:value>

                        <gco:Record xsi:type="gco:CharacterString\_PropertyType">

                           <gco:CharacterString>Passed</gco:CharacterString>

                        </gco:Record>

                     </gmd:value>

                  </gmd:DQ\_QuantitativeResult>

               </gmd:result>

            </gmd:DQ\_NonQuantitativeAttributeAccuracy>

         </gmd:report>

      </gmd:DQ\_DataQuality>

   </gmd:dataQualityInfo>

## C.2.11 Platforms

**Element Specification**

Platforms/ShortName (1)
Platforms/Instruments (0..\*)

Platforms/Instruments/ShortName (1)

Platforms/Instruments/Characteristics (0..\*)

Platforms/Instruments/Characteristics/Name (1)

Platforms/Instruments/Characteristics/Value (1)

Platforms/Instruments/ComposedOf (0..\*) {these are embedded instruments}

Platforms/Instruments/OperationalModes (0..\*)

**Description**

A reference to a platform in the parent collection that is associated with the acquisition of the granule. The platform must exist in the parent collection. For example, platform types may include (but are not limited to): ADEOS-II, AEM-2, Terra, Aqua, Aura, BALLOONS, BUOYS, C-130, DEM, DMSP-F1,etc. Instruments are embedded into the platform definition. They also contain a reference to an instrument in the parent collection that is associated with the acquisition of the granule. Instruments also contain instrument characteristics that are defined in the parent collection where specific values can be given in the granule for a specific characteristic identified by its name. Instruments can be composedOf other instruments and this definition replaces the old sensor sub-elements. The specific operational modes that pertain to a granule can be described and must also exist in the parent collections instruments operational modes.

**Cardinality**

0..\*

**Tags**

*Recommended, Free Text Search, Search API, Controlled Vocabulary, Faceted, Validated*

**Sample Mappings**

ECHO 10 Granule:

Platforms/Platform Platforms/Platform/ShortName Platforms/Platform/Instruments/Instrument Platforms/Platform/Instruments/Instrument/ShortName Platforms/Platform/Instruments/Instrument/Characteristics/Characteristic Platforms/Platform/Instruments/Instrument/Characteristics/Characteristic/Name Platforms/Platform/Instruments/Instrument/Characteristics/Characteristic/Value Platforms/Platform/Instruments/Instrument/Sensors/Sensor Platforms/Platform/Instruments/Instrument/Sensors/Sensor/ShortName Platforms/Platform/Instruments/Instrument/Sensors/Sensor/Characteristics Platforms/Platform/Instruments/Instrument/Sensors/Sensor/Characteristics/Characteristic/Name Platforms/Platform/Instruments/Instrument/Sensors/Sensor/Characteristics/Characteristic/Value Platforms/Platform/Instruments/Instrument/OperationModes/OperationMode

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmi:acquisitionInformation/gmi:MI\_AcquisitionInformation/gmi:platform/eos:EOS\_Platform id="{unique ID within the record}" [=>

This id is unique only to a record, and it matches the id of mountedOn xlink= in the instrument section to connect an instrument to its platform. Hint: Use the platform short name - there should only be one. If there are two, then use either a unique id or use numbers after (e.g., Aqua2).

[=>/gmi:identifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString {the platform shortname}

[=>/gmi:identifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.platformshortname

[=>/gmi:identifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = PlatformShortName

[=>/gmi:description gco:nilReason="missing"

(CMR write only)

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gco:CharacterString {the platform short name}

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gmd:type/MD\_KeywordTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_KeywordTypeCode" codeListValue="platform" = platform

In the platform, if instrument is missing or the instrument short name = "Not provided", then use

[=>/gmi:instrument gco:nilReason="missing". Otherwise use the following mapping. There are two ways of writing an instrument in ISO. One is by embedding the instrument in the platform section. This is how the CMR will write the data into ISO. The second way is to define it separately in the instruments section, which is also shown.  All child instruments have to be defined in the separate instrument section.

CMR will use the following (first option) for instruments that are directly embedded in the platform:

[=>/gmi:instrument xlink:href="{unique instrument ID}"/eos:EOS\_Instrument id="{unique instrument ID}" ==>

Hint: Use the instrument short name - there should only be one. If there are two or more then use a unique ID or a number after the instrument (e.g., CERES 2). Not needed if the instrument is embedded in the platform

This is the second way instruments can be defined (independently from the platform)

/gmi:MI\_Metadata/gmi:acquisitionInformation/gmi:MI\_AcquisitionInformation/gmi:instrument/eos:EOS\_Instrument id="{unique instrument ID} [==>

This id is generated just for a specific record that maps the platform/instrument with the instrument. Notice that the ids are the same in the platform/instrument section for the xlink of instrument. Hint: Use the instrument short name as there should only be one. If there are 2 or more, then use a unique ID or a number after the instrument (CERES 2).

[==>/gmi:identifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString {the actual value}

[==>/gmi:identifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.instrumentshortname

[==>/gmi:type gco:nilReason="inapplicable"

(CMR write only) /gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gco:CharacterString {the instrument shortname}

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gmd:type/MD\_KeywordTypeCode codeList=""https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_KeywordTypeCode"" codeListValue="instrument" = instrument

This section is for the instrument's characteristics.

[==>/eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="instrumentInformation" = instrumentInformation

[==>/eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString {the characteristics name}

[==>/eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:value/gco:CharacterString {the characteristics value}

This mapping is for the instruments operational modes.

[==>/eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeDataTypeCode" codeListValue="instrumentInformation" = instrumentInformation

[==>/eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString="OperationalMode"

[==>/eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:value/gco:CharacterString {the operational mode}

This section is to link the child instrument or top level instrument with its parent.

[==>/gmi:mountedOn xlink:href="#{unique instrument ID}"

This ID matches the same id of either the platform in the EOS\_Platform element or the instrument in the EOS\_Instrument element. This id is unique only to a record.

**Examples**

UMM-G:

  "Platforms": [{

    "ShortName": "Aqua",

    "Instruments": [{

      "ShortName": "AMSR-E",

      "Characteristics": [{

        "Name": "InstrumentCaracteristicName1",

        "Value": "150"

      }, {

        "Name": "InstrumentCaracteristicName2",

        "Value": "22F"

      }],

      "ComposedOf": [{

        "ShortName": "AMSR-E\_ChildInstrument",

        "Characteristics": [{

          "Name": "ChildInstrumentCharacteristicName3",

          "Value": "250"

        }],

        "OperationalModes": ["Mode3"]

      }],

      "OperationalModes": ["Mode1", "Mode2"]

    }]

  }],

ECHO 10 Granule:

  <Platforms>

    <Platform>

      <ShortName>Aqua</ShortName>

      <Instruments>

        <Instrument>

          <ShortName>AMSR-E</ShortName>

          <Characteristics>

            <Characteristic>

              <Name>InstrumentCaracteristicName1</Name>

              <Value>150</Value>

            </Characteristic>

            <Characteristic>

              <Name>InstrumentCaracteristicName2</Name>

              <Value>22F</Value>

            </Characteristic>

          </Characteristics>

          <Sensors>

            <Sensor>

              <ShortName>AMSR-E\_ChildInstrument</ShortName>

              <Characteristics>

                <Characteristic>

                  <Name>ChildInstrumentCharacteristicName3</Name>

                  <Value>250</Value>

                </Characteristic>

              </Characteristics>

            </Sensor>

          </Sensors>

          <OperationModes>

            <OperationMode>Mode1</OperationMode>

            <OperationMode>Mode2</OperationMode>

          </OperationModes>

        </Instrument>

      </Instruments>

    </Platform>

  </Platforms>

ISO 19115-2 MENDS:

   <gmi:acquisitionInformation>

      <gmi:MI\_AcquisitionInformation>

         <!-- This section details an instrument that is not embedded as part of the platform - this is not as desired but put here for completeness. It is also commented out since the ID is already used in the embedded instrument section below.-->

<!--

         <gmi:instrument xlink:href="#AMSR-E">

            <eos:EOS\_Instrument id="AMSR-E">

               <gmi:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>AMSR-E</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.instrumentshortname</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>InstrumentShortName</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmi:identifier>

               <gmi:type gco:nilReason="inapplicable"/>

               <gmi:mountedOn xlink:href="#aqua"></gmi:mountedOn>

-->

               <!--Instrument Characteristics and operational modes-->

<!--

               <eos:otherProperty>

                  <gco:Record>

                     <eos:AdditionalAttributes>

-->

                        <!-- This next 2 sections are the instruments characteristics -->

<!--

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>InstrumentCaracteristicName1</gco:CharacterString>

                                 </eos:name>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>150</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>InstrumentCaracteristicName2</gco:CharacterString>

                                 </eos:name>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>22F</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

-->

                        <!-- These next two sections are the instruments operational modes-->

<!--

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

-->

                                 <!-- This is how to tell the difference between the Instruments additional attributes vs the operational modes - the name = OperationalMode -->

<!--

                                 <eos:name>

                                    <gco:CharacterString>OperationalMode</gco:CharacterString>

                                 </eos:name>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>Mode1</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>OperationalMode</gco:CharacterString>

                                 </eos:name>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>Mode2</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                     </eos:AdditionalAttributes>

                  </gco:Record>

               </eos:otherProperty>

            </eos:EOS\_Instrument>

         </gmi:instrument>

-->

         <!-- This section describes a child instrument also known as a sensor -->

         <gmi:instrument>

            <eos:EOS\_Instrument id="AMSR-E\_ChildInstrument">

               <gmi:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>AMSR-E\_ChildInstrument</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.instrumentshortname</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>InstrumentShortName</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmi:identifier>

               <gmi:type gco:nilReason="inapplicable"/>

               <!-- This next line links the child instrument to the parent instrument -->

               <gmi:mountedOn xlink:href="#AMSR-E"/>

               <!-- Child Instrument Characteristics and operational modes-->

               <eos:otherProperty>

                  <gco:Record>

                     <eos:AdditionalAttributes>

                        <!-- This describes the child instrument Characteristic-->

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>ChildInstrumentCharacteristicName3</gco:CharacterString>

                                 </eos:name>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>250</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <!-- This next section is the instrument's operational mode -->

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <!-- This is how to tell the difference between the Child Instruments additional attributes vs the operational modes - the name = OperationalMode-->

                                 <eos:name>

                                    <gco:CharacterString>OperationalMode</gco:CharacterString>

                                 </eos:name>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>Mode1</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                     </eos:AdditionalAttributes>

                  </gco:Record>

               </eos:otherProperty>

            </eos:EOS\_Instrument>

         </gmi:instrument>

...

         <gmi:platform>

            <eos:EOS\_Platform id="aqua">

               <gmi:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>Aqua</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.platformshortname</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>PlatformShortName</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmi:identifier>

               <gmi:description gco:nilReason="missing"/>

               <!-- the xlink:href= is not needed if the instrument in embedded with in the platform.  It is necessary if the instrument is not embedded -->

               <!-- In this example record we show both, but only one way is necessary. -->

               <gmi:instrument xlink:href="#AMSR-E">

                  <eos:EOS\_Instrument id="AMSR-E">

                     <gmi:identifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>AMSR-E</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.instrumentshortname</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>InstrumentShortName</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmi:identifier>

                     <gmi:type gco:nilReason="inapplicable"/>

                     <gmi:mountedOn xlink:href="#aqua"></gmi:mountedOn>

                     <!--Instrument Characteristics and operational modes-->

                     <eos:otherProperty>

                        <gco:Record>

                           <eos:AdditionalAttributes>

                              <!-- This next 2 sections are the instruments characteristics -->

                              <eos:AdditionalAttribute>

                                 <eos:reference>

                                    <eos:EOS\_AdditionalAttributeDescription>

                                       <eos:type>

                                          <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                       </eos:type>

                                       <eos:name>

                                          <gco:CharacterString>InstrumentCaracteristicName1</gco:CharacterString>

                                       </eos:name>

                                    </eos:EOS\_AdditionalAttributeDescription>

                                 </eos:reference>

                                 <eos:value>

                                    <gco:CharacterString>150</gco:CharacterString>

                                 </eos:value>

                              </eos:AdditionalAttribute>

                              <eos:AdditionalAttribute>

                                 <eos:reference>

                                    <eos:EOS\_AdditionalAttributeDescription>

                                       <eos:type>

                                          <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                       </eos:type>

                                       <eos:name>

                                          <gco:CharacterString>InstrumentCaracteristicName2</gco:CharacterString>

                                       </eos:name>

                                    </eos:EOS\_AdditionalAttributeDescription>

                                 </eos:reference>

                                 <eos:value>

                                    <gco:CharacterString>22F</gco:CharacterString>

                                 </eos:value>

                              </eos:AdditionalAttribute>

                              <!-- These next two sections are the instruments operational modes-->

                              <eos:AdditionalAttribute>

                                 <eos:reference>

                                    <eos:EOS\_AdditionalAttributeDescription>

                                       <eos:type>

                                          <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                       </eos:type>

                                       <!-- This is how to tell the difference between the Instruments additional attributes vs the operational modes - the name = OperationalMode -->

                                       <eos:name>

                                          <gco:CharacterString>OperationalMode</gco:CharacterString>

                                       </eos:name>

                                    </eos:EOS\_AdditionalAttributeDescription>

                                 </eos:reference>

                                 <eos:value>

                                    <gco:CharacterString>Mode1</gco:CharacterString>

                                 </eos:value>

                              </eos:AdditionalAttribute>

                              <eos:AdditionalAttribute>

                                 <eos:reference>

                                    <eos:EOS\_AdditionalAttributeDescription>

                                       <eos:type>

                                          <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="instrumentInformation">instrumentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                       </eos:type>

                                       <eos:name>

                                          <gco:CharacterString>OperationalMode</gco:CharacterString>

                                       </eos:name>

                                    </eos:EOS\_AdditionalAttributeDescription>

                                 </eos:reference>

                                 <eos:value>

                                    <gco:CharacterString>Mode2</gco:CharacterString>

                                 </eos:value>

                              </eos:AdditionalAttribute>

                           </eos:AdditionalAttributes>

                        </gco:Record>

                     </eos:otherProperty>

                  </eos:EOS\_Instrument>

               </gmi:instrument>

            </eos:EOS\_Platform>

         </gmi:platform>

      </gmi:MI\_AcquisitionInformation>

   </gmi:acquisitionInformation>

</gmi:MI\_Metadata>

## C.2.12 Projects

**Element Specification**

Projects/ShortName (1)

Projects/Campaigns (0..\*)

**Description**

A reference to a project in the parent collection that is associated with the acquisition of the granule. The project must exist in the parent collection. Campaigns are a part of a project and must also be defined in the parent collection.

**Cardinality**

0..\*

**Tags**

*Recommended, Free Text Search, Search API, Controlled Vocabulary, Faceted, Validated*

**Sample Mappings**

ECHO 10 Granule:

Campaigns/Campaign/ShortName

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmi:acquisitionInformation/gmi:MI\_AcquisitionInformation/gmi:operation/gmi:MI\_Operation/ [=>

[=>/gmi:identifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString {the project value}

[=>/gmi:identifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.projectshortname

[=>/gmi:identifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString => ProjectShortName

(CMR write only)

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gco:CharacterString {The project short name}

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gmd:type/MD\_KeywordTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_KeywordTypeCode" codeListValue="project"  = project

[=>/gmi:childOperation/gmi:MI\_Operation/gmi:identifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString {the actual campaign value}

[=>/gmi:childOperation/gmi:MI\_Operation/gmi:identifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.campaignshortname

[=>/gmi:childOperation/gmi:MI\_Operation/gmi:identifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = CampaignShortName

(CMR write only)

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gco:CharacterString {the campaign value}

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:descriptiveKeywords/gmd:MD\_Keywords/gmd:keyword/gmd:type/MD\_KeywordTypeCode codeList="" codeListValue="" = campaign

**Examples**

UMM-G:

  "Projects": [{

    "ShortName": "Project1",

    "Campaigns": ["Campaign1"]

  }, {

    "ShortName": "Project2",

    "Campaigns": ["Campaign2", "Campaign3"]

  }],

ECHO 10 Granule:

  <Campaigns>

    <Campaign>

      <ShortName>Campaign1</ShortName>

    </Campaign>

    <Campaign>

      <ShortName>Campaign2</ShortName>

    </Campaign>

    <Campaign>

      <ShortName>Campaign3</ShortName>

    </Campaign>

  </Campaigns>

ISO 19115-2 MENDS:

   <gmi:acquisitionInformation>

      <gmi:MI\_AcquisitionInformation>

...

         <!-- This section lists the projects and their dependent campaigns. -->

         <gmi:operation>

            <gmi:MI\_Operation>

               <gmi:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>Project1</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.projectshortname</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>ProjectShortName</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmi:identifier>

               <gmi:status/>

               <gmi:parentOperation gco:nilReason="inapplicable"/>

               <gmi:childOperation>

                  <gmi:MI\_Operation>

                     <gmi:identifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Campaign1</gco:CharacterString></gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.campaignshortname</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>CampaignShortName</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmi:identifier>

                     <gmi:status gco:nilReason="inapplicable"/>

                     <gmi:parentOperation gco:nilReason="inapplicable"/>

                  </gmi:MI\_Operation>

               </gmi:childOperation>

            </gmi:MI\_Operation>

         </gmi:operation>

         <!-- This section lists the projects and their dependent campaigns. -->

         <gmi:operation>

            <gmi:MI\_Operation>

               <gmi:identifier>

                  <gmd:MD\_Identifier>

                     <gmd:code>

                        <gco:CharacterString>Project2</gco:CharacterString>

                     </gmd:code>

                     <gmd:codeSpace>

                        <gco:CharacterString>gov.nasa.esdis.umm.projectshortname</gco:CharacterString>

                     </gmd:codeSpace>

                     <gmd:description>

                        <gco:CharacterString>ProjectShortName</gco:CharacterString>

                     </gmd:description>

                  </gmd:MD\_Identifier>

               </gmi:identifier>

               <gmi:status/>

               <gmi:parentOperation gco:nilReason="inapplicable"/>

               <!-- This section contains the project's campaigns -->

               <gmi:childOperation>

                  <gmi:MI\_Operation>

                     <gmi:identifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Campaign2</gco:CharacterString></gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.campaignshortname</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>CampaignShortName</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmi:identifier>

                     <gmi:status gco:nilReason="inapplicable"/>

                     <gmi:parentOperation gco:nilReason="inapplicable"/>

                  </gmi:MI\_Operation>

               </gmi:childOperation>

               <gmi:childOperation>

                  <gmi:MI\_Operation>

                     <gmi:identifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Campaign3</gco:CharacterString></gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.campaignshortname</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>CampaignShortName</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmi:identifier>

                     <gmi:status gco:nilReason="inapplicable"/>

                     <gmi:parentOperation gco:nilReason="inapplicable"/>

                  </gmi:MI\_Operation>

               </gmi:childOperation>

            </gmi:MI\_Operation>

         </gmi:operation>

...

## C.2.13 Additional Attributes

**Element Specification**

AdditionalAttributes/Name (1)

AdditionalAttributes/Values (1..\*)

**Description**

The additional attribute described here is a reference to an additional attribute in the parent collection. The attribute reference may contain a granule specific value that will override the value in the parent collection for this granule. An attribute with the same name must exist in the parent collection.

**Cardinality**

0..\*

**Tags**

*Recommended, Free Text Search, Search API, Validated*

**Sample Mappings**

ECHO 10 Granule:

AdditionalAttributes/AdditionalAttribute/Name

AdditionalAttributes/AdditionalAttribute/Values

ISO 19115-2 MENDS:

(CMR write: the following list of Additional Attribute Names goes to the first path and the rest goes to the second path: AquisitionQuality,

Band10\_Available, Band11\_Available, Band12\_Available, Band13\_Available, Band14\_Available, Band1\_Available, Band2\_Available,

Band3B\_Available, Band3N\_Available, Band4\_Available, Band5\_Available, Band6\_Available, Band6Missing, Band7\_Available,

Band8\_Available, Band9\_Available, ImageQualityVcid1, ImageQualityVcid2, NDAYS\_COMPOSITED, OrbitQuality,

PERCENTSUBSTITUTEBRDFS, QAFRACTIONGOODQUALITY, QAFRACTIONNOTPRODUCEDCLOUD,

QAFRACTIONNOTPRODUCEDOTHER, QAFRACTIONOTHERQUALITY, QualityBand1, QualityBand2, QualityBand3, QualityBand4,

QualityBand5, QualityBand6, QualityBand7, QualityBand8, SIPSMetGenVersion

First Path:

/gmi:MI\_Metadata/gmd:dataQualityInfo/gmd:DQ\_DataQuality/gmd:scope/gmd:DQ\_Scope/gmd:level/gmd:MD\_ScopeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_ScopeCode" codeListValue="dataset" = dataset

/gmi:MI\_Metadata/gmd:dataQualityInfo/gmd:DQ\_DataQuality/gmd:report [\\=>

[\\=>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:nameOfMeasure/gco:CharacterString = {the actual name value}

[\\=>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult/gmd:valueType/gco:RecordType = Additional Attributes

[\\=>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult/gmd:valueUnit gco:nilReason="missing"

[\\=>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult/gmd:value/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation" = qualityInformation

[\\=>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult/gmd:value/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString {the actual name value}

[\\=>/gmd:DQ\_QuantitativeAttributeAccuracy/gmd:result/gmd:DQ\_QuantitativeResult/gmd:value/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

Second Path:

(different contentInfo than MeasurementParameters, DayNightFlag, and CloudCover)

/gmi:MI\_Metadata/gmd:contentInfo/gmd:MD\_CoverageDescription [=>

[=>/gmd:attributeDescription/gco:RecordType = AdditionalAttributes

[=>/gmd:contentType/gmd:MD\_CoverageContentTypeCode  codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_CoverageContentTypeCode" codeListValue="physicalMeasurement" = physicalMeasurement

[=>/gmd:dimension/gmd:MD\_Band/gmd:otherProperty/gco:Record/eos:AdditionalAttributes [===>

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:type/eos:EOS\_AdditionalAttributeTypeCode codeList=""https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode"" codeListValue=""contentInformation"" = contentInformation

[===>/eos:AdditionalAttribute/eos:reference/eos:EOS\_AdditionalAttributeDescription/eos:name/gco:CharacterString {the actual name value}

[===>/eos:AdditionalAttribute/eos:reference/eos:value/gco:CharacterString {the actual value}

**Examples**

UMM-G:

  "AdditionalAttributes": [{

    "Name": "AdditionalAttribute1 Name1",

    "Values": ["AdditionalAttribute1 Value3", "AdditionalAttribute1 Value4"]

  }, {

    "Name": "EVI1KM16DAYQCLASSPERCENTAGE",

    "Values": ["EVI1KM16DAYQCLASSPERCENTAGE Value5", "EVI1KM16DAYQCLASSPERCENTAGE Value6"]

  }, {

    "Name": "QAFRACTIONGOODQUALITY",

    "Values": ["QAFRACTIONGOODQUALITY Value7", "QAFRACTIONGOODQUALITY Value8"]

  }, {

    "Name": "QAFRACTIONNOTPRODUCEDCLOUD",

    "Values": ["QAFRACTIONNOTPRODUCEDCLOUD Value9", "QAFRACTIONNOTPRODUCEDCLOUD Value10"]

  }],

ECHO 10 Granule:

  <AdditionalAttributes>

    <AdditionalAttribute>

      <Name>AdditionalAttribute1 Name1</Name>

      <Values>

        <Value>AdditionalAttribute1 Value3</Value>

        <Value>AdditionalAttribute1 Value4</Value>

      </Values>

    </AdditionalAttribute>

    <AdditionalAttribute>

      <Name>EVI1KM16DAYQCLASSPERCENTAGE</Name>

      <Values>

        <Value>EVI1KM16DAYQCLASSPERCENTAGE Value5</Value>

        <Value>EVI1KM16DAYQCLASSPERCENTAGE Value6</Value>

      </Values>

    </AdditionalAttribute>

    <AdditionalAttribute>

      <Name>QAFRACTIONGOODQUALITY</Name>

      <Values>

        <Value>QAFRACTIONGOODQUALITY Value7</Value>

        <Value>QAFRACTIONGOODQUALITY Value8</Value>

      </Values>

    </AdditionalAttribute>

    <AdditionalAttribute>

      <Name>QAFRACTIONNOTPRODUCEDCLOUD</Name>

      <Values>

        <Value>QAFRACTIONNOTPRODUCEDCLOUD Value9</Value>

        <Value>QAFRACTIONNOTPRODUCEDCLOUD Value10</Value>

      </Values>

    </AdditionalAttribute>

  </AdditionalAttributes>

ISO 19115-2 MENDS:

   <!-- This is the data quality section. It holds ReprocessingActual, ProductionDateTime, PGEVersionClass, Some AdditionalAttributes, and InputGranules.  The MeasuredParameters go into its own dataQualityInfo Section. -->

   <gmd:dataQualityInfo>

      <gmd:DQ\_DataQuality>

         <!-- this lists that the scope for the data quality section pertains to the data set - the granule. -->

         <gmd:scope>

            <gmd:DQ\_Scope>

               <gmd:level>

                  <gmd:MD\_ScopeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_ScopeCode" codeListValue="dataset">dataset</gmd:MD\_ScopeCode>

               </gmd:level>

            </gmd:DQ\_Scope>

         </gmd:scope>

         <!-- The QAFRACTIONGOODQUALITY Additional Attribute-->

         <gmd:report>

            <gmd:DQ\_QuantitativeAttributeAccuracy>

               <gmd:nameOfMeasure>

                  <gco:CharacterString>QAFRACTIONGOODQUALITY</gco:CharacterString>

               </gmd:nameOfMeasure>

               <gmd:result>

                  <gmd:DQ\_QuantitativeResult>

                     <gmd:valueType>

                        <gco:RecordType>Additional Attributes</gco:RecordType>

                     </gmd:valueType>

                     <gmd:valueUnit gco:nilReason="missing"/>

                     <gmd:value>

                        <gco:Record>

                           <eos:AdditionalAttributes>

                              <eos:AdditionalAttribute>

                                 <eos:reference>

                                    <eos:EOS\_AdditionalAttributeDescription>

                                       <eos:type>

                                          <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation">qualityInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                       </eos:type>

                                       <eos:name>

                                          <gco:CharacterString>QAFRACTIONGOODQUALITY</gco:CharacterString>

                                       </eos:name>

                                    </eos:EOS\_AdditionalAttributeDescription>

                                 </eos:reference>

                                 <eos:value>

                                    <gco:CharacterString>QAFRACTIONGOODQUALITY Value7</gco:CharacterString>

                                 </eos:value>

                                 <eos:value>

                                    <gco:CharacterString>QAFRACTIONGOODQUALITY Value8</gco:CharacterString>

                                 </eos:value>

                              </eos:AdditionalAttribute>

                           </eos:AdditionalAttributes>

                        </gco:Record>

                     </gmd:value>

                  </gmd:DQ\_QuantitativeResult>

               </gmd:result>

            </gmd:DQ\_QuantitativeAttributeAccuracy>

         </gmd:report>

         <!-- The QAFRACTIONNOTPRODUCEDCLOUD Additional Attribute-->

         <gmd:report>

            <gmd:DQ\_QuantitativeAttributeAccuracy>

               <gmd:nameOfMeasure>

                  <gco:CharacterString>QAFRACTIONNOTPRODUCEDCLOUD</gco:CharacterString>

               </gmd:nameOfMeasure>

               <gmd:result>

                  <gmd:DQ\_QuantitativeResult>

                     <gmd:valueType>

                        <gco:RecordType>Additional Attributes</gco:RecordType>

                     </gmd:valueType>

                     <gmd:valueUnit gco:nilReason="missing"/>

                     <gmd:value>

                        <gco:Record>

                           <eos:AdditionalAttributes>

                              <eos:AdditionalAttribute>

                                 <eos:reference>

                                    <eos:EOS\_AdditionalAttributeDescription>

                                       <eos:type>

                                          <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="qualityInformation">qualityInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                       </eos:type>

                                       <eos:name>

                                          <gco:CharacterString>QAFRACTIONNOTPRODUCEDCLOUD</gco:CharacterString>

                                       </eos:name>

                                    </eos:EOS\_AdditionalAttributeDescription>

                                 </eos:reference>

                                 <eos:value>

                                    <gco:CharacterString>QAFRACTIONNOTPRODUCEDCLOUD Value9</gco:CharacterString>

                                 </eos:value>

                                 <eos:value>

                                    <gco:CharacterString>QAFRACTIONNOTPRODUCEDCLOUD Value10</gco:CharacterString>

                                 </eos:value>

                              </eos:AdditionalAttribute>

                           </eos:AdditionalAttributes>

                        </gco:Record>

                     </gmd:value>

                  </gmd:DQ\_QuantitativeResult>

               </gmd:result>

            </gmd:DQ\_QuantitativeAttributeAccuracy>

         </gmd:report>

   <!-- This is the Additional Attributes section - it needs to be in its own contentInfo section - not within MeasuredParameters, DayNightFlag, or CloudCover -->

   <gmd:contentInfo>

      <gmd:MD\_CoverageDescription>

         <gmd:attributeDescription>

            <gco:RecordType>AdditionalAttributes</gco:RecordType>

         </gmd:attributeDescription>

         <gmd:contentType>

            <gmd:MD\_CoverageContentTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_CoverageContentTypeCode" codeListValue="physicalMeasurement">physicalMeasurement</gmd:MD\_CoverageContentTypeCode>

         </gmd:contentType>

         <gmd:dimension>

            <gmd:MD\_Band>

               <gmd:otherProperty>

                  <gco:Record>

                     <eos:AdditionalAttributes>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="contentInformation">contentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>AdditionalAttribute1 Name1</gco:CharacterString>

                                 </eos:name>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>AdditionalAttribute1 Value3</gco:CharacterString>

                           </eos:value>

                           <eos:value>

                              <gco:CharacterString>AdditionalAttribute1 Value4</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                        <eos:AdditionalAttribute>

                           <eos:reference>

                              <eos:EOS\_AdditionalAttributeDescription>

                                 <eos:type>

                                    <eos:EOS\_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/eosCodelists.xml#EOS\_AdditionalAttributeTypeCode" codeListValue="contentInformation">contentInformation</eos:EOS\_AdditionalAttributeTypeCode>

                                 </eos:type>

                                 <eos:name>

                                    <gco:CharacterString>EVI1KM16DAYQCLASSPERCENTAGE</gco:CharacterString>

                                 </eos:name>

                              </eos:EOS\_AdditionalAttributeDescription>

                           </eos:reference>

                           <eos:value>

                              <gco:CharacterString>EVI1KM16DAYQCLASSPERCENTAGE Value5</gco:CharacterString>

                           </eos:value>

                           <eos:value>

                              <gco:CharacterString>EVI1KM16DAYQCLASSPERCENTAGE Value6</gco:CharacterString>

                           </eos:value>

                        </eos:AdditionalAttribute>

                     </eos:AdditionalAttributes>

                  </gco:Record>

               </gmd:otherProperty>

            </gmd:MD\_Band>

         </gmd:dimension>

      </gmd:MD\_CoverageDescription>

   </gmd:contentInfo>

## C.2.14 Input Granules

**Element Specification**

InputGranules

**Description**

This element contains the identification of the input granule(s) for a specific granule.

**Cardinality**

0..\*

**Tags**

*Recommended*

**Sample Mappings**

ECHO 10 Granule:

InputGranules/InputGranule/

ISO 19115-2 MENDS:

/gmi:MI\_Metadata/gmd:dataQualityInfo/gmd:DQ\_DataQuality/gmd:lineage/gmd:LI\_Lineage/gmd:source [=>

[=>gmi:LE\_Source/gmd:description/gco:CharacterString = GranuleInput

[=>/gmi:LE\_Source/gmd:sourceCitation/gmd:CI\_Citation/gmd:title/gmx:FileName src="{the actual InputGranule Value}" = {the actual InputGranule Value}

[=>/gmi:LE\_Source/gmd:sourceCitation/gmd:CI\_Citation/gmd:date gco:nilReason="unknown"

**Examples**

UMM-G:

  "InputGranules": ["InputGranule1", "InputGranule2"],

ECHO 10 Granule:

  <InputGranules>

    <InputGranule>InputGranule1</InputGranule>

    <InputGranule>InputGranule2</InputGranule>

  </InputGranules>

ISO 19115-2 MENDS:

   <gmd:dataQualityInfo>

      <gmd:DQ\_DataQuality>

...

         <gmd:lineage>

            <gmd:LI\_Lineage>

...

               <!-- This section holds the GranuleInputs -->

               <gmd:source>

                  <gmi:LE\_Source>

                     <gmd:description>

                        <gco:CharacterString>GranuleInput</gco:CharacterString>

                     </gmd:description>

                     <gmd:sourceCitation>

                        <gmd:CI\_Citation>

                           <gmd:title>

                              <gmx:FileName src="InputGranule1">InputGranule1</gmx:FileName>

                           </gmd:title>

                           <gmd:date gco:nilReason="unknown"/>

                        </gmd:CI\_Citation>

                     </gmd:sourceCitation>

                  </gmi:LE\_Source>

               </gmd:source>

               <gmd:source>

                  <gmi:LE\_Source>

                     <gmd:description>

                        <gco:CharacterString>GranuleInput</gco:CharacterString>

                     </gmd:description>

                     <gmd:sourceCitation>

                        <gmd:CI\_Citation>

                           <gmd:title>

                              <gmx:FileName src="InputGranule2">InputGranule2</gmx:FileName>

                           </gmd:title>

                           <gmd:date gco:nilReason="unknown"/>

                        </gmd:CI\_Citation>

                     </gmd:sourceCitation>

                  </gmi:LE\_Source>

               </gmd:source>

...

## C.2.15 Tiling Identification System

**Element Specification**

TilingIdentificationSystem/TilingIdentificationSystemName (1) <CALIPSO, MISR, MODIS Tile EASE, MODIS Tile SIN, SMAP Tile EASE, WELD Alaska Tile, WELD CONUS Tile, WRS-1, WRS-2>

TilingIdentificationSystem/Coordinate1 (1)

TilingIdentificationSystem/Coordinate1/MinimumValue (1)

TilingIdentificationSystem/Coordinate1/MaximumValue (0..1)

TilingIdentificationSystem/Coordinate2 (1)

TilingIdentificationSystem/Coordinate2/MinimumValue (1)

TilingIdentificationSystem/Coordinate2/MaximumValue (0..1)

**Description**

This element stores the tiling identification system for the granule. The tiling identification system information is an alternative way to express granule's spatial coverage based on a certain two dimensional coordinate system defined by the providers. The name must match the name in the parent collection.

**Cardinality**

0..1

**Tags**

*Recommended, Controlled Vocabulary, Search API, Validated*

**Sample Mappings**

ECHO 10 Granule:

TwoDCoordinateSystem

TwoDCoordinateSystem/TwoDCoordinateSystemName

TwoDCoordinateSystem/StartCoordinate1

TwoDCoordinateSystem/EndCoordinate1

TwoDCoordinateSystem/StartCoordinate2

TwoDCoordinateSystem/EndCoordinate2

ISO 19115-2 MENDS:

(Make a separate extent object from UMM SpatialExtent) /gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:extent/gmd:EX\_Extent id="TilingIdentificationSystem" [=>

[=>/gmd:description/gco:CharacterString="Tiling Identification System" [=>/gmd:geographicElement/gmd:EX\_GeographicDescription [==>

[==>/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString {the TilingIdentificationSystemName}

[==>/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:code c1-min: c1-max: c2-min: c2-max:

[==>/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.tilingidentificationsystem

**Examples**

UMM-G:

   "TilingIdentificationSystem": {

    "TilingIdentificationSystemName": "MODIS Tile EASE",

    "Coordinate1": {

      "MinimumValue": -100,

      "MaximumValue": -50

    },

    "Coordinate2": {

      "MinimumValue": 50,

      "MaximumValue": 100

    }

  },

ECHO 10 Granule:

  <TwoDCoordinateSystem>

    <StartCoordinate1>-100</StartCoordinate1>

    <EndCoordinate1>-50</EndCoordinate1>

    <StartCoordinate2>50</StartCoordinate2>

    <EndCoordinate2>100</EndCoordinate2>

    <TwoDCoordinateSystemName>MODIS Tile EASE</TwoDCoordinateSystemName>

  </TwoDCoordinateSystem>

ISO 19115-2 MENDS:

         <!-- This section describes the Tiling Identification System - This is a separate extent from the spatial extent.-->

         <gmd:extent>

            <gmd:EX\_Extent id="TilingIdentificationSystem">

               <gmd:description>

                  <gco:CharacterString>Tiling Identification System</gco:CharacterString>

               </gmd:description>

               <gmd:geographicElement>

                  <gmd:EX\_GeographicDescription>

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>c1-min: -100 c1-max: -50 c2-min: 50 c2-max: 100</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.tilingidentificationsystem</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>MODIS Tile EASE</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

            </gmd:EX\_Extent>

         </gmd:extent>

## C.2.16 Cloud Cover

**Element Specification**

CloudCover

**Description**

This element is a percentage value indicating how much of the area of a granule has been obscured by clouds. It is worth noting that there are many different measures of cloud cover across data holdings and that the cloud cover parameter that is represented is specific to the entire granule.

**Cardinality**

0..1

**Tags**

*Recommended, Search API*

**Sample Mappings**

ECHO 10 Granule:

/Granule/CloudCover

ISO 19115-2 MENDS:

(different contentInfo than MeasurementParameters, DayNightFlag, and AdditionalAttributes)

/gmi:MI\_Metadata/gmd:contentInfo/gmd:MD\_ImageDescription/gmd:attributeDescription/gco:RecordType = CloudCover

/gmi:MI\_Metadata/gmd:contentInfo/gmd:MD\_ImageDescription/gmd:contentType/gmd:MD\_CoverageContentTypeCode  codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_CoverageContentTypeCode" codeListValue="physicalMeasurement" = physicalMeasurement

/gmi:MI\_Metadata/gmd:contentInfo/gmd:MD\_ImageDescription/gmd:cloudCoverPercentage/gco:Real = {the actual value}

**Examples**

UMM-G:

  "CloudCover": 60,

ECHO 10 Granule:

  <CloudCover>60</CloudCover>

ISO 19115-2 MENDS:

   <!-- This is the CloudCover section - it needs to be in its own contentInfo section - not within Additional Attributes, MeasuredParameters, or DayNightFlag -->

   <gmd:contentInfo>

      <gmd:MD\_ImageDescription>

         <gmd:attributeDescription>

            <gco:RecordType>CloudCover</gco:RecordType>

         </gmd:attributeDescription>

         <gmd:contentType>

            <gmd:MD\_CoverageContentTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#MD\_CoverageContentTypeCode" codeListValue="physicalMeasurement">physicalMeasurement</gmd:MD\_CoverageContentTypeCode>

         </gmd:contentType>

         <gmd:cloudCoverPercentage>

            <gco:Real>60</gco:Real>

         </gmd:cloudCoverPercentage>

      </gmd:MD\_ImageDescription>

   </gmd:contentInfo>

## C.2.17 Related Urls

**Element Specification**

RelatedUrls/URL (1)

RelatedUrls/Type (1) <see below>

RelatedUrls/Subtype (0..1) <see below>

RelatedUrls/Description (0..1)

RelatedUrls/Format (0..1) <see below>

RelatedUrls/MimeType (0..1) <see below>

RelatedUrls/Size (0..1)

RelatedUrls/SizeUnit (0..1, 1 if Size exists) <KB, MB, GB, TB, PB, NA>

Type enumerations:

DOWNLOAD SOFTWARE, EXTENDED METADATA, GET DATA, GET DATA VIA DIRECT ACCESS, GET RELATED VISUALIZATION, GOTO WEB TOOL, PROJECT HOME PAGE, USE SERVICE API, VIEW RELATED INFORMATION

Subtype enumerations:

MOBILE APP, APPEARS, DATA COLLECTION BUNDLE, DATA TREE, DATACAST URL, DIRECT DOWNLOAD, EOSDIS DATA POOL, Earthdata Search, GIOVANNI, LAADS, LANCE, MIRADOR, MODAPS, NOAA CLASS, NOMADS, PORTAL, USGS EARTH EXPLORER, VERTEX, VIRTUAL COLLECTION, MAP, WORLDVIEW, LIVE ACCESS SERVER (LAS), MAP VIEWER, SIMPLE SUBSET WIZARD (SSW), SUBSETTER, GRADS DATA SERVER (GDS), MAP SERVICE, OPENDAP DATA, OpenSearch, SERVICE CHAINING, TABULAR DATA STREAM (TDS), THREDDS DATA, WEB COVERAGE SERVICE (WCS), WEB FEATURE SERVICE (WFS), WEB MAP SERVICE (WMS), WEB MAP TILE SERVICE (WMTS), ALGORITHM DOCUMENTATION, ALGORITHM THEORETICAL BASIS DOCUMENT, ANOMALIES, CASE STUDY, DATA CITATION POLICY, DATA QUALITY, DATA RECIPE, DELIVERABLES CHECKLIST, GENERAL DOCUMENTATION, HOW-TO, IMPORTANT NOTICE, INSTRUMENT/SENSOR CALIBRATION DOCUMENTATION, MICRO ARTICLE, PI DOCUMENTATION,

PROCESSING HISTORY, PRODUCT HISTORY, PRODUCT QUALITY ASSESSMENT, PRODUCT USAGE, PRODUCTION HISTORY, PUBLICATIONS, READ-ME, REQUIREMENTS AND DESIGN, SCIENCE DATA PRODUCT SOFTWARE DOCUMENTATION, SCIENCE DATA PRODUCT VALIDATION, USER FEEDBACK, USER'S GUIDE, DMR++, DMR++ MISSING DATA

Format enumerations:

Defined at 'https://gcmd.earthdata.nasa.gov/kms/concepts/concept\_scheme/GranuleDataFormat?format=csv'

MimeType enumerations:

application/json, application/xml, application/x-netcdf, application/x-hdfeos, application/gml+xml, application/vnd.google-earth.kml+xml, image/gif, image/tiff, image/bmp, text/csv, text/xml, application/pdf, application/x-hdf, application/xhdf5, application/octet-stream, application/vnd.google-earth.kmz, image/jpeg, image/png, image/vnd.collada+xml, text/html, text/plain, application/zip, application/gzip, application/tar, application/tar+gzip, application/tar+zip, application/vnd.opendap.dap4.dmrpp+xml, Not provided

**Description**

This element describes any data/service related URLs that include project home pages, services, related data archives/servers, metadata extensions, direct links to online software packages, web mapping services, links to images, or other data.

**Cardinality**

0..\*

**Tags**

*Recommended, Controlled Vocabulary*

**Sample Mappings**

ECHO 10 Granule:

OnlineAccessURLs/OnlineAccessURL

OnlineAccessURLs/OnlineAccessURL/URL

OnlineAccessURLs/OnlineAccessURL/URLDescription

OnlineAccessURLs/OnlineAccessURL/MimeType

OnlineAccessURLs = "GET DATA"

OnlineResources/OnlineResource

OnlineResources/OnlineResource/URL

OnlineResources/OnlineResource/Description

OnlineResources/OnlineResource/Type

AssociatedBrowseImageUrls/ProviderBrowseUrl

AssociatedBrowseImageUrls/ProviderBrowseUrl/URL

AssociatedBrowseImageUrls/ProviderBrowseUrl/Description

AssociatedBrowseImageUrls/ProviderBrowseUrl/MimeType

AssociatedBrowseImage = "GET RELATED VISUALIZATION"

AssociatedBrowseImageUrls/ProviderBrowseUrl/FileSize

ISO 19115-2 MENDS:

(CMR write: UMM-G type contains GET SERVICE, GET DATA, OPENDAP DATA ACCESS;  CMR reading - use path to help determine type)

/gmi:MI\_Metadata/gmd:distributionInfo/gmd:MD\_Distribution/gmd:distributor/gmd:MD\_Distributor/gmd:distributorContact gco:nilReason="missing" /gmi:MI\_Metadata/gmd:distributionInfo/gmd:MD\_Distribution/gmd:distributor/gmd:MD\_Distributor/gmd:distributorTransferOptions/gmd:MD\_DigitalTransferOptions/gmd:onLine [=>

[=>/gmd:CI\_OnlineResource/gmd:linkage/gmd:URL

[=>/gmd:CI\_OnlineResource/gmd:function/gmd:CI\_OnLineFunctionCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#CI\_OnLineFunctionCode" codeListValue="download" = download

[=>/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString="Description: "

[=>/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString="MimeType: "

(CMR reading: if type doesn't exist use GET DATA)

type contains GET SERVICE, GET DATA, OPENDAP DATA ACCESS:

[=>/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString="Type: "

[=>/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString="Subtype: "

[=>/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString="Size: "

[=>/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString="SizeUnit: "

[=>/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString="Format: "

UMM-G type contains VIEW RELATED INFORMATION or VIEW PROJECT HOME PAGE: /gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:aggregationInfo [=>

[=>/gmd:MD\_AggregateInformation/gmd:aggregateDataSetName/gmd:CI\_Citation/gmd:citedResponsibleParty/gmd:CI\_ResponsibleParty/gmd:contactInfo/gmd:CI\_Contact/gmd:onlineResource/gmd:CI\_OnlineResource/gmd:linkage/gmd:URL

[=>/gmd:MD\_AggregateInformation/gmd:aggregateDataSetName/gmd:CI\_Citation/gmd:citedResponsibleParty/gmd:CI\_ResponsibleParty/gmd:contactInfo/gmd:CI\_Contact/gmd:onlineResource/gmd:CI\_OnlineResource/gmd:function/gmd:CI\_OnLineFunctionCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#CI\_OnLineFunctionCode" codeListValue="information" = information

[=>/gmd:MD\_AggregateInformation/gmd:aggregateDataSetName/gmd:CI\_Citation/gmd:citedResponsibleParty/gmd:CI\_ResponsibleParty/gmd:contactInfo/gmd:onlineResource/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString

="Description:"

[=>/gmd:MD\_AggregateInformation/gmd:aggregateDataSetName/gmd:CI\_Citation/gmd:citedResponsibleParty/gmd:CI\_ResponsibleParty/gmd:contactInfo/gmd:onlineResource/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString

="MimeType:"

 (CMR Reading default: if type does't exist use VIEW RELATED INFORMATION)

[=>/gmd:MD\_AggregateInformation/gmd:aggregateDataSetName/gmd:CI\_Citation/gmd:citedResponsibleParty/gmd:CI\_ResponsibleParty/gmd:contactInfo/gmd:onlineResource/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString ="Type:"

[=>/gmd:MD\_AggregateInformation/gmd:aggregateDataSetName/gmd:CI\_Citation/gmd:citedResponsibleParty/gmd:CI\_ResponsibleParty/gmd:contactInfo/gmd:onlineResource/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString

="Subtype:" (CMR read default: if not present then Subtype isn't used.)

[=>/gmd:MD\_AggregateInformation/gmd:aggregateDataSetName/gmd:CI\_Citation/gmd:citedResponsibleParty/gmd:CI\_ResponsibleParty/gmd:contactInfo/gmd:onlineResource/gmd:CI\_OnlineResource/gm

[=>/gmd:MD\_AggregateInformation/gmd:aggregateDataSetName/gmd:CI\_Citation/gmd:citedResponsibleParty/gmd:CI\_ResponsibleParty/gmd:contactInfo/gmd:onlineResource/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString ="SizeUnit::"

[=>/gmd:MD\_AggregateInformation/gmd:aggregateDataSetName/gmd:CI\_Citation/gmd:citedResponsibleParty/gmd:CI\_ResponsibleParty/gmd:contactInfo/gmd:onlineResource/gmd:CI\_OnlineResource/gmd:description/gco:CharacterString = "Format:"

UMM-G type contains "GET RELATED VISUALIZATION"

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:graphicOverview [=>

(CMR Reading - look at first path first, if it doesn't exist then look at second path and then third) (Writing - use first path only)

[=>/gmd:MD\_BrowseGraphic/gmd:fileName/gmx:Anchor xlink:href=  {also use xlink:href as element value} or

[=>/gmd:MD\_BrowseGraphic/gmd:fileName/gmx:FileName src=  {also use source as element value} or

[=>/gmd:MD\_BrowseGraphic/gmd:fileName/gco:CharacterString

[=>/gmd:MD\_BrowseGraphic/gmd:fileDescription/gco:CharacterString ="Description: "

[=>/gmd:MD\_BrowseGraphic/gmd:fileType/gco:CharacterString ="MimeType: " {the actual value}

(CMR reading: if tye doesn't exist use GET RELATED VISUALIZATION)

[=>/gmd:MD\_BrowseGraphic/gmd:fileDescription/gco:CharacterString ="Type: "

[=>/gmd:MD\_BrowseGraphic/gmd:fileDescription/gco:CharacterString ="Subtype: "

[=>/gmd:MD\_BrowseGraphic/gmd:fileDescription/gco:CharacterString ="Size: "

[=>/gmd:MD\_BrowseGraphic/gmd:fileDescription/gco:CharacterString ="SizeUnit: "

[=>/gmd:MD\_BrowseGraphic/gmd:fileType/gco:CharacterString ="Format: " {the actual value}

**Examples**

UMM-G:

  "RelatedUrls": [{

    "URL": "https://daac.ornl.gov/daacdata/islscp\_ii/vegetation/erbe\_albedo\_monthly\_xdeg/data/erbe\_albedo\_1deg\_1986.zip",

    "Type": "GET DATA",

    "Description": "This link provides direct download access to the granule.",

    "Format": "ZIP",

    "MimeType": "application/zip",

    "Size": 395.673,

    "SizeUnit": "KB"

  }, {

    "URL": "https://daac.ornl.gov/ISLSCP\_II/guides/erbe\_albedo\_monthly\_xdeg.html",

    "Type": "VIEW RELATED INFORMATION",

    "Subtype": "USER'S GUIDE",

    "Description": "ORNL DAAC Data Set Documentation",

    "Format": "HTML",

    "MimeType": "text/html"

  }, {

    "URL": "https://webmap.ornl.gov/sdat/pimg/957\_1.png",

    "Type": "GET RELATED VISUALIZATION",

    "Description": "ISLSCP II EARTH RADIATION BUDGET EXPERIMENT (ERBE) MONTHLY ALBEDO, 1986-1990",

    "Format": "PNG",

    "MimeType": "image/png",

    "Size": 10,

    "SizeUnit": "MB"

  }],

ECHO 10 Granule:

  <OnlineAccessURLs>

    <OnlineAccessURL>

      <URL>https://daac.ornl.gov/daacdata/islscp\_ii/vegetation/erbe\_albedo\_monthly\_xdeg/data/erbe\_albedo\_1deg\_1986.zip</URL>

      <URLDescription>This link provides direct download access to the granule.</URLDescription>

      <MimeType>application/zip</MimeType>

    </OnlineAccessURL>

  </OnlineAccessURLs>

  <OnlineResources>

    <OnlineResource>

      <URL>https://daac.ornl.gov/ISLSCP\_II/guides/erbe\_albedo\_monthly\_xdeg.html</URL>

      <Description>ORNL DAAC Data Set Documentation</Description>

      <Type>VIEW RELATED INFORMATION</Type>

      <MimeType>text/html</MimeType>

    </OnlineResource>

  </OnlineResources>

...

  <AssociatedBrowseImageUrls>

    <ProviderBrowseUrl>

      <URL>https://webmap.ornl.gov/sdat/pimg/957\_1.png</URL>

      <FileSize>10 MB</FileSize>

      <Description>ISLSCP II EARTH RADIATION BUDGET EXPERIMENT (ERBE) MONTHLY ALBEDO, 1986-1990</Description>

      <MimeType>image/png</MimeType>

    </ProviderBrowseUrl>

  </AssociatedBrowseImageUrls>

ISO 19115-2 MENDS:

...

         <!-- This section describes image URLs-->

         <gmd:graphicOverview>

            <gmd:MD\_BrowseGraphic>

               <gmd:fileName>

                  <gmx:Anchor xlink:href="https://webmap.ornl.gov/sdat/pimg/957\_1.png">https://webmap.ornl.gov/sdat/pimg/957\_1.png</gmx:Anchor>

               </gmd:fileName>

               <gmd:fileDescription>

                  <gco:CharacterString>Size: 10 SizeUnit: KB Description: ISLSCP II EARTH RADIATION BUDGET EXPERIMENT (ERBE) MONTHLY ALBEDO, 1986-1990</gco:CharacterString>

               </gmd:fileDescription>

               <gmd:fileType>

                  <gco:CharacterString>Format: PNG MimeType: image/png</gco:CharacterString>

               </gmd:fileType>

            </gmd:MD\_BrowseGraphic>

         </gmd:graphicOverview>

...

         <!-- This is where View Related Information or Project Home Page RelatedUrls go.-->

         <gmd:aggregationInfo>

            <gmd:MD\_AggregateInformation>

               <gmd:aggregateDataSetName>

                  <gmd:CI\_Citation>

                     <gmd:title></gmd:title>

                     <gmd:date></gmd:date>

                     <gmd:citedResponsibleParty>

                        <gmd:CI\_ResponsibleParty>

                           <gmd:contactInfo>

                              <gmd:CI\_Contact>

                                 <gmd:onlineResource>

                                    <gmd:CI\_OnlineResource>

                                       <gmd:linkage>

                                          <gmd:URL>https://daac.ornl.gov/ISLSCP\_II/guides/erbe\_albedo\_monthly\_xdeg.html</gmd:URL>

                                       </gmd:linkage>

                                       <gmd:description>

                                          <gco:CharacterString>Type: VIEW RELATED INFORMATION Subtype: USER'S GUIDE MimeType: text/html Description: ORNL DAAC Data Set Documentation</gco:CharacterString>

                                       </gmd:description>

                                       <gmd:function>

                                          <gmd:CI\_OnLineFunctionCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#CI\_OnLineFunctionCode" codeListValue="information">information</gmd:CI\_OnLineFunctionCode>

                                       </gmd:function>

                                    </gmd:CI\_OnlineResource>

                                 </gmd:onlineResource>

                              </gmd:CI\_Contact>

                           </gmd:contactInfo>

                           <gmd:role></gmd:role>

                        </gmd:CI\_ResponsibleParty>

                     </gmd:citedResponsibleParty>

                  </gmd:CI\_Citation>

               </gmd:aggregateDataSetName>

               <gmd:associationType></gmd:associationType>

            </gmd:MD\_AggregateInformation>

         </gmd:aggregationInfo>

...

   <!-- This section holds the Related URLs that pertain to distributions - where UMM-G RelatedUrl/Type = GET SERVICE, GET DATA, OPENDAP DATA ACCESS -->

   <gmd:distributionInfo>

      <gmd:MD\_Distribution>

         <gmd:distributor>

            <gmd:MD\_Distributor>

               <gmd:distributorContact gco:nilReason="missing"/>

               <gmd:distributorTransferOptions>

                  <gmd:MD\_DigitalTransferOptions>

                     <gmd:onLine>

                        <gmd:CI\_OnlineResource>

                           <gmd:linkage>

                              <gmd:URL>https://daac.ornl.gov/daacdata/islscp\_ii/vegetation/erbe\_albedo\_monthly\_xdeg/data/erbe\_albedo\_1deg\_1986.zip</gmd:URL>

                           </gmd:linkage>

                           <!-- The Type, Subtype, Format, MimeType, Size, SizeUnit, and Description go here.  Some of these can be placed in other places, but then all of the information is not contained in one area and then for each URL a different distributor section will be needed.

                                This also creates consistency with other areas that use OnlineResources, but that don't have the other distribution elements -->

                           <gmd:description>

                              <gco:CharacterString>Type: GET DATA Format: ZIP MimeType: application/zip Size: 395.673 SizeUnit: KB Description: This link provides direct download access to the granule.</gco:CharacterString>

                           </gmd:description>

                           <gmd:function>

                              <gmd:CI\_OnLineFunctionCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodelists.xml#CI\_OnLineFunctionCode" codeListValue="download">download</gmd:CI\_OnLineFunctionCode>

                           </gmd:function>

                        </gmd:CI\_OnlineResource>

                     </gmd:onLine>

                  </gmd:MD\_DigitalTransferOptions>

               </gmd:distributorTransferOptions>

            </gmd:MD\_Distributor>

         </gmd:distributor>

      </gmd:MD\_Distribution>

   </gmd:distributionInfo>

## C.2.18 Native Projection Names

**Element Specification**

NativeProjectionNames <Geographic, Mercator, Spherical Mercator, Space Oblique Mercator, Universal Transverse Mercator, Military Grid Reference, MODIS Sinusoidal System, Sinusoidal, Lambert Equal Area, NSIDC EASE Grid North and South (Lambert EA), NSIDC EASE Grid Global, EASE Grid 2.0 N. Polar, Plate Carree, Polar Stereographic, WELD Albers Equal Area, Canadian Albers Equal Area Conic, Lambert Conformal Conic, State Plane Coordinates, Albers Equal Area Conic, Transverse Mercator, Lambert Azimuthal Equal Area, UTM Northern Hemisphere, NAD83 / UTM zone 17N, UTM Southern Hemisphere, Cylindrical>

**Description**

This element represents the native projection of the granule if the granule has a native projection. The name must match a native projection name that is defined in the collection.

**Cardinality**

0..\*

**Tags**

*Recommended*

**Sample Mappings**

ISO 19115-2 MENDS:

(this element is included with the spatial extent block - a new geographicElement for each projection name)

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:extent/gmd:EX\_Extent id="boundingExtent" [=>

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription id="NativeProjectionName\*"/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString {native projection name}

where \* = 1, 2, etc. A unque number for each projection name.

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.nativeprojectionname

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = NativeProjectionName

**Examples**

UMM-G:

  "NativeProjectionNames": ["MODIS Sinusoidal System", "Sinusoidal"],

ISO 19115-2 MENDS:

               <!-- This section documents the NativeProjectionNames -->

               <gmd:geographicElement>

                  <!-- Must use NativeProjectionName\* where \* = 1, 2, 3, 4, etc. -->

                  <gmd:EX\_GeographicDescription id="NativeProjectionName1">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>MODIS Sinusoidal System</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.nativeprojectionname</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>NativeProjectionName</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

               <!-- This section documents the NativeProjectionNames -->

               <gmd:geographicElement>

                  <!-- Must use NativeProjectionName\* where \* = 1, 2, 3, 4, etc. -->

                  <gmd:EX\_GeographicDescription id="NativeProjectionName2">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Sinusoidal</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.nativeprojectionname</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>NativeProjectionName</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

## C.2.19 Grid Mapping Names

**Element Specification**

GridMappingNames

**Description**

This element represents the native grid mapping of the granule, if the granule is gridded. The grid name must match a grid that has been defined in the parent collection.

**Cardinality**

0..\*

**Tags**

*Recommended*

**Sample Mappings**

ISO 19115-2 MENDS:

(this element is included with the spatial extent block - a new geographicElement for each projection name)

/gmi:MI\_Metadata/gmd:identificationInfo/gmd:MD\_DataIdentification/gmd:extent/gmd:EX\_Extent id="boundingExtent" [=>

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription id="GridMappingName\*"/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:code/gco:CharacterString

where \* = 1, 2, etc. A unque number for each grid mapping name.

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.gridmappingname

[=>/gmd:geographicElement/gmd:EX\_GeographicDescription/gmd:geographicIdentifier/gmd:MD\_Identifier/gmd:description/gco:CharacterString = GridMappingName

**Examples**

UMM-G:

  "GridMappingNames": ["Sinusoidal", "Lambert Azimuthal Equal-Area"]

ISO 19115-2 MENDS:

               <!-- This section describes the GridMappingNames -->

               <gmd:geographicElement>

                  <!-- Must use GridMappingName\* where \* = 1, 2, 3, 4, etc. -->

                  <gmd:EX\_GeographicDescription id="GridMappingName1">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Sinusoidal</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.gridmappingname</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>GridMappingName</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

               <!-- This section describes the GridMappingNames -->

               <gmd:geographicElement>

                  <!-- Must use GridMappingName\* where \* = 1, 2, 3, 4, etc. -->

                  <gmd:EX\_GeographicDescription id="GridMappingName2">

                     <gmd:geographicIdentifier>

                        <gmd:MD\_Identifier>

                           <gmd:code>

                              <gco:CharacterString>Lambert Azimuthal Equal-Area</gco:CharacterString>

                           </gmd:code>

                           <gmd:codeSpace>

                              <gco:CharacterString>gov.nasa.esdis.umm.gridmappingname</gco:CharacterString>

                           </gmd:codeSpace>

                           <gmd:description>

                              <gco:CharacterString>GridMappingName</gco:CharacterString>

                           </gmd:description>

                        </gmd:MD\_Identifier>

                     </gmd:geographicIdentifier>

                  </gmd:EX\_GeographicDescription>

               </gmd:geographicElement>

## C.2.20 Metadata Specification [R]

**Element Specification**

MetadataSpecification/URL (1) <https://cdn.earthdata.nasa.gov/umm/granule/v1.6.4>

MetadataSpecification/Name (1) <UMM-G>

MetadataSpecification/Version (1) <1.6.4>

**Description**

This element represents the UMM-G schema used to create the record. It records the schema name, version, and the location of where it lives on the web.

**Cardinality**

1

**Tags**

*Required*

**Sample Mappings**

This element does not map to any other specification.

**Examples**

UMM-G:

"MetadataSpecification": {

    "URL": "https://cdn.earthdata.nasa.gov/umm/granule/v1.6.4",

    "Name": "UMM-G",

    "Version": "1.6.4"

  }

 Appendix A Tags Glossary

The following table lists all tags used in this model and provides a description of the tags' usage.

|  |  |
| --- | --- |
| **Tag Name** | **Description** |
| Required | This element is required. |
| Free Text Search | This element will be indexed by the CMR as part of the Free Text Search. |
| Search API | This element will be indexed by the CMR and will be exposed via the CMR. For example, the CMR will expose a "platform" search option, so the "Platform" element will have this tag. |
| Controlled Vocabulary | This element will have a vocabulary that will be used to validate the value. This will most likely be done via a vocabulary management service. |
| Faceted | This element should be exposed by the CMR catalog via a faceted search response. |
| Recommended | This element is recommended. |
| Validated | Any associated granules use this element for validation against the collection, or associated collections are checked for validity. |

#

 Appendix B Abbreviations and Acronyms

|  |  |
| --- | --- |
| API | Application Programming Interface |
| CCB | Configuration Control Board |
| CCR | Configuration Change Request |
| CMO | Configuration Management Office |
| CMR | Common Metadata Repository |
| DAAC | Distributed Active Archive Center |
| ECHO | Earth Observing System (EOS) Clearing House |
| EOS | Earth Observing System |
| EOSDIS | Earth Observing System Data and Information System |
| ESDIS | Earth Science Data and Information System |
| GSFC | Goddard Space flight Center |
| ID | Identifier |
| ISO | International Organization for Standardization |
| MAS | Metadata Architecture Studies |
| MENDS | Metadata Evolution for NASA Data Systems |
| NASA | National Aeronautics and Space Administration |
| PGE | Product Generation Executive |
| SMAP | Soil Moisture Active Passive |
| UMM | Unified Metadata Model |
| UMM-C | Unified Metadata Model - Collections |
| UMM-Common | Unified Metadata Model - Common Elements |
| UMM-G | Unified Metadata Model - Granules |
| UR | Universal Reference |
| URL | Uniform Resource Locator |
| XLink | XML Markup Language |
| XML | Extensible Markup Language |
| XPath | XML Path Language |
| XSLT | Extensible Stylesheet Language Transformations |