DGIWG 101

Profile of ISO 19131
Geographic information – Data product specification

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Abstract:	This is a descriptive profile of the ISO 19131:2007/Amd. 1:2011 Geographic information – Data product specifications. Its purpose is to define military requirements for the specification of data products and provide guidance for the creation of such data product specifications.
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Introduction

A geospatial data product specification is a precise technical description which characterizes a geospatial data product. It includes general information for data product identification as well as information on data content and structure, reference systems, data quality aspects, data capture, maintenance, delivery and metadata.

This standard considers geospatial data products in a broad sense; these may range from a hardcopy dataset to vector data, imagery data, or gridded data exchanged via web services. This approach ensures that the specifications for all product forms can be described in a consistent manner. To reflect this some elements within this profile are optional and guidance is given in the relevant locations such as when elements should be included.

A data product specification may be created and used, by different parties and for different reasons. However, the main reason for creating a data product specification is to define the characteristics of a newly developed data product.

Datasets or dataset series described in a data product specification based upon this standard are aimed to fulfil military requirements that are reflected in that particular data product specification. Therefore, the purpose of this DGIWG-profile of the International Standard (ISO) 19131 is to give guidance for creating data product specifications that meet military requirements.

Figure 1 shows the relationship between this profile, its base standard and data product specifications which conform to this profile. It also depicts key elements of a product specification. Optional components are shown with dashed outlines. It shows how data producers use capture guidance to create a dataset reflecting the content of a feature catalogue. Producers also generate the relevant metadata which allows a user to discover and understand a dataset. A product specification defines a tailored metadata template and for each specific dataset relevant values are populated. If a portrayal catalogue is provided this determines how the dataset is presented to the user. A description of this portrayal for the user may also be provided.

As such a broad range of data product types exist that the figure below is an oversimplification. Table 1 covers a selection of different product types, summarising some of the specific considerations that are applicable to each.

Table 1 – Summary of data product types

Data Product Type	Specific Considerations
Hardcopy map data product	• A portrayal catalogue and an annotation catalogue are recommended.
Vector data product	• A machine-readable portrayal and an annotation catalogue is recommended.
Vector data exchange	• A ubiquitous exchange format such as GML is recommended. • Portrayal need not be defined.
Imagery data product	• Portrayal need not be defined.
Gridded data product	• Portrayal should be defined if visualization is intended.
Framework product	• A product specification which is intended as the basis for

Data Product Type	Specific Considerations
specification	other more detailed data product specifications • Appropriate when a common content model needs to be supported in a range of data products such as those using different formats

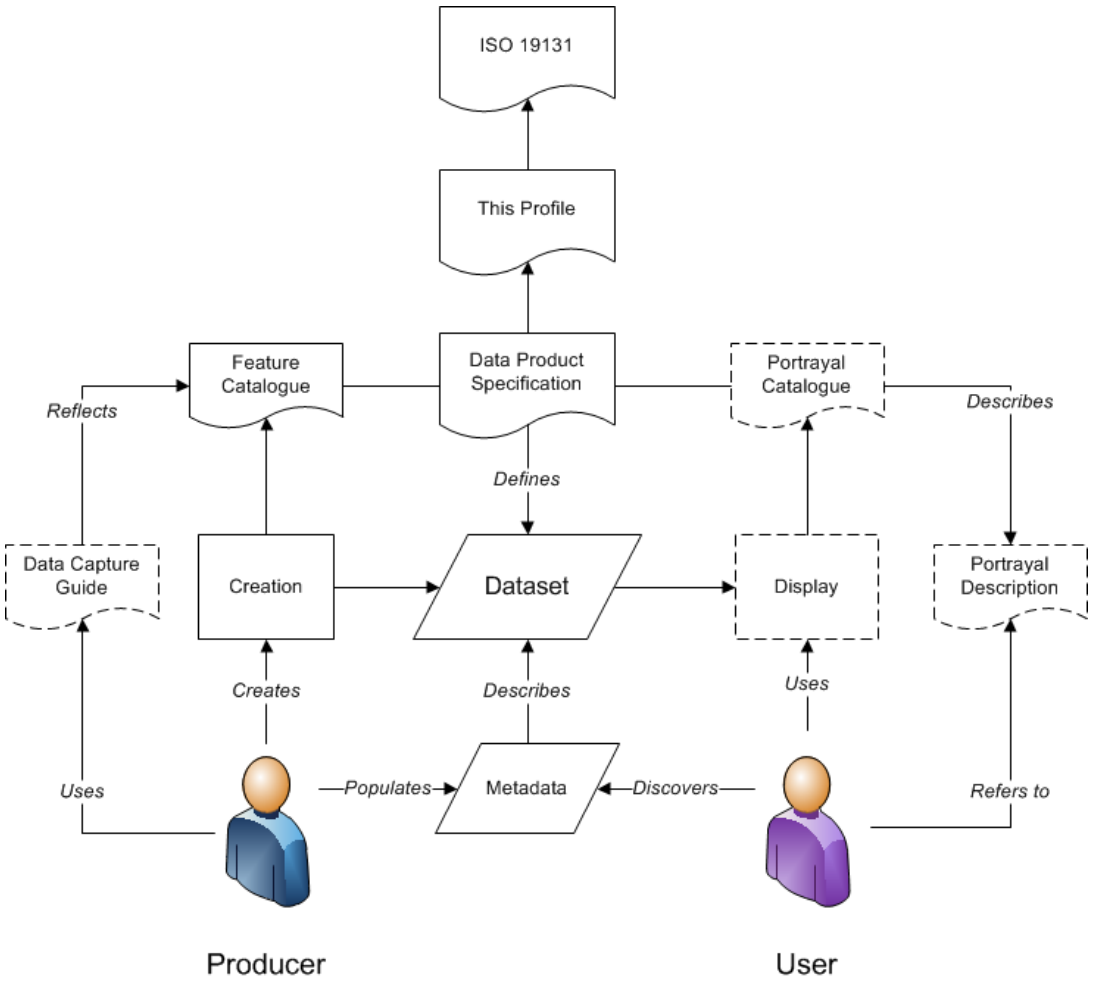

Figure 1 – Simplified representation of the relationship between a data product specification and other elements.

1. Scope

This document describes the requirements for the specification of geographic data products. It is a profile of ISO 19131 that extends and constrains the base standard based on the requirements of the military community. It also provides guidance to assist in the creation of data product specifications, so that they are easily understood and achieve their intended purpose.

2. Conformance

Conformance to this specification is detailed at Annex A.

3. Normative References

ISO 639-2:1998, *Code for the representation of names of languages — Part 2: Alpha-3 code*

ISO 8601:2004, *Date and time format*

ISO 19103:2005, *Geographic information — Conceptual schema language*

ISO 19106:2004, *Geographic information — Profiles*

ISO 19107:2003, *Geographic information — Spatial schema*

ISO 19108:2002, *Geographic information — Temporal schema*

ISO 19109:2005, *Geographic information — Rules for application schema*

ISO 19110:2005, *Geographic information — Methodology for feature cataloguing*

ISO 19111:2007, *Geographic information — Spatial referencing by coordinates*

ISO 19112:2003, *Geographic information — Spatial referencing by geographic identifiers*

ISO 19115:2003, *Geographic information — Metadata*

ISO 19115-1:2014, *Geographic information — Metadata – Part 1: Fundamentals*

ISO19115-2:2009, *Geographic information — Metadata Part 2 Extensions for imagery and gridded data*

ISO 19115-3:2016, *Geographic information -- Metadata – Part 3: XML schema implementation for fundamental concepts*

ISO 19117:2012, *Geographic information — Portrayal*

ISO 19123:2005, *Geographic information — Schema for coverage geometry and functions*

ISO 19130:2010, *Geographic information - Imagery sensor models for geopositioning*

ISO 19130-2:2014, *Geographic information -- Imagery sensor models for geopositioning -- Part 2: SAR, InSAR, lidar and sonar*

ISO 19131:2007/Amd. 1:2011, *Geographic information – Data product specifications*

ISO/TS 19139:2007, *Geographic information -- Metadata -- XML schema implementation*

ISO/TS 19139-2, *Geographic information — Metadata Part 2 Extensions for imagery and gridded data*

ISO 19157:2013, *Geographic information — Data quality*

STANAG 2211 (AGeoP – 21) Geodetic Datums, Projections, Grids and Grid References

STANAG 2215 Evaluation of Land Maps, Aeronautical charts and Digital Topographic Data

DGIWG 108: GeoTIFF Profile for Georeferenced Imagery, Ed. 2.2.1

DGIWG 104: DGIWG Profile of JPEG2000 for Georeferenced Imagery (GMLJP2), Ed. 2

DGIWG 114: DGIWG Metadata Foundation, Ed. 2

DGIWG 205: Defence Geospatial Information Model (DGIM), Ed. 2

DGIWG 206: Defence Geospatial Feature Concept Dictionary (DGFCD), Ed. 2

DGIWG 207: Defence Geospatial Real World Object Index (DGRWI), Ed. 2

DGIWG 208: Defence Geospatial Information - Exchange Formats for Vector Data - Part-1: GML, Ed. 2

DGIWG 116-1: DGIWG Elevation Surface Model (ESM) - Core model, Ed. 1.1

4. Terms, definitions and abbreviations

4.1. Definitions

annotation catalogue

a catalogue with rules that define the visualisation and presentaion of map display metadata or non-feature data upon a cartographic product in order to provide necessary context for the display, interpretation and compression.

EXAMPLE : The portrayal of metadata information to be included in the marginalia of a map

application schema

conceptual schema for data required by one or more applications [ISO 19101-1:2014]

coverage

feature that acts as a function to return values from its range for any direct position within its spatial, temporal or spatiotemporal domain [ISO 19123:2005]

coverage-based data

coverage-based content and structure of data information

EXAMPLE Raster image, digital elevation matrix

dataset

identifiable collection of data [ISO 19115-1:2014]

dataset series

collection of datasets sharing common characteristics [ISO 19115-1:2014]

data product specification

detailed description of a dataset or dataset series together with additional information that will enable it to be created, supplied to and used by another party [ISO 19131:2007]

NOTE: A data product specification provides a description of the universe of discourse and a specification for mapping the universe of discourse to a dataset. It may be used for production, sales, end-use or other purpose.

data capture guide

instruction describing the information capturing process

feature-based data

data where real world geographical entities or phenomena (i.e. rivers, roads, buildings, etc.) are represented as geometric objects

feature catalogue

catalogue containing definitions and descriptions of the feature types, feature attributes and feature relationships occurring in one or more sets of geographic data, together with any feature operations that may be applied [ISO 19101-1:2014]

metadata

information about a resource [ISO 19115-1:2014]

portrayal catalogue

collection of defined portrayals for a feature catalogue [ISO 19117:2012]

profile

set of one or more base standards or subsets of base standards, and, where applicable, the identification of chosen clauses, classes, options and parameters of those base standards, that are necessary for accomplishing a particular function [adopted from ISO 19106:2004]

NOTE A profile is derived from base standards so that by definition, conformance to a profile is conformance to the base standards from which it is derived.

4.2. Abbreviations

AML	Additional Military Layers
CLB	Contour Line Bathymetry
DGIF	DGIWG Geospatial Information Framework
DGIM	DGIWG Geospatial Information Model
DMF	DGIWG Metadata Foundation
DPS	Data Product Specification
DQ	Data Quality
EPSG	European Petroleum Survey Group
HTML	HyperText Markup Language
ISO	International Organization for Standardization
OGC	Open Geospatial Consortium
MD	Metadata
NATO	North Atlantic Treaty Organization
PC	Portrayal Catalogue
STANAG	Standardization Agreement
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
URN	Uniform Resource Name
UUID	Universally Unique Identifier
XML	Extensible Markup Language

5. General structure and content of a data product specification

A data product specification defines the requirements for a data product. It shall contain sections covering the following aspects of the data product [adopted from ISO 19131:2007/Amd. 1:2011][1]:

- Overview see Clause 6
- Specification scopes see Clause 7
- Data product identification see Clause 8
- Data content and structure see Clause 9
- Reference systems see Clause 10
- Data quality see Clause 11
- Delivery information see Clause 15
- Metadata see Clause 17

A data product specification may also contain sections covering the following aspects of the data product [adopted from ISO 19131:2007/Amd. 1:2011]:

- Data production see Clause 12
- Data maintenance see Clause 13
- Portrayal see Clause 14
- Additional information see Clause 16

NOTE: The sections of a data product specification are described in the clauses of this profile. Items which are extensions to ISO 19131 are in bold; those which are constrained are marked by an asterisk (*).

6. Overview

The overview section provides the reader of a data product specification with general introductory information on the data product along with product specification metadata.

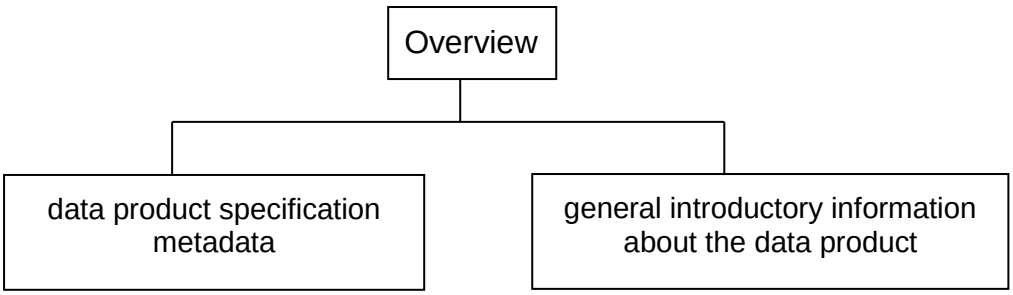

Table 2 defines the structure of the Overview element which supports a short narrative description.

The data product specification metadata shall provide information to uniquely identify the data product specification as well as information about the creation of the data product

[1] The order of the sections are adopted from ISO 19131:2007/Amd. 1:2011 has been changed.

specification. The data product specification metadata shall include the items specified in Table 3.

Terms, Definitions and Abbreviations relevant to the specification are included in the structure defined in tables 4 and 5.

Table 6 defines the elements of the informal description of the data product.

For DGIF data product specifications the identifier shall be developed and agreed by DGIWG management. For example for the DGIF Topographic Map 1:50k the identifier “DTM50” is assigned.

Table 2: Overview

DPS			**1,1**
Item name	**Description**	**Type**	**Mult**
overview	general information about the product specification	CharacterString	1,1

Table 3: Data product specification metadata

Data Product Specification Metadata			**1,1**
Item name	**Description**	**Type**	**Mult**
title	title of the data product specification	CharacterString	1,1
version	version of the data product specification	CharacterString	1,1
date	date the product specification was created / published	Date	1,1
language	language(s) of the data product specification, e.g. translations	CharacterString **Fixed to English**	1,1
classification system	The system of classification which is in use	CharacterString	0,1
classification	classification code of the handling restriction on the data product specification	MD_ClassificationCode	1,1
contact	party responsible for the data product specification	CI_ResponsibleParty	1,1
url	online-address where the resource is downloadable	URL	0,*
identifier	persistent unique identifier for a published version of the product specification.	CharacterString	1,1
maintenance	description of the maintenance regime for the product specification.	MD_Maintenance Information	1,1
keyword	commonly used word(s) or formalised word(s) or phrase(s) used to describe the subject.	MD_Keywords	1,*
topicCategory	the main theme(s) of the data product	MD_TopicCategoryCode	1,*
distributionFormat	the format in which the product specification is provided.	CharacterString	1,*
useLimitation	general use limitations (limitations not implied by security or legal constraints) of the data product specification.	CharacterString	0,*

Table 4: Terms and definitions

Terms and definitions			**0,***
Item name	**Description**	**Type**	**Mult**
term	one word, or a short group of word	CharacterString	1,1
definition	definition of the term	CharacterString	1,1
termNote	potentially notes may be added to complete the definition, specify a domain etc.	CharacterString	0,*

Table 5: Abbreviations

Abbreviations			**0,***
Item name	**Description**	**Type**	**Mult**
abbreviation	abbreviation used within the specification	CharacterString	1,1
definition	long version of the term	CharacterString	1,1
acronym	any acronym for the term	CharacterString	0,1

Table 6: Informal description of the data product

Informal Description of the Data Product			**1,1**
Item name	**Description**	**Type**	**Mult**
title	Official designation of the data product	CharacterString	1,1
abstract	informal description of the data product	CharacterString	1,1
acronym	Any acronyms for the title of the data product	CharacterString	0,*
content	Textual description of the content of any dataset compliant with this specification	CharacterString	1,1
spatialExtent	Description of the spatial extent covered by the data product	EX_Extent	1,1
temporalExtent	Description of the temporal extent covered by the data product	EX_Extent	1,1
specificPurpose	Specific purpose for which the data has been collected or can be used	CharacterString	1,1

7. Specification scopes

The specification of a data product shall include a description of its scope, which may be restricted in terms of spatial or temporal extent, feature types and properties included, spatial representation, or position within a product hierarchy. If the product is homogenous a single ‘root scope’ may be defined. The data product specification may specify a partitioning of the data content of the product on the basis of one or more criteria. Such partitioning may be different for different parts of the data product specification.

Each such part of the data content shall be described by a specific scope that may inherit or override the general specification scope. Criteria that might be used as the basis for partitioning include, but are not limited to;

- spatial or temporal extent,
- feature type,
- property type,
- property value,
- spatial representation,
- product hierarchy.

Example

For a data product, which combines a coverage containing imagery and vector data separate scopes may be defined that apply specifically to the imagery and vector data, these may have different properties such as spatial resolution and maintenance frequency.

The information in the different sections of the specification only applies to parts of the data product. In this case, each part shall be clearly identified by a scope.

When a data product has more than one delivery medium e.g. digital and hardcopy scopes may be used to reflect requirements, which apply to the different forms. Annex B provides an example of this.

Table 7: Scope information

DPS_ScopeInformation			**1,***
Item name	**Description**	**Type**	**Mult**
scopeIdentification	identification of the scope for the purpose of a particular data specification	CharacterString	1,1
level	hierarchical level of the data specified by the scope	MD_ScopeCode	0,1
level name	name of the hierarchy level of the data specified by the scope	CharacterString	0,1
extent	spatial, vertical and temporal extent of the data	EX_Extent	0,1
level description	detailed description about the level of the data specified by the scope	CharacterString	0, *
coverage[1]	coverages to which the information applies	CharacterString	0, *

[1] This should only be used for data products where one or more coverage is defined within section 9. This item is not intended to be used to describe thematic groups within a dataset.

8. Data product identification

The specification shall include information by which the data product can be identified. This information supports the discovery and identification of suitable data products by users. The items required for this section are detailed in table 8. This section extends ISO 19131 with a number of items including elements to cater for security classification information.

Table 8: Data product identification

DPS_ IdentificationInformation			**1,1**
Item name	**Description**	**Type**	**Mult**
title	title of data product	CharacterString	1,1
alternateTitle	other name by which the data product is known	CharacterString	0,*
abstract	brief narrative summary of the content of the data product	CharacterString	1,1
purpose*	summary of the intentions with which the data product is developed	CharacterString	1,1 (0,1)
keyword	**commonly used word(s) or formalised word(s) or phrase(s) used to describe the subject.**	**MD_Keywords (see DMF)**	**0,***
topicCategory	main theme(s) of the dataset	MD_TopicCategoryCode (see DMF)	1,*
spatialRepresentationType	form of spatial representation	MD_Spatial RepresentationTypeCode (see DMF)	0,*
spatialResolution	factor which provides a general understanding of the density of spatial data in the dataset	MD_Resolution (see DMF)	0,*
geographicExtent	description of the geographic area within which data is available	EX_GeographicExtent (see DMF)	1,*
supplementalInformation	any other descriptive information about the dataset	CharacterString	0,1
language	**language(s) of the dataset If language is not applicable, e.g. for raster data, use "not applicable" as value for the element**	**Language Codelist (see DMF)**	**1,***
classifierClassification System	**This is the classification system related to the classification level. The classification system is expressed as a code of the corresponding country or NATO Body.**	**CharacterString (see DMF)**	**0,1**
classification	**classification code of the handling restriction on the data product**	**MD_ClassificationCode (see DMF)**	**1,1**
handlingDescription	**additional information about the restrictions on handling the resource.**	**CharacterString (see DMF)**	**0,***
pointOfContact	**identification of, and means of communication with, person(s) and organization(s) associated with the data**	**CI_ResponsibleParty (see DMF)**	**0,***
useLimitation	**this element provides a means to express general use limitations (limitations not implied by security or legal constraints) of the resource.**	**CharacterString (see DMF)**	**0,***
identificationScope	reference to the applicable scope as defined in clause 7	DPS_ScopeInformation	1,1

9. Data content and structure

The content information of a data product is described in terms of an application schema and a feature catalogue, references to these and a narrative description shall be included in the specification. For imagery and gridded data product specifications additional elements define any coverages they may contain. There shall be a feature catalogue to define the information content of vector, imagery or gridded data.

For DGIF compliant product specifications a profile of the DGIM shall be created and from this a Feature Catalogue derived.

Feature Catalogues must be created in XML format in accordance with the ISO 19110 XML schema. A human readable version of the Feature Catalogue may also be provided as an HTML document.

For DGIF compatible product specifications a set of rules shall be defined to relate the application to the DGIM. As far as possible changes to the DGIM or the application schema shall be made to ensure maximum consistency.

For non-DGIF compatible vector data product specifications application schemas may be developed independently however they are recommended to be based upon concepts registered in an internationally recogonised Feature Concept Dictionary.

A data product specification shall reference a Feature Catalogue.

A Data Capture Guide (see Data Capture) reflects the content of the Feature Catalogue but adds additional information such as informative guidance and inclusion criteria.

This section covers the requirements for feature based and coverage based data products. This specification extends ISO 19131 by defining items for coverages based data as listed in table 9.

For products with a defined tiling scheme such as a Web Map Tile Service (WMTS) or a map series with a defined regular grid this should either be documented within this section or by reference to another specification.

Table 9: Data content and structure

DPS_ContentAndStructureInformation			**1,***
Item name	**Description**	**Type**	**Mult**
narrativeDescription	unique identifier of data	CharacterString	1,1
DPS_FeatureBasedDataInformation			1,1
Item name	**Description**	**Type**	**Mult**
applicationSchema	the application schema	DPS_ApplicationSchema (see ISO 19109)	0,1
featureCatalogue	the feature catalogue	FC_FeatureCatalogue (see ISO 19110)	1,1

DPS_CoverageBasedDataInformation*			0,*
Item name	**Description**	**Type**	**Mult**
coverageID	**unique identifier of coverage**	**gml:ID**	**1,1**
spatialRepresentationOfA GeorectifiedGriddedCoverage	**Describes the axis, cell geometry and grid locations of the coverage**	**DMF_Grid Spatial Representation**	**1,1**
coverageDescription	**technical description of the coverage**	**CharacterString**	**1,1**
coverageType	**type of the coverage**	**DMF_CoverageContentInformation**	**1,1**
specification	**additional information**	**CI_Citation**	**1,1**
contentScope	**reference to the applicable scope as defined in clause 7**	**DPS_ScopeInformation**	**1,1**

10. Reference systems

The data product specification shall include information that defines the reference systems used in the data product. This shall include the following:

- the spatial reference system;
- the temporal reference system.

The spatial reference system used may be either a coordinate reference system, as defined in ISO 19111, or a spatial reference system using geographic identifiers, as defined in ISO 19112. Each spatial reference system shall be defined within the MD_ReferenceSystem class by defining the code, codespace and version. An example is included at B.9.

The temporal reference system shall be as defined in ISO 19108.

The default horizontal reference system for geospatial information shall be World Geodetic System 1984 as specified in STANAG 2211.

Table 10: Reference system information

DPS_ReferenceSystemInformation			**1,***
Item name	**Description**	**Type**	**Mult**
spatialReferenceSystem*	reference system identifier(s) of spatial reference system used,	MD_ReferenceSystem	1,* (1,1)
temporalReferenceSystem	reference system identifier of temporal reference system used	TM_ReferenceSystem (see ISO 19108)	0,1
rsScope	reference to the applicable scope as defined in clause 7	DPS_ScopeInformation	1,1

11. Data quality

The data product specification shall identify the data quality requirements for the data product in accordance with ISO 19157. This shall include a statement on acceptable conformance quality levels and corresponding data quality measures as defined in ISO 19157. This statement shall cover all the data quality elements and data quality sub-elements defined in ISO 19157, even if only to state that a specific data quality element or data quality sub-element is not applicable. It shall also include any additional data quality elements and sub-elements. It shall be repeated as many times as the number of different specification scopes in the data product and shall be recorded as described in ISO 19115.

When establishing the conformance quality levels in a data product specification, it should be taken into consideration that

- different quality evaluation methods may be applied to different parts of the dataset (different data quality scopes),
- for the same data quality element, different results with different confidence intervals can be achieved with different quality evaluation measures,
- conformance quality levels can be different for different features in the dataset, e.g. the required positional accuracy for features with fuzzy boundaries is usually much lower than for linear and well defined features.

Specific measures may reflect existing evaluation techniques an example being STANAG 2215 which defines a number of specific measures and groups them into a composite alphanumeric code. A DPS should list each individual measure separately. The metadata profile of the DPS should reflect these measures to allow data quality information to be included in metadata records.

Table 11: Data quality information

DPS_DataQualityInformation			**1,***
Item name	**Description**	**Type**	**Mult**
dataQuality	required level of data quality	DQ_DataQuality	1,*
scope	the specific data to which the data quality information applies	DQ_Scope	1,1
report	Aspect of quantitative quality information	DQ_Element	0,*
result	Value (or set of values) obtained from applying a data quality measure or the outcome of evaluating the obtained value (or set of values) against a specified acceptable conformance quality level	DQ_Result	1,2
DQ_Result	The values or information about the value(s) (or set of values) obtained from applying a data quality measure	DQ_QuantitativeResult	1,1
valueType	Value type of the data quality parameter (shall be one of the data types defined in ISO/TS 19103:2005)	RecordType	0,1
valueUnit	value unit for reporting a data	UnitOfMeasure	1,1

	quality result		
value		Record	1,*
errorStatistic	-	CharacterString	0,1
DQ_Scope			**1,1**
Item name	**Description**	**Type**	**Mult**
level	hierarchical level of the data specified by the scope	MD_ScopeCode	1,1
extent	spatial, vertical and temporal extent of the data	EX_Extent	0,1
levelDescription	detailed description about the level of the data specified by the scope	MD_ScopeDescription	0,*
qualityScope	reference to the applicable scope as defined in clause 7	DPS_ScopeInformation	1,1

12. Data production

In order to produce a data product conforming to this specification additional descriptive guidance and rules may be defined for vector data. This may be done in the following ways depending on the product type;

12.1 Data Capture Guide

A document describing the capture of features and attributes from source information. Annex C provides an example of how a Data Capture Guide may be presented.

12.2 Inclusion Criteria

Logical rules which define when and how features and attributes shall be included in the data product. This may be defined in a machine-readable form.

12.3 Acquisition and Processing

The data product specification may provide information on how the data is translated from source information to data product. For vector data, this may take the form of inclusion criteria. For imagery and gridded data acquisition and processing steps may be specified.

Table 12: Data production information

DPS_DataCaptureInformation			**1,***
Item name	**Description**	**Type**	**Mult**
dataCaptureStatement	general description of the process for the capture of the data	CharacterString	1,*
captureScope	reference to the applicable scope as defined in clause 7	DPS_ScopeInformation	1,1

13. Data maintenance

The data product specification may provide information on how the data product is maintained. Where this section of the data product specification is included, it shall describe the principles and criteria applied in the maintenance of the data product once it has been produced. This shall include the maintenance and update frequency which shall describe the

frequency with which changes and additions are made to the data product. This profile allows additional information on data sources and production process to be included. A data capture guide as described in clause 12 may provide more detailed guidance on the detailed processes which apply to data maintenance. This may include specific update criteria.

Maintenance may result in a new version of a dataset or an update which is a change to a subset of a dataset. The use of updates shall depend on the nature of the data product. Guidance on the update mechanism and relevant encoding information shall be provided within a data product specification.

Table 13: Data maintenance

DPS_ MaintenanceInformation			0,*
Item name	**Description**	**Type**	**Mult**
maintenanceAnd UpdateInformation	frequency with which changes and additions are made to the product	CharacterString	1,1
maintenanceAnd UpdateFrequency	**frequency with which changes and additions are made to the data product**	**MD_Maintencance Information**	**1,1**
updateScope	**parts of a data product to which maintenance will be applied**	**MD_ScopeCode**	**1,1**
dataSource	**Identification of the kinds of data sources usable to product datasets compliant with the considering specification**	**CharacterString**	**0,***
productionProcess	**Textual description of the production process applicable to the datasets compliant with the considering specification**	**CharacterString**	**0,1**
maintenanceScope	reference to the applicable scope as defined in clause 7	DPS_ScopeInformation	1,1

14. Portrayal

The data product specification may provide information on how the data is to be presented as graphic output as a plot or as an image. Where included, this shall take the form of a reference to a set of portrayal rules and a set of portrayal specifications. This section is most relevant to vector data product specifications which are intended to be presented in a consistent manner to end users. Therefore specifications for imagery and gridded data or those aimed at data exchange only would normally omit this component.

This section may include rules and symbols for the display of marginalia and other information including legends and metadata. Such information shall be provided as an annotation catalogue and this is an extension to ISO 19131. An annotation catalogue is a specialised type of portrayal catalogue. Depending on the product this approach may not be appropriate and provision of a separate guidance document in digital form may be more appropriate.

The form of a Portrayal Catalogue may vary depending on the data product type. For example, data products delivered via web services may use Styled Layer Descriptors, for hardcopy products a human readable catalogue must be provided.

The intention is to develop machine readable forms such as OGC Styled Layer Descriptors or an XML Portrayal Catalogue structure. This will allow software applications to read such files and support updated Portrayal information. The format will depend on the type of data product.

Various considerations such as coloured light readability, digital display of symbols must be taken into account when developing a Portrayal Catalogue. If required a Portrayal Description may be produced to provide users with an understanding of the Portrayal.

Table 14: Portrayal information

DPS_PortrayalInformation			**0,***
Item name	**Description**	**Type**	**Mult**
portrayalCatalogueCitation	bibliographic reference to the portrayal catalogue	CI_Citation (see ISO 19115)	1,*
annotationCatalogueCitation	**bibliographic reference to the annotation catalogue**	**CI_Citation**	**0,***
portrayalScope	reference to the applicable scope as defined in clause 7	DPS_ScopeInformation	1,1

15. Delivery Information

The data product specification shall identify any requirements for the data product delivery. Where applicable these shall include delivery format information and delivery medium information.

Delivery format shall cover exchange formats such as Geography Markup Language, Geopackage and Geotiff. The most suitable format should be selected based on the requirements for the data product specification. If a more detailed description of the encoding (e.g. a GML Application Schema) is required, it may be incorporated as an annex to the data product specification.

In this profile delivery format is used to specify data products delivered via web services such as via Web Map Service (WMS) and Web Feature Service (WFS) interfaces. In such instances the specific web service profile to be used shall be referenced.

Edition 1.0.0 of this profile is intended to support the development of data product specifications for raster and vector data products. It is recognised that further development of this profile is required to cater for the requirements of Web Services and Imagery and Gridded Data. That said the structure of the profile and some components may still be useful to such specifications.

Table 15: Delivery Information

DPS_DeliveryInformation			**1,***
Item name	**Description**	**Type**	**Mult**
deliveryScope	reference to the applicable scope as defined in clause 7	DPS_ScopeInformation	1,1
DPS_DeliveryMedium			**1,***
Item name	**Description**	**Type**	**Mult**
unitsOfDelivery	description of the units of delivery (e.g.tiles, layers, geographic areas)	CharacterString	1,1
transferSize	estimated size of a unit in the specified format, expressed in Mbytes	Real	0,1
mediumName	name of the data medium	CharacterString	0,1
otherDeliveryInformation	other information about the delivery	CharacterString	0,1
DPS_DeliveryFormat			**0,***
Item name	**Description**	**Type**	**Mult**
formatName	name of the data format	CharacterString	1,1
version	version of the format (date, number, etc)	CharacterString	0,1
specification	name of a subset, profile, or product specification of the format	CharacterString	0,1
fileStructure	structure of delivery file	CharacterString	0,1
language	language(s) used within the dataset	DMF_LanguageCode	1,*
characterSet	full name of the character coding standard used for the dataset	MD_CharacterSetCode	0,1

15.1 File naming

For data product specifications defining specific datasets a formal structure for file names may be defined within a data product specification. The following factors should be considered:

- File names shall be meaningful to humans.
- Filenames should be unique. This may be achieved using a producing agency identifier as part of the name.
- Filenames should indicate the Data Product Specification and any sub type specified by that specification.
- Additional detailed information will be provided within an XML metadata file and therefore the file name should not duplicate this content. Applications accessing datasets should utilize the metadata.

For example a structure may be defined as follows;

111_22222_3333333_4.555

1. Producer identifier
2. Data Product Specification Identifier
3. Producer allocated numeric identifier (may be a UUID)

4. Edition
5. File extension

GBR_DTM50_456723_2.gml

Underscores may be used to enhance human readability.

16. Additional information

This section of the data product specification may include any other aspects of the data product not provided elsewhere in this specification. This might include constraint information (for access and use). If this information only applies to part of the product, then the scope for this must be clearly identified.

Table 16: Additional information

DPS_AdditionalInformation			0,*
Item name	**Description**	**Type**	**Mult**
additionalInformation*	any additional information to describe the data product	CharacterString	1,1 (0,1)
additionalInfoScope	reference to the applicable scope as defined in clause 7	DPS_ScopeInformation	1,1

17. Metadata

The data product specification shall define the metadata elements to describe the content, reference system, quality, and other characteristics of the data product. Data product specifications based on this profile shall utilize the current version of the DGIWG Metadata Foundation which is based on ISO 19115 and ISO 19115-1. Where required additional elements may be used to meet the requirements of the data product, these should be taken from the DMF in the first instance. In cases where additional items are found to be required they should follow the rules laid out in Annex B of DMF.

The format and encoding of the metadata shall be stated in the data product specification. The DGIWG Metadata Foundation describes an XML encoding which conforms to ISO 19139 and ISO 19115-3. The ISO 19139 encoding shall be the default metadata encoding for data product specifications.

An example metadata specification based on DMF 2.0 can be found in Annex B.15.

Table 17: Metadata

DPS_Metadata			1,1
Item name	**Description**	**Type**	**Mult**
MD_Metadata	a metadata specification conforming to the DGIWG Metadata Foundation	-	1,1
metadataScope	reference to the applicable scope as defined in clause 7	DPS_ScopeInformation	1,1

Annex A - Conformance Test Suite

A Data Product Specification claiming conformance to this profile shall meet the following conformance tests where applicable.

A.1. Data Product Specification - General

Verify that a data product specification is conformant with this profile.

A.1.1 Confirm that all required elements are present and that their content is consistent with this profile.

A.1.2 Confirm that optional elements are present where applicable and consistent with this profile.

A.2. Data Product Specification - Metadata

Metadata conformance to DMF

A.2.1. Confirm that the metadata specification defined in the data product specification is a valid profile of the DGIWG Metadata Foundation.

A.2.2. Confirm that any extensions to the DGIWG Metadata Foundation used in this data product specification are consistent with that specification and registered in a metadata registry or dictionary.

A.3. Data Product Specification –Vector Data

For DGIF compliant vector data product specifications only

A.3.1 Check that the application schema is a valid profile of the DGIM.

A.4. Data Product Specification – Imagery and Gridded Data

For DGIF compliant gridded elevation data product specifications only

A.4.1 Confirm that the data product specification is compliant with the DGED product implementation profile.

Annex B – Informative Example

This annex provides an informative example of a data product specification based on this profile. It is indicative and therefore some elements are partial examples.

B.1. Overview

In order to plan and conduct maritime operations a detailed understanding of the marine environment is required in order to consider how platforms and systems should be utilized. This product specification describes a data product which contains detailed bathymetric contours as a vector data product. It specifies delivery as datasets in Geographic Markup Language (GML) format. In addition to bathymetry, names and data quality information may be incorporated within the data product.

B.2. Data product specification metadata

Title –Additional Military Layers – Contour Line Bathymetry

Version – 1.0

Date –2015-05-11

Language – English

Classification System - NATO

Classification – unclassified

Contact – Role - Custodian

Address

United Kingdom Hydrographic Office

Admiralty Way

Taunton

TA1 3JP

UK

URL – http://www.ukho.gov.uk/Defence/AML/Pages/Home.aspx.

Identifier – AML-CLB

Maintenance – asNeeded

Keyword – bathymetry, depths, oceans

Topic Category – oceans

Distribution Format – PDF

Use Limitation – Not to be used for marine navigation

B.3. Terms and definitions

Term	Definition	Term note

B.4. Abbreviations

Abbreviation	Definition	Acronym
-	Additional Military Layers	AML
-	Contour Line Bathymetry	CLB
-	Warship Electronic Chart Display and Information system	WECDIS

B.5. Informal Description of the Data Product

Title – Additional Military Layers – Contour Line Bathymetry

Abstract – An AML CLB is a data product which supports situational awareness in the maritime environment. It provides users with a better understanding of the bathymetry in support of the planning and conduct of exercises and operations.

Acronym – AML-CLB

Content – This data product contains depth areas and depth contours which form its primary content. Additionally named areas and data quality features describing the quality of the bathymetric data may be encoded.

Spatial extent –

Description: Marine areas only.

East Bounding Longitude: 180°

West Bounding Longitude: -180°

North Bounding Latitude: 90°

South Bounding Latitude: -90°

Temporal Extent – Not defined

Specific purpose – The data product supports situational awareness in the marine environment. It supplements navigational products to allow forces to plan and execute operations safely and efficiently. It is intended to be used in Warship ECDIS (WECDIS) and C2 systems.

B.6. Scope Information

Scope identification – Root scope

Level – dataset

Level name – AML-CLB scope

Level description -

Extent – global, marine areas only

B.7. Data Product Identification

Title – Additional Military Layers – Contour Line Bathymetry

Alternate Title – Contour Line Bathymetry

Abstract – The data product contains vector bathymetry consisting of contours and depth areas. Additionally, geographic names and bathymetric data quality information may be included.

Purpose – The data product supports situational awareness in the marine environment. It supplements navigational products to allow forces to plan and execute operations safely and efficiently. It is intended to be used in Warship ECDIS (WECDIS) and C2 systems.

Keyword - bathymetry, depths, oceans

Topic Category – elevation, oceans

Spatial representation type – vector

Spatial resolution – *An integer value from the following list;*

Table B1 – Scale bands and values

Scale Band	Equivalent Scale Value	Note
1	100,000,000	< 1:100,000,000
2	25,000,000	
3	5,000,000	
4	1,000,000	
5	250,000	
6	50,000	
7	10,000	
8	2,500	
9	1,600	> 1:1,600

Geographic extent – *DMF/Extent*

Language - eng

Classifier Classification System – *DMF/NATO Body Codelist or String*

Classification – *DMF/Classification Level Codelist*

Handling Description – *String*

Point of contact - *Producing Organisation*

Use limitation – Not to be used for marine navigation

Identification scope – Root scope

B.8. Data content and structure

Narrative Description

This data product contains features which describe the bathymetry of the ocean. In addition, features for named sea areas and the quality of bathymetric information are included.

Application Schema

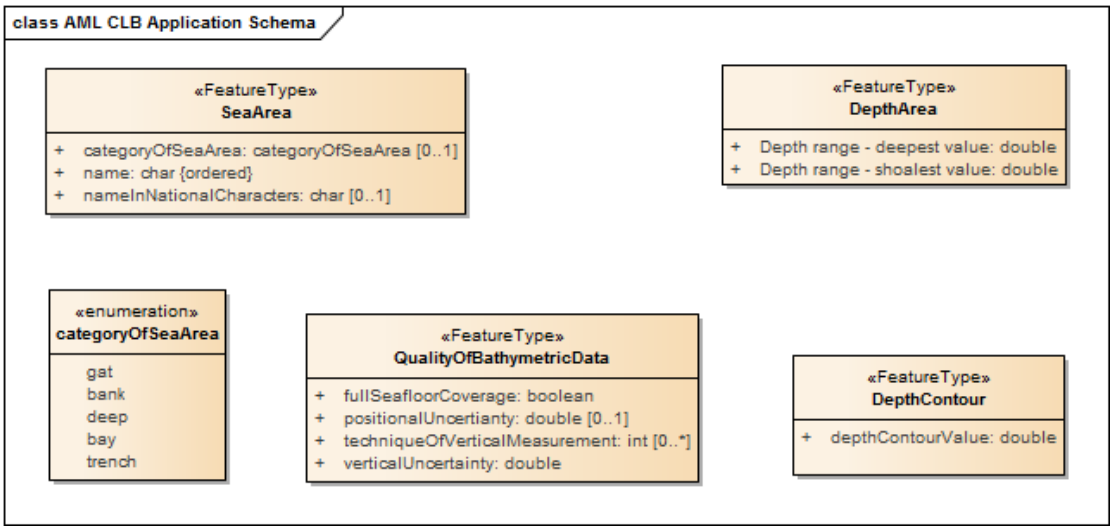

Figure B1 - AML CLB Application Schema (simplified)

Feature Catalogue
Name: AML Contour Line Bathymetry
Scope:
Field of application:
Version number: 1.0
Version date: 2015/04/01
Producer:
Feature Type
Name: Depth Area
Definition: A water area whose depth is within a defined range of values.
Code: BE019
Feature Attributes
Depth range - shoalest value
Depth range – deepest value

Feature Type
Name: Depth Contour
Definition: A line connecting points of equal depth at and below the hydrographic datum.
Code: BE015
Feature Attributes
Depth contour value

Feature Type
Name: Sea Area
Definition: A geographically defined part of the sea or other navigable waters. It may be specified within its limits by its proper name.
Code: -
Feature Attributes
Category of Sea Area
Name

Name (in national characters**)**

Feature Type
Name: Sounding
Definition: A spot depth or drying height that has been referenced to a vertical datum.
Code: BE020
Feature Attributes
Value of sounding
Sounding uncertainty

Feature Type
Name: Quality of Bathymetric Data
Definition: An area within which a uniform assessment of the quality of the bathymetric data exists.
Code: -
Feature Attributes
Positional uncertainty
Technique of vertical measurement
Full seafloor coverage
Vertical uncertainty

Feature Attribute
Name: Name
Definition: The individual name of a feature.
Data Type: text

Feature Attribute
Name: Category of sea area
Definition:
Data Type: enumeration
Feature Attribute Value

Label:	Code:	Definition:
gat	1	A natural or artificial passage or channel through shoals or steep banks, or across a line of banks lying between two channels.
bank	2	An elevation over which the depth of water is relatively shallow, but normally sufficient for safe surface navigation.
deep	3	In oceanography, an obsolete term which was generally restricted to depths greater than 6,000 m.
bay	4	Wide indentation in the coastline generally smaller than a gulf and larger than a cove.
trench	5	A long narrow, characteristically very deep and asymmetrical depression of the sea floor, with relatively steep sides.

B.9. Reference systems

Spatial reference system - Horizontal

- Code: 4326
- Code space: EPSG

- Version: 8.9

Spatial reference system - Vertical

- Code: 1080
- Code space: EPSG
- Version: 8.9

Scope – Root Scope

B.10. Data quality

This specification defines a number of a specific Data Quality Elements. Additionally, features and attributes incorporated in the application schema carry further data quality information.

Data Quality Element – 1 - Conceptual Consistency

Measure

Scope	Root scope
Name of measure	Conceptual consistency
Measure Description	conceptual schema non-compliance

Result (Conformance)

Scope	Root scope
Pass	True
Specification	Feature Catalogue
Explanation	If any items are present in the dataset which are not present in the feature catalogue this result shall return false.

Data Quality Element – 2 – Format Consistency

Measure

Scope	Dataset
Name of measure	Format consistency
Measure Description	Measure that the dataset is a valid GML file.

Result (Conformance)

Scope	Dataset
Pass	True
Specification	Data Format – GML Encoding
Explanation	If the dataset is not well formed and does not validate against the GML Application Schema

Within each Dataset the feature Quality of Bathymetric Data shall be used to describe the quality of source data. Additionally, attributes on the Sounding and Depth Contour features shall indicate uncertainty.

B.11. Data production

Data capture statement – Data products shall be captured from processed bathymetric survey data and depth areas and contours created from this information either manually or through the processing of bathymetric surfaces.

Capture scope – Root scope

B.12. Data maintenance

Maintenance and update information

Maintenance and updates to data products conforming to this specification are made as required. Typically, this will reflect the availability of new bathymetric survey information. Updated datasets shall be issued as a new version.

Maintenance and update frequency

Maintenance frequency – As needed

Update scope – Root scope

Data source

The primary data source for this product specification is processed bathymetric survey data. This may be obtained by acoustic or optical sensors such as multi-beam echo sounders and LIDAR systems.

Maintenance scope – Root scope

B.13. Portrayal information

The portrayal of this data product is defined in a set of Styled Layer Descriptors (SLDs) which form a Portrayal Catalogue, these are listed below. These files accompany this specification. They may be provided with datasets for use in receiving systems or used to style Web Map Services.

SeaArea.sld
QualityofBathymetricData.sld
DepthContour.sld
DepthArea.sld

Portrayal scope – Root scope

B.14. Delivery information

This product specification caters for data products delivered as GML datasets, GML via Web Feature Services and via Web Map Services. Web Map Services providing images as both PNG and JPEG are permitted.

Delivery Scope – Root scope
Delivery format
Format name - GML
Version – 3.2.1
Specification -
Language – English
Characterset – UTF-8

Datasets shall use the following file name structure;

1. Producer identifier
2. Data Product Specification Identifier
3. Producer allocated numeric identifier – for this specification the Global Area Reference System character designation shall be used followed by the edition number of the dataset
4. File extension

GBR_AML_CLB_006AG_1.gml

B.15. Metadata

Items in italic font are extensions to the DMF.

Items shaded in grey are values which should be taken from this product specification.

Identifier	Title	Card	Fixed Values / Specific Values
MDSID	Metadata Set Identifier	0..1	MD_GBR_AML_CLB_006AG_1
MDDLOC	Metadata Default Locale	1	Locale Language eng, Character Encoding utf8
MDRPTY	Metadata Responsible Party	1..*	UKHO DMGIC…
MDDATE	Metadata Date Stamp	1	2015-03-03
MDSTD	Metadata Standard	1	Title -urn:dgiwg:metadata:dmf:1.0.1:profile:AML-CLB Version – 1.0
RSTITLE	Resource Title	1	GBR_AML_CLB_006AG_1
RSABSTR	Resource Abstract	1	Contour line bathymetry derived from GEBCO data for the North Sea.
RSPURP	Resource Purpose	0..1	Contour line bathymetry data to support situational awareness.
RSTYPE	Resource Type Code	1	dataset
RSED	Resource Edition	0..1	1.0
RSEDDAT	Resource Edition Date	0..1	2015-03-10
RSID	Resource Identifier	0..*	GBR_AML_CLB_006AG_1
RSKWDS	Resource Keyword Set	0..*	bathymetry, depths, oceans
RSSCALE	Resource Equivalent Scale	0..*	1,000,000
RSLOC	Resource Locale	1..*	Locale Language - eng Character Encoding - utf8
RSRPTP	Resource Spatial Representation Type	0..1	Vector
DGITYP	Geospatial Information Type	0..1	vector2D
RSGFLV	Resource Georeferencing Level	0..1	georeferenced
RSPREF	Resource Representation Form	0..1	digital
RSTOPIC	Resource Topic Category	1..*	elevation, oceans
RSTHEME	Resource Theme	0..*	Depths
RSEXT	Resource Extent	0..*	Identifier – 006AG Polygon - …..
RSRSYS	Resource Reference System	0..*	URI http://www.opengis.net/def/crs/EPSG/0/4326
RSDATE	Resource Reference Date	1..*	2015-03-10
RSRPTY	Resource Responsible Party	0..*	UKHO DMGIC…
RSSCST	Resource Security Constraint	0..*	Classification Level – unclassified

Identifier	Title	Card	Fixed Values / Specific Values
			Classification System - NATO
RSACLV	*Resource Accessibility Level*	*0..1*	natoPlanning
RSUSE	Resource Use Limitation	0..*	Not to be used for navigation.
RSLING	Resource Lineage	1	……
RSDFMT	Resource Distribution Format	1..*	Title - GML Version - 3.2.1

Metadata Scope Dataset

Annex C – Data Capture Guide Example

Depth contour

Definition: **DEPTH CONTOUR**. A line connecting points of equal depth at and below the hydrographic datum. DFDD BE015

Feature: Depth contour

Primitives: Curve

Attribute	Alphacode	Allowable Encoding Value	Type	Multiplicity
Depth contour value	CRV		RE	1,1

1.1.1 Depth contour

The standard series of depth contour lines to be encoded for AML CLB is: drying line (0 contour – where tides are appreciable), 2, 5, 10, 15, 20, 30, 50, 100, 200, 300, 400, 500, 1000, 2000 metres, etc. The 2, 5 and/or 15 metre contours may be omitted where they serve no useful purpose, and on smaller maximum display scale AML data all depth contours to 30 metres (1:1500000 and 1:3000000 scales) or 200 metres (1:10000000 scale) should be omitted. It is not necessary for the complete sequence of contours to be shown, e.g. on steep slopes and around isolated pinnacles.

Supplementary contours, e.g. at 3, 8, 25, 40, 75 metres and multiples of 10 or 100 metres may be shown, if the available data permit, to delineate particular bathymetric features where soundings would otherwise be the only depth information over a large area, or for the benefit of particular categories of shipping.

Remarks:

- Encoded drying contours must be indicated by negative values for the attribute **depth contour value**.