

# Open Geospatial Consortium Inc.

Date: 2012-10-29

Reference number of this document: **OGC 12-101**

Version: **0.0.7**

Category: OGC® Interface Standard

Editor: Stephan Meissl

## **OGC® Web Coverage Service 2.0 Interface Standard - GeoTIFF Coverage Encoding Extension**

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Document type:	OGC® Interface Standard
Document subtype:	
Document stage:	Draft
Document language:	English

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## **i. Preface**

This Interface Standard is an extension to the OGC® Web Coverage Service (WCS) 2.0 Interface Standard – Core version 2.0 [OC 09-110r4]. It specifies the usage of the GeoTIFF coverage encoding with WCS.

Suggested additions, changes, and comments on this draft standard are welcome and encouraged. Such suggestions may be submitted by email message to OGC or by making suggested changes in an edited copy of this document and submitting this document to OGC.

## **ii. Document terms and definitions**

This document uses the standard terms defined in Subclause 5.3 of [OGC 06-121r9], 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.

### iii. Document contributor contact points

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### iv. Revision history

Date	Release	Editor	Primary clauses modified	Description
2012-08-08	0.0.1	Stephan Meissl	All	First draft based on discussions in the WCS.SWG.
2012-08-13	0.0.2	Stephan Meissl, Peter Baumann	All	Minor corrections and format adaptations.
2012-08-22	0.0.3	Stephan Meissl	Clauses 6.3.1, 6.3.2 and 6.3.3	Adapted list of parameters, added note on exceptions, and added list of exception codes as discussed in WCS.SWG teleconference.
2012-08-24	0.0.4	Stephan Meissl	Clauses 3 and 5.2	Adjusted namespace URI and schema location.
2012-09-13	0.0.5	Stephan Meissl	All, clauses 2, and 3	Adjusted URIs, integrated comments received, and added ATS.
2012-09-17	0.0.6	Stephan Meissl	Clause 6.3.1	Added note for KVP protocol binding.
2012-10-29	0.0.7	Stephan Meissl	All	Removed comments.

### v. Changes to the OGC Abstract Specification

The OpenGIS<sup>®</sup> Abstract Specification does not require any changes to accommodate the technical contents of this document.

### vi. Future work

None foreseen at the moment.

## Foreword

This document is an extension to the OGC® Web Coverage Service (WCS) 2.0 Interface Standard – Core version 2.0 [OC 09-110r4] defining the usage of the GeoTIFF coverage encoding with WCS.

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## Introduction

Coverages represent digital geospatial information representing space/time-varying phenomena. OGC Abstract Topic 6 [OGC 07-011] – which is identical to ISO 19123 – defines an abstract model of coverages. Coverage instances may be encoded using the GML Application Schema – Coverages – GeoTIFF Coverage Encoding Extension version 1.0 [OGC 12-100] which is based on the GML Application Schema – Coverages (GMLCOV) version 1.0 [OGC 09-146r2] which in turn is based on the Geography Markup Language (GML) version 3.2 [07-036], an XML grammar written in XML Schema for the description of application schemas as well as the transport and storage of geographic information.

This extension to the Web Coverage Service (WCS) 2.0 Interface Standard – Core (WCS) version 2.0 [OC 09-110r4] specifies the usage of the GeoTIFF coverage encoding with WCS. It is based on the authoritative GML Application Schema – Coverages – GeoTIFF Coverage Encoding Extension version 1.0 [OGC 12-100].

# OGC® Web Coverage Service 2.0 Interface Standard - GeoTIFF Coverage Encoding Extension

## 1 Scope

This *OGC® Web Coverage Service 2.0 Interface Standard - GeoTIFF Coverage Encoding Extension* – henceforth abbreviated as “GeoTIFF-Coverages” specifies the usage of GeoTIFF coverage encoding with WCS.

## 2 Conformance

This document establishes the following requirements and conformance class:

- *geotiff-coverage*, of URI [http://www.opengis.net/spec/WCS\\_geotiff-coverages/1.0/req/geotiff-coverage](http://www.opengis.net/spec/WCS_geotiff-coverages/1.0/req/geotiff-coverage), with a single pertaining conformance class, *geotiff-coverage*, of URI [http://www.opengis.net/spec/WCS\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/WCS_geotiff-coverages/1.0/conf/geotiff-coverage).

Standardization target of all conformance classes are concrete coverage instance documents, as generated by some service and/or consumed by some client.

URIs given in this document for each requirement or conformance test URIs are relative paths to be appended to the root [http://www.opengis.net/spec/WCS\\_geotiff-coverages/1.0/](http://www.opengis.net/spec/WCS_geotiff-coverages/1.0/).

Annex A lists the conformance tests which shall be exercised on any software artifact claiming to implement GeoTIFF-Coverages.

## 3 Normative references

This GeoTIFF-Coverages specification consists of the present document and an XML Schema. The complete specification is identified by OGC URI [http://www.opengis.net/spec/WCS\\_geotiff-coverages/1.0](http://www.opengis.net/spec/WCS_geotiff-coverages/1.0), the document has OGC URI [http://www.opengis.net/doc/ISx/WCS\\_geotiff-coverages/1.0](http://www.opengis.net/doc/ISx/WCS_geotiff-coverages/1.0).

The complete specification is available for download from <http://www.opengeospatial.org/standards/wcs>; additionally, the XML Schema is posted online at <http://schemas.opengis.net/wcs/geotiff/1.0> as part of the OGC schema repository. In the event of a discrepancy between bundled and schema repository versions of the XML Schema files, the schema repository shall be considered authoritative.

The following normative documents contain provisions that, through reference in this text, constitute provisions of this specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the normative document referred to applies.

OGC 12-100, *OGC® GML Application Schema - Coverages - GeoTIFF Coverage Encoding Extension*, version 1.0

Conformance classes used:

- geotiff-coverage

OGC 09-110r4, *OGC® Web Coverage Service 2.0 Interface Standard – Core*, version 2.0

Conformance classes used:

- core

## 4 Terms and definitions (normative)

For the purposes of this document, the terms and definitions given in the above references apply.

## 5 Overview and conventions

### 5.1 Overview (informal)

The GeoTIFF [1] format specification extends the basic raster file format TIFF [2] with georeferencing information using reserved TIFF tags. In doing so the GeoTIFF format is fully compliant with the TIFF format. Thus software incapable of reading and interpreting these extension TIFF tags is still able to open a GeoTIFF format file by simply ignoring them.

A TIFF file is composed of the Image File Header (IFH) and one or multiple Image File Directories (IFDs) holding the actual data entries in 2D rectangular arrays of pixels.

Thus, the only coverage types supported by this specification are `gmlcov:GridCoverage`, `gmlcov:RectifiedGridCoverage`, `gmlcov:ReferenceableGridCoverage`, and any coverage type derived thereof with exactly 2 dimensions. Although techniques to store 3D or even higher dimensional coverages in TIFF files are known they are not considered herein.

Please find further details in the OGC® GML Application Schema - Coverages - GeoTIFF Coverage Encoding Extension [OGC 12-100].

### 5.2 Namespace prefix conventions

The following namespaces are used in this document. The prefix abbreviations used constitute conventions used here, but are **not** normative. The namespaces to which the prefixes refer are normative, however.



Table 1 – Namespace mappings

Prefix	Namespace URI	Description
xsd	<a href="http://www.w3.org/2001/XMLSchema">http://www.w3.org/2001/XMLSchema</a>	XML Schema namespace
gml	<a href="http://www.opengis.net/gml/3.2">http://www.opengis.net/gml/3.2</a>	GML 3.2.1
gmlcov	<a href="http://www.opengis.net/gmlcov/1.0">http://www.opengis.net/gmlcov/1.0</a>	GML Application Schema – Coverages 1.0
wcs	<a href="http://www.opengis.net/wcs/2.0">http://www.opengis.net/wcs/2.0</a>	WCS 2.0
geotiff	<a href="http://www.opengis.net/wcs/geotiff/1.0">http://www.opengis.net/wcs/geotiff/1.0</a>	GeoTIFF-Coverages 1.0

### 5.3 Multiple representations

When multiple representations of the same information are given in a specification document these are consistent. Should this not be the case then this is considered an error, and the XML schema shall take precedence.

## 6 GeoTIFF coverage representation requirements class

Requirements class *geotiff-coverage* establishes how GeoTIFF encoded coverages can be requested from a WCS including parameters defining TIFF features like compression, tiling, etc. Its identifying URL is given by [http://www.opengis.net/spec/WCS\\_geotiff-coverages/1.0/req/geotiff-coverage](http://www.opengis.net/spec/WCS_geotiff-coverages/1.0/req/geotiff-coverage).

### 6.1 GetCapabilities

The support of GeoTIFF coverage encoding shall be advertised in `ows:Profile` and a `wcs:formatSupported` elements.

#### Requirement 1 /req/geotiff-coverage/gmlcov-extension-identifier:

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

[http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage).

**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

#### Requirement 2 /req/geotiff-coverage/wcs-extension-identifier:

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

[http://www.opengis.net/spec/WCS\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/WCS_geotiff-coverages/1.0/conf/geotiff-coverage).

#### Requirement 3 /req/geotiff-coverage/format-supported:

A WCS implementing this extension **shall** include the following MIME type identifier in a `wcs:formatSupported` element in the `wcs:ServiceMetadata` element in a *GetCapabilities* response:

image/tiff

**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

## 6.2 DescribeCoverage

### **Requirement 4 /req/geotiff-coverage/native-format:**

A coverage served via WCS and native format GeoTIFF **shall** use the following MIME type identifier in the `wcs:nativeFormat` element in the `wcs:ServiceParameters` element in a *DescribeCoverage* response:

image/tiff

**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

## 6.3 GetCoverage

### 6.3.1 GetCoverage request

#### **Requirement 5 /req/geotiff-coverage/format-requested:**

In a *GetCoverage* request requesting a coverage in GeoTIFF encoding the `format` parameter value **shall** be the following MIME type identifier:

image/tiff

**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

The following additional *parameters* are defined for requesting GeoTIFF encoded coverages via *GetCoverage* requests.

**Note** It is always possible for a given coverage instance to determine its current parameter values, i.e., the parameter values used at creation. Thus a GeoTIFF encoded coverage is self-describing.

#### **Requirement 6 /req/geotiff-coverage/additional-parameters:**

The structure of a *GetCoverage* request requesting a coverage in GeoTIFF encoding **shall** be extended as defined in Table 2 and the respective XML Schema being part of this standard.

**Note** In case of using KVP protocol binding it is recommended for server implementations to parse the format parameter first in order to have the right context for further parameters.

**Table 2 – GetCoverage additional parameters for GeoTIFF encoding**

Name	Definition	Data Type	Multiplicity
compression	Compression used	String, one of: "None", "PackBits", "Huffman", "LZW", "JPEG", "DEFLATE"	zero or one (optional)

jpeg_quality	Quality of compression; Allowed only in presence of "compression=JPEG"	Integer between 1 and 100	zero or one (optional)
predictor	Indicates if predictor is requested	String, one of: "None", "Horizontal", "Floatingpoint"	zero or one (optional)
interleave	Determines how the components of each pixel are stored (PlanarConfiguration in TIFF terminology with value 1 for chunky or pixel and value 2 for planar or band format)	String, one of: "pixel", "band"	zero or one (optional)
tiling	Indicates if tiling is requested	Boolean	zero or one (optional)
tileheight	Edge length of tiles in pixels (tiled storage only; TileLenght in TIFF terminology); Allowed only together with tiling being "true" and tilewidth being present	Integer being a multiple of 16 greater than zero	zero or one (optional)
tilewidth	Edge width of tiles in pixels (tiled storage only); Allowed only together with tiling being "true" and tileheight being present	Integer being a multiple of 16 greater than zero	zero or one (optional)

### 6.3.2 GetCoverage response

A GeoTIFF encoded coverage shall follow the OGC® GML Application Schema - Coverages - GeoTIFF Coverage Encoding Extension [OGC 12-100] and thus the GeoTIFF [1] format specification as well as the TIFF [2] raster file format specification.

#### **Requirement 7 /req/geotiff-coverage/format-returned:**

The response to a successful *GetCoverage* request containing a *format* parameter with value *image/tiff* **shall** consist of a coverage encoded as specified in the *OGC® GML Application Schema - Coverages - GeoTIFF Coverage Encoding Extension* [OGC 12-100].

**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

A GeoTIFF encoded coverage shall encode the TIFF features as requested in a *GetCoverage* request.

**Requirement 8 /req/geotiff-coverage/compression:**

The response to a successful *GetCoverage* request containing a `compression` parameter **shall** consist of a GeoTIFF encoded coverage using the specified compression.

**Requirement 9 /req/geotiff-coverage/jpeg:**

The response to a successful *GetCoverage* request containing a `jpeg_quality` and a `compression` parameter with value “JPEG” **shall** consist of a GeoTIFF encoded coverage using JPEG compression with the quality indicated.

**Requirement 10 /req/geotiff-coverage/predictor:**

The response to a successful *GetCoverage* request containing a `predictor` parameter **shall** consist of a GeoTIFF encoded coverage using the specified predictor.

**Requirement 11 /req/geotiff-coverage/interleave:**

The response to a successful *GetCoverage* request containing a `interleave` parameter **shall** consist of a GeoTIFF encoded coverage using the specified interleave method.

**Requirement 12 /req/geotiff-coverage/tiling:**

The response to a successful *GetCoverage* request containing a `tiling` and optionally a `tileheight` and a `tilewidth` parameter **shall** consist of a GeoTIFF encoded coverage with internal tiling using the specified height and width if present.

Note A server not implementing the requested feature is always free to respond with an exception.

**6.3.3 GetCoverage exceptions****Requirement 13 /req/geotiff-coverage/exceptions:**

When a WCS server encounters an error described in column “meaning of exception code” in Table 3 then it **shall** return the corresponding exception report message with the contents of the locator parameter value as specified in the right column of Table 3.

**Dependency:** <http://www.opengis.net/spec/WCS/2.0/conf/core>

**Table 3 – Exception codes for GeoTIFF**

exceptionCode value	HTTP code	Meaning of code	locator value
CompressionNotSupported	404	Server does not support the requested compression.	Value of compression parameter.
CompressionInvalid	404	Invalid compression requested.	Value of compression parameter.

JpegQualityInvalid	404	Invalid JPEG quality requested.	Value of jpeg_quality parameter.
PredictorNotSupported	404	Server does not support the requested predictor.	Value of predictor parameter.
PredictorInvalid	404	Invalid predictor requested.	Value of predictor parameter.
InterleavingNotSupported	404	Server does not support the requested interleave method.	Value of interleave parameter.
InterleavingInvalid	404	Invalid interleaving requested.	Value of interleave parameter.
TilingNotSupported	404	Server does not support tiling.	–
TilingInvalid	404	Either tileheight, tilewidth, or both are missing or one or both are not a positive integer being a multiple of 16 and thus invalid.	Value of tileheight and tilewidth parameter.

## Annex A (normative)

### Abstract Test Suite

This Annex specifies an Abstract Test Suite which shall be passed in completeness by any implementation claiming conformance with this GeoTIFF coverage encoding extension.

Test identifiers below are relative to  
[http://www.opengis.net/spec/WCS\\_geotiff-coverages/1.0/](http://www.opengis.net/spec/WCS_geotiff-coverages/1.0/).

#### A.1 Conformance Test Class: *geotiff-coverage*

The OGC URI identifier of this conformance class is:  
[http://www.opengis.net/spec/WCS\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/WCS_geotiff-coverages/1.0/conf/geotiff-coverage).

##### A.1.1 Prerequisites

Make sure that at least one coverage with GeoTIFF as native format is available from server under test.

##### A.1.2 Include GMLCOV extension identifier

**Test id:** `/conf/geotiff-coverage/gmlcov-extension-identifier`

**Test Purpose:** **Requirement /req/geotiff-coverage/gmlcov-extension-identifier:**  
 A WCS implementing this extension **shall** include the following URI in a `ows:Profile` element of the `ows:ServiceIdentification` in a *GetCapabilities* response:  
[http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage).  
**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

**Test method:** Send a *GetCapabilities* request to the server under test and verify that the response contains a `Profile` element with said URI.

Test passes if constraint evaluates to true.

##### A.1.3 Include WCS extension identifier

**Test id:** `/conf/geotiff-coverage/wcs_extension-identifier`

**Test Purpose:** **Requirement /req/geotiff-coverage/wcs-extension-identifier:**  
 A WCS implementing this extension **shall** include the following URI in a `ows:Profile` element of the `ows:ServiceIdentification` in a *GetCapabilities* response:

[http://www.opengis.net/spec/WCS\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/WCS_geotiff-coverages/1.0/conf/geotiff-coverage).

**Test method:** Send a *GetCapabilities* request to the server under test and verify that the response contains a `Profile` element with said URI.

Test passes if constraint evaluates to true.

#### A.1.4 Include format supported

**Test id:** `/conf/geotiff-coverage/format-supported`

**Test Purpose:** **Requirement /req/geotiff-coverage/format-supported:**  
A WCS implementing this extension **shall** include the following MIME type identifier in a `wcs:formatSupported` element in the `wcs:ServiceMetadata` element in a *GetCapabilities* response:  
image/tiff  
**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

**Test method:** Send a *GetCapabilities* request to the server under test and verify that the response contains a `wcs:formatSupported` element in the `wcs:ServiceMetadata` element with the value "image/tiff".

Test passes if constraint evaluates to true.

#### A.1.5 Native format

**Test id:** `/conf/geotiff-coverage/native-format`

**Test Purpose:** **Requirement /req/geotiff-coverage/native-format:**  
A coverage served via WCS and native format GeoTIFF **shall** use the following MIME type identifier in the `wcs:nativeFormat` element in the `wcs:ServiceParameters` element in a *DescribeCoverage* response:  
image/tiff  
**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

**Test method:** Send *DescribeCoverage* requests to the server under test for each coverage known to have GeoTIFF as native format and verify that the responses contain a `wcs:nativeFormat` element in the `wcs:ServiceParameters` element with the value "image/tiff".

Test passes if constraint evaluates to true.

### A.1.6 Format parameter

**Test id:** `/conf/geotiff-coverage/format-requested`

**Test Purpose:** **Requirement /req/geotiff-coverage/format-requested:**  
In a *GetCoverage* request requesting a coverage in GeoTIFF encoding the `format` parameter value **shall** be the following MIME type identifier:

`image/tiff`

**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

**Test method:** Send *GetCoverage* requests to the server under test for each coverage known to be able to be encoded in GeoTIFF (which are at least the ones known to have GeoTIFF as native format) with the `format` parameter set to "image/tiff" and verify that the responses are properly encoded in GeoTIFF.

Test passes if constraint evaluates to true.

### A.1.7 Additional parameters

**Test id:** `/conf/geotiff-coverage/additional-parameters`

**Test Purpose:** **Requirement /req/geotiff-coverage/additional-parameters:**  
The structure of a *GetCoverage* request requesting a coverage in GeoTIFF encoding **shall** be extended as defined in Table 2 and the respective XML Schema being part of this standard.

**Test method:** Send *GetCoverage* requests to the server under test for a coverage known to be available using GeoTIFF encoding for each parameter defined in Table 2 and each possible value for String and Boolean parameters and at least 3 different values for Integer parameters. Each request shall include one optional parameter respecting dependencies (e.g. `jpeg_quality` needs `compression` set to JPEG).

Test passes if for each request the response either indicates (by inspection) that the parameter has been recognized and executed properly or is a valid exception as defined in Table 3.

### A.1.8 Format returned

**Test id:** `/conf/geotiff-coverage/format-returned`

**Test Purpose:** **Requirement /req/geotiff-coverage/format-returned:**  
The response to a successful *GetCoverage* request containing a `format` parameter with value `image/tiff` **shall** consist of a coverage encoded as specified in the OGC® GML Application Schema -



*Coverages - GeoTIFF Coverage Encoding Extension* [OGC 12-100].

**Dependency:** [http://www.opengis.net/spec/GMLCOV\\_geotiff-coverages/1.0/conf/geotiff-coverage](http://www.opengis.net/spec/GMLCOV_geotiff-coverages/1.0/conf/geotiff-coverage)

**Test method:** Send *GetCoverage* requests to the server under test for each coverage known to be able to be encoded in GeoTIFF (which are at least the ones known to have GeoTIFF as native format) with the `format` parameter set to "image/tiff" and verify that the responses are properly encoded in GeoTIFF. Exercise tests for at least each of the following situations:

- `mediaType` parameter present with value "multipart/related"
  - No subsetting parameter
  - Trimming in one dimension
  - Trimming in two dimensions
- `mediaType` parameter not present

Test passes if for each request the response indicates (by inspection) that the parameter(s) has(have) been recognized and executed properly.

#### A.1.9 Parameter for compression

**Test id:** `/conf/geotiff-coverage/compression`

**Test Purpose:** **Requirement /req/geotiff-coverage/compression:**  
The response to a successful *GetCoverage* request containing a `compression` parameter **shall** consist of a GeoTIFF encoded coverage using the specified compression.

**Test method:** Send *GetCoverage* requests to the server under test for each coverage known to be able to be encoded in GeoTIFF (which are at least the ones known to have GeoTIFF as native format) with the `format` parameter set to "image/tiff" and the "compression" parameter present for each possible value of the "compression" parameter and verify that the responses are properly encoded in GeoTIFF.

Test passes if for each request the response either indicates (by inspection) that the parameters have been recognized and executed properly or is the valid exception "CompressionNotSupported" as defined in Table 3.

### A.1.10 Parameter for JPEG compression

**Test id:** /conf/geotiff-coverage/jpeg

**Test Purpose:** **Requirement /req/geotiff-coverage/jpeg:**  
The response to a successful *GetCoverage* request containing a `jpeg_quality` and a `compression` parameter with value "JPEG" **shall** consist of a GeoTIFF encoded coverage using JPEG compression with the quality indicated.

**Test method:** Send *GetCoverage* requests to the server under test for each coverage known to be able to be encoded in GeoTIFF (which are at least the ones known to have GeoTIFF as native format) with the `format` parameter set to "image/tiff", the "compression" parameter set to "JPEG", and the "jpeg\_quality" parameter present for at least 3 different values of the "jpeg\_quality" parameter and verify that the responses are properly encoded in GeoTIFF.

Test passes if for each request the response either indicates (by inspection) that the parameters have been recognized and executed properly or is the valid exception "CompressionNotSupported" as defined in Table 3.

### A.1.11 Parameter for predictor

**Test id:** /conf/geotiff-coverage/predictor

**Test Purpose:** **Requirement /req/geotiff-coverage/predictor:**  
The response to a successful *GetCoverage* request containing a `predictor` parameter **shall** consist of a GeoTIFF encoded coverage using the specified predictor.

**Test method:** Send *GetCoverage* requests to the server under test for each coverage known to be able to be encoded in GeoTIFF (which are at least the ones known to have GeoTIFF as native format) with the `format` parameter set to "image/tiff" and the "predictor" parameter present for each possible value of the "predictor" parameter and verify that the responses are properly encoded in GeoTIFF.

Test passes if for each request the response either indicates (by inspection) that the parameters have been recognized and executed properly or is the valid exception "PredictorNotSupported" as defined in Table 3.

**A.1.12 Parameter for interleave**

**Test id:** /conf/geotiff-coverage/interleave

**Test Purpose:** **Requirement /req/geotiff-coverage/interleave:**  
The response to a successful *GetCoverage* request containing a `interleave` parameter **shall** consist of a GeoTIFF encoded coverage using the specified interleave method.

**Test method:** Send *GetCoverage* requests to the server under test for each coverage known to be able to be encoded in GeoTIFF (which are at least the ones known to have GeoTIFF as native format) with the `format` parameter set to "image/tiff" and the "interleave" parameter present for each possible value of the "interleave" parameter and verify that the responses are properly encoded in GeoTIFF.

Test passes if for each request the response either indicates (by inspection) that the parameters have been recognized and executed properly or is the valid exception "InterleavingNotSupported" as defined in Table 3.

**A.1.13 Parameter for tiling**

**Test id:** /conf/geotiff-coverage/tiling

**Test Purpose:** **Requirement /req/geotiff-coverage/tiling:**  
The response to a successful *GetCoverage* request containing a `tiling` and optionally a `tileheight` and a `tilewidth` parameter **shall** consist of a GeoTIFF encoded coverage with internal tiling using the specified height and width if present.

**Test method:** Send *GetCoverage* requests to the server under test for each coverage known to be able to be encoded in GeoTIFF (which are at least the ones known to have GeoTIFF as native format) with the `format` parameter set to "image/tiff", the "tiling" parameter set to "true", and the "tileheight" and "tilewidth" parameters set to at least 3 different valid values and verify that the responses are properly encoded in GeoTIFF.

Test passes if for each request the response either indicates (by inspection) that the parameters have been recognized and executed properly or is the valid exception "TilingNotSupported" as defined in Table 3.

#### A.1.14 Exceptions

**Test id:** /conf/geotiff-coverage/exceptions

**Test Purpose:** **Requirement /req/geotiff-coverage/exceptions:**  
When a WCS server encounters an error described in column “meaning of exception code” in Table 3 then it **shall** return the corresponding exception report message with the contents of the locator parameter value as specified in the right column of Table 3.

**Dependency:** <http://www.opengis.net/spec/WCS/2.0/conf/core>

**Test method:** Send *GetCoverage* requests to the server under test for a coverage known to be available using GeoTIFF encoding for each parameter defined in Table 2 including exactly one optional and using an invalid value.

Test passes if for each request the response is a valid exception as defined in Table 3 using the relevant exceptionCode.

-- end of ATS --

## **Annex B Bibliography**

- [1] *GeoTIFF Format Specification* , version 1.8.2, supporting GeoTIFF Revision 1.0 Final, 2000-12-28, available at  
<http://www.remotesensing.org/geotiff/spec/geotiffhome.html> [2011-06-17]
- [2] *TIFF*, revision 6.0 Final, 1992-06-03, available at  
<ftp://ftp.remotesensing.org/geotiff/spec/tiff6.pdf> [2011-06-17]