

Temporal Extents

- [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](#)
 - [ARC Documentation](#)

Element Description

The Temporal Extents element describes when data were acquired or collected.

Best Practices

Dates provided in CMR metadata should comply with the [ISO 8601 Standard](#), which is an International Standard for the representation of dates and times.

The [Data Product Development Guide for Data Producers](#) offers the following guidance about time:

"The CF Conventions represent time as an integer or float, with the units attribute set to the time unit since an epochal time, represented as YYYY-MM-DDThh:mm:ss (e.g., "seconds since 1993-01-01T00:00:00Z"). Unless there is a strongly justifiable reason not to do so, use the UTC Time Zone instead of alternative time zones.

The date-time information in the file should adhere to the following guidelines (detailed in [26], Rec. 3.11):

- *Adopt the ISO 8601 standard [51] [52] for date-time information representation.*
- *If describing time intervals, the start time should appear before the end time.*
- *Date-time fields representing the temporal extent of a file's data should appear before any other date-time field in the file name.*
- *All date-time fields should have the same format."*

There are three options in the [UMM](#) for describing the temporal extent of data: Single Date Time, Range Date Time and Periodic Date Time.

Using different temporal extent representations between collection and granule level metadata are allowed, as long as it makes logical sense. For example, Single Date Time could be used to describe temporal coverage at the granule level, whereas a Range Date Time may be used to describe temporal coverage at the collection level. It is important that the temporal extent at the collection level be in sync with the temporal extent provided in associated granule level metadata files.

Single Date Time

The Single Date Time element should be used if data were captured instantaneously (i.e. a single time stamp sufficiently describes the temporal extent of the data). For example, if a data file contains an image that was taken by a camera, the time stamp associated with the time the image was taken would be listed as the Single Date Time in the granule level metadata. Single Date Time may also be used in the collection level metadata if appropriate. If the exact time of data capture is known, it is strongly recommended that the time be included in the Single Date Time. If the exact time of data collection is unknown, it is okay to just provide a date. Multiple Single Date Times may be provided if necessary (cardinality 0..*).

Examples:

SingleDateTime: 2018-11-11T14:53:32Z

SingleDateTime: 2017-04-14T05:26:22Z

Range Date Time

The Range Date Time element should be used when a continuous time range is appropriate to describe the temporal extent of data. Range Date Time is composed of two sub-elements: **Beginning Date Time** and **Ending Date Time**, which describe the start and end time of a data file or a collection.

For completed datasets:

- It is *required* that an Ending Date Time be provided. The 'EndingDateTime' element should specify the ending date and time of the last available granule in the collection. In addition:
 - The 'Ends at Present Flag' element should be set to "false." Setting the 'Ends at Present Flag' element to "false" tells the CMR that the ending time for the collection is in the past. Note: Ends at Present Flag is an optional element.
 - The [Collection Progress](#) element should be set to "COMPLETE"

If data collection is ongoing,

- An Ending Date Time *does not* need to be provided. Even if the future end date of the collection is known, this future date should *not* be provided in the metadata as the Ending Date Time, since data for these future dates do not yet exist. In addition:
 - The 'Ends at Present Flag' element should be set to "true." Setting the 'Ends at Present Flag' element to "true" tells the CMR that the ending time for the collection is present day, and thus eliminates the need to specify the Ending Date Time of the collection. This also eliminates the need to update the Ending Date Time in the metadata each time new data gets added to the collection.
 - The [Collection Progress](#) element should be set to "ACTIVE"

Multiple RangeDateTimes may be provided if necessary (cardinality 0..*). It is recommended that multiple RangeDateTimes be used if there is a significant temporal gap present in the data. Generally, the Ending Date Time provided should not be in the future, with the exception of data that has an actual future time stamp (e.g. modeled/ forecasted data that includes future projections).

Examples:

A satellite collected data from May 1, 2004 to February 10, 2008. A data product derived from this satellite provides monthly global averages of surface temperature. A monthly global average for February 2008 was not included in the dataset since only 10 days of data were available in February.

RangeDateTime for the collection:	RangeDateTime for the first granule in the collection:
BeginningDateTime: 2004-05-01T00:00:00Z	BeginningDateTime: 2004-05-01T00:00:00Z
EndingDateTime: 2008-01-31T23:59:59Z	EndingDateTime: 2004-05-31T23:59:59Z

Radar measurements were taken from a plane. One flight occurred each day from August 20, 2018 to August 31, 2018.

RangeDateTime for the collection:	RangeDateTime for the first granule in the collection:	RangeDateTime for the last granule in the collection:
BeginningDateTime: 2018-08-20T12:34:00Z	BeginningDateTime: 2018-08-20T12:34:00Z	BeginningDateTime: 2018-08-31T06:18:21Z
EndingDateTime: 2018-08-31T10:01:02Z	EndingDateTime: 2018-08-20T16:50:52Z	EndingDateTime: 2018-08-31T10:01:02Z

Periodic Date Time

For data that is collected in regular reoccurring intervals, the temporal extent can be described as a Periodic Date Time. Periodic Date Time is described via the below sub-elements. If Periodic Date Time is provided, *all sub-elements are required*:

Name: The name given to the recurring time period.

StartDate: The date (day and time) of the first occurrence of this regularly occurring period. This is when data collections begins for the entire collection. This also identifies the day of the month and time of the day when data collection starts for each reoccurring cycle.

EndDate: The date (day and time) of the last occurrence of this regularly occurring period. This is when data collection ends for the entire collection.

DurationUnit: The unit for the regularly reoccurring data collection period. In combination with DurationValue, this describes the length of time that data gets collected. This value must be selected from a controlled vocabulary list maintained in the UMM-Common schema. Options include: DAY, MONTH, YEAR

DurationValue: The number of DurationUnits comprising the regularly reoccurring data collection period. Together, DurationValue and DurationUnit describe the length of time that data gets collected.

PeriodCycleDurationUnit: The duration unit of one full cycle. The full cycle includes both the active data collection period as well as an inactive period. This value must be selected from a controlled vocabulary list maintained in the UMM-Common schema. Options include: DAY, MONTH, YEAR.

PeriodCycleDurationValue: The number of CycleDurationUnits comprising one full cycle. Together, CycleDurationValue and CycleDurationUnit describe the length of a full cycle which includes both the active data collection period as well as an inactive period.

Examples:

Data for a field campaign are collected in December, January and February of each year. Data collection started in December 2013 and ended in February 2017.

Name: Winter_FieldCampaign
 StartDate: 2013-12-01T00:00:00Z
 EndDate: 2017-02-28T23:59:59Z

DurationUnit: MONTH

DurationValue: 3

PeriodCycleDurationUnit: YEAR

PeriodCycleDurationValue: 1

A sensor collected data every morning from 5 AM to 6 AM UTC.

Name: AM_Sensor_Daily

StartDate: 2000-04-01T05:00:00Z

EndDate: 2010-09-04T06:00:00Z

DurationUnit: DAY

DurationValue: 0.0417

PeriodCycleDurationUnit: DAY

PeriodCycleDurationValue: 1

For paleoclimate or geologic data, temporal coverage can be described via the Paleo Temporal Coverage elements. Paleo Temporal Coverage should be used to describe time frames earlier than 0001-01-01 (yyyy-mm-dd). Please see the [Paleo Temporal Coverage](#) wiki page for details.

Element Specification

Model	Element	Type	Constraints	Required?	Cardinality	Notes
UMM-Common	TemporalExtents/PrecisionOfSeconds	Integer	n/a	No	0..1	The precision (position in number of places to right of decimal point) of seconds used in measurement.
UMM-Common	TemporalExtents/EndsAtPresentFlag	Boolean	n/a	No	0..1	Setting the Ends At Present Flag to 'True' indicates that a data collection currently ends at the present date. Setting the Ends at Present flag to 'True' eliminates the need to continuously update the Range Ending Time for collections where granules are continuously being added to the collection inventory.
UMM-Common	TemporalExtents/TemporalResolution	Object	n/a	No	0..1	
UMM-Common	TemporalExtents/TemporalResolution/Unit	Enumeration	Valid Values: "Constant", "Varies", "Second", "Minute", "Hour", "Day", "Week", "Month", "Year", "Diurnal"	Yes	1	
UMM-Common	TemporalExtents/TemporalResolution/Value	Number	n/a	Yes if Type=Constant or Varies	0..1	Number may include decimal points 3.14 vs Integers such as 42

Choice of:

(1) SingleDateTime

If SingleDateTime is selected, the cardinality is 1..*

Model	Element	Type	Constraints	Required?	Cardinality	Notes
UMM-Common	TemporalExtents/SingleDateTime	dateTime	n/a	Yes, if applicable	1	Dates must comply with the ISO 8601 Standard .

(2) RangeDateTime

If RangeDateTime is selected, the cardinality is 1..*

Model	Element	Type	Constraints	Required?	Cardinality	Notes
-------	---------	------	-------------	-----------	-------------	-------

UMM-Common	TemporalExtents/RangeDateTime/BeginningDateTime	dateTime	n/a	Yes, if applicable	1	Dates must comply with the ISO 8601 Standard .
UMM-Common	TemporalExtents/RangeDateTime/EndingDateTime	dateTime	n/a	No	0..1	An EndingDateTime must be provided at the collection level if the collection is complete.

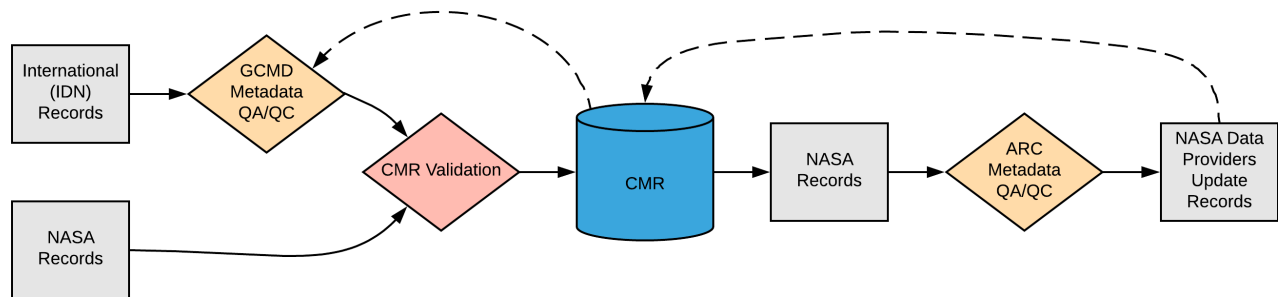
(3) PeriodicDateTime

If PeriodicDateTime is selected, the cardinality is 1..*

Model	Element	Type	Usable Valid Values	Constraints	Required?	Cardinality	Notes
UMM-Common	TemporalExtents/PeriodicDateTime/Name	String	n/a	1 - 30 characters	Yes, if applicable	1	
UMM-Common	TemporalExtents/PeriodicDateTime/StartDate	dateTime	n/a	n/a	Yes, if applicable	1	Dates must comply with the ISO 8601 Standard .
UMM-Common	TemporalExtents/PeriodicDateTime/EndDate	dateTime	n/a	n/a	Yes, if applicable	1	Dates must comply with the ISO 8601 Standard .
UMM-Common	TemporalExtents/PeriodicDateTime/DurationUnit	Enumeration	DAY MONTH YEAR	n/a	Yes, if applicable	1	
UMM-Common	TemporalExtents/PeriodicDateTime/DurationValue	Integer	n/a	n/a	Yes, if applicable	1	
UMM-Common	TemporalExtents/PeriodicDateTime/PeriodCycleDurationUnit	Enumeration	DAY MONTH YEAR	n/a	Yes, if applicable	1	
UMM-Common	TemporalExtents/PeriodicDateTime/PeriodCycleDurationValue	Integer	n/a	n/a	Yes, if applicable	1	

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 at least of the fields (Range_DateTime; Single_DateTime; Periodic_DateTime; or Paleo_DateTime) has been populated.
 - Check that the field is populated with a valid value from KMS (Chronostratigraphic_Unit).
 - Check that the field values matches the enumeration values.
 - Check that the field length is not greater than 80 characters (Date_Type).
 - Check that the field length is not greater than 30 characters (Periodic_DateTime/Name).
 - Check that the field length is not greater than 80 characters (Temporal_Range_Type).
 - Check that the field length is not greater than 80 characters (Temporal_Resolution/Unit).
 - Check that the field length is not greater than 80 characters (Time_Type).
 - Check that the date format is correct.
 - TemporalResolution Value is not negative
 - TemporalResolution Value is only provided if Type is Constant or Varies

- Dates must comply with the [ISO 8601 Standard](#).
- For a RangeDateTime:
 - The BeginningDateTime must be earlier or equal to the EndingDateTime.
 - The BeginningDateTime must be in the past.
 - If the EndingDateTime is set it must also be in the past.
 - If the EndingDateTime is set the EndsAtPresentFlag must not be set.
- For a SingleDateTime the SingleDateTime must be in the past.
- For any granules that are ingested for the collection, the granules temporal extent must exist within the collection's temporal extent.

ARC Priority Matrix

Priority Categorization	Justification
Red = High Priority Finding	This element is categorized as highest priority when: • No Temporal Extents is provided. • A Temporal Extents element is included but no dates are provided. Either a SingleDateTime, RangeDateTime or PeriodicDateTime must be provided in the metadata. • The date provided does not comply with the ISO 8601 Standard. • The valid value in the element appears to be out of sync with data collection. Examples include: ◦ Data collection has ended but no ending date has been provided. ◦ An ending date has been provided for data that is still being actively collected. ◦ Dates and/or times do not align with time stamps provided in the actual data. ◦ The 'Ends at Present Flag' element is set to 'True' when data collection has ended. ◦ The 'Ends at Present Flag' element is set to 'False' (i.e. data collection has ended) but no ending date has been provided. • The beginning and/or ending date time provided in the collection level metadata is out of sync with the dates provided in the granule level metadata. ◦ This is flagged as red if the discrepancy is greater than 1 day. (E.g. The Ending Date Time of the last granule in a collection is 2003-03-03T06:33:00Z but the Ending Date Time of the collection level metadata is 2003-03-01T06:33:00Z, two days before the last granule was collected).
Yellow = Medium Priority Finding	This element is categorized as medium priority when: • The beginning and/or ending date time provided in the collection level metadata is out of sync with the dates provided in the granule level metadata. ◦ This is flagged as yellow if the collection level temporal extent <i>does not</i> include the full extent of the granules, and if the discrepancy is less than 1 day. (E.g. The Ending Date Time of the last granule in a collection is 2003-03-03T06:33:00Z but the Ending Date Time provided in the collection level metadata is 2003-03-03T00:00:00Z. 6 hours and 33 minutes of data in the last granule of the collection is not represented in the collection level temporal extent). ◦ This is also flagged as yellow if the collection level temporal extent <i>does</i> include the full extent of the granules and the discrepancy is equal to exactly 1 day. • The beginning and ending date time are identical. In this case 'Single Date Time' should be used instead. • The 'Ends at Present Flag' element is not provided for an ongoing dataset. For ongoing or active datasets, the Ends at Present Flag should be provided with a value of 'True'. • There are significant temporal gaps in the data, but only one Range Date Time is provided in the collection level metadata. Significant gaps can be more accurately represented by providing multiple Range Date Times.
Blue = Low Priority Finding	This element is categorized as low priority when: • The beginning and/or ending date time provided in the collection level metadata is out of sync with the dates provided in the granule level metadata. ◦ This is flagged as blue if the collection level temporal extent <i>includes</i> the full extent of the granules, but there is a discrepancy between the times that amount to less than 1 day. (E.g. The EndingDateTime of the last granule in a collection is 2003-03-03T06:33:00Z but the EndingDateTime provided in the collection level metadata is 2003-03-03T23:59:59Z. The collection level metadata includes the full extent of the granule but there is a discrepancy in the ending time provided on 2003-03-03 between the granule and the collection metadata).
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

DIF 9 (Note: DIF-9 has been phased out and is no longer supported since 2018)

DIF 10

UMM-C Element	DIF 10 Path	Type	Constraints	Required in DIF 10?	Cardinality	Notes
	Temporal_Coverage /Time_Type	String		No	0..1	This element is not translated
	Temporal_Coverage /Date_Type	String		No	0..1	This element is not translated
	Temporal_Coverage /Temporal_Range_Type	String		No	0..1	This element is not translated
TemporalExtent/ PrecisionOfSeconds	Temporal_Coverage /Precision_Of_Seconds	Integer		No	0..1	The precision (position in number of places to right of decimal point) of seconds used in measurement.
TemporalExtent/ EndsAtPresentFlag	Temporal_Coverage /Ends_At_Present_Flag	Boolean		No	0..1	Recommend providing a value of "true" for active datasets.
	Temporal_Coverage /Temporal_Info	Object		No	0..1	Positioned after choice of Range_DateTime, Single_DateTime, Periodic_DateTime, and Paleo_DateTime
TemporalExtents /TemporalResolution	Temporal_Coverage /Temporal_Info /Temporal_Resolution	Object		No	0..1	
TemporalExtents /TemporalResolution/Value	Temporal_Coverage /Temporal_Info /Temporal_Resolution /Value	Number		No	0..1	- number with or without decimal point values - Not used if unit is Constant or Varies
TemporalExtents /TemporalResolution/Unit	Temporal_Coverage /Temporal_Info /Temporal_Resolution /Unit	Enumeration	Valid Values: "Constant", "Varies", "Second", "Minute", "Hour", "Day", "Week", "Month", "Year", "Diurnal"	Yes	1	

Choice of:

(1) Single_DateTime

If Single_DateTime is selected, the cardinality is 1..*

UMM-C Element	DIF 10 Element	Type	Usable Valid Values	Required?	Cardinality	Notes
TemporalExtent/ SingleDateTime	/DIF/Temporal_Coverage/ Single_DateTime	Date dateTime Enumeration	unknown present unbounded future Not provided	Yes, if applicable	1	DateTime fields must be in date (YYY-MM-DD) or Date-Time (YYYY-MM-DDTHH:MM:SS) format. It is preferred that a date or dateTime be provided if known, rather than one of the enumeration values. For definitions of the enumeration values, please see the DIF schema. The enumeration "Not provided" should not be used by metadata providers. This value is used by translation software (to DIF 10) for required fields.

(2) Range_DateTime

If Range_DateTime is selected, the cardinality is 1..*

UMM-C Element	DIF 10 Element	Type	Usable Valid Values	Required?	Cardinality	Notes

TemporalExtent/ RangeDateTime/ BeginningDateTime	/DIF/Temporal_Coverage/ Range_DateTime/ Beginning_DateTime	Date dateTime Enumeration	unknown present unbounded future Not provided	Yes, if applicable	1	DateTime fields must be in date (YYY-MM-DD) or Date-Time (YYYY-MM-DDTHH:MM:SS) format. It is preferred that a date or dateTime be provided if known, rather than one of the enumeration values. For definitions of the enumeration values, please see the DIF schema . The enumeration "Not provided" should not be used by metadata providers. This value is used by translation software (to DIF 10) for required fields.
TemporalExtent/ RangeDateTime/ EndingDateTime	/DIF/Temporal_Coverage/ Range_DateTime/ Ending_DateTime	Date dateTime Enumeration	unknown present unbounded future Not provided	No	0..1	DateTime fields must be in date (YYY-MM-DD) or Date-Time (YYYY-MM-DDTHH:MM:SS) format. It is preferred that a date or dateTime be provided if known, rather than one of the enumeration values. For definitions of the enumeration values, please see the DIF schema . The enumeration "Not provided" should not be used by metadata providers. This value is used by translation software (to DIF 10) for required fields.

(3) Periodic_DateTime

If Periodic_DateTime is selected, the cardinality is 1..*

UMM-C Element	DIF 10 Element	Type	Usable Valid Values	Constraints	Required?	Cardinality	Notes
TemporalExtent/ PeriodicDateTime/ Name	/DIF/Temporal_Coverage/ Periodic_DateTime/Name	String	n/a		Yes, if applicable	1	Dates must comply with the ISO 8601 Standard .
TemporalExtent/ PeriodicDateTime/ StartDate	/DIF/Temporal_Coverage/ Periodic_DateTime/Start_Date	Date dateTime Enumeration	unknown present unbounded future Not provided		Yes, if applicable	1	DateTime fields must be in date (YYY-MM-DD) or Date-Time (YYYY-MM-DDTHH:MM:SS) format. It is preferred that a date or dateTime be provided if known, rather than one of the enumeration values. For definitions of the enumeration values, please see the DIF schema . The enumeration "Not provided" should not be used by metadata providers. This value is used by translation software (to DIF 10) for required fields.
TemporalExtent/ PeriodicDateTime/ EndDate	/DIF/Temporal_Coverage/ Periodic_DateTime/End_Date	Date dateTime Enumeration	unknown present unbounded future Not provided		Yes, if applicable	1	DateTime fields must be in date (YYY-MM-DD) or Date-Time (YYYY-MM-DDTHH:MM:SS) format. It is preferred that a date or dateTime be provided if known, rather than one of the enumeration values. For definitions of the enumeration values, please see the DIF schema . The enumeration "Not provided" should not be used by metadata providers. This value is used by translation software (to DIF 10) for required fields.
TemporalExtent/ PeriodicDateTime/ DurationUnit	/DIF/Temporal_Coverage/ Periodic_DateTime/Duration_Unit	Enumeration	DAY MONTH YEAR		Yes, if applicable	1	
TemporalExtent/ PeriodicDateTime/ DurationValue	/DIF/Temporal_Coverage/ Periodic_DateTime/Duration_Value	Integer	n/a		Yes, if applicable	1	
TemporalExtent/ PeriodicDateTime/ PeriodCycleDurationUnit	/DIF/Temporal_Coverage/ Periodic_DateTime/Period_Cycle_Duration_Unit	Enumeration	DAY MONTH YEAR		Yes, if applicable	1	

TemporalExtent/ PeriodicDateTime/ PeriodCycleDurationValue	/DIF/Temporal_Coverage/ Periodic_DateTime/ Period_Cycle_Duration_Value	Integer	n/a		Yes, if applicable	1	
--	--	---------	-----	--	--------------------	---	--

Value needed for translations:

The following value is used to translate older versions of DIF (e.g. DIF 9, DIF 10.1) to the most current version of DIF (DIF10.3) if no valid value is provided in the older version of the record.

Not provided - This value is auto-populated to any DateTime fields if no valid value is provided in the DateTime field at time of conversion to DIF 10.3. *This value should not be used by metadata providers.*

Enumeration Mapping

DIF 10	Translation Direction	UMM
DAY		DAY
MONTH		MONTH
YEAR		YEAR
unknown	unknown date is not translated	
present	date with value of present is not translated	
unbounded	date with value of unbounded is not translated	
future	date with value of future is not translated	
Not provided	date with value of Not provided is not translated	

Example Mapping

DIF 10


```

<Temporal_Coverage>
  <Single_DateTime>2018-08-20T14:13:22Z<
/Single_DateTime>
</Temporal_Coverage>

<Temporal_Coverage>
  <Ends_At_Present_Flag>true</Ends_At_Present_Flag>
  <Range_DateTime>
    <Beginning_Date_Time>1980-01-01<
/Beginning_Date_Time>
    </Range_DateTime>
  </Temporal_Coverage>

<Temporal_Coverage>
  <Range_DateTime>
    <Beginning_Date_Time>1980-01-01T00:00:00Z<
/Beginning_Date_Time>
    <Ending_Date_Time>2010-12-31T23:59:59Z<
/Ending_Date_Time>
    </Range_DateTime>
  </Temporal_Coverage>

<Temporal_Coverage>
  <Periodic_DateTime>
    <Name>Winter_FieldCampaign</Name>
    <Start_Date>2013-12-01T00:00:00Z</Start_Date>
    <End_Date>2017-02-28T23:59:59Z</End_Date>
    <Duration_Unit>MONTH</Duration_Unit>
    <Duration_Value>3</Duration_Value>
    <Period_Cycle_Duration_Unit>YEAR<
/Period_Cycle_Duration_Unit>
    <Period_Cycle_Duration_Value>1<
/Period_Cycle_Duration_Value>
    </Periodic_DateTime>
  </Temporal_Coverage>

<Temporal_Coverage>
  <Range_DateTime>
    <Beginning_Date_Time>1975-02-14<
/Beginning_Date_Time>
    </Range_DateTime>
    <Temporal_Info>
      <Temporal_Resolution>
        <Value>42</Value>
        <Unit>Hour</Unit>
      </Temporal_Resolution>
    </Temporal_Info>
  </Temporal_Coverage>

<Temporal_Coverage>
  <Range_DateTime>
    <Beginning_Date_Time>1975-02-14<
/Beginning_Date_Time>
    </Range_DateTime>
    <Temporal_Info>
      <Temporal_Resolution>
        <Unit>Constant</Unit>
      </Temporal_Resolution>
    </Temporal_Info>
  </Temporal_Coverage>

```

```

TemporalExtents: [{
  SingleDateTimes: [{
    SingleDateTime: "2018-08-20T14:13:22Z"
  }]
}]

TemporalExtents: [{
  EndsAtPresentFlag: true,
  RangeDateTimes: [{
    BeginningDateTime: "1980-01-01T00:00:00.000Z",
  }]
}]

TemporalExtents: [{
  RangeDateTimes: [{
    BeginningDateTime: "1980-01-01T00:00:00Z",
    EndingDateTime: "2010-12-31T23:59:59Z"
  }]
}]

TemporalExtents: [{
  PeriodicDateTimes: [{
    Name: "Winter_FieldCampaign",
    StartDate: "2013-12-01T00:00:00Z",
    EndDate: "2017-02-28T23:59:59Z",
    DurationUnit: "MONTH",
    DurationValue: "3",
    PeriodCycleDurationUnit: "YEAR",
    PeriodCycleDurationValue: "1"
  }]
}]

"TemporalExtents": [{
  "EndsAtPresentFlag": false,
  "SingleDateTimes": ["2024-02-14T01:02:03Z"],
  "TemporalResolution": {"Value": 42.2, "Unit":
"Minute"}
}
]

```

ECHO 10

UMM-C Element	ECHO 10 Path	Type	Constraints	Required in ECHO10?	Cardinality	Notes
	/Collection /Temporal /TimeType	String	1 - 80 characters	No	0..1	The time system which the values found in temporal subclasses. Not mapped it UMM-C
	/Collection/Temporal /DateType	String	1 - 80 characters	No	0..1	The type of date represented by the value in the date attributes of the temporal subclasses. Not mapped it UMM-C
	/Collection/Temporal/ TemporalRangeType	String	1 - 80 characters	No	0..1	Tells the system how temporal coverage is specified for the collection. Not mapped it UMM-C
TemporalExtent/ PrecisionOfSeconds	/Collection/Temporal/ PrecisionOfSeconds	Integer	n/a	No	0..1	The precision (position in number of places to right of decimal point) of seconds used in measurement.
TemporalExtent/ EndsAtPresentFlag	/Collection/Temporal/ EndsAtPresentFlag	Boolean	n/a	No	0..1	It is recommended that a value of "true" be provided for active datasets.

TemporalExtent/ TemporalResolution/ Unit	/Collection/ Temporal/ TemporalResolution	Object		No	0..1	
TemporalExtent/ TemporalResolution/ Value	/Collection/ Temporal/ Value	String (Decimal)	Decimal	No	0..1	Errata: should be a decimal (3.14), currently a string Use with care!
TemporalExtent/ TemporalResolution/ Unit	/Collection/ Temporal/ Unit	Enumeration	Valid Values: "Constant", "Varies", "Second", "Minute", "Hour", "Day", "Week", "Month", "Year", "Diurnal"	Yes	1	

Choice of:

(1) SingleDateTime

If SingleDateTime is selected, the cardinality is 1..*

UMM-C Element	ECHO 10 Path	Type	Constraints	Required in ECHO10?	Cardinality
TemporalExtent/ SingleDateTime	/Collection/Temporal/SingleDateTime	dateTime	n/a	Yes, if applicable	0..1

(2) RangeDateTime

If RangeDateTime is selected, the cardinality is 1..*

UMM-C Element	ECHO 10 Path	Type	Constraints	Required in ECHO10?	Cardinality	Notes
TemporalExtent/ RangeDateTime/ BeginningDateTime	/Collection/ Temporal/ RangeDateTime/ BeginningDateTime	dateTime	n/a	Yes, if applicable	1	
TemporalExtent/ RangeDateTime/ EndingDateTime	/Collection/Temporal/ RangeDateTime/ EndingDateTime	dateTime	n/a	No	0..1	An EndingDateTime must be provided if the collection is complete. No not use the EndingDateTime if the collection is active. Use the UMM-C EndsAtPresentFlag.

(3) PeriodicDateTime

If PeriodicDateTime is selected, the cardinality is 1..*

UMM-C Element	ECHO 10 Path	Type	Usable Valid Values	Constraints	Required in ECHO10?	Cardinality
TemporalExtent/ PeriodicDateTime/ Name	/Collection/Temporal/ PeriodicDateTime/Name	String	n/a	1 - 30 characters	Yes, if applicable	1

TemporalExtent/ PeriodicDateTime/ StartDate	/Collection/Temporal/ PeriodicDateTime/StartDate	dateTime	n/a	n/a	Yes, if applicable	1
TemporalExtent/ PeriodicDateTime/ EndDate	/Collection/Temporal/ PeriodicDateTime/EndDate	dateTime	n/a	n/a	Yes, if applicable	1
TemporalExtent/ PeriodicDateTime/ DurationUnit	/Collection/Temporal/ PeriodicDateTime/DurationUnit	Enumeration	DAY MONTH YEAR	n/a	Yes, if applicable	1
TemporalExtent/ PeriodicDateTime/ DurationValue	/Collection/Temporal/ PeriodicDateTime/DurationValue	Integer	n/a	n/a	Yes, if applicable	1
TemporalExtent/ PeriodicDateTime/ PeriodCycleDurationUnit	/Collection/Temporal/ PeriodicDateTime /PeriodCycleDurationUnit	Enumeration	DAY MONTH YEAR	n/a	Yes, if applicable	1
TemporalExtent/ PeriodicDateTime/ PeriodCycleDurationValue	/Collection/Temporal/ PeriodicDateTime /PeriodCycleDurationValue	Integer	n/a	n/a	Yes, if applicable	1

Enumeration Mapping For Duration Units

ECHO 10	Translation Direction	UMM
DAY		DAY
MONTH		MONTH
YEAR		YEAR

Example Mapping

ECHO 10

```

<Temporal>
  <SingleDateTime>2018-08-20T14:13:22Z<
/SingleDateTime>
</Temporal>

<Temporal>
  <EndsAtPresentFlag>true</EndsAtPresentFlag>
  <RangeDateTime>
    <BeginningDateTime>1980-01-01T00:00:00Z<
/BeginningDateTime>
    </RangeDateTime>
  </Temporal>

<Temporal>
  <RangeDateTime>
    <BeginningDateTime>1980-01-01T00:00:00Z<
/BeginningDateTime>
    <EndingDateTime>2010-12-31T23:59:59Z<
/EndingDateTime>
    </RangeDateTime>>
  </Temporal>

<Temporal>
  <PeriodicDateTime>
    <Name>Winter_FieldCampaign</Name>
    <StartDate>2013-12-01T00:00:00Z</StartDate>
    <EndDate>2017-02-28T23:59:59Z</EndDate>
    <DurationUnit>MONTH</DurationUnit>
    <DurationValue>3</DurationValue>
    <PeriodCycleDurationUnit>YEAR<
/PeriodCycleDurationUnit>
    <PeriodCycleDurationValue>1<
/PeriodCycleDurationValue>
    </PeriodicDateTime>
  </Temporal>

<Temporal>
  <SingleDateTime>2024-02-14T13:14:15Z<
/SingleDateTime>
  <TemporalResolution>
    <Value>42</Value>
    <Unit>Year</Unit>
  </TemporalResolution>
</Temporal>

<Temporal>
  <SingleDateTime>2024-02-14T13:14:15Z<
/SingleDateTime>
  <TemporalResolution>
    <Unit>Constant</Unit>
  </TemporalResolution>
</Temporal>

```

```

TemporalExtents: [{
  SingleDateTimes: [{
    SingleDateTime: "2018-08-20T14:13:22Z"
  }]
}]

TemporalExtents: [{
  EndsAtPresentFlag: true,
  RangeDateTimes: [{
    BeginningDateTime: "1980-01-01T00:00:00Z",
  }]
}]

TemporalExtents: [{
  RangeDateTimes: [{
    BeginningDateTime: "1980-01-01T00:00:00Z",
    EndingDateTime: "2010-12-31T23:59:59Z"
  }]
}]

TemporalExtents: [{
  PeriodicDateTimes: [{
    Name: "Winter_FieldCampaign",
    StartDate: "2013-12-01T00:00:00Z",
    EndDate: "2017-02-28T23:59:59Z",
    DurationUnit: "MONTH",
    DurationValue: "3",
    PeriodCycleDurationUnit: "YEAR",
    PeriodCycleDurationValue: "1"
  }]
}]

"TemporalExtents": [{
  "EndsAtPresentFlag": false,
  "SingleDateTimes": ["2024-02-14T01:02:03Z"],
  "TemporalResolution": {"Value": 42.2, "Unit":
"Minute"}
}
]

```

ISO 19115-2 MENDS

UMM-C Element	ISO 19115-2 MENDS Path	Type	Notes
TemporalExtent/ PrecisionOfSeconds	/gmi:MI_Metadata/gmd:dataQualityInfo/gmd:DQ_DataQuality/gmd:report/ gmd:DQ_AccuracyOfATimeMeasurement/gmd:measureIdentification/ gmd:MD_Identifier/gmd:code/gco:CharacterString = PrecisionOfSeconds	String	
	/gmi:MI_Metadata/gmd:dataQualityInfo/gmd:DQ_DataQuality/gmd:report/ gmd:DQ_AccuracyOfATimeMeasurement/gmd:result/gmd:DQ_QuantitativeResult/ gmd:value/gco:Record xsi:type="gco:Real_PropertyType"/gco:Real - PrecisionOfSeconds Value	Decimal	
TemporalExtent/ EndsAtPresentFlag	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:extent/ gmd:EX_Extent/gmd:temporalElement/gmd:EX_TemporalExtent/gmd:extent/ gml:TimePeriod/gml:endPosition indeterminatePosition="now"	String	Fill in the XML attribute value of now. The field is empty.
TemporalExtents/ TemporalResolution	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:extent/gmd:EX_Extent/gmd:temporalElement/gmd:EX_TemporalExtent/gmd:extent [=>		

TemporalExtents/ TemporalResolution/ Unit	[=>/gml:TimePeriod/gml:timeInterval unit="second minute hour day month year" {value}		
TemporalExtents/ TemporalResolution/ Value	[=>/gml:TimeInstant <gml:id={unique value}/gml:timePosition Valid Values: gov.nasa.esdis.umm.temporalresolution.varies gov.nasa.esdis.umm.temporalresolution.constant OR [=>/gml:TimePeriod gml:id={unique value}/gml:timeInterval unit="second minute hour day month year".		

Enumeration Mapping For Temporal Resolution Units

ISO	Translation Direction	UMM
second		Second
minute		Minute
hour		Hour
day		Day
month		Month
year		Year
hour		Diurnal
n/a		Constant
n/a		Varies

Choice of:

(1) SingleDateTime

If SingleDateTime is selected, the cardinality is 1..*

UMM-C Element	ISO 19115-2 MENDS Path	Type
TemporalExtent/ SingleDateTime	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/ gmd:extent/gmd:EX_Extent/gmd:temporalElement/gmd:EX_TemporalExtent/ gmd:extent/gml:TimeInstant/gml:timePosition	dateTime

(2) RangeDateTime

If RangeDateTime is selected, the cardinality is 1..*

UMM-C Element	ISO 19115-2 MENDS Path	Type	Notes
TemporalExtent/ RangeDateTime/ BeginningDateTime	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:extent/ gmd:EX_Extent/gmd:temporalElement/gmd:EX_TemporalExtent/ gmd:extent/gml:TimePeriod/gml:beginPosition	dateTime	

TemporalExtent/	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:extent/	dateTime	An EndingDateTime must be provided if the collection is complete. No not use the EndingDateTime if the collection is active. Use the UMM-C EndsAtPresentFlag.
RangeDate Time/	gmd:EX_Extent/gmd:temporalElement/gmd:EX_TemporalExtent/		
EndingDate Time	gmd:extent/gml:TimePeriod/gml:endPosition		

(3) PeriodicDateTime

Periodic Date Time is not yet translated to ISO 19115-2 MENDS.

Enumeration/Code List Mapping

None

Example Mapping

ISO 19115-2 MENDS

```

<gmi:MI_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:extent>
        <gmd:EX_Extent>
          ...
          <gmd:temporalElement>
            <gmd:EX_TemporalExtent>
              <gmd:extent>
                <gml:TimeInstant gml:
id="de532bfaf-4b47-4521-b08f-6a795c796e45">
                  <gml:
timePosition>2018-08-20T14:13:22.000Z</gml:
timePosition>
                </gml:TimeInstant>
              </gmd:extent>
            </gmd:EX_TemporalExtent>
          </gmd:temporalElement>
        <gmd:temporalElement>
          <gmd:EX_TemporalExtent>
            <gmd:extent>
              <gml:TimeInstant gml:
id="d3581a152-c91f-43ea-940d-29d3fe59d89a">
                <gml:
timePosition>2018-09-20T14:13:22.000Z</gml:
timePosition>
              </gml:TimeInstant>
            </gmd:extent>
          </gmd:EX_TemporalExtent>
        </gmd:temporalElement>
      </gmd:EX_Extent>
    </gmd:extent>
    ...
    <gmd:dataQualityInfo>
      <gmd:DQ_DataQuality>
        <gmd:scope>
          <gmd:DQ_Scope>
            <gmd:level>
              <gmd:MD_ScopeCode
codeList="http://www.
ngdc.noaa.gov/metadata/published/xsd/schema/resources
/CodeList/gmxCodeLists.xml#MD_ScopeCode"
codeListValue="series">series</gmd:MD_ScopeCode>
            </gmd:level>
          </gmd:DQ_Scope>
        </gmd:scope>
      </gmd:DQ_DataQuality>
    </gmd:dataQualityInfo>
  </gmd:identificationInfo>
</gmi:MI_Metadata>

```



```
<gmd:MD_Identifier>  
    <gmd:code>  
        <gco:  
CharacterString>PrecisionOfSeconds</gco:  
CharacterString>  
    </gmd:code>  
    </gmd:MD_Identifier>  
</gmd:measureIdentification>  
<gmd:result>  
    <gmd:DQ_QuantitativeResult>  
        <gmd:valueUnit/>  
        <gmd:value>  
type="gco:Real_PropertyType">  
            <gco:Real>1</gco:  
Real>  
        </gco:Record>  
    </gmd:value>  
    </gmd:DQ_QuantitativeResult>  
    </gmd:result>  
    </gmd:DQ_AccuracyOfATimeMeasurement>  
</gmd:report>  
...  
  
<gmi:MI_Metadata>  
    ...  
    <gmd:identificationInfo>  
        <gmd:MD_DataIdentification>  
            ...  
            <gmd:extent>  
                <gmd:EX_Extent>  
                    ...  
                    <gmd:temporalElement>  
                        <gmd:EX_TemporalExtent>  
                            <gmd:extent>  
                                <gml:TimePeriod gml:  
id="d4f71b8f2-2469-4369-8463-8ae31eee4f97">  
                                    <gml:  
beginPosition>1980-01-01T00:00:00.000Z</gml:  
beginPosition>  
                                    <gml:  
endPosition>2010-12-31T23:59:59.000Z</gml:  
endPosition>  
                                </gml:TimePeriod>  
                            </gmd:extent>  
                        </gmd:EX_TemporalExtent>  
                    </gmd:temporalElement>  
                <gmd:temporalElement>  
                    <gmd:EX_TemporalExtent>  
                        <gmd:extent>  
                            <gml:TimePeriod gml:  
id="dabdc7f81-5813-4e84-873f-fb46b71c2f4d">  
                                <gml:  
beginPosition>2011-12-31T23:59:59.000Z</gml:  
beginPosition>  
                                <gml:  
endPosition>2012-12-31T23:59:59.000Z</gml:  
endPosition>  
                            </gml:TimePeriod>  
                        </gmd:extent>  
                    </gmd:EX_TemporalExtent>  
                </gmd:temporalElement>  
            </gmd:EX_Extent>  
        </gmd:extent>  
        ...  
    <gmd:dataQualityInfo>  
        <gmd:DQ_DataQuality>  
            <gmd:scope>  
                <gmd:DQ_Scope>
```

```

        <gmd:level>
            <gmd:MD_ScopeCode
                codeList="http://www.
ngdc.noaa.gov/metadata/published/xsd/schema/resources
/Codelist/gmxCodeLists.xml#MD_ScopeCode"
codeListValue="series">series</gmd:MD_ScopeCode>
            </gmd:level>
        </gmd:DQ_Scope>
    </gmd:scope>
    <gmd:report>
        <gmd:DQ_AccuracyOfATimeMeasurement>
            <gmd:measureIdentification>
                <gmd:MD_Identifier>
                    <gmd:code>
                        <gco:
CharacterString>PrecisionOfSeconds</gco:
CharacterString>
                    </gmd:code>
                </gmd:MD_Identifier>
            </gmd:measureIdentification>
            <gmd:result>
                <gmd:DQ_QuantitativeResult>
                    <gmd:valueUnit/>
                    <gmd:value>
                        <gco:Record xsi:
type="gco:Real_PropertyType">
                            <gco:Real>1</gco:
Real>
                        </gco:Record>
                    </gmd:value>
                </gmd:DQ_QuantitativeResult>
            </gmd:result>
        </gmd:DQ_AccuracyOfATimeMeasurement>
    </gmd:report>
    ...

<gmd:temporalElement>
    <gmd:EX_TemporalExtent>
        <gmd:extent>
            <gml:TimeInstant>
                <gml:timeInterval
gml:id="012345">
                    <gml:
timePosition>gov.nasa.esdis.umm.temporalresolution.
varies</gml:timePosition>
                </gml:timeInterval>
            </gml:TimeInstant>
        </gmd:extent>
    </gmd:EX_TemporalExtent>
</gmd:temporalElement>

<gmd:temporalElement>
    <gmd:EX_TemporalExtent>
        <gmd:extent>
            <gml:TimePeriod>
                <gml:timeInterval
unit="hour">42</gml:timeInterval>
            </gml:TimePeriod>
        </gmd:extent>
    </gmd:EX_TemporalExtent>
</gmd:temporalElement>
    ...

```

UMM

```

    "TemporalExtents": [{
      "PrecisionOfSeconds": 1,
      "SingleDateTimes" : ["2018-08-20T14:13:22Z",
"2018-09-20T14:13:22Z"]
    }],

    "TemporalExtents": [{
      "PrecisionOfSeconds": 1,
      "EndsAtPresentFlag": true,
      "RangeDateTimes": [{
        "BeginningDateTime": "1980-01-01T00:00:
00.000Z"
      }]
    }],

    "TemporalExtents": [{
      "PrecisionOfSeconds": 1,
      "RangeDateTimes": [{
        "BeginningDateTime": "1980-01-01T00:00:
00.000Z",
        "EndingDateTime": "2010-12-31T23:59:59Z"
      }, {
        "BeginningDateTime": "2011-12-31T23:59:
59Z",
        "EndingDateTime": "2012-12-31T23:59:59Z"
      }]
    }],

    "TemporalExtents": [{
      "EndsAtPresentFlag": false,
      "SingleDateTimes": ["2024-02-14T01:02:03Z"],
      "TemporalResolution": {"Value": 42.2, "Unit":
"Minute"}
    }
  ]

```

ISO 19115-2 SMAP

UMM-C Element	ISO 19115-2 SMAP	Type	Notes
TemporalExtent/ PrecisionOfSeconds	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmd:dataQualityInfo/ gmd:DQ_DataQuality/gmd:report/gmd:DQ_AccuracyOfATimeMeasurement/ gmd:measureIdentification/gmd:MD_Identifier/gmd:code/gco:CharacterString = PrecisionOfSeconds	String	
	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmd:dataQualityInfo/ gmd:DQ_DataQuality/gmd:report/gmd:DQ_AccuracyOfATimeMeasurement/ gmd:result/gmd:DQ_QuantitativeResult/gmd:value/gco:Record xsi:type="gco:Real_PropertyType" /gco:Real - PrecisionOfSeconds Value	Decimal	
TemporalExtent/ EndsAtPresentFlag	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/gmd:EX_Extent/gmd:temporalElement/ gmd:EX_TemporalExtent/gmd:extent/gml:TimePeriod/gml:endPosition indeterminatePosition=" now"	String	Fill in the XML attribute value of now. The field is empty.

Choice of:

(1) SingleDateTime

If SingleDateTime is selected, the cardinality is 1..*

UMM-C Element	ISO 19115-2 SMAP	Type
TemporalExtent/ SingleDateTime	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/gmd:EX_Extent/gmd:temporalElement/ gmd:EX_TemporalExtent/gmd:extent/gml:TimeInstant/gml:timePosition	dateTime

(2) RangeDateTime

If RangeDateTime is selected, the cardinality is 1..*

UMM-C Element	ISO 19115-2 SMAP	Type	Notes
TemporalExtent/ RangeDateTime/ BeginningDateTime	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/gmd:EX_Extent/gmd:temporalElement/ gmd:EX_TemporalExtent/gmd:extent/gml:TimePeriod/gml:beginPosition	dateTime	
TemporalExtent/ RangeDateTime/ EndingDateTime	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/gmd:EX_Extent/gmd:temporalElement/ gmd:EX_TemporalExtent/gmd:extent/gml:TimePeriod/gml:endPosition	dateTime	An EndingDateTime must be provided if the collection is complete. No not use the EndingDateTime if the collection is active. Use the UMM-C EndsAtPresentFlag.

(3) PeriodicDateTime

Periodic Date Time is not yet translated to ISO 19115-2 SMAP.

Enumeration/Code List Mapping

None

Example Mapping

ISO 19115-2 SMAP

```
<gmd:DS_Series>
<gmd:seriesMetadata>
<gmi:MI_Metadata>
...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
        <gmd:extent>
          <gmd:EX_Extent>
            ...
              <gmd:temporalElement>
                <gmd:EX_TemporalExtent>
                  <gmd:extent>
                    <gml:TimeInstant gml:
id="de532bfaf-4b47-4521-b08f-6a795c796e45">
                      <gml:
timePosition>2018-08-20T14:13:22.000Z</gml:
timePosition>
                    </gml:TimeInstant>
                  </gmd:extent>
                </gmd:EX_TemporalExtent>
              </gmd:temporalElement>
```

```

        <gmd:temporalElement>
          <gmd:EX_TemporalExtent>
            <gmd:extent>
              <gml:TimeInstant gml:
id="d3581a152-c91f-43ea-940d-29d3fe59d89a">
                <gml:
timePosition>2018-09-20T14:13:22.000Z</gml:
timePosition>
              </gml:TimeInstant>
            </gmd:extent>
          </gmd:EX_TemporalExtent>
        </gmd:temporalElement>
      </gmd:EX_Extent>
    </gmd:extent>
    ...
    <gmd:dataQualityInfo>
      <gmd:DQ_DataQuality>
        <gmd:scope>
          <gmd:DQ_Scope>
            <gmd:level>
              <gmd:MD_ScopeCode
codeList="http://www.
ngdc.noaa.gov/metadata/published/xsd/schema/resources
/CodeList/gmxCodeLists.xml#MD_ScopeCode"
codeListValue="series">series</gmd:MD_ScopeCode>
            </gmd:level>
          </gmd:DQ_Scope>
        </gmd:scope>
        <gmd:report>
          <gmd:DQ_AccuracyOfATimeMeasurement>
            <gmd:measureIdentification>
              <gmd:MD_Identifier>
                <gmd:code>
                  <gco:
CharacterString>PrecisionOfSeconds</gco:
CharacterString>
                </gmd:code>
              </gmd:MD_Identifier>
            </gmd:measureIdentification>
          <gmd:result>
            <gmd:DQ_QuantitativeResult>
              <gmd:valueUnit/>
              <gmd:value>
                <gco:Record xsi:
type="gco:Real_PropertyType">
                  <gco:Real>1</gco:
Real>
                </gco:Record>
              </gmd:value>
            </gmd:DQ_QuantitativeResult>
          </gmd:result>
        </gmd:DQ_AccuracyOfATimeMeasurement>
      </gmd:report>
    ...

    <gmd:DS_Series>
    <gmd:seriesMetadata>
    <gmi:MI_Metadata>
      ...
      <gmd:identificationInfo>
        <gmd:MD_DataIdentification>
          ...
          <gmd:extent>
            <gmd:EX_Extent>
              ...
              <gmd:temporalElement>
                <gmd:EX_TemporalExtent>
                  <gmd:extent>
                    <gml:TimePeriod gml:
id="d50020500-7b2c-4da6-a340-50df5e2e3a01">

```

```

                                <gml:
beginPosition>1980-01-01T00:00:00.000Z</gml:
beginPosition>
                                <gml:endPosition
indeterminatePosition="now"/>
                                </gml:TimePeriod>
                                </gmd:extent>
                                </gmd:EX_TemporalExtent>
                                </gmd:temporalElement>
                                </gmd:EX_Extent>
                                </gmd:extent>
                                ...
                                <gmd:dataQualityInfo>
                                <gmd:DQ_DataQuality>
                                <gmd:scope>
                                <gmd:DQ_Scope>
                                <gmd:level>
                                <gmd:MD_ScopeCode
                                codeList="http://www.
ngdc.noaa.gov/metadata/published/xsd/schema/resources
/CodeList/gmxCodeLists.xml#MD_ScopeCode"
codeListValue="series">series</gmd:MD_ScopeCode>
                                </gmd:level>
                                </gmd:DQ_Scope>
                                </gmd:scope>
                                <gmd:report>
                                <gmd:DQ_AccuracyOfATimeMeasurement>
                                <gmd:measureIdentification>
                                <gmd:MD_Identifier>
                                <gmd:code>
                                <gco:
CharacterString>PrecisionOfSeconds</gco:
CharacterString>
                                </gmd:code>
                                </gmd:MD_Identifier>
                                </gmd:measureIdentification>
                                <gmd:result>
                                <gmd:DQ_QuantitativeResult>
                                <gmd:valueUnit/>
                                <gmd:value>
                                <gco:Record xsi:
type="gco:Real_PropertyType">
                                <gco:Real>1</gco:
Real>
                                </gco:Record>
                                </gmd:value>
                                </gmd:DQ_QuantitativeResult>
                                </gmd:result>
                                </gmd:DQ_AccuracyOfATimeMeasurement>
                                </gmd:report>
                                ...

                                <gmd:DS_Series>
                                <gmd:seriesMetadata>
                                <gmi:MI_Metadata>
                                ...
                                <gmd:identificationInfo>
                                <gmd:MD_DataIdentification>
                                ...
                                <gmd:extent>
                                <gmd:EX_Extent>
                                ...
                                <gmd:temporalElement>
                                <gmd:EX_TemporalExtent>
                                <gmd:extent>
                                <gml:TimePeriod gml:
id="d4f71b8f2-2469-4369-8463-8ae31eee4f97">
                                <gml:
beginPosition>1980-01-01T00:00:00.000Z</gml:
beginPosition>

```

```

                                <gml:
endPosition>2010-12-31T23:59:59.000Z</gml:
endPosition>
                                </gml:TimePeriod>
                                </gmd:extent>
                                </gmd:EX_TemporalExtent>
                                </gmd:temporalElement>
                                <gmd:temporalElement>
                                <gmd:EX_TemporalExtent>
                                <gmd:extent>
                                <gml:TimePeriod gml:
id="dabdc7f81-5813-4e84-873f-fb46b71c2f4d">
                                <gml:
beginPosition>2011-12-31T23:59:59.000Z</gml:
beginPosition>
                                <gml:
endPosition>2012-12-31T23:59:59.000Z</gml:
endPosition>
                                </gml:TimePeriod>
                                </gmd:extent>
                                </gmd:EX_TemporalExtent>
                                </gmd:temporalElement>
                                </gmd:EX_Extent>
                                </gmd:extent>
                                ...
                                <gmd:dataQualityInfo>
                                <gmd:DQ_DataQuality>
                                <gmd:scope>
                                <gmd:DQ_Scope>
                                <gmd:level>
                                <gmd:MD_ScopeCode
                                codeList="http://www.
ngdc.noaa.gov/metadata/published/xsd/schema/resources
/CodeList/gmxCodeLists.xml#MD_ScopeCode"
                                codeListValue="series">series</gmd:MD_ScopeCode>
                                </gmd:level>
                                </gmd:DQ_Scope>
                                </gmd:scope>
                                <gmd:report>
                                <gmd:DQ_AccuracyOfATimeMeasurement>
                                <gmd:measureIdentification>
                                <gmd:MD_Identifier>
                                <gmd:code>
                                <gco:
CharacterString>PrecisionOfSeconds</gco:
CharacterString>
                                </gmd:code>
                                </gmd:MD_Identifier>
                                </gmd:measureIdentification>
                                <gmd:result>
                                <gmd:DQ_QuantitativeResult>
                                <gmd:valueUnit/>
                                <gmd:value>
                                <gco:Record xsi:
type="gco:Real_PropertyType">
                                <gco:Real>1</gco:
Real>
                                </gco:Record>
                                </gmd:value>
                                </gmd:DQ_QuantitativeResult>
                                </gmd:result>
                                </gmd:DQ_AccuracyOfATimeMeasurement>
                                </gmd:report>
                                ...

```



```
    "TemporalExtents": [{
      "PrecisionOfSeconds": 1,
      "SingleDateTimes" : ["2018-08-20T14:13:22Z",
"2018-09-20T14:13:22Z"]
    }],

    "TemporalExtents": [{
      "PrecisionOfSeconds": 1,
      "EndsAtPresentFlag": true,
      "RangeDateTimes": [{
        "BeginningDateTime": "1980-01-01T00:00:
00.000Z"
      }]
    }],

    "TemporalExtents": [{
      "PrecisionOfSeconds": 1,
      "RangeDateTimes": [{
        "BeginningDateTime": "1980-01-01T00:00:
00.000Z",
        "EndingDateTime": "2010-12-31T23:59:59Z"
      }, {
        "BeginningDateTime": "2011-12-31T23:59:
59Z",
        "EndingDateTime": "2012-12-31T23:59:59Z"
      }]
    }],
```

UMM Migration

None

History

UMM Versioning

Version	Date	What Changed
1.18.0	2024-03-18	Added Temporal Resolution to Temporal Extents in version 1.18.0
1.17.1	2022-08-10	No changes were made for Temporal Extents during the transition from version 1.17 to 1.17.1
1.17	2022-05-11	No changes were made for Temporal Extents during the transition from version 1.16.7 to 1.17
1.16.7	2022-03-02	No changes were made for Temporal Extents during the transition from version 1.16.6 to 1.16.7
1.16.6	2021-12-01	No changes were made for Temporal Extents during the transition from version 1.16.5 to 1.16.6
1.16.5	2021-07-13	No changes were made for Temporal Extents during the transition from version 1.16.4 to 1.16.5
1.16.4	2021-06-30	No changes were made for Temporal Extents during the transition from version 1.16.3 to 1.16.4
1.16.3	2021-05-19	No changes were made for Temporal Extents during the transition from version 1.16.2 to 1.16.3
1.16.2	2021-04-07	No changes were made for Temporal Extents during the transition from version 1.16.1 to 1.16.2
1.16.1	2021-04-07	No changes were made for Temporal Extents during the transition from version 1.16 to 1.16.1

1.16	2021-03-24	No changes were made for Temporal Extents during the transition from version 1.15.5 to 1.16
1.15.5	2020-12-03	No changes were made for Temporal Extents during the transition from version 1.15.4 to 1.15.5
1.15.4	2020-09-18	No changes were made for Temporal Extents during the transition from version 1.15.3 to 1.15.4
1.15.3	2020-07-01	No changes were made for Temporal Extents during the transition from version 1.15.2 to 1.15.3
1.15.2	2020-05-20	No changes were made for Temporal Extents during the transition from version 1.15.1 to 1.15.2
1.15.1	2020-03-25	No changes were made for Temporal Extents during the transition from version 1.15.0 to 1.15.1
1.15.0	2020-02-26	No changes were made for Temporal Extents during the transition from version 1.14.0 to 1.15.0
1.14.0	2019-10-21	No changes were made for Temporal Extents during the transition from version 1.13.0 to 1.14.0
1.13.0	2019-04-11	No changes were made for Temporal Extents during the transition from version 1.12.0 to 1.13.0
1.12.0	2019-01-22	No changes were made for Temporal Extents during the transition from version 1.11.0 to 1.12.0.
1.11.0	2018-11-28	No changes were made for Temporal Extents during the transition from version 1.10.0 to 1.11.0.
1.10.0	2018-05-02	In the transition from Version 1.9 to 10.0, the subelement 'Temporal Range Type' was removed from Temporal Extent Type.

ARC Documentation

Version	Date	What Changed	Author
1.0	2018-08-17	Recommendations/priority matrix transferred from internal ARC documentation to wiki space	Kaylin Bugbee