# Ocean Data Standards

## Volume 8

SeaDataNet Common Data Index (CDI) metadata model for Marine and Oceanographic Datasets (including SeaDataNet CDI metadata profile of ISO 19115, V12.2.0)

**UNESCO**

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# Ocean Data Standards

Volume 8

SeaDataNet Common Data Index (CDI) metadata model for Marine and Oceanographic Datasets

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**SeaDataNet Common Data Index (CDI) metadata model for Marine and Oceanographic Datasets**

_Scope_: Proposal to acknowledge SeaDataNet Common Data Index (CDI) metadata profile of ISO 19115 as a standard metadata model for the documentation of Marine and Oceanographic Datasets. In particular, the proposal aims to promote CDI as a regional (i.e. European) standard.

The SeaDataNet infrastructure, its standards, services and products started to build since the mid-1990s under the EU MAST Programmes with the precursor EDMED, EURONODIM, MEDATLAS projects and continued with the EU-FP5 SeaSearch project (2002-2005). Under EU-FP6 Programme, the distributed SeaDataNet system was set up (2006-2011) and continued into its second phase under the EU-FP7 SeaDataNet II project (2011-2015). In the EU HORIZON 2020 SeaDataCloud project, the infrastructure is being upgraded and expanded making use of cloud services, High Performance Computing technology and taking into account the European Open Science Cloud (EOSC) challenge.

SeaDataNet CDI has been drafted and published as a metadata community profile of ISO 19115 by SeaDataNet, the leading infrastructure in Europe for marine & ocean data management. Its wide implementation, both by data centres within SeaDataNet and by external organizations makes it also a de-facto standard in the Europe region.

The acknowledgement of SeaDataNet CDI as a standard data model by IODE/JCOMM will further favour interoperability and data management in the Marine and Oceanographic community.

_**Envisaged publication type**_: The proposal target audience includes all the European bodies, programs, and projects that manage and exchange marine and oceanographic data. Besides, the proposed document informs all the international community dealing with marine and oceanographic data about the SeaDataNet CDI metadata model.

_**Purpose and Justification**_: Provide details based wherever practicable.

1. Describe the specific aims and reason for this Proposal, with particular emphasis on the aspects of standardization covered, the problems it is expected to solve or the difficulties it is intended to overcome.

By acknowledging SeaDataNet CDI as a standard data model for Marine and Oceanographic datasets, multiple objectives are sought:
- Wider adoption of SeaDataNet CDI by additional marine data centres around European waters. The process will favour further harmonisation and standardisation of European ocean and marine metadata as well as interoperability by reducing the existing metadata heterogeneity. Organizations adopting this standard will be able to document their datasets according to a well-known and well specified marine metadata model, therefore the data management and exchange of marine and oceanographic information will be eased in many ways (see following point 2).
- Ease interoperability and outreach towards international communities and initiatives. The existence of a recognized standard at European level will favour its understanding also at a broader level.

Example given, international marine and oceanographic communities will be able to correctly understand the information carried by SeaDataNet CDI model.

2. <u>Describe how this proposed standard supports data management, exchange or interoperability. When applicable include mention of what data management functions (e.g. date transport, quality control, archive) the proposal supports.</u>

SeaDataNet CDI supports data management by providing a metadata profile of ISO 19115 to document individual datasets and collections managed and archived by Pan-European marine data centres.

Many metadata elements from ISO 19115 are part of the profile, including elements allowing discovery (e.g. using common criteria: what, when, where, who), evaluation (e.g. lineage), access and use (e.g. online resource information).

Extended (and restricted) elements are present as well, in order to tailor SeaDataNet CDI according to the specific needs of the marine and oceanographic community. Example given, specific elements having a free text domain in ISO 19115 are domain restricted in SeaDataNet CDI only to the values listed in specific code lists. This is the case of organisation names, allowing values only from the EDMO vocabulary. Other vocabularies used to restrict the allowed values of specific elements of SeaDataNet CDI include (but not limited to):

- EDMED - European Directory of Marine Environmental Data sets
- EDMERP - European Directory of Marine Environmental Research Projects
- SeaVoX Platform Categories
- SeaVoX salt and fresh water body gazetteer
- International Standards Organization countries
- SeaDataNet Parameter Discovery Vocabulary
- BODC data storage units

SeaDataNet CDI is a metadata community profile of ISO 19115, drafted and published according to ISO methodologies. SeaDataNet CDI is also compliant with the European directive INSPIRE, which imposes a common set of mandatory and optional metadata elements to be documented by all the organizations from EU countries that are sharing spatial datasets. Compliancy with ISO and INSPIRE eases interoperability towards different communities.

SeaDataNet has established a large European and international network, working closely together with operational oceanography, marine research, and marine environmental monitoring communities as well as with other marine data management infrastructures. The implementation of the CDI by all these different communities leads to improvements of the profile to meet their needs. For example CDI profiles has been extended to incorporate geological and geophysical data from Geo-Seas project and its XML encoding has been upgraded to the 19139 Schema in support of the SeaDataNet users requiring INSIPRE compliance. Concerning the usage of the vocabularies, any user not only those who belong to the SeaDataNet network can require additions of new or changes of the existing terms. The vocabularies content governance is controlled by SeaVoX, a combined SeaDataNet and MarineXML Vocabulary Content Governance Group, moderated by BODC. SeaVox operates by mailing list server and is open to anyone interested in controlled vocabularies for the marine science domain.

3. Describe the main interests benefitting from or affected by the proposed standard, such as industry, consumers, governments, distributors. Identify any relationships and/or dependencies.

Adoption by IODE/JCOMM of SeaDataNet CDI as a metadata standard will give extra momentum to European marine and ocean data centres adopting SeaDataNet. This will also benefit users from all over the world from various sectors. Moreover, it will benefit efforts for global interoperability (as it was done within ODIP and ODIP 2 projects activities) because that process can focus on a limited set of marine metadata profiles, whereby SeaDataNet CDI represents European input.

4. Describe the feasibility of implementing the proposed standard. Include any factors that could hinder the successful establishment or global application of the proposed standard. Are there any associated issues? Identify resource implications resulting from the recommendations.

The feasibility and practicality of implementing the SeaDataNet CDI can be, and has already been successfully accomplished at 43 data centres within the SeaDataNet partnership. Moreover, another 74 data centres in Europe at present have realized the CDI implementation for their managed data sets giving in total access to already more than 2.3 million data sets for physical oceanography, chemistry, geology, geophysics, bathymetry and biology. The results of these activities can be followed at the operational CDI data access service that is part of the SeaDataNet portal (https://www.seadatanet.org). The implementation is supported by dedicated Training Workshops which deal with presenting the standards and the associated tools and which provide hands-on training activities to get fully acquainted with them. The Training Workshops are supported by the IOC-IODE at the UNESCO/IOC Project Office for IODE in Ostend, Belgium, and the training material (included videos of the presentations) is available at the OceanTeacher Global Academy (OTGA) of IODE. The training material is also documented in Vademecums for study and consultation. The time needed for full implementation at a data centre is approximately estimated in 12 months considering the mapping of legacy datasets to SeaDataNet CDI and deployment of the associated SeaDataNet CDI tools.

5. Considering the needs of other fields or organizations, indicate the timeliness, target date(s), or if proposing a series of standards, suggest priorities. List any statutory requirement or other driving factors.

There are no statutory requirements for adoption of the SeaDataNet CDI standard as one of the metadata discovery standards. The National Oceanographic Data Centres in Europe are bound to implement the standard within their contractual obligations of several EU projects. The NODCs also motivate other data centres in their countries to adopt it. The IOC recommendation will add to this process.

6. Describe the possible benefits gained by the implementation of the proposed standard. Alternatively, describe the loss or disadvantage(s) if no standard is established within a reasonable time.

The advantage of using the SeaDataNet CDI standard in Europe is described in (2) and (3). There are no anticipated disadvantages to adopting it.

7.   Indicate whether the proposed standard is or may become the subject of regulations or may require the harmonization of existing regulations.   Describe any impacts of this activity.

The SeaDataNet CDI standard is a de-facto standard in Europe and increasingly prescribed in calls for proposal and contracts by the European Commission for framework programmes and the EMODnet implementation as part of the EU Marine Directive.

***Current Operational Implementations***: At present already 43 National Ocean Data Centres (NODC's) and marine data centres within the SeaDataNet partnership have successfully implemented the SeaDataNet CDI standard and are leveraging it at their local centre for giving overview and access to their managed data sets as part of the Data Discovery and Access Services of the SeaDataNet infrastructure (see https://www.seadatanet.org). Another 74 data centres in Europe at present have implemented the SeaDataNet CDI standard as part of related EU funded projects (FP6-Upgrade Black Sea SCENE, FP6-CASPINFO, FP7/Geo-Seas, EMODnet Projects, FP7-EuroFleets, FP7-EuroFleets2 and Horizon2020 EuroFleetsPlus, FP7-JERICO, Horizon2020-JERICO NEXT, FP7-CitClops, FP7-Micro B3,    ). The results of these activities can be followed at the SeaDataNet portal, where at present search can be distributed against more than 110 data centres, giving access to already more than 2.3 million data sets for physical oceanography, chemistry, geology, geophysics, bathymetry and biology. Implementation is currently based on the reference SeaDataNet XML encoding: a CSW ISO service is available for queries from automatic tools (e.g this is the interface leveraged by GEOSS), as well as an OAI-PMH service (e.g. leveraged to automatize harvesting by the ODP portal).

In addition, SeaDataNet has been adopted as the leading component for data management in the development of the European Marine Observation and Data Network (EMODnet) which was initiated in the framework of the MSFD. This contributes to SeaDataNet perspective towards long term sustainability.

Different software tools are implementing SeaDataNet CDI, such as the MIKADO metadata editor and the GI-cat discovery broker.

***Relevant Documents:***

The following document (attached to the current proposal) is the normative specification for the SeaDataNet CDI metadata model:

- E.Boldrini, S.Nativi. SeaDataNet CDI metadata profile of ISO 19115, Version 12.2.0 April 2020, published at https://www.seadatanet.org/Standards/Metadata-formats/CDI

The SeaDataNet CDI homepage represents as well an informative reference for SeaDataNet CDI, containing the normative reference document, as well as related standards (e.g. the XML encoding of SeaDataNet CDI metadata model) and useful documentation:

- SeaDataNet CDI metadata profile Homepage, at https://www.seadatanet.org/Standards/Metadata-formats/CDI

***Cooperation and liaison***:

1. **Existing Community**: All the organizations listed in the '***Current Operational Implementations'*** section are using SeaDataNet CDI in an operational environment and represent the SeaDataNet CDI community. In particular MARIS, CNR-IIA and IFREMER have been involved in the drafting and publication of the SeaDataNet CDI standard (together with the rest of the SeaDataNet Technical Task Team) and are responsible for the current proposal submission.

2. **Expanded Community:** Firstly, other relevant marine and oceanographic data centres in Europe that are not yet engaged in the NODC national networks and/or any of the EU projects and would like to adopt SeaDataNet CDI as the metadata model for their datasets.

   Moreover, other marine and oceanographic data centres worldwide eager to discover, evaluate and access SeaDataNet CDI datasets at full. In this regard, SeaDataNet is establishing exchanges from its infrastructure and portal to GEOSS, Ocean Data Portal (ODP) of IOC-IODE, EurOBIS and the European Nucleotide Archive (ENA) of EMBL-EBI. These activities have been extended with the active participation of SeaDataNet in the Ocean Data Interoperability Platform (ODIP and ODIP 2) projects where cooperation took place with leading oceanographic data infrastructures from the USA (US NODC, IOOS, R2R), Australia (IMOS) as well as IOC-IODE to explore common standards and interoperability solutions.

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***Proposal version:*** Version 1.0, November 2014, initial submission

Version 2.0, April 2020, incorporating feedback from SeaDataNet. No factual changes where done in the proposal, only the required modifications were included to respond to the reviewer comments which were received on January 2018, as well as the latest version of the CDI metadata model.

***List of Acronyms:***

- BODC - British Oceanographic Data Centre
- CASPINFO – CASPian Environmental and Industrial Data & INFOrmation Service (EU FP7 Project)
- CDI – Common Data Index
- CitClops - Citizens' Observatory for Coast and Ocean Optical Monitoring (EU FP7 Project)
- CNR-IIA – National Research Council of Italy – Institute of Atmospheric Pollution Research

- CSW - Catalogue *Service* for the Web
- EDMED - SeaDataNet European Directory of Marine Environmental Data sets
- EDMERP - SeaDataNet European Directory of Marine Environmental Research Projects
- EDMO – SeaDataNet European Directory of Marine Organisations
- EMBL-EBI - European Molecular Biology Laboratory-European Bioinformatics Institute
- EMODnet– European Marine Observation and Data Network
- EU – European Union
- EurOBIS - European Ocean Biogeographic Information System
- EuroFleets –Towards an Alliance of European Research Fleets (EU FP7 Project)
- EuroFleets2 – New operational steps towards an alliance of European research fleets (EU FP7 Project)
- EuroFleetsPlus – An alliance of European marine research infrastructure to meet the evolving needs of the research and industrial communities. (EU HORIZON2020 Project)
- GEOSS – Group on Earth Observation System of Systems
- Geo-Seas - Pan-European Infrastructure for Management of Marine Ocean Geological and Geophysical Data (EU FP7 Project)
- GI-cat - Geospatial Information Cataloguing
- IFREMER – Institut Francais de recherche pour l'exploitation de la mer
- IMOS - Integrated Marine Observing System
- INSPIRE - Infrastructure for Spatial Information in Europe
- IOC – Intergovernmental Oceanographic Commission
- IODE – International Oceanographic Data and Information Exchange
- IOOS - Integrated Ocean Observing System
- ISO – International Organization for Standardization
- JCOMM - Joint Technical Commission for Oceanography and Marine Meteorology
- JERICO - Joint European Research Infrastructure network for Coastal Observatories (EU FP7 Project)
- JERICO NEXT - Joint European Research Infrastructure network for Coastal Observatory – Novel European eXpertise for coastal observaTories (EU HORIZON2020 Project)
- MARIS – Mariene Informatie Service
- MIKADO – SeaDataNet metadata editor software tool
- Micro B3 - Marine Microbial Biodiversity, Bioinformatics and Biotechnology
- MSFD - Marine Strategy Framework Directive
- NODC – National Oceanographic Data Center
- OAI-PMH - Open Archives Initiative Protocol for Metadata Harvesting
- ODIP - Ocean Data Interoperability Platform (EU FP7, HORIZON2020 Project)
- ODIP 2 - Extending the Ocean Data Interoperability Platform (EU Horizon2020 Project)
- ODP - Ocean Data Portal
- R2R - Rolling Deck to Repository
- SeaDataNet – Pan-European Infrastructure for Marine and Oceanographic Data Management (EU FP6)
- SeaDataNet II – Pan-European Infrastructure for Marine and Oceanographic Data Management (EU FP7)

- SeaDataCloud - Further developing the pan-European infrastructure for marine and ocean data management (EU Horizon2020 Project)
- SeaVoX – mailing list governing the SeaDataNet Common Vocabularies
- Upgrade Black Sea SCENE - Upgrade Black Sea SCiEntific NEtwork (EU FP7 Project)
- XML – Extensible Mark-up Language

# SeaDataNet metadata profile of ISO 19115

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Author: Stefano Nativi (CNR - Institute of Atmospheric Pollution Research)

Date: 2020-04-10

Version: 12.2.0

Document type: specification

Status: Public

Description:

Definition of SeaDataNet metadata profile, according to ISO 19115 international standard specification

| Document Version | Date | Status | Author(s) | Description |
|---|---|---|---|---|
| 1.0.0 | 2012-02-02 | First version | Boldrini, Nativi | First implementation after check and merge of previous CDI/SeaDataNet documents, schemas, … |
| 2.0.0 | 2012-02-02 | Public | Nativi, Boldrini | References and table of content were added; some edits. Reformatted. General Review |
| 3.0.0 | 2012-05-04 | Revision | Boldrini | Updated fileIdentifier definition, corrected date obligation in CI_Citation, bibliography |
| 4.0.0 | 2012-05 | Revision | Boldrini, Manzella | Added extended elements to embrace also bibliographic information, modified characterSet, general revision |
| 5.0.0 | 2012-05-30 | Revision | Boldrini, Schaap | Revisions after discussion, including main namespace change, added the optional parentIdentifier element |
| 6.0.0 | 2012-07-17 | Revision | Boldrini | Added new EDMED codelist, updated KeywordTypeCode, GeometricObjectTypeCode lists |
| 7.0.0 | 2012-07-30 | Revision | Boldrini, Schaap, Leadbetter | Use of xlink, aggregation information cardinality, introduction section, official lists publication |
| 8.0.0 | 2013-03-29 | Revision | Boldrini | Spatial/temporal resolution, publications, quality info updates, additionalDocumentation |
| 9.0.0 | 2013-05-30 | Revision | Boldrini, Loubrieu | Added CSR codelist Optional representation information, replaced downloadUrl with URL, added hrsvsRegistration |
| 10.0.0 | 2013-09-02 | Revision | Boldrini | |
| 10.0.1 | 2017-09-19 | Revision | Boldrini, Duthie | Bugfix of CDI Schematron schema, to obtain validation against official ISO Schematron 2006 Relax NG Compact schema used by lxml Python library |
| 11.0.0 | 2019-01-18 | Revision | Boldrini | Updated schemas caused by ISO TC211 schemas relocation. Decision has been made to use schemas from OGC, as suggested by INSPIRE technical guidelines. E.g. previous location: http://www.isotc211.org/schemas/2005/gmd/gmd.xsd -> current location: http://schemas.opengis.net/iso/19139/20060504/gmd/gmd.xsd Important: this major change affects only the online version of the schemas |
| 11.0.1 | 2019-10-16 | Revision | Iona | Updated SeaDataNet project information |
| 12.0.0 | 2019-12-16 | Revision | Boldrini | Included as mandatory INSPIRE required elements: spatialRepresentationType, useLimitation, |

| | | | | referenceSystemInfo. Modified XML schema location as a workaround for ETF validator. Updated conformance metadata element required by INSPIRE. Validation against the new INSPIRE ETF validator accomplished. |
|---|---|---|---|---|
| **12.1.0** | 2020-01-24 | Revision | Boldrini, Tosello | Added schematron check on precision of bounding box coordinates (minimum two decimal places required by INSPIRE validator) |
| **12.1.1** | 2020-02-06 | Revision | Boldrini | Fixed schematron check about empty elements |
| **12.2.0** | 2020-04-10 | Revision | Boldrini, Dick, Tosello | Changes to reflect https uptake |

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## Foreword

This document has been drafted in the context of the EU FP7 SeaDataNet II and EU H2020 SeaDataCloud project by CNR-IIA. "*ISO/IEC Directives, Part 2: Rules for the structure and drafting of International Standards*" was used as a reference for the drafting.

## Introduction

The SeaDataNet Common Data Index (CDI) Data Discovery and Access Service provides users online unified access via a central portal to distributed marine and oceanographic datasets, managed by data centres that are connected to the SeaDataNet infrastructure.

The Common Data Index (CDI) format, based upon the ISO 19115 standard, and related service is adopted by several projects and programmes funded by the European Commission such as the EMODNet pilots, Geo-Seas, Upgrade Black Sea SCENE, EuroFleets, Jerico, etc. At present, October 2019, already 110 NODC's and marine data centres from 35 countries bordering to European seas have successfully implemented the SeaDataNet CDI standard and are maintaining it as part of the CDI Data Discovery and Access service to give overview and access to their data sets. As part of SeaDataCloud and associated projects more data centres are connecting while also the volume and range of types of data sets is expanding.

The operational CDI service this way gives access to a vast and rapidly increasing resource of marine and ocean datasets, managed by an increasing number of distributed data centres. At present, October 2019, it provides metadata and access to more than 2.3 million data sets, originating from more than 700 organisations in Europe, covering physical, geological, chemical, biological and geophysical data, and acquired in European waters and global oceans. The CDI service gives users a highly detailed insight in the availability and geographical spreading of this large variety of marine and ocean data sets. Moreover it provides a unique interface for requesting access, and if granted, for downloading data sets from these distributed data centres across Europe.

Therefore the CDI format can be considered a de-facto standard for marine metadata in Europe.

The CDI format is a marine profile of the ISO 19115 metadata content standard. Its XML encoding is based on ISO 19139 Schema, which has also been adopted as part of the EU INSPIRE Directive Implementing Rules. An analysis has been undertaken to ensure present and future INSPIRE compliance, while accommodating all the requirements coming from the SeaDataNet community. The analysis has been performed by CNR with support of MARIS, IFREMER, STFC, BODC and ENEA.

## Scope

This document aims to define a ISO 19115:2003 IS compliant profile for describing datasets in the SeaDataNet Community. The profile consists of a set of metadata elements along with their obligations/conditions, both imported from ISO 19115 and drafted by the SeaDataNet community.

A related document (*SeaDataNet ISO 19115 profile – XML encoding*) defines and details a XML schema implementation for this metadata profile, based on the XML schema defined in ISO 19139:2006 plus additional definitions and Schematron rules.

# Metadata elements

In the following sections the metadata elements that compose the profile are listed, each one in a separate row.

Modifications from ISO 19115:2003 data model are recorded in the table; the interested cells are highlighted in red. In particular the following modification types have been considered:

- **Change of an obligation or condition**: the obligation or condition column contains the original ISO19115, followed by an arrow, followed by the new obligation or condition. E.g. O -> M indicates a change from an optional (in ISO 19115) to a mandatory obligation (in the profile).

## Elements from ISO 19115

The most part of the elements included in the profile is taken from ISO 19115. The following table lists them all (for individual descriptions you can refer to ISO 19115). The light gray rows contain elements from the ISO 19115 Core metadata element set.

### B.2    Metadata package data dictionaries

### B.2.1    Metadata information

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 1. | MD_Metadata | root entity which defines metadata about a resource or resources | M | 1 | Class | Lines 2-6-15, 17, 18 | |
| 2. | fileIdentifier | unique identifier for this metadata file | O -> M | 1 | CharacterString | Free text -> urn as defined in RFC 1737 and starting with the string "urn:SDN:CDI:" | SeaDataNet requires one file identifier urn, starting with the default string urn:SDN:CDI:. ISO as mandatory fileIdentifier. |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 3. | language | language used for documenting metadata | C -> M | 1 | CharacterString -> LanguageCode class | Free text -> LanguageCode <<CodeList>> restricted to value "eng" | SeaDataNet is more restrictive (fixed to "eng"). ISO 19115 has C / not defined by encoding. |
| 4. | characterSet | name/identifier of the character coding standard used for the metadata set | C -> M | 1 | Class | MD_CharacterSetCode <<CodeList>> -> MD_CharacterSetCode <<CodeList>> restricted to value "utf8" | SeaDataNet is more restrictive (fixed to "utf8"). ISO 19115 has C / ISO IEC 10646-1 not used and not defined by encoding. |
| 5. | parentIdentifier | file identifier of the metadata to which this metadata is a subset (child) | C / hierarchyLevel is not equal to "dataset"? -> O | 1 | CharacterString | Free text | |
| 6. | hierarchyLevel | scope to which the metadata applies (see Annex H for more information about metadata hierarchy levels) | C -> M | N -> 1 | Class | MD_ScopeCode <<Codelist>> -> MD_ScopeCode <<CodeList>> restricted to values "dataset" and "series" | SeaDataNet is more restrictive. ISO 19115 has C / hierarchyLevel is not equal to "dataset" |
| 7. | hierarchyLevelName | name of the hierarchy levels for which the metadata is provided | C -> M | N -> 1 | CharacterString -> CodeList | Free text -> HierarchyLevelNameCode <<CodeList>> restricted to value "Common Data Index record" | Values for this codelists are from SDN vocabulary at: https://www.seadatanet.org/urnurl/SDN:L23 |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 8. | contact | party responsible for the metadata information | M | N -> 1 | Class | CI_ResponsibleParty (B.3.2) | As for INSPIRESC16: The value of MD_Metadata.contact.CI_ResponsibleParty.role.CI_RoleCode shall be pointOfContact. |
| 9. | dateStamp | date that the metadata was created | M | 1 | Class | DateTime (B.4.2) | |
| 10. | metadataStandardName | name of the metadata standard (including profile name) used | O -> M | 1 | CharacterString | Free text -> "ISO 19115/ SeaDataNet profile" | |
| 11. | metadataStandardVersion | version of the metadata standard (version of the profile) used | O -> M | 1 | CharacterString | Free text | |
| 12. | *Role name*: spatialRepresentationInfo | digital representation of spatial information in the resource | O | N | Association | MD_SpatialRepresentation <<Abstract>> (B.2.6) | |
| 13. | *Role name:* referenceSystemInfo | description of the spatial and temporal reference systems used in the resource | O -> M | N -> 1 | Association | MD_ReferenceSystem (B.2.7) | As for INSPIRE Implementing Rules on interoperability of spatial data sets and services set |
| 14. | *Role name*: metadataExtensionInfo | information describing metadata extensions | O -> M | N | Association | MD_MetadataExtension Information (B.2.11) | |
| 15. | *Role name*: identificationInfo | basic information about the resource(s) to which the metadata applies | M | N -> 1 | Association | *MD_Identification (B.2.2) <<Abstract>>* | |
| 17. | *Role name*: distributionInfo | information about the distributor of and options for obtaining the resource(s) | O -> M | N -> 1 | Association | MD_Distribution (B.2.10) | |
| 18. | *Role name*: dataQualityInfo | overall assessment of quality of a resource(s) | O -> M | N -> 1 | Association | DQ_DataQuality (B.2.4) | |

## B.2.2 Identification information (data and service identification)

### B.2.2.1 General

| | | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|---|
| 23. | | *MD_Identification* | basic information required to uniquely identify a resource or resources | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Metadata) <<Abstract>> | Lines 24, 25, 29, 33, 35, 35.1 | |
| 24. | | citation | citation for the resource(s) | M | 1 | Class | CI_Citation (B.3.2) | As for INSPIRE SC7: There shall not be more than one instance of MD_Metadata.identificationInfo[1].MD_Identification.citation.CI_Citation. date declared as a creation date<br><br>As for INSPIRE SC8: MD_Metadata.identificationInfo[1].MD_DataIdentification.citation.CI_Citation.identifier cis mandatory for metadata sets related to spatial dataset and spatial dataset series |
| 25. | | abstract | brief narrative summary of the content of the resource(s) | M | 1 | CharacterString | Free text | |
| 29. | | pointOfContact | identification of, and means of communication with, person(s) and organisation(s) associated with the resource(s) | O -> M | N -> 1 | Class | CI_ResponsibleParty (B.3.2) | Use "custodian" for role code).<br>Use EDMO Code : SDN:EDMO::EDMO as xlink:href of the organisation |
| 30. | | *Role name:* resourceMaintenance | Provides information about the frequency of resource updates, and the scope of those updates | O | N | Association | MD_MaintenanceInformation (B 2.5) | |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 33. | *Role name:* descriptiveKeywords | category keywords, their type, and reference source | O -> M | N | Association | MD_GenericKeywords (B.2.2.3) | At least two descriptive keywords must be present, one for type "platform_class", one or more for type "parameter" <br><br>As for INSPIRE SC17: <br><br>For datasets and series at least one keyword of GEMET thesaurus shall be documented using MD_Metadata.identificationInfo[1].MD_DataIdentification.descriptiveKeywords. |
| 35. | *Role name:* resourceConstraints | information about constraints which apply to the resource(s) | O -> M | N | Association | MD_Constraints (B.2.3) | |
| 35.1 | *Role name:* aggregationInfo | associated resource information | O | N | Association | MD_AggregateInformation (B.2.2.7) | |
| 36. | MD_DataIdentification | information required to identify a resource | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (MD_Identification) | Lines 38-41, 45 and 24, 25, 29, 33, 35, 35.1 | |
| 37. | spatialRepresentationType | method used to spatially represent geographic information | O -> M | N | Class | MD_SpatialRepresentationTypeCode <<CodeList>> (B.5.26) | |
| 38. | spatialResolution | factor which provides a general understanding of the density of spatial data in the resource | O | N | Class | MD_Resolution <<Union>> (B.2.2.5) | Used in SDN to provide general information of spatial/temporal resolution (resolutions of the most relevant dimensions) |
| 39. | language | language(s) used within the resource | M | N -> 1 | CharacterString -> CodeList | Free text -> MD_LanguageCode <<CodeList>> restricted to value: "eng" | |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 40. | characterSet | full name of the character coding standard used for the dataset | C/ISO/IEC 10646-1 not used? -> M | N -> 1 | CodeList | MD_CharacterSetCode <<CodeList>> (B.5.10) -> MD_CharacterSetCode <<CodeList>> restricted to value: "utf8" | |
| 41. | topicCategory | main theme(s) of the resource | O -> M | N -> 1 | Class | MD_TopicCategoryCode <<CodeList>> restricted to value: "oceans" | |
| 45. | extent | spatial and temporal extent of the resource | O -> M | N | Class | EX_Extent (B.3.1) | As for INSPIRE SC10: There is at least one instance of MD_Metadata.identificationInfo[1].MD_DataIdentification.extent defining the geographic location of the resource as a geographic bounding box (i.e. an instance of EX_GeographicBoundingBox or one of its subclasses). |

### B.2.2.2 Browse graphic information
No elements from this ISO 19115 metadata section were selected

### B.2.2.3 Keyword information

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 52. | MD_Keywords | keywords, their type and reference source | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (MD_GenericKeywords) | Lines 53-55 | |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 53. | keyword | commonly used word(s) or formalised word(s) or phrase(s) used to describe the subject | M | N | CharacterString -> CharacterString or CodeList | Free text -> Free text or SDN_DeviceCategoryCode <<CodeList>> or SDN_PlatformCategoryCode <<CodeList>> or SDN_ParameterDiscoveryCode <<CodeList>> or SDN_EDMERPCode <<CodeList>> or SDN_PortCode or <<CodeList>> SDN_CountryCode <<CodeList>> or SDN_PlatformCode <<CodeList>> or SDN_WaterBodyCode <<CodeList>>or SDN_MarsdenCode <<CodeList>> | The values for the given codelists are from the SDN vocabularies P02, L05, L06, EDMERP<br><br>E.g. "Bathymetry and Elevation" |
| 54. | type | subject matter used to group similar keywords | O | 1 | Class | MD_KeywordTypeCode <<CodeList>> (B.5.16) | |
| 55. | thesaurusName | name of the formally registered thesaurus or a similar authoritative source of keywords | O | 1 | Class | CI_Citation (B.3.2) | |

## B.2.2.4 Representative fraction information
No elements from this ISO 19115 metadata section were selected

## B.2.2.5 Resolution information

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 59. | MD_Resolution | level of detail expressed as a scale factor or a distance | Use obligation from referencing object | Use maximum occurrence from referencing object | Class <<Union>> | Lines 60-61 -> Line 61 | |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 60. | | | | | | | |
| 61. | distance | ground sample distance | C / equivalentScale not documented? -> M | 1 | Class | Distance (B.4.3) -> Distance (B.4.3), including the distance value and the distance unit of measure attribute ('uom'). The latter has a restricted domain: only the codes from the vocabulary https://www.seadatanet.org/urnurl/SDN:P06 are allowed 'uom's values (e.g. https://www.seadatanet.org/urnurl/SDN:P06::ULAA). For spatial measures uom is fixed to metres. | E.g. distance value = 50 distance uom= https://www.seadatanet.org/urnurl/SDN:P06::ULAA |

## B.2.2.6 Usage information

No elements from this ISO 19115 metadata section were selected

## B.2.2.7 Aggregation information

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 66.1 | MD_AggregateInformation | associated resource information Note: An associated resource is a dataset composed of a collection of datasets | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Identification) | Lines 66.2-66.5 | |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 66.2 | aggregateDataSetName | citation information about the associated resource | C / if aggregateDataSet Identifier not documented? | 1 | Class | CI_Citation (B.3.2) -> CI_Citation (B.3.2) with the following mandatory elements: title, alternateTitle, date | |
| 66.3 | aggregateDataSetIdentifier | 17dentifier and codespace of the associated resource | C / if aggregateDataSet Name not documented? | 1 | Class | MD_Identifier (B.2.7.3) | |
| 66.4 | associationType | type of relation between the resources | M | 1 | Class | DS_AssociationTypeCode (B.5.7) <<CodeList>> | |
| 66.5 | initiativeType | type of initiative under which the associated resource was produced Note: the activity that resulted in the associated resource | O -> M | 1 | Class | DS_InitiativeTypeCode (B.5.8) <<CodeList>> | |

## B.2.3 Constraint information (includes legal and security)

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 67. | MD_Constraints | restrictions on the access and use of a resource or metadata | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Metadata and MD_Identification) | Lines 68 | |
| 68. | useLimitation | limitation affecting the fitness for use of the resource or metadata. Example, "not to be used for navigation" | O -> M | N | CharacterString | Free text | |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 69. | MD_LegalConstraints | restrictions and legal prerequisites for accessing and using the resource or metadata | Use obligation from referencing object | N | Specified Class (MD_Constraints) | Lines 70,72 and 68 | |
| 70. | accessConstraints | access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the resource or metadata | O | N | Class | MD_RestrictionCode <<CodeList>> (B.5.24) | |
| 72. | otherConstraints | other restrictions and legal prerequisites for accessing and using the resource or metadata | C / accessConstraints or useConstraints equal "otherRestrictions"? | N | CharacterString | Free text | |

## B.2.4   Data quality information

### B.2.4.1 General

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comments |
|---|---|---|---|---|---|---|---|
| 78. | DQ_DataQuality | Quality information for the data specified by a data quality scope | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Metadata) | Lines 79-81 | |
| 79. | scope | The specific data to which the data quality information applies | M | 1 | Class | DQ_Scope <<DataType>> (B.2.4.5) | |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comments |
|---|---|---|---|---|---|---|---|
| 80. | *Role name:* report | Quantitative quality information for the data specified by the scope | C / lineage not provided? -> M | N | Association | DQ_Element <<Abstract>> (B.2.4.3) | There shall be a conformance result report against the latest INSPIRE commission regulation about metadata or other relevant regulations (see schematron rules for more details) |
| 81. | *Role name:* lineage | Non-quantitative quality information about the lineage of the data specified by the scope | C / report not provided -> M | 1 | Association | LI_Lineage (B.2.4.2) | |

## B.2.4.2 Lineage information

### B.2.4.2.1 General

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 82. | LI_Lineage | information about the events or source data used in constructing the data specified by the scope or lack of knowledge about lineage | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (DQ_DataQuality) | Line 83 | |
| 83. | statement | general explanation of the data producer's knowledge about the lineage of a resource | C / (DQ_DataQuality.scope.DQ_Scope.level = "dataset" or "series")? -> M | 1 | CharacterString | Free text. | This element has been included with mandatory obligation to comply with INSPIRE. |

### B.2.4.2.2 Process step information

No elements from this ISO 19115 metadata section were selected

### B.2.4.2.3 Source information

No elements from this ISO 19115 metadata section were selected

## B.2.4.3 Data quality element information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 99. | DQ_Element | Aspect of quantitative quality information | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (DQ_DataQuality) <<Abstract>> | Line 107 | |
| 107. | 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 | M | 2 | Class | DQ_Result <<Abstract>> (B.2.4.4) | |

## B.2.4.4 Result information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 128. | DQ_Result | Generalization of more specific result classes | Use obligation from referencing object | Use maximum occurrence from referencing object | Class <<Abstract>> | | |
| 129. | DQ_ConformanceResult | Information about the outcome of evaluating the obtained value (or set of values) against a specified acceptable conformance quality level | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DQ_Result) | Lines 130-132 | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 130. | specification | Citation of product specification or user requirement aginst which data is being evaluated | M | 1 | Class | CI_Citation <<DataType>> (B.3.2) | |
| 131. | explanation | Explanation of the meaning of conformance for this result | M | 1 | CharacterString | Free text | |
| 132. | pass | Indication of the conformance result where 0=fail and 1=pass | M | 1 | Boolean | 1 = yes<br>0 = no | |

### B.2.4.5 Scope information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 138. | DQ_Scope | Extent of characteristric(s) of the data for which quality information is reported | Use obligation from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> | Line 139 | |
| 139. | level | hierarchical level of the data specified by the scope | M | 1 | Class | MD_ScopeCode <<CodeList>> (B.5.25) | |

## B.2.5    Maintenance information

### B.2.5.1 General

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comments |
|---|---|---|---|---|---|---|---|
| 142. | MD_MaintenanceInformation | Information about te scope and frequency of updating | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Metadata and MD_Identification) | Lines 143,145 | |

| | Name / Role name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comments |
|---|---|---|---|---|---|---|---|
| 143. | maintenanceAndUpdateFrequency | Frequency with which changes and additions are made to the resource after the initial resource is completed | M | 1 | Class | MD_MaintenanceFrequencyCode <<CodeList>> (B.5.18) | |
| 144. | dateOfNextUpdate | Scheduled revision date for resource | O | 1 | Class | Date (B.4.2) | |
| 145. | userDefinedMaintenanceFrequency | Maintenance period other than those defined | O | 1 | Class | TM_PeriodDuration (B 4.5) | |

## B.2.6 Spatial representation information (includes grid and vector representation)

### B.2.6.1 General

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comments |
|---|---|---|---|---|---|---|---|
| 156. | *MD_SpatialRepresentation* | digital mechanism used to represent spatial information | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Metadata) <<Abstract>> | | |
| 157. | MD_GridSpatial Representation | information about grid spatial objects in the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (MD_Spatial Representation) | Lines 158-161 | |
| 158. | numberOfDimensions | number of independent spatial-temporal axes | M | 1 | Integer | Integer | |
| 159. | axisDimensionsProperties | information about spatial-temporal axis properties | M | 1 | Sequence (B.4.7) | MD_Dimension <<DataType>> (B.2.6.2) | |
| 160. | cellGeometry | identification of grid data as point or cell | M | 1 | Class | MD_CellGeometryCode <<CodeList>> (B.5.9) | |
| 161. | transformationParameter Availability | indication of whether or not parameters for transformation between image coordinates and geographic or map coordinates exist (are available) | M | 1 | Boolean | 1 = yes 0 = no | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comments |
|---|---|---|---|---|---|---|---|
| 176. | MD_VectorSpatial Representation | information about the vector spatial objects in the resource | Use obligation/con dition from referencing object | Use maximum occurrence from referencing object | Specified Class (MD_Spatial Representation) | Line 178 | |
| 178. | geometricObjects | information about the geometric objects used in the resource | O -> M | N -> 1 | Class | MD_GeometricObjects <<DataType>> (B.2.6.3) | |

## B.2.6.2 Dimension information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 179. | MD_Dimension | axis properties | Use obligation/con dition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> | Lines 180-182 | |
| 180. | dimensionName | name of the axis | M | 1 | Class | MD_DimensionNameTy pe Code <<CodeList>> (B.5.14) | |
| 181. | dimensionSize | number of elements along the axis | M | 1 | Integer | Integer | |
| 182. | resolution | degree of detail in the grid dataset | O -> M | 1 | Class | Measure (B.4.3) -> Measure; both value and unit of measure are mandatory; for the unit of the resolution/frequency ('uom') attribute only values from vocabulary https://www.seadatanet. org/urnurl/SDN:P06 are allowed. For spatial measures uom is fixed to metres. | E.g. Measure.value = 50; Measure.uom=https://w ww.seadatanet.org/urnu rl/SDN:P06::ULAA |

### B.2.6.3 Geometric object information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 183. | MD_GeometricObjects | number of objects, listed by geometric object type, used in the dataset | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> | Line 184 | |
| 184. | geometricObjectType | name of point or vector objects used to locate zero-, one-, two-, or three-dimensional spatial locations in the dataset | M | 1 | Class | MD_GeometricObjectType Code <<CodeList>> (B.5.15) | |

## B.2.7   Reference system information (includes temporal, coordinate and geographic identifiers)

### B.2.7.1 General
UML model shown in Figure A.9

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 186. | MD_ReferenceSystem | information about the reference system | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Metadata) | Line 187 | |
| 187. | referenceSystemIdentifier | Name of reference system | C / MD_CRS.projection, MD_CRS.ellipsoid, and MD_CRS.datum not documented? | 1 | Class | RS_Identifier (B.2.7.3) | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 189. | MD_CRS | Metadata about a coordinate system in which attributes have been derived from SC_CRS as defined in ISO 19111 – Spatial referencing by coordinates | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (MD_Reference System) | Line 187 | |

## B.2.7.2 Ellipsoid parameter information

## B.2.7.3 Identifier information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 205. | MD_Identifier | value uniquely identifying an object within a namespace | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class | Lines 206-207 -> Lines 206-207 with code data type = CharacterString, code domain = Free text | |
| 206. | authority | Citation for the code namespace and optionally the person or party responsible for maintenance of that namespace | O | 1 | Class | CI_Citation (B.3.2) | |
| 207. | code | alphanumeric value identifying an instance in the namespace e.g. 4326 | M | 1 | CharacterString -> Class <<Union>> | Free text -> Free text or SDN_EDMEDCode <<CodeList>> or SDN_CSRCode <<CodeList>> or SDN_CRSCode <<CodeList>> values from L10 vocabulary | E.g. 4326 |
| 208. | RS_Identifier | identifier used for reference systems | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (MD_Identifier) | Lines 206-207 and 208.1-208.2 -> Lines 206-207 and 208.1 with code data type = Class, code domain = SDN_CRSCode <<CodeList>> | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 208.1 | codeSpace | Identifier or namespace in which the code is valid | O -> M | 1 | CharacterString | Free text | This element has been included with mandatory obligation to comply with INSPIRE. |

## B.2.8 Content information

## B.2.9 Portrayal catalogue information

## B.2.10 Distribution information

### B.2.10.1 General

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 270. | MD_Distribution | information about the distributor of and options for obtaining the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Metadata) | Lines 271-273 | |
| 271. | *Role name:* distributionFormat | provides a description of the format of the data to be distributed | C / MD_Distributor. distibutorFormat not documented? -> M | N | Class | MD_Format (B.2.10.4) | |
| 272. | *Role name:* distributor | provides information about the distributor | O -> M | N -> 1 | Class | MD_Distributor (B.2.10.3) | |
| 273. | *Role name:* transferOptions | provides information about technical means and media by which a resource is obtained from the distributor | O -> M | N | Class | MD_DigitalTransferOptions (B.2.10.2) | |

### *B.2.10.2 Digital transfer options information*

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 274. | MD_DigitalTransferOptions | technical means and media by which a resource is obtained from the distributor | Use obligation/condition from referencing object (If this class is used at least one attribute must be provided) | Use maximum occurrence from referencing object | Aggregated Class (MD_Distribution and MD_Distributor) | Lines 276-277 | |
| 276. | transferSize | estimated size of a unit in the specified transfer format, expressed in megabytes. The transfer size is > 0.0 | O | 1 | Real | > 0,0 | |
| 277. | onLine | information about online sources from which the resource can be obtained | O -> M | N | Class | CI_OnlineResource (B.3.2.5) | |

### *B.2.10.3 Distributor information*

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 279. | MD_Distributor | information about the distributor | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Distribution and MD_Format) | Line 280 | |
| 280. | distributorContact | party from whom the resource may be obtained. This list need not be exhaustive | M | 1 | Class | CI_ResponsibleParty (B.3.2) | |

### B.2.10.4    Format information

|  | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 284. | MD_Format | description of the computer language construct that specifies the representation of data objects in a record, file, message, storage device or transmission channel | Use obligation/con dition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Distributio n, MD_Identificatio n, and MD_Distributor) | Lines 285-286 | |
| 285. | name | name of the resource format(s) | M | 1 | CharacterString -> Class | Free text -> SDN_FormatNameCod e  <<CodeList>> | Values for this codelist are populated from the vocabulary at https://www.seadatanet. org/urnurl/SDN:L24 E.g. https://www.seadatanet. org/urnurl/SDN:L24::CF |
| 286. | version | version of the resource format (date, number, etc.) | M | 1 | CharacterString | Free text | |

### B.2.10.5    Medium information

No elements from this ISO 19115 metadata section were selected

### B.2.10.6    Standard order process information

No elements from this ISO 19115 metadata section were selected

## B.2.11 Metadata extension information

### B.2.11.1    General

|  | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 303. | MD_MetadataExtensi on Information | information describing metadata extensions | Use obligation/con dition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_Metadata) | Lines 304-305 | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 304. | extensionOnLineResource | information about on-line sources containing the community profile name and the extended metadata elements. Information for all new metadata elements | O -> M | 1 | Class | CI_OnlineResource (B.3.2.5) | The pointer to the online profile documentation about the extended metadata elements. Recommended values are linkage=https://www.seadatanet.org/urnurl/metadataprofile, name=SeaDataNet metadata profile of ISO 19115 |
| 305. | Role name: extendedElementInformation | Provides information about a new metadata element, not found in ISO 19115, which is required to describe geographic data | O | N | Association | MD_ExtendedElementInformation (B.2.11.2) | |

### B.2.11.2    Extended element information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 306. | MD_ExtendedElementInformation | new metadata element, not found in ISO 19115, which is required to describe geographic data | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD_MetadataExtensionInformation) | Lines 307-319 | |
| 307. | name | name of the extended metadata element | M | 1 | CharacterString | Free text | |
| 308. | shortName | short form suitable for use in an implementation method such as XML or SGML. NOTE other methods may be used | C / dataType not Equal "codelistElement"? | 1 | CharacterString | Free text | |
| 309. | domainCode | three digit code assigned to the extended element | C / is dataType "codelistElement"? | 1 | Integer | Integer | |
| 310. | definition | definition of the extended element | M | 1 | CharacterString | Free text | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 311. | obligation | obligation of the extended element | C / dataType not "codelist", "enumeration" or "codelistElement"? | 1 | Class | MD_ObligationCode <<Enumeration>> (B.5.21) | |
| 312. | condition | condition under which the extended element is mandatory | C / obligation = "conditional"? | 1 | CharacterString | Free text | |
| 313. | dataType | code which identifies the kind of value provided in the extended element | M | 1 | Class | MD_DatatypeCode <<CodeList>> (B.5.13) | |
| 314. | maximumOccurrence | maximum occurrence of the extended element | C / dataType not "codelist", "enumeration" or "codelistElement"? | 1 | CharacterString | N or any integer | |
| 315. | domainValue | valid values that can be assigned to the extended element | C / dataType not "codelist ", "enumeration" or "codelistElement"? | 1 | CharacterString | Free text | |
| 316. | parentEntity | name of the metadata entity(s) under which this extended metadata element may appear. The name(s) may be standard metadata element(s) or other extended metadata element(s) | M | N | CharacterString | Free text | |
| 317. | rule | specifies how the extended element relates to other existing elements and entities | M | 1 | CharacterString | Free text | |
| 318. | rationale | reason for creating the extended element | O | N | CharacterString | Free text | |
| 319. | source | name of the person or organisation creating the extended element | M | N | Class | CI_ResponsibleParty (B.3.2) | |

## B.2.12 Application schema information

## B.3 Data type information

No elements from this ISO 19115 metadata section were selected

## B.3.1 Extent information

### B.3.1.1 General

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 334. | EX_Extent | extent of the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | <<DataType>> Class | Lines 336-338 | |
| 336. | *Role name:* geographicElement | provides spatial component of the extent of the referring object | C -> M | N | Association | EX_GeographicExtent <<Abstract>> (B.3.1.2) | |
| 337. | *Role name:* temporalElement | provides temporal component of the extent of the referring object | C / description and geographicElement and verticalElement not documented? -> M | N | Association | EX_TemporalExtent (B.3.1.3) | |
| 338. | *Role name:* verticalElement | provides vertical component of the extent of the referring object | C / description and geographicElement and temporalElement not documented? -> O | N | Association | EX_VerticalExtent (B.3.1.4) | |

## B.3.1.2 Geographic extent information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 339. | *EX_GeographicExtent* | geographic area of the dataset | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (EX_Extent and EX_SpatialTemporal Extent) <<Abstract>> | | |
| 341. | EX_BoundingPolygon | enclosing geometric object which locates the resource, expressed as a set of (x,y) coordinate (s) NOTE: If a polygon is used it should be closed (last point replicates first point) | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (EX_GeographicExtent) | Line 340 and 342 -> Line 342 | The extentTypeCode is removed from the profile. The bounding polygon always encompasses an area covered by the data. |
| 342. | polygon | sets of points defining the bounding polygon or any other GM_Object geometry (point, line or polygon) | M | N | Class | GM_Object (B.4.6) | |
| 343. | EX_GeographicBoundingBox | geographic position of the resource NOTE This is only an approximate reference so specifying the coordinate reference system is unnecessary and need only be provided with a precision of up to two decimal places | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (EX_GeographicExtent) | Lines 340 and 344-347 -> Lines 344-347 | The extentTypeCode is removed from the profile. The bounding polygon always encompasses an area covered by the data. |
| 344. | westBoundLongitude | western-most coordinate of the limit of the resource extent, expressed in longitude in decimal degrees (positive east) | M | 1 | Decimal, minimum precision of two decimal places | -180,0 <= West Bounding Longitude Value <= 180,0 | |
| 345. | eastBoundLongitude | eastern-most coordinate of the limit of the resource extent, expressed in longitude in decimal degrees (positive east) | M | 1 | Decimal, minimum precision of two decimal places | -180,0 <= East Bounding Longitude Value <= 180,0 | |
| 346. | southBoundLatitude | southern-most coordinate of the limit of the resource extent, expressed in latitude in decimal degrees (positive north) | M | 1 | Decimal, minimum precision of two decimal places | -90,0 <= South Bounding Latitude Value <= 90,0; South Bounding Latitude Value <= North bounding Latitude Value | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 347. | northBoundLatitude | northern-most, coordinate of the limit of the resource extent expressed in latitude in decimal degrees (positive north) | M | 1 | Decimal, minimum precision of two decimal places | -90,0 <= North Bounding Latitude Value <= 90,0; North Bounding Latitude Value >= South Bounding Latitude Value | |
| 348. | EX_GeographicDescription | description of the geographic area using identifiers | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (EX_GeographicExtent) | Line 349 and 340 -> Line 349 | |
| 349. | geographicIdentifier | identifier used to represent a geographic area | M | 1 | Class | MD_Identifier (B.2.7.3) | |

## B.3.1.3 Temporal extent information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 350. | EX_TemporalExtent | time period covered by the content of the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (EX_Extent) | Line 351 | |
| 351. | extent | date and time for the content of the resource | M | 1 | Class | TM_Primitive (B.4.5) -> TM_Period (B.4.5) | |

## B.3.1.4 Vertical extent information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 354. | EX_VerticalExtent | vertical domain of resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (EX_Extent) | Lines 355-358 | |
| 355. | minimumValue | lowest vertical extent contained in the resource | M | 1 | Real | Real | |
| 356. | maximumValue | highest vertical extent contained in the resource | M | 1 | Real | Real | |
| 357. | unitOfMeasure | vertical units used for vertical extent information Examples: metres, feet, millimetres, hectopascals | M | 1 | Class | *UomLength (B.4.3) -> fixed value to "metres"* | |
| 358. | *role name:* verticalDatum | provides information about the origin from which the maximum and minimum elevation values are measured | M | 1 | Association | *SC_Vertical Datum (B.4.9) -> SC_Vertical Datum (B.4.9) with identifier allowed values from vocabulary at https://www.seadatanet.org/urnurl/SDN:L11* | *e.g. VerticalDatum.identifier = https://www.seadatanet.org/urnurl/SDN:L11::D99* |

## B.3.2    Citation and responsible party information

## B.3.2.1 Citation information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 359. | CI_Citation | standardized resource reference | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class | *Lines 360-365, 367, 369-370, 372-373* | |
| 360. | title | name by which the cited resource is known | M | 1 | CharacterString | Free text | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 361. | alternateTitle | short name or other language name by which the cited information is known. Example: "DCW" as an alternative title for "Digital Chart of the World" | O | N | CharacterString | Free text | |
| 362. | date | reference date for the cited resource | M | N | Class | CI_Date (B.3.2.4) <<DataType>> | |
| 363. | edition | version of the cited resource | O | 1 | CharacterString | Free text | |
| 364. | editionDate | date of the edition | O | 1 | Class | Date (B.4.2) | |
| 365. | identifier | value uniquely identifying an object within a namespace | O | N | Class | MD_Identifier | |
| 367. | citedResponsibleParty | name and position information for an individual or organisation that is responsible for the resource | O | N | Class | CI_ResponsibleParty <<DataType>> (B.3.2) | |
| 369. | series | information about the series, or aggregate dataset, of which the dataset is a part | O | 1 | Class | CI_Series <<DataType>> (B.3.2.6) | |
| 370. | otherCitationDetails | other information required to complete the citation that is not recorded elsewhere | O | 1 | CharacterString | Free text | |
| 372. | ISBN | international Standard Book Number | O | 1 | CharacterString | Free text | |
| 373. | ISSN | international Standard Serial Number | O | 1 | CharacterString | Free text | |
| 374. | CI_ResponsibleParty | identification of, and means of communication with, person(s) and organisations associated with the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified class | Lines 375, 376, 378, 379 | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 375. | individualName | name of the responsible person- surname, given name, title separated by a delimiter | C / organisationN ame and positionName not documented? -> C / organisationN ame not documented? | 1 | CharacterString | Free text | |
| 376. | organisationName | name of the responsible organisation | C / individualNam e and positionName not documented? -> individualNam e not documented? | 1 | CharacterString -> CodeList | Free text -> SDN_EDMOCode <<CodeList>> | e.g. IFREMER |
| 378. | contactInfo | address of the responsible party | O -> M | N -> 1 | Class | CI_Contact <<DataType>> (B.3.2.3) | |
| 379. | role | function performed by the responsible party | M | 1 | Class | CI_RoleCode <<CodeList>> (B 5.5) | |

## B.3.2.2 Address information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 380. | CI_Address | location of the responsible individual or organisation | Use obligation/con dition from referencing object | Use maximum occurrence from referencing object | Class | Lines 381-386 | |
| 381. | deliveryPoint | address line for the location (as described in ISO 11180, Annex A) | O | N | CharacterString | Free text | |
| 382. | city | city of the location | O | 1 | CharacterString | Free text | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 383. | administrativeArea | state, province of the location | O | 1 | CharacterString | Free text | |
| 384. | postalCode | ZIP or other postal code | O | 1 | CharacterString | Free text | |
| 385. | country | country of the physical address | O | 1 | CharacterString -> Class | ISO 3166 -> SDN_CountryCode <<CodeList>> | |
| 386. | electronicMailAddress | address of the electronic mailbox of the responsible organisation or individual | O -> M | N | CharacterString | Free text | |

### B.3.2.3 Contact information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 387. | CI_Contact | information required to enable contact with the responsible person and/or organisation | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class | Lines 388-390 | |
| 388. | phone | telephone numbers at which the organisation or individual may be contacted | O | N | Class | CI_Telephone (B.3.2.7) | |
| 389. | address | physical and email address at which the organisation or individual may be contacted | O -> M | N | Class | CI_Address (B.3.2.2) | |
| 390. | onlineResource | on-line information that can be used to contact the individual or organisation | O | N | Class | CI_OnlineResource (B.3.2.5) | |

### B.3.2.4 Date information

|  | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 393. | CI_Date | reference date and event used to describe it | Use obligation/con dition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> | Lines 394-395 | |
| 394. | date | reference date for the cited resource | M | 1 | Class | Date (B.4.2) | |
| 395. | dateType | event used for reference date | M | 1 | CodeList | CI_DateTypeCode <<CodeList>> (B.5.2) | |

### B.3.2.5 OnLine resource information

|  | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 396. | CI_OnlineResource | information about on-line sources from which the resource, specification, or community profile name and extended metadata elements can be obtained | Use obligation/con dition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> | Lines 397-398,400-402 | |
| 397. | linkage | location (address) for on-line access using a Uniform Resource Locator/Uniform Resource Identifier address or similar addressing scheme such as http://www.statkart.no/isotc211 | M | 1 | Class | URL (IETF RFC1738 IETF RFC 2056) -> URL (IETF RFC1738 IETF RFC 2056) with restriction: linkage should start with "http://", "https://" or "ftp://" | |
| 398. | protocol | connection protocol to be used e.g. http, ftp, file | O | 1 | CharacterString | Free text | |
| 400. | name | name of the online resource | O | 1 | CharacterString | Free text | |
| 401. | description | detailed text description of what the online resource is/does | O | 1 | CharacterString | Free text | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 402. | function | code for function performed by the online resource | O | 1 | Codelist | CI_OnLineFunctionCode <<CodeList>> (B.5.3) | |

### B.3.2.6 Series information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 403. | CI_Series | information about the series, or aggregate dataset, to which a dataset belongs | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> | Lines 404-406 | |
| 404. | name | Name of the series, or aggregate dataset, of which the dataset is a part | O | 1 | CharacterString | Free text | |
| 405. | issueIdentification | Information identifying the issue of the series | O | 1 | CharacterString | Free text | |
| 406. | page | details on which pages of the publication the article was published | O | 1 | CharacterString | Free text | |

### B.3.2.7 Telephone information

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 407. | CI_Telephone | telephone numbers for contacting the responsible individual or organisation | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> | Lines 408-409 | |
| 408. | voice | telephone number by which individuals can speak to the responsible organisation or individual | O | N | CharacterString | Free text | |

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain | Comment |
|---|---|---|---|---|---|---|---|
| 409. | facsimile | telephone number of a facsimile machine for the responsible organisation or individual | O | N | CharacterString | Free text | |

## B.4    Externally referenced classes

### B.4.1    Introduction
There are several classes referenced by this International Standard that are documented by another, external, standard. Those externally referenced entities are explained below.

### B.4.2    Date and DateTime information
Date: gives values for year, month and day. Character encoding of a date is a string which shall follow the format for date specified by ISO 8601. This class is documented in full in ISO/TS 19103.

Note: the precision of the date can be defined by showing a combination of century plus year plus month plus day. Eg. YY (century), YYYY (year), YYYY-MM (year-month), YYYY-MM-DD or YYYYMMDD (year, month and day)

DateTime: combination of a date and a time type (given by an hour, minute and second). Character encoding of a DateTime shall follow ISO 8601. This class is documented in full in ISO/TS 19103.

Note: although the DateTime definition allows for more precise temporal statements, the less precise values can also be used. For example, YY (century), YYYY (year), YYYY-MM( year, month), YYYY-MM-DD or YYYYMMDD (year, month, day), YYYY-MM-DDTHH (year, month, day, hour), YYYY-MM-DDThh:mm (year, month, day, hour, minute), YYYY-MM-DDThh:mm:ss.d or YYYYMMDDThhmmss.d (year, month, day, hour, minute, second and decimals of seconds). The time zone should also be added. EG. YYYY-M-DDThh:mm:ss.d+hh:mm

### B.4.3    Distance, angle, measure, number, record, recordType, scale and UomLength information
Distance: This class is documented in full in ISO/TS 19103.

Angle: Amount of rotation need to bring one line or plane into coincidence with another, generally measured in radians or degrees. This class is documented in full in ISO/TS 19103.

Measure: result from performing the act or process of ascertaining the extent, dimensions, or quantity of some entity. This class is documented in full in ISO/TS 19103.

Number: abstract class that can be sub-typed to a specific number type (real, integer, decimal, double, float). This class is documented in full in ISO/TS 19103.

Record: This class is documented in full in ISO/TS 19103.

RecordType: This class is documented in full in ISO/TS 19103.

Scale: This class is documented in full in ISO/TS 19103.

UnitOfMeasure: This class is documented in full in ISO/TS 19103.

UomLength: any of the measuring systems to measure the length, distance between two entities. This class is documented in full in ISO/TS 19103.

### B.4.5 PeriodDuration and temporal primitive information

TM_PeriodDuration: duration of a period as specified by ISO 8601. This class is fully documented in ISO 19108.

TM_Duration: duration of time as specified by ISO 8601. This class is fully documented in ISO 19108.

TM_Primitive: an abstract class representing a non-decomposed element of geometry or topology. This class is fully documented in ISO 19108.

### B.4.6 Point and Object information

GM_Point: 0-dimensional geometric primitive, representing a position, but not having extent. This class is fully documented in ISO 19107.

GM_Object: root class of the geometric object taxonomy and supports interfaces common to all geographically referenced geometric objects. This class is fully documented in ISO 19107.

### B.4.9 Vertical datum information

SC_VerticalDatum: set of parameters describing the relation of gravity-related heights to the Earth. This class is fully documented in ISO 19111.

# B.5 CodeLists and enumerations

## B.5.1 Introduction

The stereotype classes <<CodeList>> and <<Enumeration>> can be found below. These two stereotype classes also do not contain any "other" values as <<Enumeration>>s are closed (not extendable) and <<CodeList>>s are extendable. Consult Annex C and Annex F for information about how to extend <<CodeList>>s. The concept name is the name of the item (English is this version of the standard and should be transtated into the language of the nation or entity developing a profile). The code is a language neutral identifier.

The first sections list the ISO codelists used within this metadata profile, including modified ones (restricted or extended).

The modified ISO codelists are published in a codelist catalogue at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/gmxCodeLists.xml

Then the new codelists are presented, defined in this metadata profile. Pointers to the online codelist catalogues are provided as well.

## B.5.2 CI_DateTypeCode <<CodeList>>

|    | Concept name | Definition |
|----|--------------|------------|
| 1. | CI_DateTypeCode | identification of when a given event occurred |
| 2. | creation | date identifies when the resource was brought into existence |
| 3. | publication | date identifies when the resource was issued |
| 4. | revision | date identifies when the resource was examined or re-examined and improved or amended |

## B.5.3 CI_OnLineFunctionCode <<CodeList>>

|    | Concept name | Definition |
|----|--------------|------------|
| 1. | CI_OnLineFunction Code | function performed by the resource |
| 2. | download | online instructions for transferring data from one storage device or system to another |
| 3. | information | online information about the resource |
| 4. | offlineAccess | online instructions for requesting the resource from the provider |

| | Concept name | Definition |
|---|---|---|
| 5. | order | online order process for obtaining the resource |
| 6. | search | online search interface for seeking out information about the resource |
| 7. | <<new>> downloadRegistration | manual interaction with an on-line system by registered users following successful authentication and authorisation |
| 8. | <<new>> URL | *online resource locator for accessing data using a specific web protocol* |
| 9. | <<new>> hrsvsRegistration | *online system for visualisation of high resolution seismic data by registered users following successful authentication and authorisation* |

## B.5.5 CI_RoleCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | CI_RoleCode | function performed by the responsible party |
| 2. | resourceProvider | party that supplies the resource |
| 3. | custodian | party that accepts accountability and responsibility for the data and ensures appropriate care and maintenance of the resource |
| 4. | owner | party that owns the resource |
| 5. | user | party who uses the resource |
| 6. | distributor | party who distributes the resource |
| 7. | originator | party who created the resource |
| 8. | pointOfContact | party who can be contacted for acquiring knowledge about or acquisition of the resource |
| 9. | principalInvestigator | key party responsible for gathering information and conducting research |
| 10. | processor | party who has processed the data in a manner such that the resource has been modified |
| 11. | publisher | party who published the resource |
| 12. | author | party who authored the resource |

### B.5.7 DS_AssociationTypeCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | DS_AssociationTypeCode | justification for the correlation of two resources |
| 2. | crossReference | reference from one resource to another |
| 3. | largerWorkCitation | reference to a master resource of which this one is a part |
| 4. | partOfSeamlessDatabase | part of same structured set of data held in a computer |
| 5. | Source | mapping and charting information from which the resource content originates (use Lineage in the future) |
| 6. | stereoMate | part of a set of imagery that when used together, provides three-dimensional images |

### B.5.8 DS_InitiativeTypeCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | DS_InitiativeTypeCode | type of aggregation activity in which resources are related |
| 2. | campaign | series of organized planned actions |
| 3. | collection | accumulation of resources assembled for a specific purpose |
| 4. | exercise | specific performance of a function or group of functions |
| 5. | experiment | process designed to find if something is effective or valid |
| 6. | investigation | search or systematic inquiry |
| 7. | mission | specific operation of a data collection system |
| 8. | sensor | device or piece of equipment which detects or records |
| 9. | operation | action that is part of a series of actions |
| 10. | platform | vehicle or other support base that holds a sensor |
| 11. | process | method of doing something involving a number of steps |

| | Concept name | Definition |
|---|---|---|
| 12. | program | specific planned activity |
| 13. | project | organized undertaking, research, or development |
| 14. | study | examination or investigation |
| 15. | task | piece of work |
| 16. | trial | process of testing to discover or demonstrate something |

## B.5.9   MD_CellGeometryCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | MD_CellGeometryCode | code indicating the geometry represented by the grid cell value |
| 2. | point | each cell represents a point |
| 3. | area | each cell represents an area |

## B5.10 MD_CharacterSetCode <<CodeList>> restricted

| | Concept name | Definition |
|---|---|---|
| 1. | MD_CharacterSetCode | name of the character coding standard used for the resource |
| 5. | utf8 | 8-bit variable size UCS Transfer Format, based on ISO/IEC 10646 |

## B.5.13  MD_DatatypeCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | MD_DatatypeCode | datatype of element or entity |
| 2. | class | descriptor of a set of objects that share the same attributes, operations, methods, relationships, and behaviour |

| | Concept name | Definition |
|---|---|---|
| 3. | codelist | flexible enumeration useful for expressing a long list of values, can be extended |
| 4. | enumeration | data type whose instances form a list of named literal values, not extendable |
| 5. | codelistElement | permissible value for a codelist or enumeration |
| 6. | abstractClass | class that cannot be directly instantiated |
| 7. | aggregateClass | class that is composed of classes it is connected to by an aggregate relationship |
| 8. | specifiedClass | subclass that may be substituted for its superclass |
| 9. | datatypeClass | class with few or no operations whose primary purpose is to hold the abstract state of another class for transmittal, storage, encoding or persistent storage |
| 10. | interfaceClass | named set of operations that characterize the behaviour of an element |
| 11. | unionClass | class describing a selection of one of the specified types |
| 12. | metaClass | class whose instances are classes |
| 13. | typeClass | class used for specification of a domain of instances (objects), together with the operations applicable to the objects. A type may have attributes and associations |
| 14. | characterString | free text field |
| 15. | integer | numerical field |
| 16. | association | semantic relationship between two classes that involves connections among their instances |

### B.5.14 MD_DimensionNameTypeCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | MD_Dimension NameTypeCode | name of the dimension |
| 2. | row | ordinate (y) axis |
| 3. | column | abscissa (x) axis |
| 4. | vertical | vertical (z) axis |

| | Concept name | Definition |
|---|---|---|
| 5. | track | along the direction of motion of the scan point |
| 6. | crossTrack | perpendicular to the direction of motion of the scan point |
| 7. | line | scan line of a sensor |
| 8. | sample | element along a scan line |
| 9. | time | duration |

## B.5.15  MD_GeometricObjectTypeCode <<CodeList>> restricted

| | Concept name | Definition |
|---|---|---|
| 1. | MD_Geometric ObjectTypeCo de | name of point or vector objects used to locate zero-, one-, two-, or three-dimensional spatial locations in the dataset |
| 4. | curve | bounded, 1-dimensional geometric primitive, representing the continuous image of a line |
| 5. | point | zero-dimensional geometric primitive, representing a position but not having an extent |
| 7. | surface | bounded, connected 2-dimensional geometric primitive, representing the continuous image of a region of a plane |

## B.5.16 MD_KeywordTypeCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | MD_KeywordType Code | methods used to group similar keywords |
| 2 | discipline | keyword identifies a branch of instruction or specialized learning |
| 3 | place | keyword identifies a location |
| 4 | stratum | keyword identifies the layer(s) of any deposited substance or levels within an ordered system |
| 5 | temporal | keyword identifies a time period related to the resource |

| | Concept name | Definition |
|---|---|---|
| 6 | theme | keyword identifies a particular subject or topic |
| 7 | <<new>> instrument | keyword describes or cateogorises sample collection or data production tools |
| 8 | <<new>> project | keyword describes a strategic undertaking encomapssing an organised set of activities |
| 8 | <<new>> parameter | keyword identifies a phenomenon or group of phenomena in the dataset |
| 9 | <<new>> platform | keyword identifies a specific vehicle, object, structure or organism capable of bearing instruments or tools for the collection of physical, chemical, geological or biological samples. |
| 10 | <<new>> platform_class | keyword identifies groups of vehicles, objects, structures or organisms capable of bearing instruments or tools for the collection of physical, chemical, geological or biological samples. |
| 11 | <<new>> departure_place | keyword identifies a location where an activity starts |
| 12 | <<new>> departure_country | keyword identifies the country where an activity starts |
| 13 | <<new>> arrival_place | keyword identifies a location where an activity finishes |
| 14 | <<new>> arrival_country | keyword identifies the country where an activity begins |
| 15 | <<new>> marsden_square | keyword identifies a location as encoded geographic co-ordinates for a rectangular polygon following WMO conventions |

## B.5.18 MD_MaintenanceFrequencyCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | MD_MaintenanceFrequencyCode | Frequency with which modifications and deletions are made to the data after it is first produced |
| 2. | continual | Data is repeatedly and frequently updated |

| | Concept name | Definition |
|---|---|---|
| 3. | daily | Data is updated each day |
| 4. | weekly | Data is updated on a weekly basis |
| 5. | fortnightly | Data is updated every two weeks |
| 6. | monthly | Data is updated each month |
| 7. | quarterly | Data is updated every three months |
| 8. | biannually | Data is updated twice each year |
| 9. | annually | Data is updated every year |
| 10. | asNeeded | Data is updated as deemed necessary |
| 11. | irregular | Data is updated in intervals that are uneven in duration |
| 12. | notPlanned | There are no plans to update the data |
| 13. | unknown | Frequency of maintenance for the data is not known |

## B.5.21 MD_ObligationCode <<Enumeration>>

| | Concept name | Definition |
|---|---|---|
| 1. | MD_ObligationCode | obligation of the element or entity |
| 2. | mandatory | element is always required |
| 3. | optional | element is not required |
| 4. | conditional | element is required when a specific condition is met |

## B.5.24 MD_RestrictionCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | MD_RestrictionCode | limitation(s) placed upon the access or use of the data |
| 2. | copyright | exclusive right to the publication, production, or sale of the rights to a literary, dramatic, musical, or artistic work, or to the use of a commercial print or label, granted by law for a specified period of time to an author, composer, artist, distributor |

| | Concept name | Definition |
|---|---|---|
| 3. | patent | government has granted exclusive right to make, sell, use or license an invention or discovery |
| 4. | patentPending | produced or sold information awaiting a patent |
| 5. | trademark | a name, symbol, or other device identifying a product, officially registered and legally restricted to the use of the owner or manufacturer |
| 6. | license | formal permission to do something |
| 7. | intellectualPropertyRights | rights to financial benefit from and control of distribution of non-tangible property that is a result of creativity |
| 8. | restricted | withheld from general circulation or disclosure |
| 9. | otherRestrictions | limitation not listed |

## B.5.25 MD_ScopeCode <<CodeList>> restricted

| | Concept name | Definition |
|---|---|---|
| 1. | MD_ScopeCode | class of information to which the referencing entity applies |
| 6. | dataset | information applies to the dataset |
| 7. | series | Information applies to the series |

## B.5.26 MD_SpatialRepresentationTypeCode <<CodeList>>

| | Concept name | Definition |
|---|---|---|
| 1. | MD_SpatialRepresentationTypeCode | method used to represent geographic information in the dataset |
| 2. | vector | vector data is used to represent geographic data |
| 3. | grid | grid data is used to represent geographic data |
| 4. | textTable | textual or tabular data is used to represent geographic data |
| 5. | tin | triangulated irregular network |

| | Concept name | Definition |
|---|---|---|
| 6. | stereoModel | three-dimensional view formed by the intersecting homologous rays of an overlapping pair of images |
| 7. | video | scene from a video recording |

### B.5.27 MD_TopicCategoryCode << Enumeration>>

| | Concept name | Definition |
|---|---|---|
| 1. | MD_TopicCategoryCode | high-level geographic data thematic classification to assist in the grouping and search of available geographic data sets. Can be used to group keywords as well. Listed examples are not exhaustive. NOTE It is understood there are overlaps between general categories and the user is encouraged to select the one most appropriate. |
| 2. | farming | rearing of animals and/or cultivation of plants Examples: agriculture, irrigation, aquaculture, plantations, herding, pests and diseases affecting crops and livestock |
| 3. | biota | flora and/or fauna in natural environment Examples: wildlife, vegetation, biological sciences, ecology, wilderness, sealife, wetlands, habitat |
| 4. | boundaries | legal land descriptions Examples: political and administrative boundaries |
| 5. | climatologyMeteorologyAtmosphere | processes and phenomena of the atmosphere Examples: cloud cover, weather, climate, atmospheric conditions, climate change, precipitation |
| 6. | economy | economic activities, conditions and employment Examples: production, labour, revenue, commerce, industry, tourism and ecotourism, forestry, fisheries, commercial or subsistence hunting, exploration and exploitation of resources such as minerals, oil and gas |
| 7. | elevation | height above or below a vertical datum Examples: altitude, bathymetry, digital elevation models, slope, derived products |
| 8. | environment | environmental resources, protection and conservation Examples: environmental pollution, waste storage and treatment, environmental impact assessment, monitoring environmental risk, nature reserves, landscape |

| | Concept name | Definition |
|---|---|---|
| 9. | geoscientificInformation | information pertaining to earth sciences |
| | | Examples: geophysical features and processes, geology, minerals, sciences dealing with the composition, structure and origin of the earth's rocks, risks of earthquakes, volcanic activity, landslides, gravity information, soils, permafrost, hydrogeology, erosion |
| 10. | health | health, health services, human ecology, and safety |
| | | Examples: disease and illness, factors affecting health, hygiene, substance abuse, mental and physical health, health services |
| 11. | imageryBaseMapsEarthCover | base maps |
| | | Examples: land cover, topographic maps, imagery, unclassified images, annotations |
| 12. | intelligenceMilitary | military bases, structures, activities |
| | | Examples: barracks, training grounds, military transportation, information collection |
| 13. | inlandWaters | inland water features, drainage systems and their characteristics |
| | | Examples: rivers and glaciers, salt lakes, water utilization plans, dams, currents, floods, water quality, hydrographic charts |
| 14. | location | positional information and services |
| | | Examples: addresses, geodetic networks, control points, postal zones and services, place names |
| 15. | oceans | features and characteristics of salt water bodies (excluding inland waters) Examples: tides, tidal waves, coastal information, reefs |
| 16. | planningCadastre | information used for appropriate actions for future use of the land |
| | | Examples: land use maps, zoning maps, cadastral surveys, land ownership |
| 17. | society | characteristics of society and cultures |
| | | Examples: settlements, anthropology, archaeology, education, traditional beliefs, manners and customs, demographic data, recreational areas and activities, social impact assessments, crime and justice, census information |
| 18. | structure | man-made construction |
| | | Examples: buildings, museums, churches, factories, housing, monuments, shops, towers |

| | Concept name | Definition |
|---|---|---|
| 19. | transportation | means and aids for conveying persons and/or goods<br><br>Examples: roads, airports/airstrips, shipping routes, tunnels, nautical charts, vehicle or vessel location, aeronautical charts, railways |
| 20. | utilitiesCommunication | energy, water and waste systems and communications infrastructure and services<br><br>Examples: hydroelectricity, geothermal, solar and nuclear sources of energy, water purification and distribution, sewage collection and disposal, electricity and gas distribution, data communication, telecommunication, radio, communication networks |
| 21. | extraTerrestrial | region more than 100 km above the surface of the Earth |

## B.5.90  LanguageCode <<CodeList>> restricted

| | Concept name | Definition |
|---|---|---|
| 1. | MD_LanguageCode | International language |
| 1. | eng | English |

## B.6.1  SDN_FormatNameCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list L24 defining "Formats used for data delivery by SeaDataNet".

The reference ISO CodeList catalogue is published at:

https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_FormatNameCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:L24

To obtain the ISO list the following mapping has been used:

- Concept.prefLabel elements in the original list map to ISO concept names
- Concept.definition elements in the original list map to ISO concept definitions

### B.6.2   SDN_ HierarchyLevelNameCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list L23 defining "Types of metadata record in the SeaDataNet metadata".

The reference ISO CodeList catalogue is published at:

https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_HierarchyLevelNameCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:L23

To obtain the ISO list the following mapping has been used:

- Concept.prefLabel elements in the original list map to ISO concept names
- Concept.definition elements in the original list map to ISO concept definitions

### B.6.3   SDN_ DeviceCategoryCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list L05 defining "SeaDataNet device categories".

The reference ISO CodeList catalogue is published at:

https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_DeviceCategoryCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:L05

To obtain the ISO list the following mapping has been used:

- Concept.prefLabel elements in the original list map to ISO concept names
- Concept.definition elements in the original list map to ISO concept definitions

### B.6.4 SDN_ PlatformCategoryCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list L06 defining "SeaVoX Platform Categories".

The reference ISO CodeList catalogue is published at:

https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_PlatformCategoryCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:L06

To obtain the ISO list the following mapping has been used:

- Concept.prefLabel elements in the original list map to ISO concept names
- Concept.definition elements in the original list map to ISO concept definitions

### B.6.5 SDN_ ParameterDiscoveryCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list P02 defining "SeaDataNet Parameter Discovery Vocabulary".

The reference ISO CodeList catalogue is published at:

https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_ParameterDiscoveryCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:P02

To obtain the ISO list the following mapping has been used:

- Concept.prefLabel elements in the original list map to ISO concept names
- Concept.definition elements in the original list map to ISO concept definitions

### B.6.6 SDN_ CRSCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list L10 defining "Co-ordinate reference systems used for positions (latitude/longitude or grid references) in SeaDataNet metadata.".

The reference ISO CodeList catalogue is published at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_CRSCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:L10

To obtain the ISO list the following mapping has been used:

- Concept.prefLabel elements in the original list map to ISO concept names
- Concept.definition elements in the original list map to ISO concept definitions

### B.6.7 SDN_ CSRCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet CSR codes list.

The reference ISO CodeList catalogue is published at: https://seadata.bsh.de/isoCodelists/sdnCodelists/csrCodeList.xml#SDN_CSRCode

### B.6.8 SDN_ CountryCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list C32 defining "International Standards Organisation countries".

The reference ISO CodeList catalogue is published at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_CountryCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:C32

To obtain the ISO list the following mapping has been used:

- Concept.prefLabel elements in the original list map to ISO concept names
- Concept.definition elements in the original list map to ISO concept definitions

### B.6.9   SDN_ EDMERPCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list EDMERP defining "European Directory of Marine Environmental Research Projects".

The reference ISO CodeList catalogue is published at: https://edmo.seadatanet.org/isocodelists/sdncodelists/edmo-edmerp-codelists.xml#SDN_EDMERPCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:EDMERP

To obtain the ISO list the following mapping has been used:

- SimpleMetadata.Acronym  elements in the original list map to ISO concept names
- SimpleMetadata.Title elements in the original list map to ISO concept definitions

### B.6.10  SDN_ EDMOCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list EDMO defining "European Directory of Marine Organisations".

The reference ISO CodeList catalogue is published at: https://edmo.seadatanet.org/isocodelists/sdncodelists/edmo-edmerp-codelists.xml#SDN_EDMERPCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:EDMO

To obtain the ISO list the following mapping has been used:

- • Organisation.n_code elements in the original list map to ISO concept names
- • Organisation.name elements in the original list map to ISO concept definitions

## B.6.11  SDN_ EDMEDCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list EDMED defining "European Directory of Marine Environmental Data".

The reference ISO CodeList catalogue is published at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/edmedCodeList.xml#SDN_EDMEDCode

The original list can be found at:

**http://www.bodc.ac.uk/data/information_and_inventories/edmed**


## B.6.11 SDN_PortCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list C381 defining "Ports Gazetteer".

The reference ISO CodeList catalogue is published at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_PortCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:C38

To obtain the ISO list the following mapping has been used:

- • Concept.prefLabel elements in the original list map to ISO concept names
- • Concept.definition elements in the original list map to ISO concept definitions

## B.6.12  SDN_CountryCode <<CodeList>>

This is a ISO codelist catalogue version of the ISO country codes from ISO3166-1

The reference ISO CodeList catalogue is published at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_CountryCode

### B.6.13  SDN_PlatformCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list L06 defining "Platform Categories".

The reference ISO CodeList catalogue is published at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_PlatformCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:L06

To obtain the ISO list the following mapping has been used:

- Concept.prefLabel elements in the original list map to ISO concept names
- Concept.definition elements in the original list map to ISO concept definitions

### B.6.14  SDN_WaterBodyCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list C19 defining "Water Body Gazetteer".

The reference ISO CodeList catalogue is published at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_WaterBodyCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:C19

To obtain the ISO list the following mapping has been used:

- Concept.prefLabel elements in the original list map to ISO concept names
- Concept.definition elements in the original list map to ISO concept definitions

### B.6.15  SDN_MarsdenCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list C37 defining "Ten-degree Marsden Squares".

The reference ISO CodeList catalogue is published at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_MarsdenCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:C37

To obtain the ISO list the following mapping has been used:

- • Concept.prefLabel elements in the original list map to ISO concept names
- • Concept.definition elements in the original list map to ISO concept definitions

### B.6.16 SDN_DataCategoryCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list C77 defining "SeaDataNet Cruise Summary Report data categories".

The reference ISO CodeList catalogue is published at:
https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_DataCategoryCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:C77

To obtain the ISO list the following mapping has been used:

- • Concept.prefLabel elements in the original list map to ISO concept names
- • Concept.definition elements in the original list map to ISO concept definitions

### B.6.17 SDN_CSRUnitCode <<CodeList>>

This codelist is a ISO version of the SeaDataNet list L18 defining "SeaDataNet Cruise Summary Report quantification units".

The reference ISO CodeList catalogue is published at: https://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_CSRUnitCode

The original list can be found at:

https://www.seadatanet.org/urnurl/SDN:L18

To obtain the ISO list the following mapping has been used:

- • Concept.prefLabel elements in the original list map to ISO concept names
- • Concept.definition elements in the original list map to ISO concept definitions

# Elements from ISO 19139

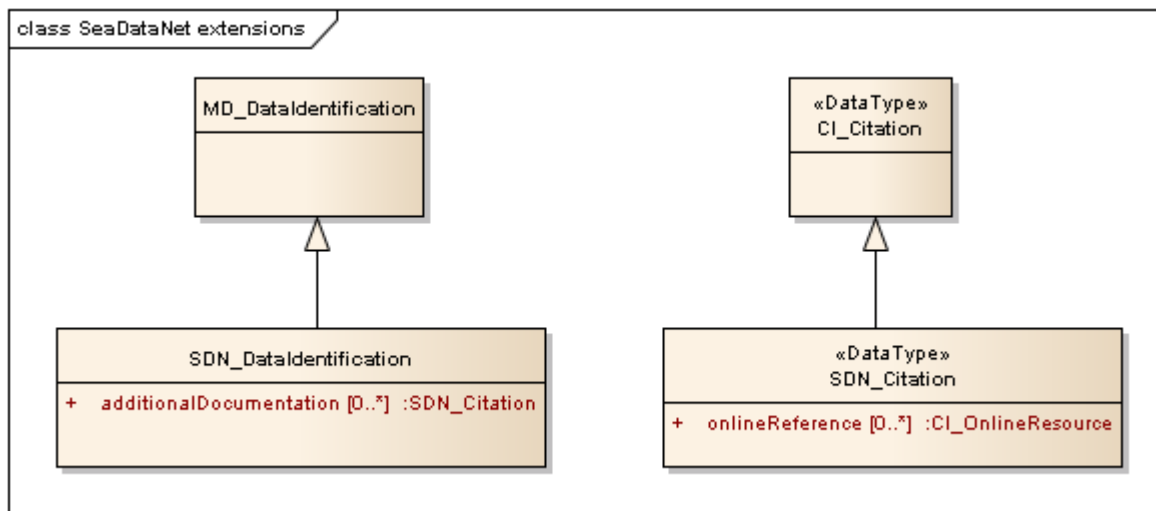The following table list the elements from ISO 19139.

## *B.7.1.1 Web environment extensions*

### B.7.1.1.1        Anchor

| | Name / Role Name | Definition | Obligation / Condition | Maximum occurrence | Data type | Domain |
|---|---|---|---|---|---|---|
| 1. | Anchor | Supports hyper-linking capabilities and ensures a web-like implementation of CharacterStrings | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class | Lines 411 |
| 2. | href | Supplies the data that allows an XLink application to find a remote resource (or resource fragment) [W3C XLINK] | M | 1 | CharacterString | Free text |

# Extended elements

The following figure presents a UML model of the extension information that is part of the SeaDataNet profile. SDN_DataIdentification is a sub class of MD_DataIdentification, containing the (optional) attribute additionalDocumentation of type SDN_Citation to collect  bibliographic references to the dataset, such as articles and related publications. SDN_Citation is as well an extension, of class CI_Citation: it adds (optional) online references to the cited documentation.

The following table list the data dictionary of the extended elements that are part of the profile.

| Name | Short Name | Definition | Obligation/Condition | Data Type | Domain | Max Occur | Parent Entity | Rule | Rationale | Source |
|---|---|---|---|---|---|---|---|---|---|---|
| SDN_DataIdentification | SDNDataIdent | information required to identify a resource within SeaDataNet | Use obligation from referencing object | Specified Class (MD_Identification) | Lines 38-45, 24-35.1 and additional Documentation | Use maximum occurrence from referencing object | MD_Metadata | New Metadata class | To provide additionalDocumentation information | SeaDataNet |
| additionalDocumentation | idAdditionalDocumentation | other documentation associated with the resource (e.g. related articles, publications) | O | Class | SDN_Citation () | N | SDN_DataIdentification | New Metadata class | To provide bibliographic references related to the resource | SeaDataNet |

| SDN_Citation | SDNCitation | standardized resource reference within SeaDataNet | Use obligation from referencing object | Specified Class (CI_Citation) | Lines 360-373 and onlineReference | Use Maximum occurrence from referencing object | additionalDocumentation | New Metadata class | To provide citation completed with online references | SeaDataNet |
|---|---|---|---|---|---|---|---|---|---|---|
| onlineReference | onlineReference | online reference to the cited documentation | O | Class | CI_Online Resource <<DataType>> (B.3.2.5) | 1 | SDN_Citation | New Metadata class | To provide pointers to online references | SeaDataNet |

## Null elements use

Null elements (i.e. elements without content) are not permitted to appear in instance documents of this profile in place of mandatory elements. They have instead an use when documenting a missing optional element. Indeed two methods are available to document a missing optional element:

1. Skip the element entirely
2. Document a null element (element without content) along with a nilReason attribute explaining the reason for the null element. A possible encoding using the ISO 19139 schema is the following: <gmd:alternateTitle gco:nilReason="missing"></gmd:alternateTitle>

A null element is also allowed if containing an xlink attribute pointing to the element actual content.

## SeaDataNet specific constraints

Additional SeaDataNet specific constraints are below listed:

- The reference system identifier (RS_Identifier) should be documented along with the authority.CI_Citation, with values:
  - alternateTitle='L101'

- o identifier. MD_Identifier.code.CharacterString=' https://www.seadatanet.org/urnurl/SDN:L101'
- The thesaurus used for keywords should be correctly referenced. E.g. for code list SDN_ParameterDiscoveryCode:
  - o alternateTitle='P021'
  - o identifier. MD_Identifier.code.CharacterString=' https://www.seadatanet.org/urnurl/SDN:P021'
- At least one keyword with type 'parameter' should be documented
- At least one keyword with type 'platform_class' should be documented
- A maximum of one associationType.AssociationTypeCode/@codeListValue = 'source' for all aggregationInfo

## INSPIRE specific constraints

To be compliant with the European Directive INSPIRE, this profile include the following additional constraints:

- **SC7**. There shall not be more than one instance of MD_Metadata.identificationInfo[1].MD_Identification.citation.CI_Citation.date declared as a creation date (i.e. CI_Date.dateType having the 'creation' value)
- **SC8**. MD_Metadata.identificationInfo[1].MD_DataIdentification.citation.CI_Citation.identifier is mandatory for metadata sets related to spatial dataset and spatial dataset series;
- **SC10**.There is at least one instance of MD_Metadata.identificationInfo[1].MD_DataIdentification.extent defining the geographic location of the resource as a geographic bounding box (i.e. an instance of EX_GeographicBoundingBox or one of its subclasses).
- **SC16**. The value of MD_Metadata.contact[1].CI_ResponsibleParty.role.CI_RoleCode shall be pointOfContact.
- **SC17**. For datasets and series at least one keyword of GEMET thesaurus shall be documented using MD_Metadata.identificationInfo[1].MD_DataIdentification.descriptiveKeywords.
- There shall be a **conformance result report** against the latest INSPIRE commission regulation about metadata and other relevant regulations. There shall be at least the following:
  - o Conformance result report for metatadata. E.g. a DQ_DataQuality.report.DQ_ConformanceResult with values:
    - specification.CI_Citation.title.CharacterString = '**COMMISSION REGULATION (EC) No 1205/2008 of 3 December 2008 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata**'
    - specification.CI_Citation.date.CI_Date.date.Date = '2008-12-04'
    - specification.CI_Citation.date.CI_Date.dateType.CI_DateTypeCode.@codeListValue = 'publication'
    - explanation.CharacterString = 'See the referenced specification'
    - pass.Boolean = 'true'

- o Conformance result report for interoperability of spatial data sets and services. E.g. a DQ_DataQuality.report.DQ_ConformanceResult with values:
  - specification.CI_Citation.title.CharacterString = '**COMMISSION REGULATION (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services**'
  - specification.CI_Citation.date.CI_Date.date.Date = '2010-12-08'
  - specification.CI_Citation.date.CI_Date.dateType.CI_DateTypeCode.@codeListValue = 'publication'
  - explanation.CharacterString = 'See the referenced specification'
  - pass.Boolean = 'true'

## Normative references

— ISO 19115:2003, Geographic information – Metadata

— ISO 19115:2003/Cor 1:2006, Geographic information – Metadata, Corrigendum

— ISO/TS 19139:2007, Geographic information – Metadata – XML schema implementation

— ISO 19106:2004, Geographic information – Profiles

— INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119