Processing Level

- Element Description
- Best Practices
- Element Specification
- Metadata Validation and QA/QC
- Dialect Mappings
  - DIF 10
  - ECHO 10
  - ISO 19115-2 MENDS
  - ISO 19115-2 SMAP
- UMM Migration
- History
  - UMM Versioning
  - DIF Versioning
  - ARC Documentation

Element Description

An identifier indicating the level at which the data in the collection are processed, ranging from level 0 (raw instrument data at full resolution) to level 4 (model output or analysis results).

Best Practices

It is recommended that the processing level align with the EOSDIS data processing levels if at all possible. The EOSDIS data processing levels are: 0, 1A, 1B, 1C, 2, 2A, 2B, 3, 3A, 4. Please see the EOSDIS Data Processing Levels policy page for a more detailed description of each of the processing levels. It is recommended that processing levels be assigned in a consistent manner for all datasets from a data provider. A processing level Id is required.

The processing level description is an optional field used to provide details on the processing level. Ideally the description should be a brief summary which aids the user in understanding the degree to which the source data has been processed. The level of detail provided in the description may vary. The description may range from very generic (e.g. "Model derived") to more specific (e.g. "Radiometrically calibrated and orthorectified using ground control points and SRTM digital elevation model (DEM) data to correct for relief displacement. Data is provided in digital numbers.")

Examples:

Id: "4"

Description: "This data product is model derived."

Id: "1B"

Description: "Radiometrically calibrated and orthorectified using ground control points and SRTM digital elevation model (DEM) data to correct for relief displacement. Data has been converted from digital numbers to top of atmosphere (TOA) reflectance."

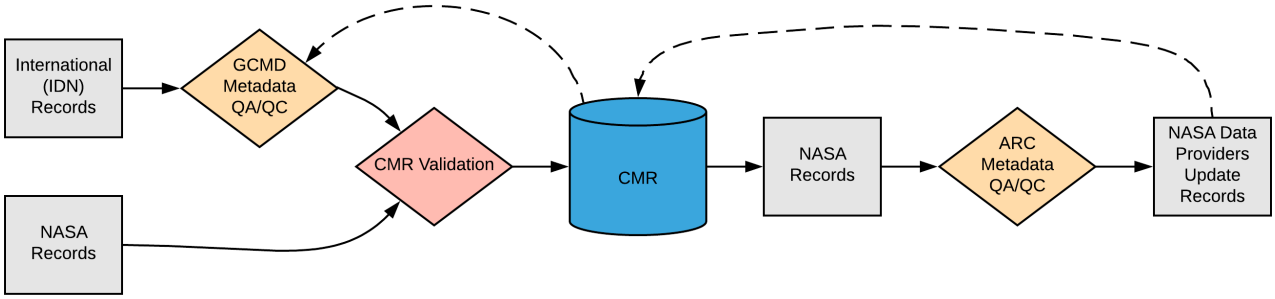
Element Specification

Model	Element	Type	Constraints	Required?	Cardinality
UMM-C	ProcessingLevel/Id	String	1 - 80 characters	Yes	1
UMM-C	ProcessingLevel/Description	String	1 - 2048 characters	No	0..1

Any values needed for translations?

Metadata Validation and QA/QC

All metadata entering the CMR goes through the below process to ensure metadata quality requirements are met. All records undergo CMR validation before entering the system. The process of QA/QC is slightly different for NASA and non-NASA data providers. Non-NASA providers include interagency and international data providers and are referred to as the International Directory Network (IDN).



Please see the expandable sections below for flowchart details.

- Manual Review
  - Identify errors, discrepancies or omissions.
- Automated Review
  - Check that the field has been populated.
  - Check that the field is populated with a valid value.
  - Check that the field length for 'ProcessingLevel/Id' is not greater than 80 characters.

<insert here>
ARC Priority Matrix

Priority Categorization	Justification
Red = High Priority Finding	This element is categorized as highest priority when: • The Processing Level Id is not provided. • The Processing Level provided is incorrect for the dataset. • The Processing Level Description contains a spelling or major grammatical error. • The Processing Level Description incorrectly describes the processing level provided.
Yellow = Medium Priority Finding	This element is categorized as medium priority when: • The Processing Level for an EOSDIS dataset does not match an EOSDIS processing level. ○ Note: if a justification is provided for why the EOSDIS dataset cannot be assigned an EOSDIS processing level, the recommendation will be changed to blue upon the second iteration of review. • A non-EOSDIS dataset, being re-distributed via EOSDIS, does not match an EOSDIS processing level. • A recommendation is made to improve the syntax of the Processing Level Description.
Blue = Low Priority Finding	This element is categorized as low priority when: • A recommendation is made to update the Processing Level Description to match a recommended Processing Level Id change. • The Processing Level Description provided is vague to the point where it does not help discern between the assigned processing level and another processing level. • The first letter of the Processing Level Description is not capitalized. • A recommendation is made to update a link in the Processing Level Description from "http" to "https". • A miscellaneous inconsistency is noted in the Processing Level Description. • No Processing Level Description is provided.
Green = No Findings/Issues	The element is provided and follows all applicable criteria specified in the best practices section above.

ARC Automated Checks

ARC uses the pyQuARC library for automated metadata checks. Please see the pyQuARC GitHub for more information.

Dialect Mappings

DIF 9 **(Note: DIF-9 is being phased out and will no longer be supported after 2018)**

DIF 10

UMM-C Element	DIF 10 Path	Type	Usable Valid Values	Constraints	Required in DIF 10?	Cardinality	Notes
ProcessingLevel/Id	Processing_Level_Id	Enumeration	Not provided 0 1 1A 1B 1T 2 2G 2P 3 4 NA	n/a	Yes	1	The DIF 10 enumeration includes values that fall outside of the EOSDIS processing level scheme. While these options are available, adherence to the EOSDIS processing levels is still strongly recommended.

Enumeration Mapping

N/A

Example Mapping

DIF 10

```
<Processing_Level_Id>3</Processing_Level_Id>
```

UMM

```
ProcessingLevel: {
  Id: "3"
},
```

ECHO 10

UMM-C Element	ECHO 10 Path	Type	Constraints	Required in ECHO10?	Cardinality	Notes
ProcessingLevel/Id	/Collection/ProcessingLevelId	String	n/a	No	0..1	Processing Level Id is not controlled in ECHO10. Therefore it is strongly encouraged that one of the EOSDIS processing levels be provided: 0, 1A, 1B, 1C, 2, 2A, 2B, 3, 3A, 4
ProcessingLevel/Description	/Collection/ProcessingLevelDescription	String	n/a	No	0..1	

Enumeration Mapping

N/A

Example Mapping

ECHO 10

```
<ProcessingLevelId>3</ProcessingLevelId>
<ProcessingLevelDescription>Variables mapped on
uniform space-time grid scales, usually with some
completeness and consistency.<
/ProcessingLevelDescription>
```

UMM

```
ProcessingLevel: {
  Id: "3",
  Description: "Variables mapped on uniform space-
time grid scales, usually with some completeness and
consistency."
},
```

ISO 19115-2 MENDS

UMM-C Element	ISO 19115-2 MENDS Path	Type	Notes
Processing Level/Id	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:processingLevel/gmd:MD_Identifier/gmd:code/gco:CharacterString and /gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:processingLevel/gmd:MD_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.processinglevelid	String	The first path to the left is where the processing level Id should be provided. It is recommended that an EOSDIS processing level be assigned if possible. The value of "gov.nasa.esdis.umm.processinglevelid" should be provided in the gmd:codeSpace field so that CMR can properly parse out the processing level Id.
Processing Level /Description	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:processingLevel/gmd:MD_Identifier/gmd:description/gco:CharacterString and /gmi:MI_Metadata/gmd:contentInfo/gmd:MD_ImageDescription/gmd:processingLevelCode/gmd:MD_Identifier/gmd:description/gco:CharacterString	String	Corresponds to the UMM field ProcessingLevel/Description.

Enumeration/Code List Mapping

N/A

Example Mapping

ISO 19115-2 MENDS

```
<gmi:MI_Metadata>
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:processingLevel>
        <gmd:MD_Identifier>
          <gmd:code>
                <gco:CharacterString>3</gco:
CharacterString>
          </gmd:code>
          <gmd:codeSpace>
            <gco:CharacterString>gov.nasa.esdis.umm.
processinglevelid</gco:CharacterString>
          </gmd:codeSpace>
          <gmd:description>
            <gco:CharacterString>Variables mapped on
uniform space-time grid scales, usually with some
completeness and consistency.</gco:CharacterString>
          </gmd:description>
        </gmd:MD_Identifier>
      </gmd:processingLevel>
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
</gmi:MI_Metadata>
```

UMM

```
ProcessingLevel: {
  Id: "3",
  Description: "Variables mapped on uniform space-
time grid scales, usually with some completeness and
consistency."
},
```

ISO 19115-2 SMAP

UMM-C Element	ISO 19115-2 SMAP Path	Type	Notes
Processing Level/Id	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:processingLevel/gmd:MD_Identifier/gmd:code/gco:CharacterString and /gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:processingLevel/gmd:MD_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.processinglevelid	String	The first path to the left is where the processing level Id should be provided. It is recommended that an EOSDIS processing level be assigned if possible. The value of "gov.nasa.esdis.umm.processinglevelid" should be provided in the gmd:codeSpace field so that CMR can properly parse out the processing level Id.
Processing Level /Description	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:processingLevel/gmd:MD_Identifier/gmd:description/gco:CharacterString and /gmi:MI_Metadata/gmd:contentInfo/gmd:MD_ImageDescription/gmd:processingLevelCode/gmd:MD_Identifier/gmd:description/gco:CharacterString	String	Corresponds to the UMM field ProcessingLevel /Description.

Enumeration/Code List Mapping

N/A

Example Mapping

ISO 19115-2 SMAP

```
<gmd:DS_Series>
  <gmd:seriesMetadata>
    <gmi:MI_Metadata>
      <gmd:identificationInfo>
        <gmd:MD_DataIdentification>
          <gmd:processingLevel>
            <gmd:MD_Identifier>
              <gmd:code>
                    <gco:CharacterString>3</gco:
CharacterString>
              </gmd:code>
              <gmd:codeSpace>
                <gco:CharacterString>gov.nasa.esdis.
umm.processinglevelid</gco:CharacterString>
              </gmd:codeSpace>
              <gmd:description>
                <gco:CharacterString>Variables
mapped on uniform space-time grid scales, usually
with some completeness and consistency.</gco:
CharacterString>
              </gmd:description>
            </gmd:MD_Identifier>
          </gmd:processingLevel>
        </gmd:MD_DataIdentification>
      </gmd:identificationInfo>
    </gmi:MI_Metadata>
  </gmd:seriesMetadata>
</gmd:DS_Series>
```

UMM

```
ProcessingLevel: {
  Id: "3",
  Description: "Variables mapped on uniform space-
time grid scales, usually with some completeness and
consistency."
},
```

UMM Migration

N/A

History

UMM Versioning

Version	Date	What Changed
1.15.5	12/3/2020	No changes were made for Processing Level during the transition from version 1.15.4 to 1.15.5
1.15.4	9/18/2020	No changes were made for Processing Level during the transition from version 1.15.3 to 1.15.4
1.15.3	7/1/2020	No changes were made for Processing Level during the transition from version 1.15.2 to 1.15.3
1.15.2	5/20/2020	No changes were made for Processing Level during the transition from version 1.15.1 to 1.15.2
1.15.1	3/25/2020	No changes were made for Processing Level during the transition from version 1.15.0 to 1.15.1
1.15.0	2/26/2020	No changes were made for Processing Level during the transition from version 1.14.0 to 1.15.0
1.14.0	10/21/2019	No changes were made for Processing Level during the transition from version 1.13.0 to 1.14.0
1.13.0	04/11/2019	No changes were made for Processing Level during the transition from version 1.12.0 to 1.13.0

1.12.0	01/22/2019	No changes were made for Processing Level during the transition from version 1.11.0 to 1.12.0.
1.11.0	11/28/2018	No changes were made for Processing Level during the transition from version 1.10.0 to 1.11.0.
1.10.0	05/02/2018	No changes were made for Processing Level during the transition from version 1.9.0 to 1.10.0.
1.9.0		

DIF Versioning

Version	Date	What Changed
10.3	May 2018	Changed field from optional to required for UMM-C compliance

ARC Documentation

Version	Date	What Changed	Author
2.0	6/18/2021	Moved "The Processing Level for an EOSDIS dataset does not match an EOSDIS processing level" from the red to yellow prioritization category. Removed "No Processing Level Description is provided" from the ARC Priority Matrix (this was listed under the blue prioritization category).	Jeanne' le Roux
1.0	05/22/2018	Recommendations/priority matrix transferred from internal ARC documentation to wiki space	Jeanne' le Roux