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# OGC METOCEAN APPLICATION PROFILE FOR WCS2.1: PART 2 METOCEAN GETPOLYGON EXTENSION

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**STANDARD  
Implementation**

**APPROVED**

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## ABSTRACT

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This document defines an extension to WCS2.1, namely the extraction of data contained within a polygon defined either by a set of points or the radius and position of a circle point consisting of an information model and an XML encoding for the following two operations:

- a) **GetCapabilities** – a WCS function that describes the services and operations via a GetCapabilities document.
- b) **GetPolygon** – a WCS function that supports this operation to extract data from a multidimensional cube that lie within a polygon.

Metadata and vocabularies are defined that provide interoperability of these operations and documents using common semantics. The information model proposed supports MetOcean specific concepts and its user community, but these constructs may be useful and applicable to other communities.



## KEYWORDS

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The following are keywords to be used by search engines and document catalogues.

ogcdoc, OGC document, WCS, coverage, meteorology, oceanography, NWP, analysis, polygon observation, measurement, simulation, O&M and MetOcean



## PREFACE

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## SECURITY CONSIDERATIONS

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No security considerations have been made for this standard.





## SUBMITTING ORGANIZATIONS

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The following organizations submitted this Document to the Open Geospatial Consortium (OGC):

- Met Office, UK
- NOAA's National Weather Service



## SUBMITTERS

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# SCOPE

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# 1

## SCOPE

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The purpose of the GetPolygon operation is to extract data contained within a polygon defined either by a set of points or the radius and position of a circle point. The need for the GetPolygon operation stems from active members of the OGC MetOcean Domain Working Group (DWG) who saw a manifest need for extraction of such information from gridded datasets.

This work has been done by members of the OGC MetOcean Domain Working Group.

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# CONFORMANCE

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This standard defines:

- An amended GetCapabilities operation response that will list the GetPolygon operation and specify the token in the Sections element of the GetCapabilities request.
- A new operation “GetPolygon” that is used to extract data from a multidimensional cube contained within a polygon.
- The conformance classes that describe the GetPolygon operation.

Conformance with this standard shall be checked using all the relevant tests specified in Annex A (normative) of this document. The framework, concepts, and methodology for testing, and the criteria to be achieved to claim conformance are specified in the OGC Compliance Testing Policies and Procedures and the OGC Compliance Testing web site[multiblock footnote omitted].

In order to conform to this OGC™ interface standard, a software implementation shall choose to implement:

Any one of the conformance levels specified in Annex A (normative).

All requirements-classes and conformance-classes described in this document are owned by the standard(s) identified.

Requirements and conformance test URIs defined in this document are relative to: [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/)

This document establishes the following requirements and conformance classes:-

**GetPolygon** of URI [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon) getPolygon at a conceptual level in clause 8.1

The corresponding conformance class is **getPolygon** with URI [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon) See A.1

**PolygonDescriptionRing** of [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/PolygonDescriptionRing](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/PolygonDescriptionRing) defining the **PolygonRing** at a conceptual level in clause 8.2

The corresponding conformance class is **PolygonDescriptionRing** with URI [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon/PolygonDescriptionRing](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionRing). See A.2

**PolygonDescriptionCircle** of [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/PolygonDescriptionCircle](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/PolygonDescriptionCircle) defining the **PolygonCircle** at a conceptual level in clause 8.3

The corresponding conformance class is **PolygonDescription** with URI [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon/PolygonDescriptionCircle](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionCircle). See A.3

**SubsetByTrim** of [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/SubsetByTrim](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByTrim) defining the **VerticalTemporalDescription** at a conceptual level in clause 8.4

The corresponding conformance class is **VerticalTemporalDescription** with URI [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon/SubsetByTrim](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/SubsetByTrim). See A.4

**SubsetByInterpolation** of [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/SubsetByInterpolation](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByInterpolation) defining the **VerticalTemporalDescription** at a conceptual level in clause 8.5

The corresponding conformance class is **VerticalTemporalDescription** with URI [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon/SubsetByInterpolation](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/SubsetByInterpolation). See A.5

**GetPolygon-post-xml** of [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean/1.0/req/getPolygon-post-xml](http://www.opengis.net/spec/WCS_application-profile_metocean/1.0/req/getPolygon-post-xml) defining the **VerticalTemporalDescription** at a conceptual level in clause 8.6

The corresponding conformance class is **VerticalTemporalDescription** with URI [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean/1.0/conf/getPolygon-post-xml](http://www.opengis.net/spec/WCS_application-profile_metocean/1.0/conf/getPolygon-post-xml) see A.6



3

# NORMATIVE REFERENCES

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## NORMATIVE REFERENCES

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The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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4

# TERMS AND DEFINITIONS

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## TERMS AND DEFINITIONS

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For the purposes of this document, the following terms and definitions apply.

This document uses the terms defined in Sub-clause 5.3 of [OGC 06-121r8], which is based on the ISO/IEC Directives, Part 2, Rules for the structure and drafting of International Standards. In particular, the word “shall” (not “must”) is the verb form used to indicate a requirement to be strictly followed to conform to this standard.

This document also uses terms defined in the OGC Standard for Modular specifications (OGC 08-131r3), also known as the ‘ModSpec’. The definitions of terms such as standard, specification, requirement, and conformance test are provided in the ModSpec.

For the purposes of this document, the following additional terms and definitions apply. There is some variation in the specific use of some technical terms within the meteorological domain. We have attempted to follow common usage, referring where possible to the WMO No.306 <http://www.wmo.int/pages/prog/www/WMOCodes>.

### 4.1. numerical weather prediction model

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A numerical weather prediction model is a mathematical model of the atmosphere and oceans used to predict the weather based on current weather conditions and are normally run at set times each day.

Synonyms for numerical weather prediction model: forecast model, NWP Model, simulation

An Example of a numerical weather prediction model: The ECMWF model that runs twice per day and creates a ten day prediction of the global atmosphere.

### 4.2. Time Dimension

---

A typical numerical model simulation has the property of start and end time of the simulation. Intermediate times within the simulation are times for which the data may be used as estimate of the forecast conditions at that time. The use of time within this document does assume that the “Time Dimension” of the simulation falls within the start and end times of the simulation. The standard ISO 8601 notation is used to describe time.

## 4.3. Web Coverage Service 2.1 (WCS2.1)

---

Web Coverage Service (WCS) is an OGC standard that refers to the exchange of geospatial information as ‘coverages’: digital geospatial information representing space-varying phenomena.

## 4.4. GetCapabilities operation

---

The getCapabilities is a WCS operation involving a machine to machine communication. A getCapabilities request to a WCS server returns a list of what operations and services (“capabilities”) are being offered by that server.

## 4.5. DescribeCoverage operation

---

A DescribeCoverage is a WCS operation involving a machine-to-machine communication. A DescribeCoverage request to a WCS server returns additional information about a coverage that a client wants to query. Generally speaking, a DescribeCoverage response includes information about the CRS, the metadata, the domain, the range and the formats available. A client generally will need to issue a DescribeCoverage request before it can make the proper GetCoverage request.

## 4.6. Polygon

---

A Polygon, in this document, consist of a plane 2D shape with a depth and time dimension. The polygon may be multi-dimensional, and in the case of aviation is often four dimensions, i.e. x, y, z, t.

## 4.7. GetPolygon operation

---

GetPolygon is a newly proposed MetOcean operation involving a machine to machine communication. A GetPolygon request to a WCS server returns a polygon coverage based on a trajectory path with a lateral and vertical extent (the polygon).

5

# CONVENTIONS

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## CONVENTIONS

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This sections provides details and examples for any conventions used in the document. Examples of conventions are symbols, abbreviations, use of XML schema, or special notes regarding how to read the document.

### 5.1. IDENTIFIERS

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The normative provisions in this standard are denoted by the URI

<http://www.opengis.net/spec/{standard}/{m.n}>

All requirements and conformance tests that appear in this document are denoted by partial URIs which are relative to this base.

### 5.2. ABBREVIATED TERMS

---

**GML** Geography Mark-up Language

**O&M** Observations and Measurements

**OGC** Open Geospatial Consortium

**MetOcean** Meteorological/Oceanographic

**NWP** Numerical Weather Prediction

**SWE** OGC Sensor Web Enablement

**UML** Unified Modelling Language

**WCS2.1** OGC Web Coverage Service version 2.1

**WMO** World Meteorological Organisation

**XML** W3C Extensible Markup Language

**XSD** W3C XML Schema Definition Language

## 5.3. SCHEMA LANGUAGE

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The XML implementation specified in this Standard is described using the XML Schema language (XSD) [XML Schema Part 1: Structures, XML Schema Part 2: Datatypes] and Schematron [ISO/IEC 19757-3, Information technology – Document Schema Definition Languages (DSDL) – Part 3: Rule-based validation – Schematron].

## 5.4. UML NOTATION

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The diagrams that appear in this standard are presented using the Unified Modeling Language (UML) static structure diagram.

**Note:** Within the context of this standard, the following color scheme is used to identify the package in which the class exists. This is just for informative purposes.



Blue: WCS2.1 plus extensions (rsub, scal, int and crs)



Orange: CIS (Coverage Implantation Schema 1.1)



Green: This standard

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# VOCABULARIES

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This standard defines a number of properties that require the use of codes or vocabulary items. In some cases, a list of terms are provided. The MetOcean Profile, on which this builds, has a specific vocabulary provided by the WMO (World Meteorological Office). These vocabularies are concerned with the naming of parameters (variables) used in the rangeSubset element, the coordinate reference systems (aka fixedSurfacetypeAndUnits) used in the srsName attribute, the units of measure, and the significance of time codes. The following table lists the references used within this document.

Table 1 — Summary of vocabularies within this standard

CODE LIST	CODE REFERENCE
GRIB edition 2	<a href="http://codes.wmo.int/ grib2">http://codes.wmo.int/ grib2</a>
Discipline	<a href="http://codes.wmo.int/grib2/codeflag/ 0.0">http://codes.wmo.int/grib2/codeflag/ 0.0</a>
Fixed surface types and units	<a href="http://codes.wmo.int/grib2/codeflag/ 4.5">http://codes.wmo.int/grib2/codeflag/ 4.5</a>
Parameter category	<a href="http://codes.wmo.int/grib2/codeflag/ 4.1">http://codes.wmo.int/grib2/codeflag/ 4.1</a>
Parameter number	<a href="http://codes.wmo.int/grib2/codeflag/ 4.2">http://codes.wmo.int/grib2/codeflag/ 4.2</a>



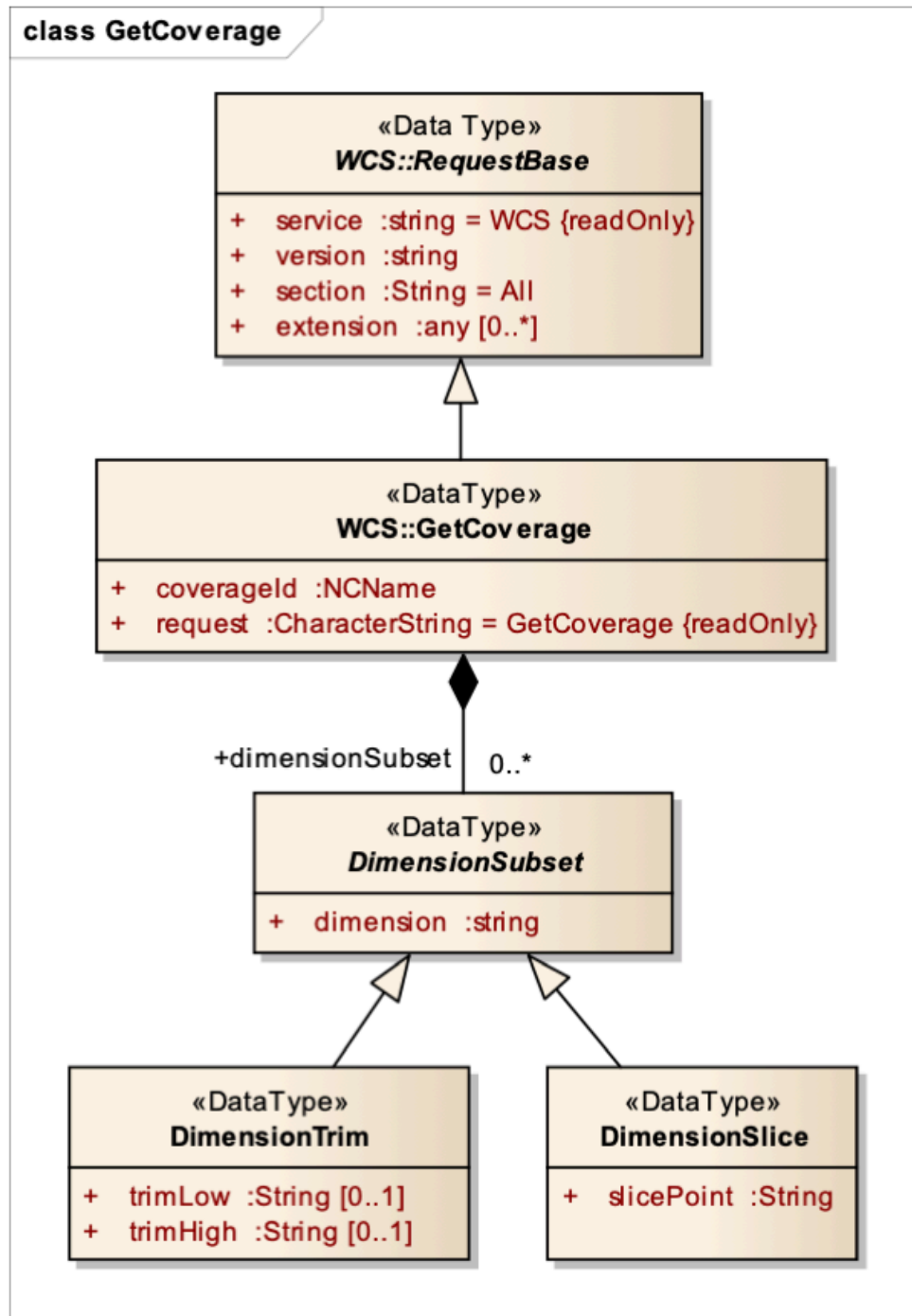
7

# NON-NORMATIVE (INFORMATIVE) MATERIAL

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The GetPolygon extension for WCS2.1 is an initiative of the MetOcean DWG to enhance the WCS2.1 core profile to extract coverages other than those extracted using the simple SLICE and TRIM methods provided by the core GetCoverage operation shown in Figure 1. For reference to the core WCS2.1 see OGC® Web Coverage Service 2.1 Interface Standard – Core ([OGC 17-089r1](#)). This specific extension is designed specifically to extract polygons from multidimensional cubes such as those created by numerical simulations (i.e. NWP) commonly found in the MetOcean community.

Figure 1 – WCS GetCoverage operation UML class diagram



The need for this work arises out of the growing need to transfer increasing amounts of data across networks. This can, and should, be done more efficiently by sub-setting the data. This profile specifies how data contained within a polygon may be extracted on the WCS server and transferred to the client. The document also details how the OGC's WCS2.1 Core is extended to include an additional GetPolygon operation. Finally, the Coverage Implementation Schema (CIS1.1) is used to describe the vertical and temporal definition of the Polygon.

## 7.1. WCS2.1

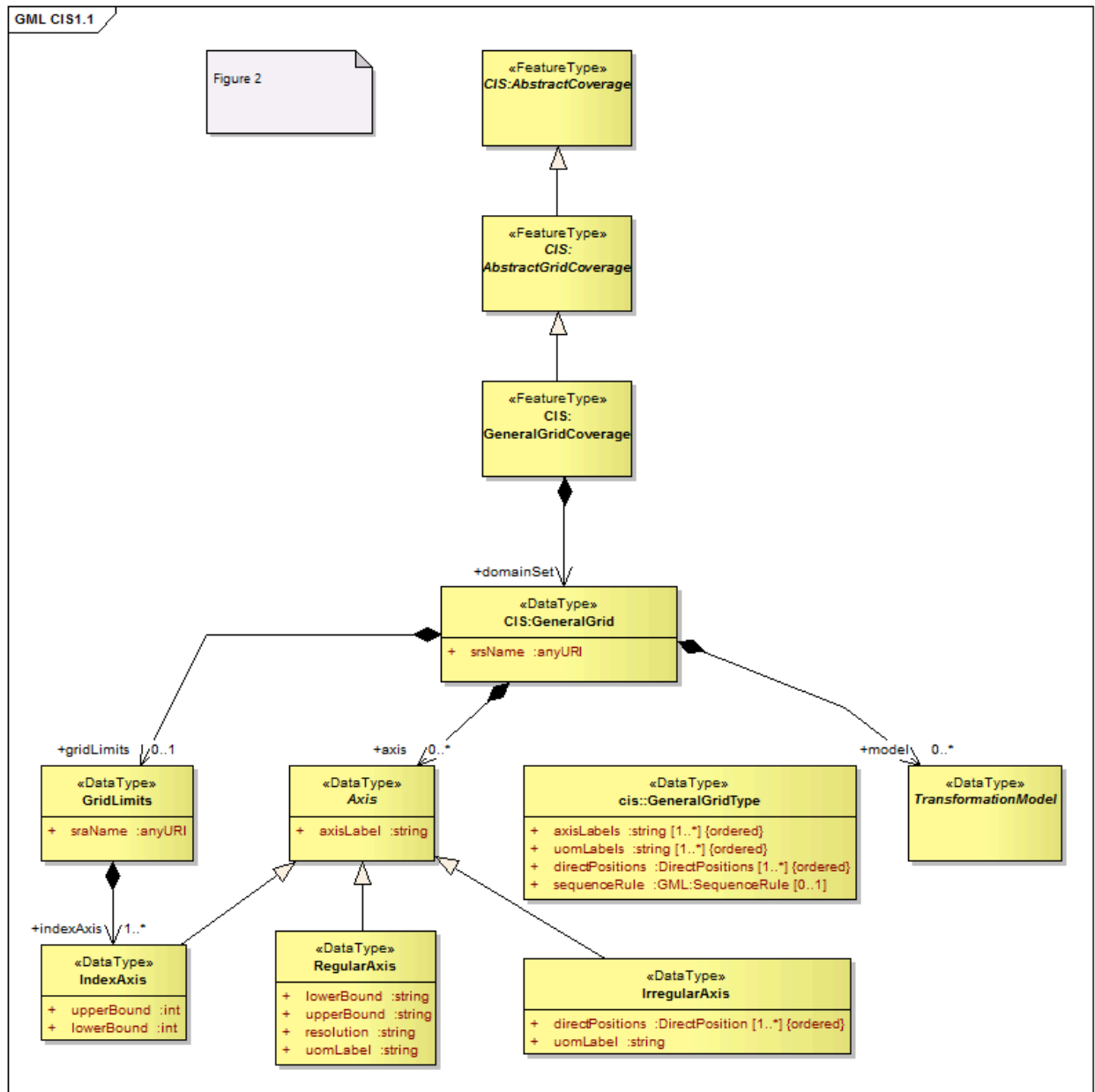
---

The WCS2.1 files (see [https://portal.opengeospatial.org/files/?artifact\\_id=671116&version=1](https://portal.opengeospatial.org/files/?artifact_id=671116&version=1)) that form the core standard and the extensions (see below) describe the GetCapabilities, DescribeCoverage and GetCoverage operations. The GetPolygon extension will use the following extensions to WCS core:

- WCS Range Subsetting Extension, version 1.0.0, [OGC 12-040](#)
- WCS Scaling Extension, version 1.0.0, [OGC 12-039](#)
- WCS Interpolation Extension, version 1.0.0, [OGC 12-049](#)
- WCS CRS Extension, version 1.0, [OGC 11-053r1](#)

The main benefit of WCS2.1 core to the MetOcean Profile, and specifically the getPolygon operation, is that it allows the description of a CIS1.1 Coverage (see Figure 2). This is important as CIS1.1 supports multi-dimensional coverages and the encoding of coverage types such as polygons.

Figure 2 – UML Diagram representing the coverage model (CIS 1.1)



## 7.2. A SHORT NWP (NUMERICAL WEATHER PREDICTION) PRIMER

The term “NWP model” refers to a computer simulation used to forecast the future state of the ocean/atmosphere. A NWP model is normally “run” at a set time and repeated at regular intervals during the day. Each model run has a “Time Dimension” that has “start time”, “end time” and intermediate times. These intermediate times are at set intervals and often referred to as

“forecast times”. For each “forecast time”, there will be an estimate of the atmospheric/oceanic conditions for that time. The model start time is a notional time that sets a “base” time for the time intervals. Thus a time interval may have an absolute time e.g. 2017-05-15T00:00:00Z. Or, a time interval may use the start time as reference e.g. PT30H. This signifies a time that is 30 hours ahead of the “start time”.

## 7.3. COVERAGES

---

A “coverage” contains a “DomainSet” component describing the coverage’s domain (i.e. the locations for which values are stored in the coverage) and a “rangeSet” component containing the values of the coverage. A “coverage” also contains a RangeType element that describes the coverage’s range set data structure that consists of one or more fields (also referred to as parameters) that uses the SWE Common [OGC 08-094] DataRecord. The metadata component represents an extensible slot for metadata. The CIS1.1 UML diagram is shown in Figure 2.

### 7.3.1. 4D Coverages

A typical NWP forecast is normally a set of 2D rectified grids; although more advanced, grids may be used. A typical model run contains literally thousands of 2D grids and each may be described using the CIS1.1 “General Grid” coverage model.

These coverages may be described and accessed by using the OGC’s Web Coverage Service (WCS). The main services are “GetCapabilities”, “DescribeCoverage” and “GetCoverage”. A problem with this approach is that the metadata returned by the GetCapabilities response and the number of GetCoverage requests quickly becomes unmanageable. By creating a multidimensional coverage from the 2D coverages, the amount of data and number of GetCoverage requests are greatly reduced, often by a factor of 100.

The key to creating a multidimensional coverage is OGC’s CIS1.1 “Coverage” model. This model makes it much easier to describe the “Domain Set” as a multi-dimensional geometry object.

A typical numerical simulation has a number of different vertical coordinates (i.e. pressure, height above mean sea level, height above ground, surface, and max wind level). By forming a 4D coverage from all of the 2D coverages that share the same horizontal, vertical, and temporal domains, there is a significant reduction in number of coverages, thus reducing complexity. This is a challenge, as the vertical and temporal axes are not regular and need to be enumerated. The “GeneralGridCoverage” as described in CIS1.1 makes this possible.

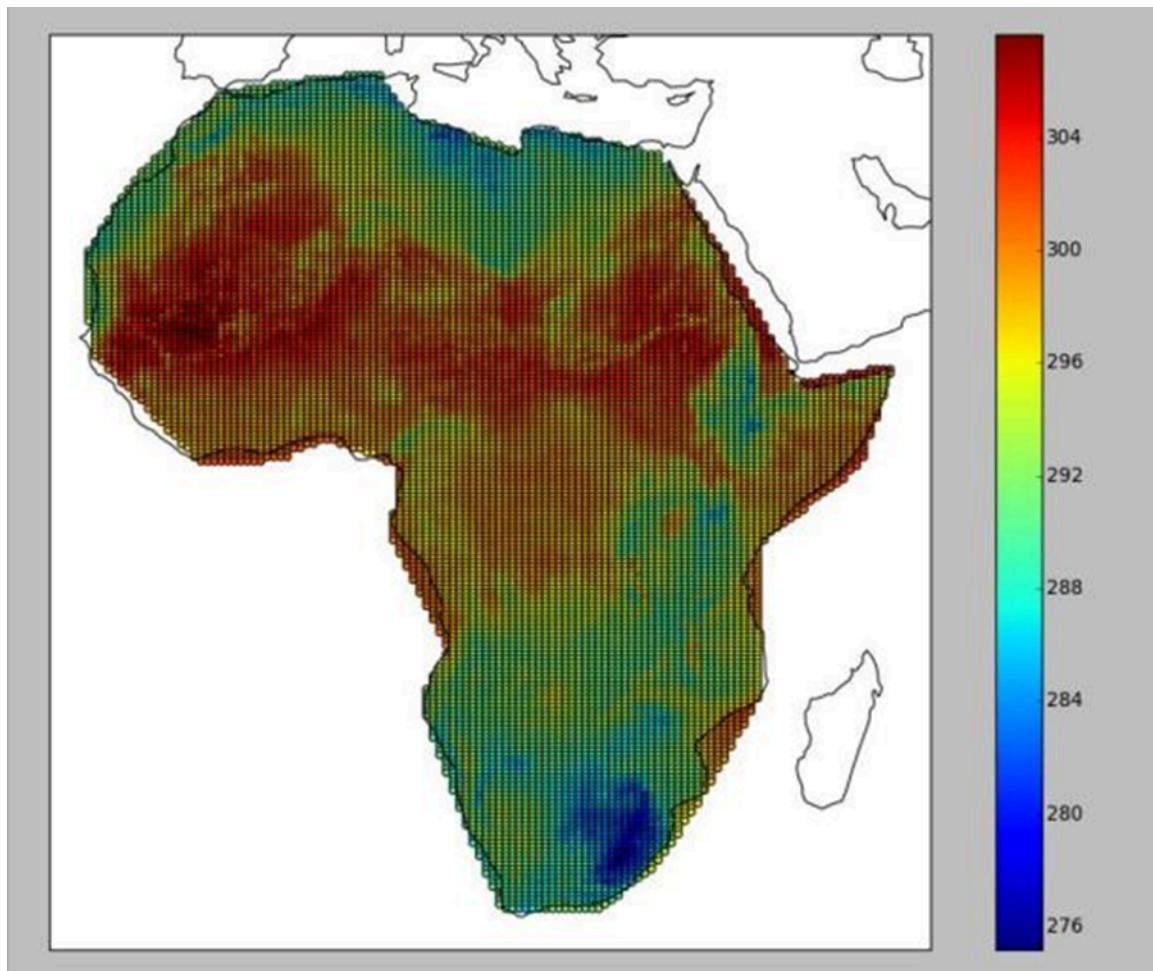
This key concept therefore changes the traditional view of data as being a set of 2D fields; each with a level, level type, parameter name, and forecast period. We can now describe the whole atmosphere as a multidimensional cube with properties, e.g. temperature, wind speed, and humidity. This results in the ability to make multidimensional (4/5/\* D) geospatial queries that are much more efficient, for both the WCS2.1 GetCoverage, GetPolygon and GetCorridor operations. It is important to note that there are special cases where the vertical axis has no vertical dependency (e.g. surface, max wind level). It is also possible that some parameters (e.g. temperature) may belong to more than one coverage (e.g. surface, isobaric, etc.)

## 7.4. POLYGONS:

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A typical polygonal extraction pattern is shown in Figure 3 using a set of points to describe the polygon. A special case of a polygon extraction is to use a circle with a radius and centre point position.

Figure 3 – Polygonal Subset (Extraction Pattern)



### 7.4.1. Encoding

Encoding of the polygon in GML is likely to be very verbose and in such cases, a binary format should be used. An alternative to GML e.g. JSON, would however provide a very accessible encoding.





8

# THE CORE GETPOLYGON REQUIREMENT (NORMATIVE)

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# THE CORE GETPOLYGON REQUIREMENT (NORMATIVE)

## 8.1. REQUIREMENTS CLASS: GETPOLYGON

This clause establishes the GetPolygon extension core for conformance class getPolygon. Clients & servers supporting the requirements class support the extraction of a polygon from a multidimensional coverage. A UML diagram of class GetPolygon is shown in Figure 4.

### REQUIREMENTS CLASS

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon)

Dependency <http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage>

Dependency [http://www.opengis.net/spec/WCS\\_service-extension\\_range-subsetting/1.0/conf](http://www.opengis.net/spec/WCS_service-extension_range-subsetting/1.0/conf)

Requirement 1 [/req/getPolygon/structure](#)

A metoceanpolygon:GetPolygon instance **shall** conform to Figure 4 and Table 2, Table 3 and Table 4.

Requirement 2 [/req/getPolygon/getCapabilities-response-conformance-class-in-profile](#)

A WCS service implementing this extension **shall** include the following URI in a Profile element in the ServiceIdentification in a GetCapabilities response:

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon)

Requirement 3 [/req/getPolygon/request-valid-identifier](#)

The coverageId parameter value in a *GetPolygon* request **shall** be equal to the identifier of one of the coverages offered by the server addressed.

Requirement 4 [/req/getPolygon/acceptable-format](#)

If a *GetPolygon* request contains a format parameter then this parameter **shall** contain a MIME type identifier occurring in some WCS::formatSupported element of the response to a successful GetCapabilities request to this server.

Requirement 5 [/req/getPolygon/acceptable-mediaType](#)

If a *GetPolygon* request contains a mediaType parameter then this parameter **shall** contain a MIME type identifier of fixed value "multipart/related".

Requirement 6 [/req/getPolygon/polygon-description](#)

Check that the Polygon Description element conforms to the requirements classes

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/SubsetByInterpolation](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByInterpolation)

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/SubsetByTrim](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByTrim)

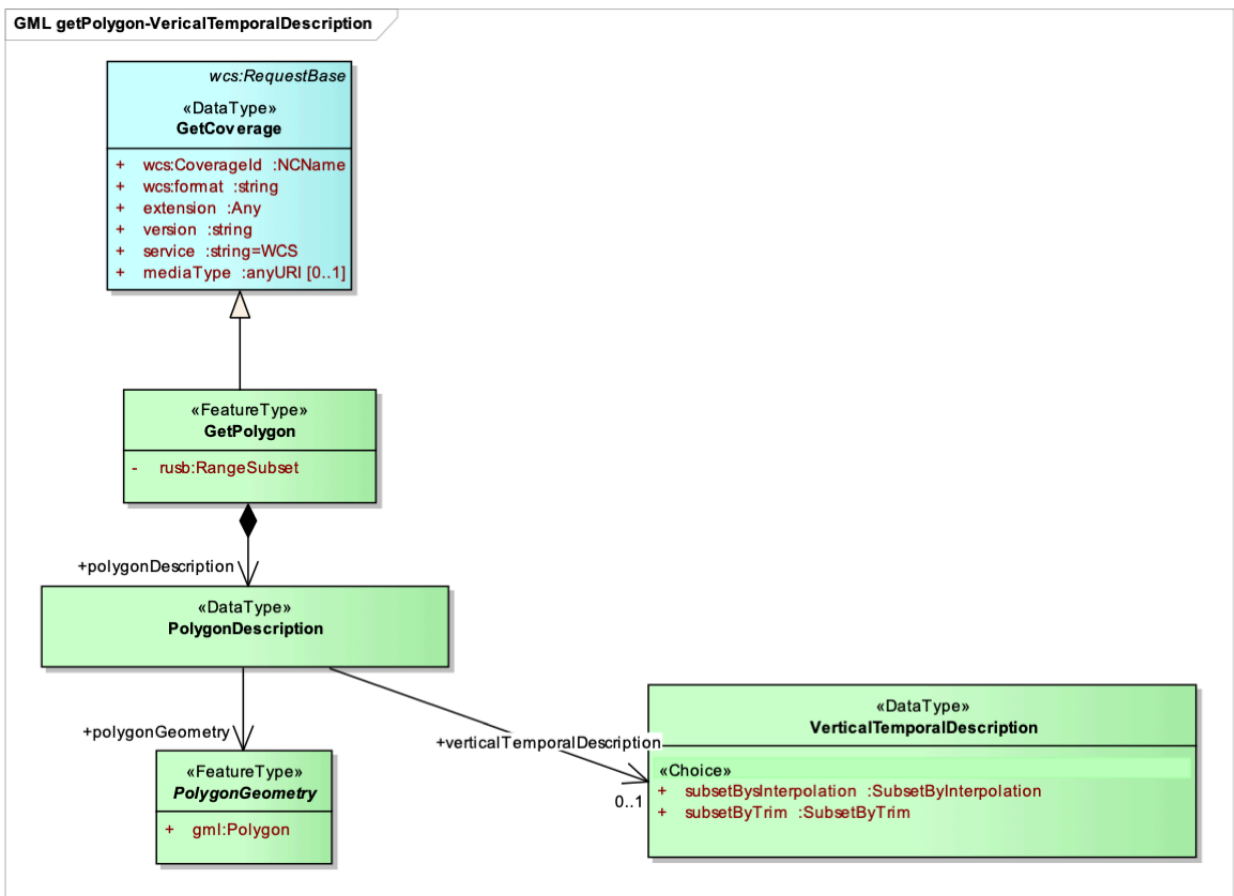
Requirement 7 [/req/getPolygon/range-component](#)

The parameter value of the RangeComponent of the wcs:Rangeltem element **shall** contain a parameter that is part of the requested coverage.

## REQUIREMENTS CLASS

- Requirement 8     /req/getPolygon/response-encoding  
 The contents of the response to a successful *GetPolygon* request shall be encoded as specified by the request format parameter, if this parameter is present, and in the coverage's Native Format if this parameter is not present.
- Requirement 9     /req/getPolygon/PolygonDescription/PolygonRingGeometry  
 The server shall support at least one of the conformance classes i.e.  
[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon/PolygonDescriptionRing](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionRing)  
[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon/PolygonDescriptionCircle](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionCircle)

Figure 4 – GetPolygon UML class diagram



### 8.1.1. Requirements class overview

The GetPolygon requirements class defines the structure of the GetPolygon operation.

## 8.1.2. Metoceanpolygon::GetPolygon

The new operation GetPolygon allows for the extraction of a polygon. The extra conformance classes are used to further define the possible options outlined here in the getPolygon conformance class. The GetPolygon operation is derived from wcs:GetCoverage and inherits the version and service elements. The GetPolygon properties are listed in Table 2.

Table 2 – METOCEANPOLYGON::GetPolygon properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
metoceanpolygon:polygonDescription	The definition of the extraction pattern (polygon) to be used by the GetPolygon request.	metoceanpolygon:PolygonDescription	One (mandatory)
metoceanpolygon:verticalTemporalDescription		metoceanpolygon:VerticalTemporalDescription	Zero or One (Optional)
wcs:coverageld	Identifier of a coverage offered by the service on hand	NCName	one (mandatory)
wcs:mediaType	Optional element indicating the MIMEType of the GetCoverage response <sup>a</sup> .	anyURI, fixed to "multipart/related"	zero or one (optional)
wcs:format	MIME type identifier of the format in which the coverage returned is encoded	anyURI	zero or one (optional)
rsub:RangeSubset	Selection is based on the coverage's range type definition where identifiable components are given; in the MetOcean domain, these take the form of defined parameters.	Directly referred to be the GetCorridor element.geltem.	One (mandatory)

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
service	The service name.	string=wcs	required
wcs:extension	Extension element used to hook in additional content e.g. in extensions or application profiles.	Any	One or more

<sup>a</sup> Only currently allowed valued is “multipart/related”.

### 8.1.3. rsub::RangeSubset

The RangeSubset properties are listed in Table 3.

Table 3 – RSUB::RangeSubset properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
rsub:RangeItem	List of range components to be extracted	RangeComponent or RangeInterval	one or more (mandatory)
rsub:RangeComponent	Range component name	RangeComponent	one (mandatory)
rsub:RangeInterval	Pair of range interval lower and upper bound	Pair of RangeComponent	one (mandatory)

### 8.1.4. rsub::RangeSubset

The RangeSubset properties are listed in Table 4.

Table 4 – RSUB::RangeSubset properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
rsub:RangeComponent	Range component name	RangeComponent	one (mandatory)

## 8.2. REQUIREMENTS CLASS: POLYGONDESCRIPTIONRING

### 8.2.1. Requirements class overview

This clause establishes the PolygonDescriptionRing requirements class. Clients and servers supporting the requirements class support the extraction of a polygon from a multidimensional data cube using the “PolygonRing” definition of a polygon must conform this requirements class.

#### REQUIREMENTS CLASS

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/  
PolygonDescriptionRing](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/PolygonDescriptionRing)

Dependency <http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage>

Dependency <http://www.opengis.net/gml/3.2>

Requirement 10 [/req/getPolygon/PolygonDescriptionRing/structure](#)  
A metoceanpolygon:PolygonDescription instance **shall** conform to Figure 5 and, Table 5, Table 6 and Table 7

Requirement 11 [/req/getPolygon/PolygonDescriptionRing/Construct](#)  
The PolygonRing element **shall** be derived from PolygonGeometry

Requirement 12 [/req/getPolygon/PolygonDescriptionRing/containment](#)  
Only data contained within the polygon **shall** be included in the result.

Requirement 13 [/req/getPolygon/PolygonDescriptionRing/closure](#)  
The first and last values in the gml:posList element as contained within the gml:LinearRing element **shall** have the same value.

Figure 5 – PolygonDescriptionRing UML class diagram



## 8.2.2. Requirements class overview

The PolygonDescription requirements class defines the structure of the polygon as extracted by the GetPolygon operation. The Polygon may be defined in one of two ways; either be a ring or a circle. The two methods are described as “per Ring” or “per Circle”.

## 8.2.3. PolygonDescription as per PolygonRing

In this clause the polygon will be defined as a set of points to form a ring. The PolygonDescription properties, as per PolygonRing, are listed in Table 5.

Table 5 – METOCEANPOLYGON::PolygonDescription properties as per PolygonRing

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
metoceanpolygon: polygonGeometry	The geometry of the polygon defined as a set of points.	metoceanpolygon:PolygonRing (By substitution)	One (mandatory)

## 8.2.4. PolygonRing Properties

Table 6 – Table 6 METOCEANPOLYGON::PolygonRing properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
gml:Polygon	The geometry of the polygon defined as a set of points.	gml:exterior	One (mandatory)

## 8.2.5. Polygon Properties

Table 7 – GML::Polygon properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
gml:exterior	The direct positions of the polygon points	gml:LinearRing	One (mandatory)



## 8.3. REQUIREMENTS CLASS: POLYGONDESCRIPTIONCIRCLE

### 8.3.1. Requirements class overview

This clause establishes the PolygonDescriptionCircle requirements class. Clients and servers supporting the requirements class support the extraction of a polygon from a multidimensional coverage using the “PolygonCircle” definition of a polygon, must conform this requirements class..

#### REQUIREMENTS CLASS

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/  
PolygonDescriptionCircle](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/PolygonDescriptionCircle)

Dependency <http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage>

Dependency <http://www.opengis.net/gml/3.2>

Requirement 14 </req/getPolygon/PolygonDescriptionCircle/structure>  
A metoceanpolygon:PolygonDescription instance **shall** conform to Figure 6 and Table 8, Table 9, Table 10, Table 11, Table 12 and Table 13.

Requirement 15 </req/getPolygon/PolygonDescriptionCircle/PolygonCircle>  
The PolygonCircle element **shall** be derived from PolygonGeometry.

Requirement 16 </req/getPolygon/PolygonDescriptionRing/PolygonRing>  
Only data contained within the polygon **shall** be included in the result.

Figure 6 – PolygonDescription UML class diagram



### 8.3.2. PolygonDescription as per PolygonCircle

In this clause the polygon will be defined as a circle with centre point and radius. The PolygonDescription properties, as per PolygonCircle, are listed in Table 8.

Table 8 – METOCEANPOLYGON::PolygonDescription properties as per PolygonCircle

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
metoceanpolygon: polygonGeometry	The geometry of the polygon defined as a centre point and radius	metoceanpolygon:PolygonCircle (By substitution)	One (mandatory)

### 8.3.3. PolygonDescription as per PolygonCircle

Table 9 – GML::Polygon properties as per PolygonCircle

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
	The geometry of the polygon defined as a set of points.	gml:Polygon	One (mandatory)

### 8.3.4. GML::Polygon as per PolygonCircle

A Polygon is a special surface that is defined by a single surface . The boundary of this patch is coplanar and the polygon uses planar interpolation in its interior. The elements exterior and interior describe the surface boundary of the polygon. The Polygon properties, as per PolygonCircle, are listed in Table 10.

Table 10 – GML::Polygon properties as per PolygonCircle

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
gml:exterior	The specification of the polygon	Circle gml: Ring	One (mandatory)

### 8.3.5. GML::Ring

A ring is used to represent a single connected component of a surface boundary as specified in ISO 19107:2003, 6.3.6. Every gml:curveMember references or contains one gml:Curve. In the context of a ring, a curve describes the boundary of the surface. The curve is described by referencing one or more gml:segments. The Ring properties are listed in Table 11.

Table 11 – GML::Ring

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
<code>gml:curveMember</code>	Defines the polygon as a set of connected curves	<code>gml: Curve</code>	One or more (mandatory)

### 8.3.6. GML::Curve

A curve is composed of one or more curve segments. The element `gml:segments` encapsulates the segments of the curve. The Curve properties are listed in Table 12 GML::Curve.

Table 12 – GML::Curve

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
<code>gml:segments</code>	A special case where the segment defines a circle	<code>gml: CircleByCenterPoint</code>	One or more (mandatory)

### 8.3.7. GML:: CircleByCenterPoint

A `gml:CircleByCenterPoint` is a `gml:ArcByCenterPoint` with identical start and end angle to form a full circle. This representation can be used only in 2D. The `CircleByCenterPoint` properties are listed in Table 13 GML::CircleByCenterPoint.

Table 13 – GML::CircleByCenterPoint

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
<code>gml:pos</code>	The centre point of the circle.	<code>gml:doubleList</code>	One (mandatory)
<code>gml:radius</code>	The radius of the circle.	<code>gml:double</code>	One (mandatory)

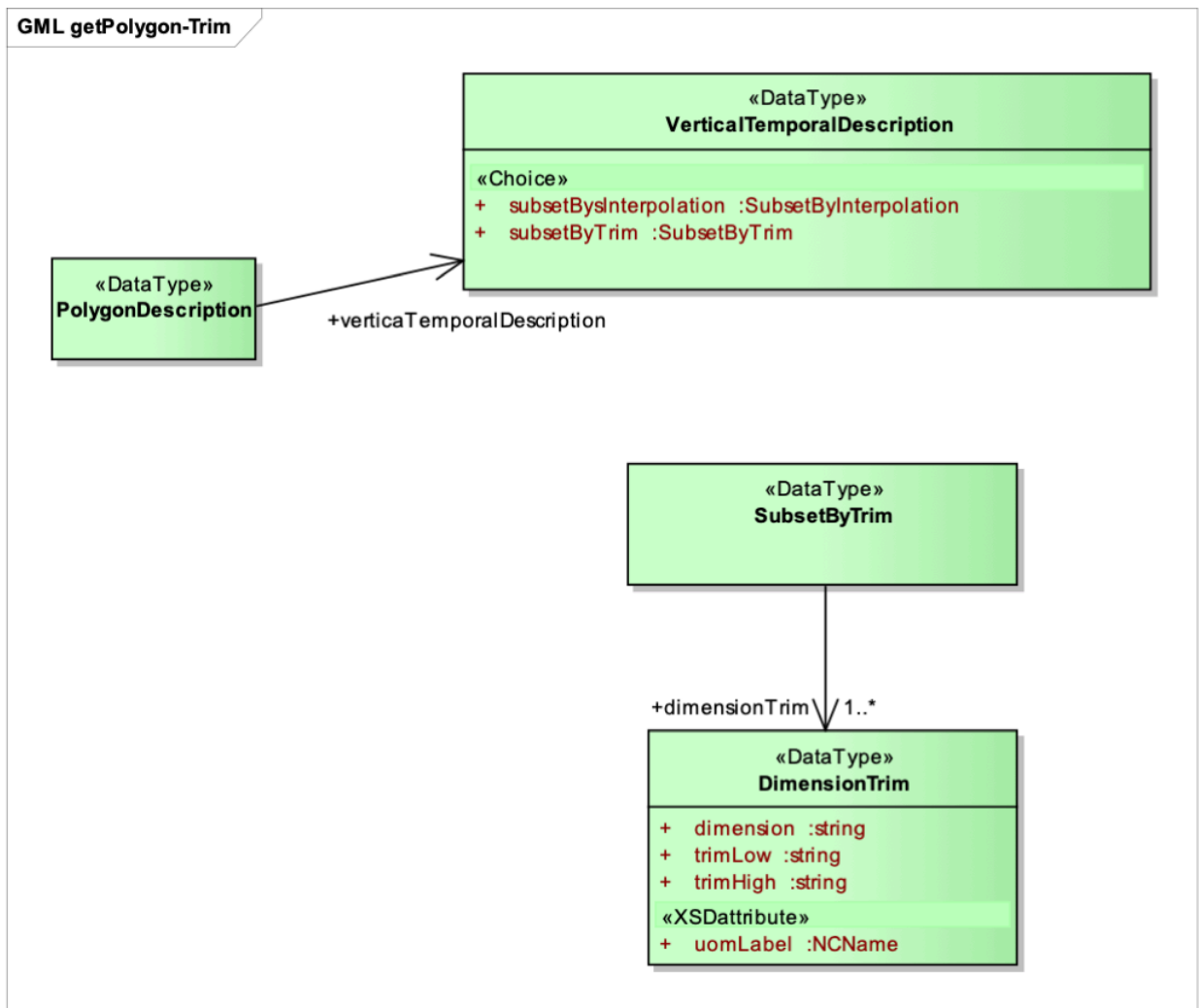
## 8.4. REQUIREMENTS CLASS: SUBSETBYTRIM

This clause establishes the `SubsetByTrim` conformance class. Clients and servers supporting the requirements class support the extraction of a polygon from a multidimensional data cube and only applies to vertical and temporal extent, if applicable. A UML diagram of class `SubSetByTrim` is shown in Figure 7. As stated in Section 7.3.1, the vertical and temporal axes are not necessarily regular and thus need to be enumerated. This necessitates using the

“CIS::GeneralGridCoverage” as described in CIS1.1, which makes this enumeration possible. A UML diagram of class VerticalTemporalDescription is shown in Figure 6.

REQUIREMENTS CLASS	
<a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByTrim">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByTrim</a>	
Dependency	<a href="http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage">http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage</a>
Dependency	<a href="http://www.opengis.net/spec/CIS/1.1/conf/coverage/conf">http://www.opengis.net/spec/CIS/1.1/conf/coverage/conf</a>
Dependency	<a href="http://www.opengis.net/spec/CIS/1.1/conf/grid-irregular/conf">http://www.opengis.net/spec/CIS/1.1/conf/grid-irregular/conf</a>
Requirement 17	<b>/req/getPolygon/SubsetByTrim/structure</b> A metoceanpolygon:SubesetByTrim instance <b>shall</b> conform to Figure 7, Table 14 and Table 15
Requirement 18	<b>/req/getPolygon/SubsetByTrim/request-valid-dimension</b> + Every dimension value in a GetPolygon Trim request <b>shall</b> be equal to one of the axisLabels dimension names specified in the coverage’s domain set.
Requirement 19	<b>/req/getPolygon/request-no-duplicate-dimension</b> + A GetPolygon request <b>shall</b> contain at most one subsetting operation for each of the dimensions of the coverage addressed.
Requirement 20	<b>/req/getPolygon/SubsetByTrim/Polygon-trim-within-extent</b> Let the extent of the coverage’s CIS::Envelope along the dimension specified in the trim request range from L to H. Then, for the trim bounds trimLow and trimHigh the following <b>shall</b> hold: $L \leq \text{trimLow} \leq \text{trimHigh} \leq H$

Figure 7 – SubsetByTrim UML class diagram



### 8.4.1. Requirements class overview

The polygon extraction pattern uses a 2D polygon, that is replicated over selected levels in the vertical dimension and selected times in the temporal dimension. These levels and times are selected by “trimming” the MetOcean cube in the vertical and temporal dimensions.

### 8.4.2. SubsetByTrim Properties

The limits define the upper and lower times and levels to be extracted from the parent MetOcean cube. The extraction, as per the polygon, is only extracted on levels and times from the MetOcean cube that lie between the upper and lower limits. The SubsetByTrim properties are listed in Table 14.

Table 14 – METOCEANPOLYGON::SubsetByTrim properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
dimensionTrim	Subsetting specifications, at most one per subsetting dimension	DimensionTrim	One (mandatory)

### 8.4.3. DimensionTrim Properties

The DimensionTrim properties are listed in Table 15.

Table 15 – METOCEANPOLYGON::DimensionTrim properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
dimension	Name of dimension along which to subset	string	One or more (mandatory)
trimLow	Lower bound of cutout along dimension	string	One (mandatory)
trimHigh	Upper bound of cutout along dimension	string	One (mandatory)

### 8.4.4. An example an encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<metoceanpolygon:GetPolygon
  xmlns:wcs20="http://www.opengis.net/wcs/2.0"
  xmlns:rsub="http://www.opengis.net/wcs/range-subsetting/1.0"
  xmlns:metoceanpolygon="http://www.opengis.net/wcs/metoceanProfile_getPolygon/1.0"
  xmlns:cis="http://www.opengis.net/cis/1.1/gml"
  xmlns:gml="http://www.opengis.net/gml/3.2"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.opengis.net/wcs/metoceanProfile_getPolygon/1.0 http://
schemas.opengis.net/wcs/metoceanProfile/1.0/wcsMetOceanGetPolygon.xsd"
  service="WCS" version="2.0.0">
<wcs20:CoverageId>CoverageId0</wcs20:CoverageId>
<rsub:RangeSubset>
<rsub:RangeItem>
<rsub:RangeComponent>Temperature</rsub:RangeComponent>
</rsub:RangeItem>
<rsub:RangeItem>
<rsub:RangeComponent>Wind_Speed</rsub:RangeComponent>
</rsub:RangeItem>
<rsub:RangeItem>
<rsub:RangeComponent>Wind_Direction</rsub:RangeComponent>
</rsub:RangeItem>
</rsub:RangeSubset>
<metoceanpolygon:polygonDescription>
<metoceanpolygon:PolygonDescription>
```

```

<metoceanpolygon:polygonGeometry>
<metoceanpolygon:PolygonRing gml:id="ID000">
<gml:Polygon gml:id="Model_Boundary-Geometry"
uomLabels="deg deg" axisLabels="lat Lon"
srsDimension="2"
srsName="http://www.opengis.net/def/crs/EPSSG/0/4326">
<gml:exterior>
<gml:LinearRing>
<gml:posList> -90.0 -180.0 90.0 -180.0 90.0 180.0
-90.0 180.0 -90.0 -180.0 </gml:posList>
</gml:LinearRing>
</gml:exterior>
</gml:Polygon>
</metoceanpolygon:PolygonRing>
</metoceanpolygon:polygonGeometry>
<metoceanpolygon:verticalTemporalDescription>
<metoceanpolygon:VerticalTemporalDescription>
<metoceanpolygon:subsetByTrim>
<metoceanpolygon:SubsetByTrim>
<metoceanpolygon:dimensionTrim>
<metoceanpolygon:DimensionTrim uomLabel="hPA">
<metoceanpolygon:dimension>Pressure</metoceanpolygon:dimension>
<metoceanpolygon:trimLow>200.0</metoceanpolygon:trimLow>
<metoceanpolygon:trimHigh>1000.0</metoceanpolygon:trimHigh>
</metoceanpolygon:DimensionTrim>
</metoceanpolygon:dimensionTrim>
<metoceanpolygon:dimensionTrim>
<metoceanpolygon:DimensionTrim uomLabel="ISO8601">
<metoceanpolygon:dimension>Time</metoceanpolygon:dimension>
<metoceanpolygon:trimLow>2017-05-14T00:00:00Z</metoceanpolygon:trimLow>
<metoceanpolygon:trimHigh>2017-05-15T00:00:00Z</metoceanpolygon:trimHigh>
</metoceanpolygon:DimensionTrim>
</metoceanpolygon:dimensionTrim>
</metoceanpolygon:SubsetByTrim>
</metoceanpolygon:subsetByTrim>
</metoceanpolygon:VerticalTemporalDescription>
</metoceanpolygon:verticalTemporalDescription>
</metoceanpolygon:PolygonDescription>
</metoceanpolygon:polygonDescription>
</metoceanpolygon:GetPolygon>

```

## 8.5. REQUIREMENTS CLASS: SUBSETBYINTERPOLATION

This clause establishes the SubsetByInterpolation conformance class. Clients and servers supporting the requirements class support the extraction of a polygon from a multidimensional coverage that has a vertical and temporal extent by interpolating the data to a defined vertical/temporal axes. A UML diagram showing the SubsetByInterpolation class is shown in Figure 8.

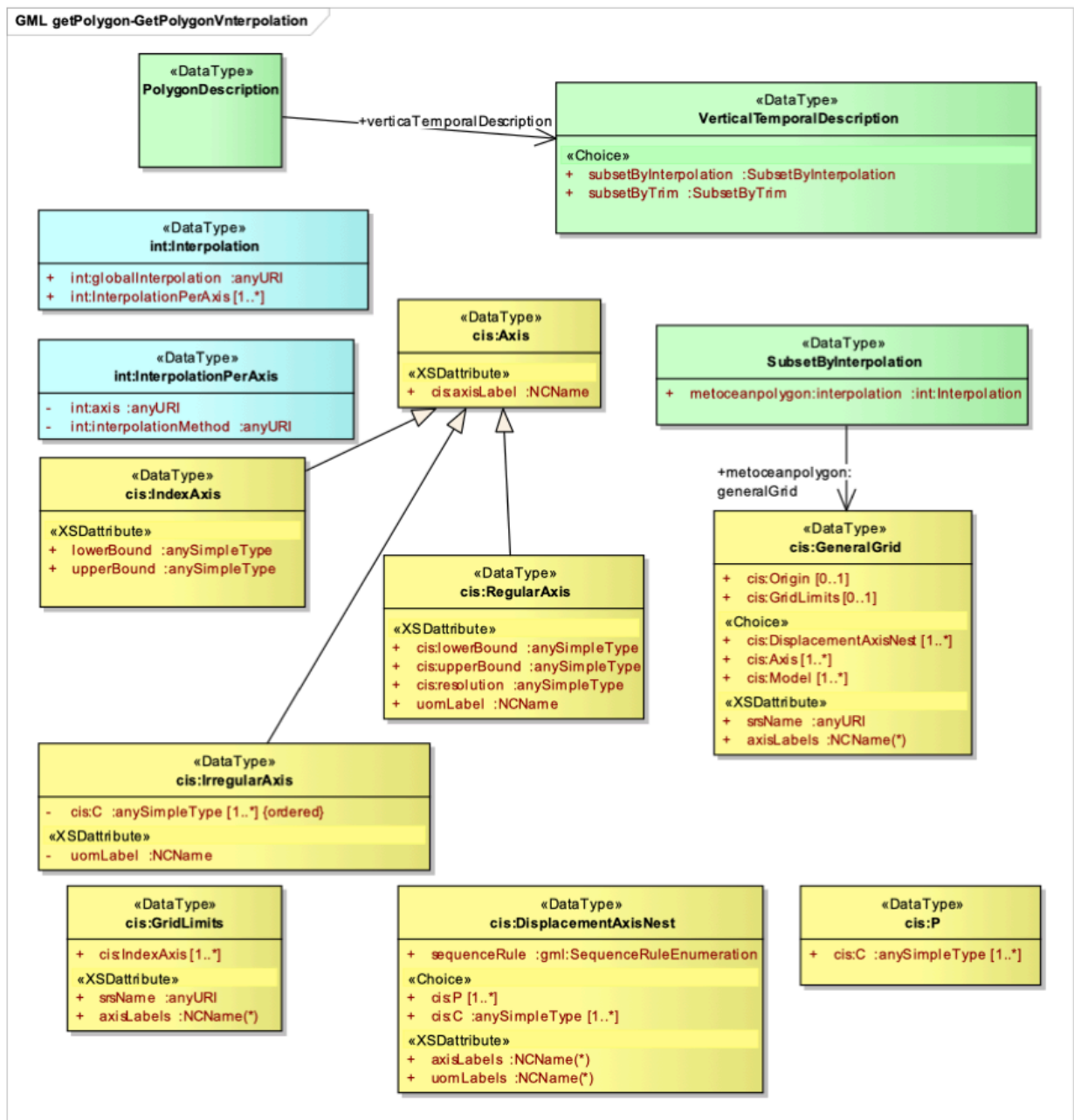


## REQUIREMENTS CLASS

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/SubsetByInterpolation](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByInterpolation)

Dependency	<a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon</a>
Dependency	<a href="http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage">http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage</a>
Dependency	<a href="http://www.opengis.net/spec/CIS/1.1/conf/coverage/conf">http://www.opengis.net/spec/CIS/1.1/conf/coverage/conf</a>
Dependency	<a href="http://www.opengis.net/spec/CIS/1.1/conf/grid-regular/conf">http://www.opengis.net/spec/CIS/1.1/conf/grid-regular/conf</a>
Dependency	<a href="http://www.opengis.net/spec/CIS/1.1/conf/grid-irregular/conf">http://www.opengis.net/spec/CIS/1.1/conf/grid-irregular/conf</a>
Dependency	<a href="http://www.opengis.net/spec/WCS_service-extension_range-subsetting/1.0/conf">http://www.opengis.net/spec/WCS_service-extension_range-subsetting/1.0/conf</a> .
Requirement 21	<b>/req/getPolygon/SubsetByInterpolation/structure</b> A metoceanpolygon:VerticalTemporalDescription instance <b>shall</b> conform to Figure 8 and Table 16, Table 17, Table 18, Table 19, Table 21, Table 22, Table 23, Table 25 and Table 24
Requirement 22	<b>/req/getPolygon/SubsetByInterpolation/grid-order</b> In a coverage using the grid-irregular scheme, the directPosition values in any CIS: :IrregularAxis <b>shall</b> be listed in strictly monotonic order, expressed in the units of measure of this axis as defined in the CRS identified in the srsName item of the envelope.
Requirement 23	<b>/req/getPolygon/SubsetByInterpolation/disjoint</b> In a GetPolygon request using the grid-irregular scheme, for any two CIS:: DisplacementAxisNest elements their set of axis names <b>shall</b> be disjoint, i.e. they have no elements in common.
Requirement 24	<b>/req/getPolygon/SubsetByInterpolation/valid-interpolation-method</b> The interpolations methods used in the interpolation <b>shall</b> be those offered by the server

Figure 8 – SubsetByInterpolation UML class diagram



### 8.5.1. Requirements class overview

This conformance class describes how a grid (target grid) is defined onto which the data contained within the polygon is extracted by interpolation. The “target” grid is only defined in the vertical and temporal dimensions as there is no interpolation in the horizontal. Thus the grid points will not be interpolated in the horizontal domain, but will be in the vertical and temporal dimensions.

## 8.5.2. SubsetByInterpolation Properties

The SubsetByInterpolation properties are shown in Table 16.

Table 16 – METOCEANPOLYGON::SubsetByInterpolation properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
metoceanpolygon:interpolation	Interpolation method to be applied to the named axis GetPolygon result preparation	int:IntInterpolation	One (mandatory)
metoceanpolygon:generalGrid	Lays foundation for the modelling of all possible grid types in CIS.	cis:GeneralGrid	One (mandatory)

## 8.5.3. Interpolation Properties

The Interpolation properties are listed in Table 17.

Table 17 – INT::Interpolation properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
int:globalInterpolation	The default Interpolation method to be used	int:IntInterpolationPerAxis	One (mandatory)

## 8.5.4. InterpolationPerAxis Properties

The InterpolationPerAxis properties are listed in Table 18.

Table 18 – INT::InterpolationPerAxis Properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
int:axis	The axis for which the interpolation Method will be applied	anyURI	One (mandatory)
interpolationMethod	The interpolation method.	anyURI	One (mandatory)

## 8.5.5. CIS::GeneralGrid Properties

Describing the direct positions in multi-dimensional coordinate space, depending on the type of grid. The GeneralGrid properties are listed in Table 19.

Table 19 – CIS::GeneralGrid properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
srsName	URL identifying the Index CRS of the domain set grid array in this coverage	anyURI	One (mandatory)
axisLabels	Axes involved in the “nest” of displaced direct positions; these axes shall form a subset of the CIS::GeneralGrid axisLabels	NCName	One or more (mandatory)
cis:GridLimits	In addition, the limits of the underlying array are given by the CIS::gridLimits component	cis:IndexAxis	Zero or one (optional)
cis:Axis	grid axis identifiers, all distinct within a grid	cis:axisLabel	One or more (mandatory)
cis:DisplacementAxisNest	DisplacementAxisNest combines several axes to a single “nest” where the coordinates are enumerated individually for each direct position.	cis:DisplacementAxisNestType	One or more (mandatory)

## 8.5.6. DisplacementAxisNest Properties

The CIS::DisplacementAxisNest combines several axes to a single “nest” where the coordinates are enumerated individually for each direct position. The properties are listed in Table 20.

Table 20 – CIS::DisplacementAxisNest properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
axisLabels	Axes involved in the “nest” of displaced direct positions; these axes shall form a subset of the CIS::GeneralGrid axisLabels	cis:NameListType	One or more
uomLabels		cis:NameListType	One or more

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
directPositions	Array of direct positions along this axis, linearized according to the sequence rule or, if missing, along the GML 3.2.1 default	string	One or more (mandatory)
gml:sequenceRule	Description of the array linearization in directPositions, according to the GML 3.2.1 sequence rule	GML:: sequenceRuleEnumeration	Zero or one (optional)

### 8.5.7. GridLimits Properties

The grid limits in the CIS::Axis structure contains information about the grid boundaries in the coverage's CRS. The GridLimits properties are listed in Table 21.

Table 21 – CIS::GridLimits properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
srsName	URL identifying the Index CRS of the domain set grid array in this coverage	anyURI	One (mandatory)
cis:indexAxis	all axes of the Index CRS referenced in srsName, in proper sequence	CIS:: IndexAxis	One or more (mandatory)
axisLabels	Axes involved in the "nest" of displaced direct positions; these axes shall form a subset of the CIS::GeneralGrid axisLabels	string	One or more (mandatory)

### 8.5.8. Axis Properties

The Axis properties are listed in Table 22.

Table 22 – CIS::Axis properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
axisLabel	identifier of this axis	NCName	One

## 8.5.9. IndexAxis Properties

The IndexAxis properties are listed in Table 23.

Table 23 – CIS::IndexAxis properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
lowerBound	Lowest array coordinate along this axis	anySimpleType	One (mandatory)
upperBound	Highest array coordinate along this axis	anySimpleType	One (mandatory)
axisLabel	identifier of this axis	NCName	One

## 8.5.10. RegularAxis Properties

The RegularAxis properties are listed in Table 24.

Table 24 – CIS::RegularAxis properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
lowerBound	Lowest coordinate along this grid axis	anySimpleType	One (mandatory)
upperBound	Highest coordinate along this axis	anySimpleType	One (mandatory)
resolution	grid resolution along this axis	anySimpleType	One (mandatory)
uomLabel	Shorthand identifier of the Unit of Measure used on this axis (as indicated in the CRS definition for this axis)	NCName	One (mandatory)
axisLabel	identifier of this axis	NCName	One

## 8.5.11. IrregularAxis Properties

The IrregularAxis properties are listed in Table 25.

Table 25 — CIS::IrregularAxis properties

NAME	DEFINITION	DATA TYPES AND VALUES	MULTIPLICITY
directPositions	Ordered sequence of direct positions along this axis	cis::DirectPositionType	One or more (mandatory)
uomLabel	unit of measure in which values along this axis are expressed	string	One (mandatory)

## 8.5.12. An example an encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<metoceanpolygon:GetPolygon xmlns:cis="http://www.opengis.net/cis/1.1/gml"
xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:swe="http://www.opengis.net/swe/2.0" xmlns:ows="http://www.opengis.net/ows/2.0"
xmlns:gco="http://www.isotc211.org/2005/gco" xmlns:gmd="http://www.isotc211.org/2005/gmd"
xmlns:sml="http://www.opengis.net/sensorml/2.0" xmlns:gmlcov="http://www.opengis.net/
gmlcov/1.0"
xmlns:om="http://www.opengis.net/om/2.0" xmlns:sam="http://www.opengis.net/sampling/2.0"
xmlns:sams="http://www.opengis.net/samplingSpatial/2.0"
xmlns:gts="http://www.isotc211.org/2005/gts"
xmlns:rsub="http://www.opengis.net/wcs/range-subsetting/1.0"
xmlns:gsr="http://www.isotc211.org/2005/gsr" xmlns:ns0="http://www.opengis.net/wcs/2.0"
xmlns:gss="http://www.isotc211.org/2005/gss"
xmlns:metocean="http://www.opengis.net/wcs/metoceanProfile/1.0"
xmlns:metoceanpolygon="http://www.opengis.net/wcs/metoceanProfile_getPolygon/1.0"
xmlns:wcs="http://www.opengis.net/wcs/2.1" xmlns:wcs20="http://www.opengis.net/wcs/2.0"
xmlns:gmlrgrid="http://www.opengis.net/gml/3.3/rgrid"
xmlns:int="http://www.opengis.net/WCS_service-extension_interpolation/1.0"
xmlns:scal="http://www.opengis.net/WCS_service-extension_scaling/1.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.opengis.net/wcs/metoceanProfile_getPolygon/1.0 http://schemas.
opengis.net/wcs/metoceanProfile/1.0/wcsMetOceanGetPolygon.xsd"
service="WCS" version="2.0.0">
<wcs20:CoverageId>CoverageId0</wcs20:CoverageId>
<rsub:RangeSubset>
<rsub:RangeItem>
<rsub:RangeComponent>Temperature</rsub:RangeComponent>
</rsub:RangeItem>
<rsub:RangeItem>
<rsub:RangeComponent>Wind_Speed</rsub:RangeComponent>
</rsub:RangeItem>
<rsub:RangeItem>
<rsub:RangeComponent>Wind_Direction</rsub:RangeComponent>
</rsub:RangeItem>
</rsub:RangeSubset>
<metoceanpolygon:polygonDescription>
<metoceanpolygon:PolygonDescription>
<metoceanpolygon:polygonGeometry>
<metoceanpolygon:PolygonCircle gml:id="ID000">
```

```

<gml:Polygon gml:id="ID001">
  <gml:exterior>
    <gml:Ring>
      <gml:curveMember>
        <gml:Curve gml:id="curve01">
          <gml:segments>
            <gml:CircleByCenterPoint numArc="1">
              <gml:pos>27.10 -73.10</gml:pos>
              <gml:radius uom="[nmi_i]">250</gml:radius>
            </gml:CircleByCenterPoint>
          </gml:segments>
        </gml:Curve>
      </gml:curveMember>
    </gml:Ring>
  </gml:exterior>
</gml:Polygon>
</metoceanpolygon:PolygonCircle>
</metoceanpolygon:polygonGeometry>
<metoceanpolygon:verticalTemporalDescription>
<metoceanpolygon:VerticalTemporalDescription>
<metoceanpolygon:subsetByInterpolation>
<metoceanpolygon:SubsetByInterpolation>
<metoceanpolygon:interpolation>
  <int:Interpolation>
    <int:globalInterpolation>http://www.opengis.net/def/interpolation/OGC/1/linear</int:
    globalInterpolation>
    <int:InterpolationPerAxis>
      <int:axis>Time</int:axis>
      <int:interpolationMethod>http://www.opengis.net/def/interpolation/OGC/1/linear</int:
      interpolationMethod>
    </int:InterpolationPerAxis>
    <int:InterpolationPerAxis>
      <int:axis>pressure</int:axis>
      <int:interpolationMethod>http://www.opengis.net/def/interpolation/OGC/1/barycentric</int:
      interpolationMethod>
    </int:InterpolationPerAxis>
  </int:Interpolation>
</metoceanpolygon:interpolation>

<metoceanpolygon:generalGrid>
<cis:GeneralGrid srsName="http://www.opengis.net/def/crs-compound?
1=http://http://www.opengis.net/def/crs/OGC/0/Time&
2=http://www.codes.wmo.int/GRIB2/table4.5/IsobaricSurface"
axisLabels="Time pressure">
<cis:IrregularAxis uomLabel="ISO8601" axisLabel="Time">
<cis:C>PT0H</cis:C>
<cis:C>PT6H</cis:C>
<cis:C>PT12H</cis:C>
<cis:C>PT18H</cis:C>
<cis:C>PT24H</cis:C>
<cis:C>PT30H</cis:C>
<cis:C>PT36H</cis:C>
<cis:C>PT42H</cis:C>
<cis:C>PT48H</cis:C>

```



```
</cis:IrregularAxis>
```

```
<cis:IrregularAxis uomLabel="hPa" axisLabel="pressure">  
<cis:C>1000.0</cis:C>  
<cis:C>950.0</cis:C>  
<cis:C>850.0</cis:C>  
<cis:C>500.0</cis:C>  
<cis:C>300.0</cis:C>  
<cis:C>250.0</cis:C>  
<cis:C>200.0</cis:C>  
</cis:IrregularAxis>
```

```
<cis:GridLimits srsName="http://www.codes.wmo.int/def/crs/OGC/0/Index4D" axisLabels="k l" >  
<cis:IndexAxis axisLabel="k" lowerBound="0" upperBound="8"/>  
<cis:IndexAxis axisLabel="l" lowerBound="0" upperBound="6"/>  
</cis:GridLimits>  
</cis:GeneralGrid>  
</metoceanpolygon:generalGrid>  
</metoceanpolygon:SubsetByInterpolation>  
</metoceanpolygon:subsetByInterpolation>  
</metoceanpolygon:VerticalTemporalDescription>  
</metoceanpolygon:verticaTemporalDescription>  
</metoceanpolygon:PolygonDescription>  
</metoceanpolygon:polygonDescription>  
</metoceanpolygon:GetPolygon>
```

## 8.6. REQUIREMENTS CLASS: GETPOLYGON-POST-XML

This requirements class specifies how the GetPolygon operation is provided in WCS servers that implement the HTTP/POST using XML request body protocol binding.

### REQUIREMENTS CLASS

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon-post-xml](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon-post-xml)

Dependency	<a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon</a>
------------	---

Dependency	WCS 2.1 protocol extension XML-POST [OGC 09-148r1]
------------	--

Requirement 25	<a href="/req/getPolygon-post-xml/mandatory">/req/getPolygon-post-xml/mandatory</a> Implementations of this GetPolygon extension that support the GetPolygon post-xml requirements class <b>shall</b> support the WCS 2.1 protocol extension XML-POST [OGC 09-148r1].
----------------	--

Requirement 26	<a href="/req/GetPolygon-post-xml/conformance-class-in-profile">/req/GetPolygon-post-xml/conformance-class-in-profile</a>
----------------	---

## REQUIREMENTS CLASS

Implementations of this GetPolygon extension that support the GetPolygon-xml-post requirements class **shall** include the following URI in a Profile element in the ServiceIdentification in a GetCapabilities response:  
[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon-post-xml](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon-post-xml)

### Requirement 27

**/req/getPolygon-post-xml/GetPolygon-request-structure**

A WCS server implementing the XML/POST protocol binding extension **shall** encode request body of the GetPolygon operation using an XML document of type metocean:GetPolygon and described in this document



# ANNEX A (NORMATIVE) CONFORMANCE CLASS ABSTRACT TEST SUITE (NORMATIVE)



# ANNEX A (NORMATIVE) CONFORMANCE CLASS ABSTRACT TEST SUITE (NORMATIVE)

---

## A.1. CONFORMANCE CLASS: GETPOLYGON

---

CONFORMANCE CLASS	
URI	<a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon</a>
Requirement	<a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon</a>
Dependency	<a href="http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage">http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage</a>
Dependent	<a href="http://www.opengis.net/spec/WCS_service-extension_range-subsetting/1.0/conf">http://www.opengis.net/spec/WCS_service-extension_range-subsetting/1.0/conf</a>
Test	<b>/conf/getPolygon/structure</b>
Requirement 1	<b>/req/getPolygon/structure</b>
Test purpose	A metoceanpolygon:GetPolygon instance <b>shall</b> conform to Figure 4 and Table 2, Table 3 and Table 4.
Test method	Send a valid GetPolygon request to server under test which conforms to the references in the requirement. Check that the response is not an exception.
Test Type	Conformance
Test	<b>/conf/getPolygon/getCapabilities-response-conformance-class-in-profile</b>
Requirement 2	<b>/req/getPolygon/getCapabilities-response-conformance-class-in-profile</b>
Test purpose	A WCS service implementing this extension <b>shall</b> include the following URI in a Profile element in the ServiceIdentification in a GetCapabilities response: <a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0 /conf/getPolygon</a>

## CONFORMANCE CLASS

Test method	Send a valid <i>GetPolygon</i> request to server under test which conforms to the references in the requirement. Check that the response is not an exception.
Test Type	Conformance
Test	<b>/conf/getPolygon/request-valid-identifier</b>
Requirement 3	<b>/req/getPolygon/request-valid-identifier</b>
Test purpose	The coverageId parameter value in a <i>GetPolygon</i> request <b>shall</b> be equal to the identifier of one of the coverages offered by the server addressed.
Test method	Send a <i>GetPolygon</i> request to the service under test. For every listed CoverageId (either in the <i>GetCapabilities</i> response or <i>DescribeCoverageCollection</i> response ) then send, for each coverage identifier listed, a valid <i>GetPolygon</i> request. Check that none of these requests results in an exception.
Test type	Conformance
Test	<b>/conf/getPolygon/acceptable-format</b>
Requirement 4	<b>/req/getPolygon/acceptable-format</b>
Test purpose	If a <i>GetPolygon</i> request contains a format parameter then this parameter <b>shall</b> contain a MIME type identifier occurring in some WCS::formatSupported element of the response to a successful <i>GetCapabilities</i> request to this server.
Test method	Send <i>GetCapabilities</i> request to server under test, remember Capabilities document returned. Send <i>GetPolygon</i> requests containing valid coverage identifiers to server under test. Vary the format parameter: <ul style="list-style-type: none"> <li>Send request with a format parameter value containing one of the MIME type identifiers reported in the Capabilities document. Request must be valid in the sense that the format requested can encode the coverage addressed. Verify that request succeeds.</li> <li>Send request with a format parameter value not occurring in the in the Capabilities document. Verify that request fails.</li> </ul>
Test type	Pass test if all checks succeed. Conformance

## CONFORMANCE CLASS

Test	/conf/getPolygon/acceptable-mediaType	
	Requirement 5	/req/getPolygon/acceptable-mediaType
	Test purpose	If a <i>GetPolygon</i> request contains a <i>mediaType</i> parameter then this parameter <b>shall</b> contain a MIME type identifier of fixed value “multipart/related”.
	Test method	Send a <i>GetPolygon</i> request containing a <i>mediaType</i> parameter. Vary this parameter value: <ul style="list-style-type: none"> <li>Send request with a <i>mediaType</i> parameter value as required. Verify that request succeeds.</li> <li>Send request with an illegal <i>mediaType</i> parameter. Verify that request fails.</li> </ul>
		Pass test if all checks succeed.
	Test type	Conformance
Test	/conf/getPolygon/polygon-description	
	Requirement 6	/req/getPolygon/polygon-description
	Test purpose	Check that the Polygon Description element conforms to the requirements classes <a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon</a> <a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByInterpolation">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByInterpolation</a> <a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByTrim">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByTrim</a>
	Test method	Send a <i>GetPolygon</i> request containing an invalid Polygon Description element and verify that request fails. Pass test if all checks succeed.
	Test type	Conformance
Test	/conf/getPolygon/range-component	
	Requirement 7	/req/getPolygon/range-component
	Test purpose	Send <i>DescribePolygon</i> request to server under test, for a valid coverage and for each coverage note the <i>RangeType</i> items returned in the response document. Send <i>GetPolygon</i> requests containing the <i>RangeItems</i> and check for a valid response. Pass test if all checks succeed.
	Test method	

## CONFORMANCE CLASS

Test type	Conformance
Test	<b><a href="#">/conf/getPolygon/response-encoding</a></b>
Requirement 8	<b><a href="#">/req/getPolygon/response-encoding</a></b>
Test purpose	The contents of the response to a successful <i>GetPolygon</i> request shall be encoded as specified by the request format parameter, if this parameter is present, and in the coverage's Native Format if this parameter is not present.
Test method	For each coverage encoding format (i.e., format encoding extension) supported by the server under test: Send a valid <i>GetPolygon</i> request to retrieve a coverage in this format. Check that the result is a valid instance of the format indicated. Pass test if all checks succeed.
Test type	Conformance
Test	<b><a href="#">/conf/getPolygon/PolygonDescription/PolygonRingGeometry</a></b>
Requirement 9	<b><a href="#">/req/getPolygon/PolygonDescription/PolygonRingGeometry</a></b>
Test purpose	The server <b>shall</b> support at least one of the conformance classes i.e. <a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionRing">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionRing</a> <a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionCircle">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionCircle</a>
Test method	Determine the list of supported extensions via a valid <i>GetCapabilities</i> request; check that there is at least one protocol extension listed.
Test type	Conformance

## A.2. CONFORMANCE CLASS: POLYGONDESCRIPTIONRING

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### CONFORMANCE CLASS

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon/PolygonDescriptionRing](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionRing)

## CONFORMANCE CLASS

Requirements [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/PolygonDescriptionRing](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/PolygonDescriptionRing)

Dependency <http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage>

Dependency <http://www.opengis.net/gml/3.2>

Test /conf/getPolygon/PolygonDescriptionRing/structure

Requirement 10 /req/getPolygon/PolygonDescriptionRing/structure

Test purpose A metoceanpolygon:PolygonDescription instance **shall** conform to Figure 5 and, Table 5, Table 6 and Table 7

Test method Send a valid GetPolygon request to server under test which conforms to the references in the requirement. Check that the response is not an exception.

Test Type Conformance

Test /conf/getPolygon/PolygonDescriptionRing/construct

Requirement 11 /req/getPolygon/PolygonDescriptionRing/construct

Test purpose The PolygonRing element **shall** be derived from PolygonGeometry

Test method Check the structure of the GetPolygon request element PolygonGeometry

Test Type Conformance

Test /conf/getPolygon/PolygonDescriptionRing/containment

Requirement 12 /req/getPolygon/PolygonDescriptionRing/containment

Test purpose Only data contained within the polygon **shall** be included in the result.

Test method Send a GetPolygon request to the service under test using PolygonDescriptionRing, check that response is correct.

Test type Conformance

Test /conf/getPolygon/PolygonDescriptionRing/Closure

Requirement 13 /req/getPolygon/PolygonDescriptionRing/closure

Test purpose The first and last values in the gml:posList element as contained within the gml:LinearRing element **shall** have the same value.

Test method Submit a GetPolygon request with a incomplete gml:LinearRing and check the correct error is returned.

Test type Conformance



## A.3. CONFORMANCE CLASS: POLYGONDESCRIPTIONCIRCLE

### CONFORMANCE CLASS

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon/PolygonDescriptionCircle](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/PolygonDescriptionCircle)

Requirement: [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/PolygonDescriptionCircle](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/PolygonDescriptionCircle)

Dependency <http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage>

Dependency <http://www.opengis.net/gml/3.2>

Test /conf/getPolygon/PolygonDescriptionCircle/structure

Requirement 14 /req/getPolygon/PolygonDescriptionCircle/structure

Test purpose A metoceanpolygon:PolygonDescription instance shall conform to Figure 6 and Table 8, Table 9, Table 10, Table 11, Table 12 and Table 13.

Test method Send a valid GetPolygon request to server under test which conforms to the references in the requirement. Check that the response is not an exception.

Test Type Conformance

Test /conf/getPolygon/PolygonDescriptionCircle/PolygonCircle

Requirement 15 /req/getPolygon/PolygonDescriptionCircle/PolygonCircle

Test purpose The PolygonCircle element shall be derived from PolygonGeometry.

Test method Check the structure of the GetPolygon request element PolygonGeometry

Test Type Conformance

Test /conf/getPolygon/PolygonDescriptionRing/PolygonRing

Requirement 16 /req/getPolygon/PolygonDescriptionRing/PolygonRing

## A.4. CONFORMANCE CLASS: SUBSETBYTRIM

## CONFORMANCE CLASS

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon/SubsetByTrim](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/SubsetByTrim)

Requirements [http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/req/getPolygon/SubsetByTrim](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByTrim)

Dependency <http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage>

Dependency <http://www.opengis.net/spec/CIS/1.1/conf/coverage/conf>

Dependency <http://www.opengis.net/spec/CIS/1.1/conf/grid-irregular/conf>

Test </conf/getPolygon/SubsetByTrim/structure>

Requirement 17 </req/getPolygon/SubsetByTrim/structure>

Test purpose A metoceanpolygon:SubsetByTrim instance **shall** conform to Figure 7, Table 14 and Table 15

Test method Send a valid GetPolygon request to server under test which conforms to the references in the requirement. Check that the response is not an exception.

Test Type Conformance

Test </conf/getPolygon/SubsetByTrim/request-valid-dimension>

Requirement 18 </req/getPolygon/SubsetByTrim/request-valid-dimension>

Test purpose Every dimension value in a GetPolygon Trim request **shall** be equal to one of the axisLabels dimension names specified in the coverage's domain set.

Test method Send an invalid GetPolygon request to server under test that does not have axisLabels dimension names specified and check for the appropriate exception.

Test Type Conformance

Test </conf/getPolygon/request-no-duplicate-dimension>

Requirement 19 </req/getPolygon/request-no-duplicate-dimension>

Test purpose A GetPolygon request **shall** contain at most one subsetting operation for each of the dimensions of the coverage addressed.

Test method Send an invalid GetPolygon request to server under test that does have duplicate dimension and check for the appropriate exception.

Test type Conformance

Test </conf/getPolygon/SubsetByTrim/Polygon-trim-within-extent>

CONFORMANCE CLASS	
Requirement 20	/req/getPolygon/SubsetByTrim/Polygon-trim-within-extent
Test purpose	Let the extent of the coverage's CIS::Envelope along the dimension specified in the trim request range from L to H. Then, for the trim bounds trimLow and trimHigh the following shall hold: $L \leq \text{trimLow} \leq \text{trimHigh} \leq H$
Test method	Send an invalid GetPolygon request to server under test that does have a valid TRIM bound and check for an exception..
Test type	Conformance

## A.5. CONFORMANCE CLASS: SUBSETBYINTERPOLATION

CONFORMANCE CLASS	
<a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/SubsetByInterpolation">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon/SubsetByInterpolation</a>	
Requirements	<a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByInterpolation">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon/SubsetByInterpolation</a>
Dependency	<a href="http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage">http://www.opengis.net/spec/WCS/2.1/conf/core/getCoverage</a>
Dependency	<a href="http://www.opengis.net/spec/CIS/1.1/conf/coverage/conf">http://www.opengis.net/spec/CIS/1.1/conf/coverage/conf</a>
Dependency	<a href="http://www.opengis.net/spec/CIS/1.1/conf/grid-regular/conf">http://www.opengis.net/spec/CIS/1.1/conf/grid-regular/conf</a>
Dependency	<a href="http://www.opengis.net/spec/CIS/1.1/conf/grid-irregular/conf">http://www.opengis.net/spec/CIS/1.1/conf/grid-irregular/conf</a>
Dependency	<a href="http://www.opengis.net/spec/WCS_service-extension_range-subsetting/1.0/conf">http://www.opengis.net/spec/WCS_service-extension_range-subsetting/1.0/conf</a>
Test	/conf/getPolygon/SubsetByInterpolation/structure
Requirement 21	req/getPolygon/SubsetByInterpolation/structure
Test purpose	A metoceanpolygon:VerticalTemporalDescription instance shall conform to Figure 8 and Table 16, Table 17, Table 18, Table 19, Table 21, Table 22, Table 23, Table 25 and Table 24
Test method	Send a valid GetPolygon request to server under test which conforms to the references in the requirement. Check that the response is not an exception.

CONFORMANCE CLASS	
Test Type	Conformance
Test	<code>/conf/getPolygon/SubsetByInterpolation/grid-order</code>
Requirement 22	<code>/req/getPolygon/SubsetByInterpolation/grid-order</code>
Test purpose	In a coverage using the grid-irregular scheme, the <code>directPosition</code> values in any <code>CIS::IrregularAxis</code> <b>shall</b> be listed in strictly monotonic order, expressed in the units of measure of this axis as defined in the CRS identified in the <code>srsName</code> item of the envelope.
Test method	Send an invalid <code>GetPolygon</code> request to server under test that does not conform to this requirement and check for an exception.
Test Type	Conformance
Test	<code>/conf/getPolygon/SubsetByInterpolation/grid-order</code>
Requirement 23	<code>/req/getPolygon/SubsetByInterpolation/disjoint</code>
Test purpose	In a <code>GetPolygon</code> request using the grid-irregular scheme, for any two <code>CIS::DisplacementAxisNest</code> elements their set of axis names <b>shall</b> be disjoint, i.e. they have no elements in common.
Test method	Send an invalid <code>GetPolygon</code> request to server under test that does not conform to this requirement and check for an exception.
Test type	Conformance
Test	<code>/conf/getPolygon/SubsetByInterpolation/valid-interpolation-method</code>
Requirement 24	<code>/req/getPolygon/SubsetByInterpolation/valid-interpolation-method</code>
Test purpose	The interpolations methods used in the interpolation <b>shall</b> be those offered by the server as listed in the <code>GetCapabilities</code> response contained in the <code>InterpolationMetadata</code> element.
Test method	In a <code>GetPolygon</code> request using the check for an invalid response if an <code>Interpolation</code> method is used that is not advertised in the <code>GetCapabilities</code> response.
Test type	Conformance

## A.6. CONFORMANCE CLASS: GETPOLYGON-POST-XML

### CONFORMANCE CLASS

[http://www.opengis.net/spec/WCS\\_application-profile\\_metocean\\_polygon/1.0/conf/getPolygon-post-xml](http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon-post-xml)

Requirements	<a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon-post-xml">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon-post-xml</a>	
Dependency	<a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/req/getPolygon</a>	
Dependency	WCS 2.1 protocol extension XML-POST [OGC 09-148r1]	
Test	/conf/getPolygon-post-xml/mandatory	
	Requirement 25	/req/getPolygon-post-xml/mandatory
	Test purpose	Implementations of this GetPolygon extension that support the GetPolygon post-xml requirements class shall support the WCS 2.1 protocol extension XML-POST [OGC 09-148r1].
	Test method	Determine the list of supported extensions via a valid GetCapabilities request; check that the extension required is listed.
	Test type	Conformance
Test	/conf/getPolygon-post-xml/conformance-class-in-profile	
	Requirement 26	/req/getPolygon-post-xml/conformance-class-in-profile
	Test purpose	Implementations of this GetPolygon extension that support the GetPolygon post-xml requirements class shall include the following URI in a Profile element in the ServiceIdentification in a GetCapabilities response: <a href="http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon-post-xml">http://www.opengis.net/spec/WCS_application-profile_metocean_polygon/1.0/conf/getPolygon-post-xml</a>
	Test method	Determine the list of supported extensions via a valid GetCapabilities request; check that the extension required is listed.
	Test type	Conformance
Test	/conf/getPolygon-post-xml/GetPolygon-request-structure	

## CONFORMANCE CLASS

Requirement 27	<b>/req/getPolygon-post-xml/GetPolygon-request-structure</b>
<b>Test purpose</b>	A WCS server implementing the XML/POST protocol binding extension <b>shall</b> encode request body of the GetPolygon operation using an XML document of type metocean:GetPolygon and described in this document.
<b>Test method</b>	Send syntactically legal and illegal GetCoverage request to server under test, verify that the server responds appropriately.
<b>Test type</b>	Conformance



# ANNEX B (INFORMATIVE) REVISION HISTORY

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# ANNEX B (INFORMATIVE) REVISION HISTORY

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DATE	RELEASE	EDITOR	PRIMARY CLAUSES MODIFIED	DESCRIPTION
2017-08-21	0.1	Trevelyan/Hershberg/Olson	all	Created
2018-11-21	0.2	Trevelyan/Hershberg/Olson	all	





# BIBLIOGRAPHY





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