



# SeaDataCloud

## Building a bridge between the SeaDataNet data and the INSPIRE data models

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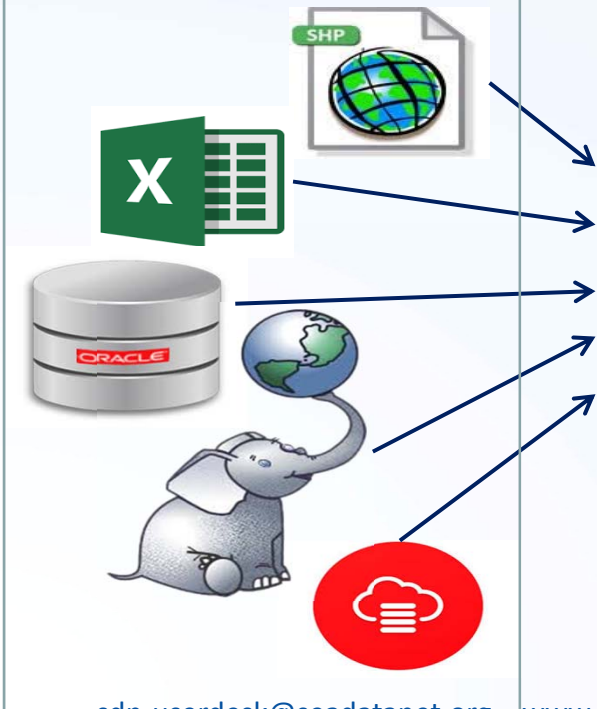
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Marine Information Service (MARIS)

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# Marine SDI in Europe

## National Data Centres



Pan-European infrastructure for ocean & marine data management



National Data Centres

Marine Strategy Framework Directive

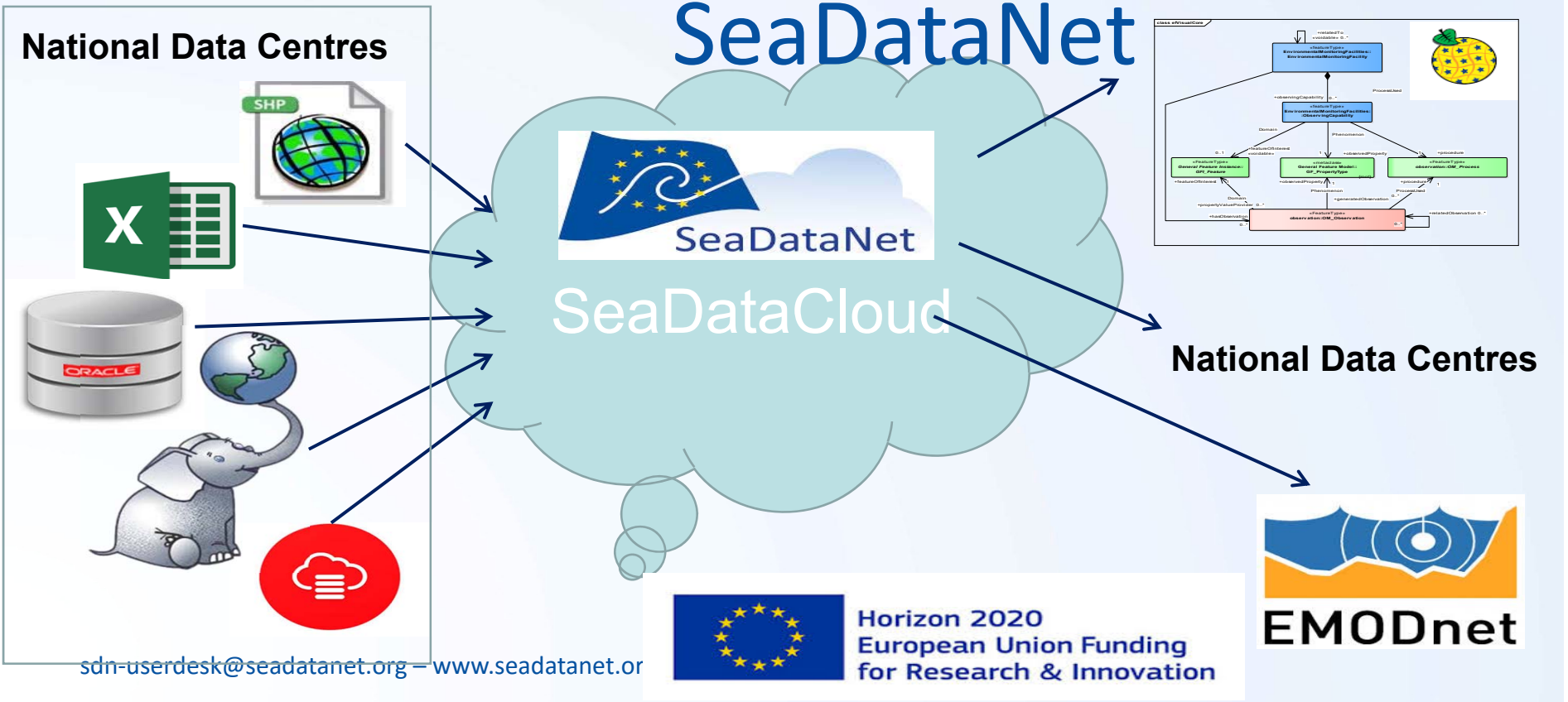


[sdn-userdesk@seadatanet.org](mailto:sdn-userdesk@seadatanet.org) - [www.seadatanet.org](http://www.seadatanet.org)



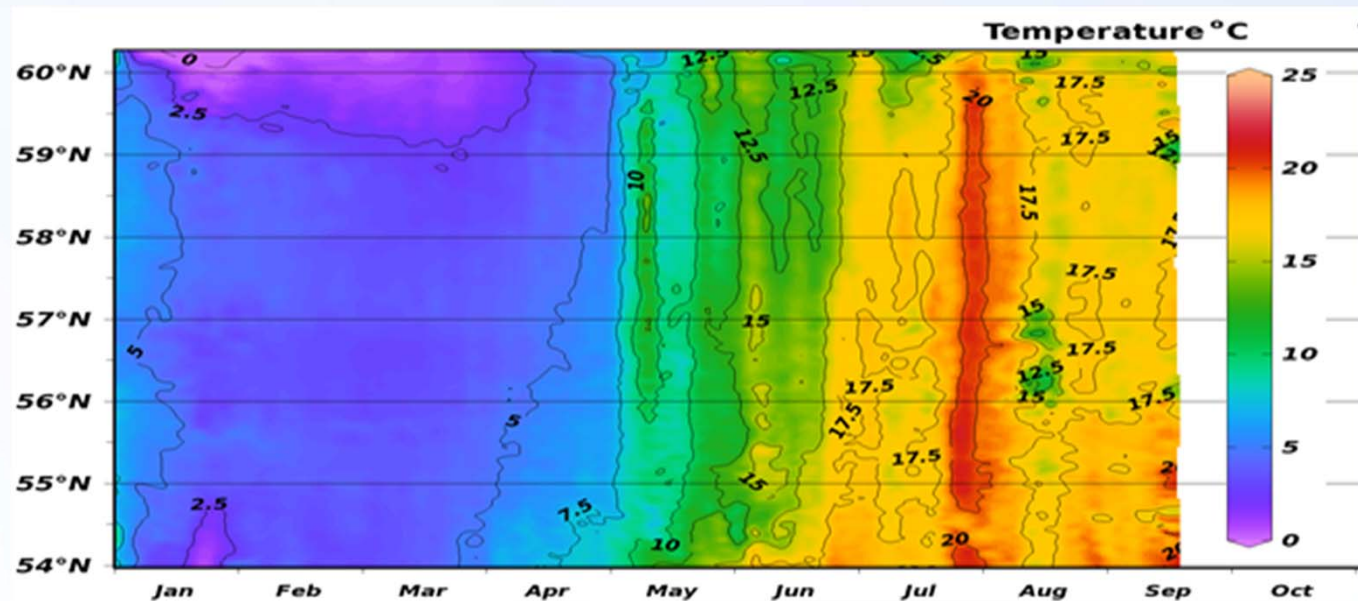
# Part of the vision: an INSPIREd

## SeaDataNet



## Step one: What's the marine data like?

- Analyse SeaDataNet source data of two SeaDataNet data providers



# Ocean Data View (ODV) ASCII file

```

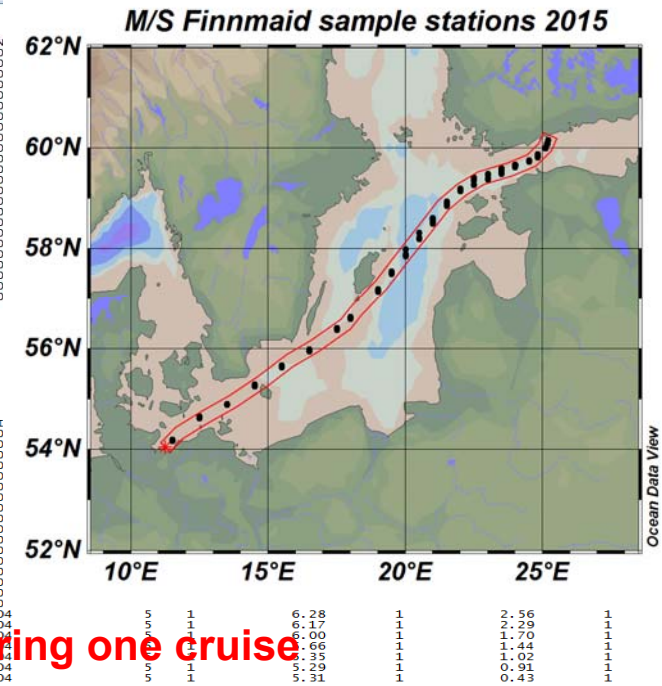
FM150208.txt - Notepad
File Edit Format View Help
V:\Algline FerryBox water sample data, M/S Finnmaid (34FM),
Finnish Environment Institute (1104), nominal depth 5 m
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<sdn_reference xlink:href="http://seadatanet.mar.is2.nl/v_cdi/v3/print_xml.asp?edmo=1104&identifier=FM150208_2015230024_HO
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<subject-SDN:LOCAL:DEPTH</subject><object-SDN:P01::ADEPZ201</object><units>SDN:P06::ULAA</units>
<subject-SDN:LOCAL:SAL</subject><object-SDN:P01::PSCLC11</object><units>SDN:P06::UUUU</units>
<subject-SDN:LOCAL:CHLA</subject><object-SDN:P01::CPHSEP1</object><units>SDN:P06::UHM</units>
<subject-SDN:LOCAL:TEMP</subject><object-SDN:P01::TMCLC11</object><units>SDN:P06::UAAA</units>
<subject-SDN:LOCAL:PTOT</subject><object-SDN:P01::PHSPPO1</object><units>SDN:P06::UPOX</units>
<subject-SDN:LOCAL:NTOT</subject><object-SDN:P01::NTOTCTX</object><units>SDN:P06::UPOX</units>
Cruise_station type yyyy-mm-ddTth:mm:ss.sss Longitude [degrees_east] Latitude [degrees_north] LOCAL_CDI_T
FM150208 2015230001 B 2015-02-08T05:57:38.000 +011.502400 +54.191000 FM150208_2015230001_H09 110
FM150208 2015230002 B 2015-02-08T08:14:37.000 +012.501500 +54.652000 FM150208_2015230002_H09 110
FM150208 2015230003 B 2015-02-08T10:03:47.000 +013.501800 +54.895000 FM150208_2015230003_H09 110
FM150208 2015230004 B 2015-02-08T12:01:59.000 +014.500500 +55.266000 FM150208_2015230004_H09 110
FM150208 2015230005 B 2015-02-08T13:55:14.000 +015.500600 +55.624000 FM150208_2015230005_H09 110
FM150208 2015230006 B 2015-02-08T15:44:03.000 +016.503200 +55.981000 FM150208_2015230006_H09 110
FM150208 2015230007 B 2015-02-08T17:37:39.000 +017.502800 +56.383000 FM150208_2015230007_H09 110
FM150208 2015230008 B 2015-02-08T18:35:55.000 +018.503500 +56.603000 FM150208_2015230008_H09 110
FM150208 2015230009 B 2015-02-08T20:45:12.000 +019.002100 +57.178000 FM150208_2015230009_H09 110
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FM150208 2015230015 B 2015-02-09T03:19:59.000 +022.002700 +59.160000 FM150208_2015230015_H09 110
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FM150208 2015230022 B 2015-02-09T08:16:42.000 +05.502400 +59.861000 FM150208_2015230022_H09 1104
FM150208 2015230023 B 2015-02-09T08:13:15.000 +025.166400 +60.080000 FM150208_2015230023_H09 1104
FM150208 2015230024 B 2015-02-09T08:27:39.000 +025.209600 +60.155000 FM150208_2015230024_H09 1104

```

Links between each measurement and metadata (CDI)

Variables measured corresponding BODC\_P01 code list

Measurements on several variables from 24 locations during one cruise



# Common Data Index (CDI) metadata

FM150208_2015230001_H09.xml	18.6.	1	<?xml version="1.0" encoding="UTF-8"?>
FM150208_2015230002_H09.xml	18.6.	2	<!-- this file has been created using MIKADO version 3.3.3 -->
FM150208_2015230003_H09.xml	18.6.	3	<?xml-model
FM150208_2015230004_H09.xml	18.6.	4	href="http://schemas.seadatanet.org/Standards-Software/Metadata-formats/SDN2_CDI_ISO19139_10.0.0.sch" type="application/xml" schematypens="http://purl.oclc.org/dsdl/schematron?>
FM150208_2015230005_H09.xml	18.6.		<gmd:MD_Metadata xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:gmi="
FM150208_2015230006_H09.xml	18.6.		http://www.isotc211.org/2005/gmi" xmlns:srv="http://www.isotc211.org/2005/srv" xmlns:gco="
FM150208_2015230007_H09.xml	18.6.		http://www.isotc211.org/2005/gco" xmlns:gts="http://www.isotc211.org/2005/gts" xmlns:gmx="
FM150208_2015230008_H09.xml	18.6.		http://www.isotc211.org/2005/gmx" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:sdn="
FM150208_2015230009_H09.xml	18.6.		http://www.seadatanet.org" xmlns:gml="http://www.opengis.net/gml" xmlns:xsi="
FM150208_2015230010_H09.xml	18.6.		http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.seadatanet.org
FM150208_2015230011_H09.xml	18.6.		http://schemas.seadatanet.org/Standards-Software/Metadata-formats/SDN2_CDI_ISO19139_10.0.0.xsd
FM150208_2015230012_H09.xml	18.6.	5	>
FM150208_2015230013_H09.xml	18.6.	6	<gmd:fileIdentifier>
FM150208_2015230014_H09.xml	18.6.	7	<gco:CharacterString>urn:SDN:CDI:LOCAL:FM150208_2015230001_H09</gco:CharacterString>
FM150208_2015230015_H09.xml	18.6.	8	</gmd:fileIdentifier>
FM150208_2015230016_H09.xml	18.6.	9	<gmd:language>
FM150208_2015230017_H09.xml	18.6.		<gmd:LanguageCode codeList="
FM150208_2015230018_H09.xml	18.6.		http://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/gmxCodelists.xml#LanguageCode"
FM150208_2015230019_H09.xml	18.6.		codeListValue="eng" codeSpace="ISOTC211/19115" >English</gmd:LanguageCode>
FM150208_2015230020_H09.xml	18.6.	10	</gmd:language>
FM150208_2015230021_H09.xml	18.6.	11	<gmd:characterSet>
FM150208_2015230022_H09.xml	18.6.	12	<gmd:MD_CharacterSetCode codeList="
FM150208_2015230023_H09.xml	18.6.		http://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/gmxCodelists.xml#MD_CharacterSetCode"
FM150208_2015230024_H09.xml	18.6.		codeListValue="utf8" codeSpace="ISOTC211/19115" >utf8</gmd:MD_CharacterSetCode>
	18.6.	13	</gmd:characterSet>
	18.6.	14	<gmd:hierarchyLevel>
	18.6.	15	<gmd:MD_ScopeCode codeList="
	18.6.		http://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/gmxCodelists.xml#MD_ScopeCode"
	18.6.		codeListValue="dataset" codeSpace="ISOTC211/19115" >dataset</gmd:MD_ScopeCode>
	18.6.	16	</gmd:hierarchyLevel>
	18.6.	17	<gmd:hierarchyLevelName>
	18.6.	18	<sdn:SDN_HierarchyLevelNameCode codeList="
	18.6.		http://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicsrCodeList.xml#SDN_HierarchyLevelNameCode
	18.6.		" codeListValue="CDI" codeSpace="SeaDataNet" >Common Data Index record</
	18.6.		sdn:SDN_HierarchyLevelNameCode>
	18.6.	19	</gmd:hierarchyLevelName>
	18.6.	20	<gmd:contact>
	18.6.	21	<gmd:CI_ResponsibleParty>
	18.6.	22	<gmd:organisationName>
	18.6.	23	<sdn:SDN_EDMOCODE codeList="
	18.6.		http://seadatanet.metis2.nl/isoCodelists/edmoCodelists/edmoCodelists.xml#SDN_EDMOCODE"

# Cruise Summary Report (CSR) metadata

```

D:\Users\hallin\SeaDataCloud\CRS\CSR_ISO19139_full_example_v3.0.1.xml
1  <?xml version="1.0" encoding="UTF-8"?>
2  <?xml-model href="http://schemas.seadatanet.org/Standards-Software/Metadata-formats/SDN2_CSR_ISO19139_3.0.1.sch"
3  type="application/xml" schematypens="http://purl.oclc.org/dsdl/schematron"?>
4  <gmi:MI_Metadata xmlns:gmd="http://www.isotc211.org/2005/gmd"
5  xmlns:gmi="http://www.isotc211.org/2005/gmi" xmlns:srv="http://www.isotc211.org/2005/srv"
6  xmlns:gco="http://www.isotc211.org/2005/gco" xmlns:gts="http://www.isotc211.org/2005/gts"
7  xmlns:gmx="http://www.isotc211.org/2005/gmx" xmlns:xlink="http://www.w3.org/1999/xlink"
8  xmlns:sdn="http://www.seadatanet.org" xmlns:gml="http://www.opengis.net/gml"
9  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
10 xsi:schemaLocation="http://www.seadatanet.org
11 http://schemas.seadatanet.org/Standards-Software/Metadata-formats/SDN2_CSR_ISO19139_3.0.1.xsd">
12 <gmd:fileIdentifier>
13 <gco:CharacterString>urn:SDN:CSR:LOCAL:FI351994800010</gco:CharacterString>
14 </gmd:fileIdentifier>
15 <gmd:language>
16 <gmd:LanguageCode codeList="
17 http://vocab.nerc.ac.uk/isoCodeLists/sdnCodeLists/gmxCodeLists.xml#LanguageCode"
18 codeListValue="eng"
19 codeSpace="ISOTC211/19115">English</gmd:LanguageCode>
20 </gmd:language>
21 <gmd:characterSet>
22 <gmd:MD_CharacterSetCode codeList="
23 http://vocab.nerc.ac.uk/isoCodeLists/sdnCodeLists/gmxCodeLists.xml#MD_CharacterSetCode"
24 codeListValue="utf8"
25 codeSpace="ISOTC211/19115">utf8</gmd:MD_CharacterSetCode>
26 </gmd:characterSet>
27 <gmd:hierarchyLevel>
28 <gmd:MD_ScopeCode codeList="
29 http://vocab.nerc.ac.uk/isoCodeLists/sdnCodeLists/gmxCodeLists.xml#MD_ScopeCode"
30 codeListValue="series"
31 codeSpace="ISOTC211/19115">series</gmd:MD_ScopeCode>
32 </gmd:hierarchyLevel>
33 <gmd:hierarchyLevelName>
34 <sdn:SDN_HierarchyLevelNameCode codeList="
35 http://vocab.nerc.ac.uk/isoCodeLists/sdnCodeLists/cdicsCodeList.xml#SDN_HierarchyLevelNameCode"
36 codeListValue="CSR"
37 codeSpace="SeaDataNet">Cruise Summary record</
38 </sdn:SDN_HierarchyLevelNameCode>
39 </gmd:hierarchyLevelName>
40 <gmd:contact>
41 <gmd:CI_ResponsibleParty>
42 <gmd:organisationName>
43 <sdn:SDN_EDMOCCode codeList="
44 http://seadatanet.maris2.nl/isoCodeLists/edmo-edmerp-CodeLists.xml#SDN_EDMOCCode"
45 codeSpace="SeaDataNet">
    
```

Cruise Summary Reports (CSR) are the usual means for reporting on research vessel cruises



# Step two: Which INSPIRE themes are relevant?

- Introduce relevant INSPIRE themes of relevance to the SeaDataNet community

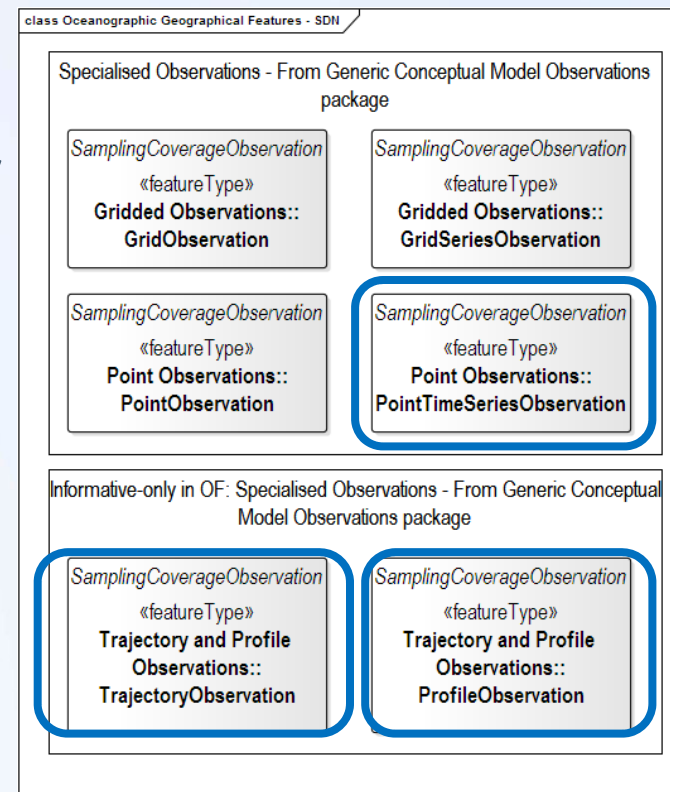


- Environmental Monitoring Facilities, EF
  - The platform, activity and network collecting marine measurements



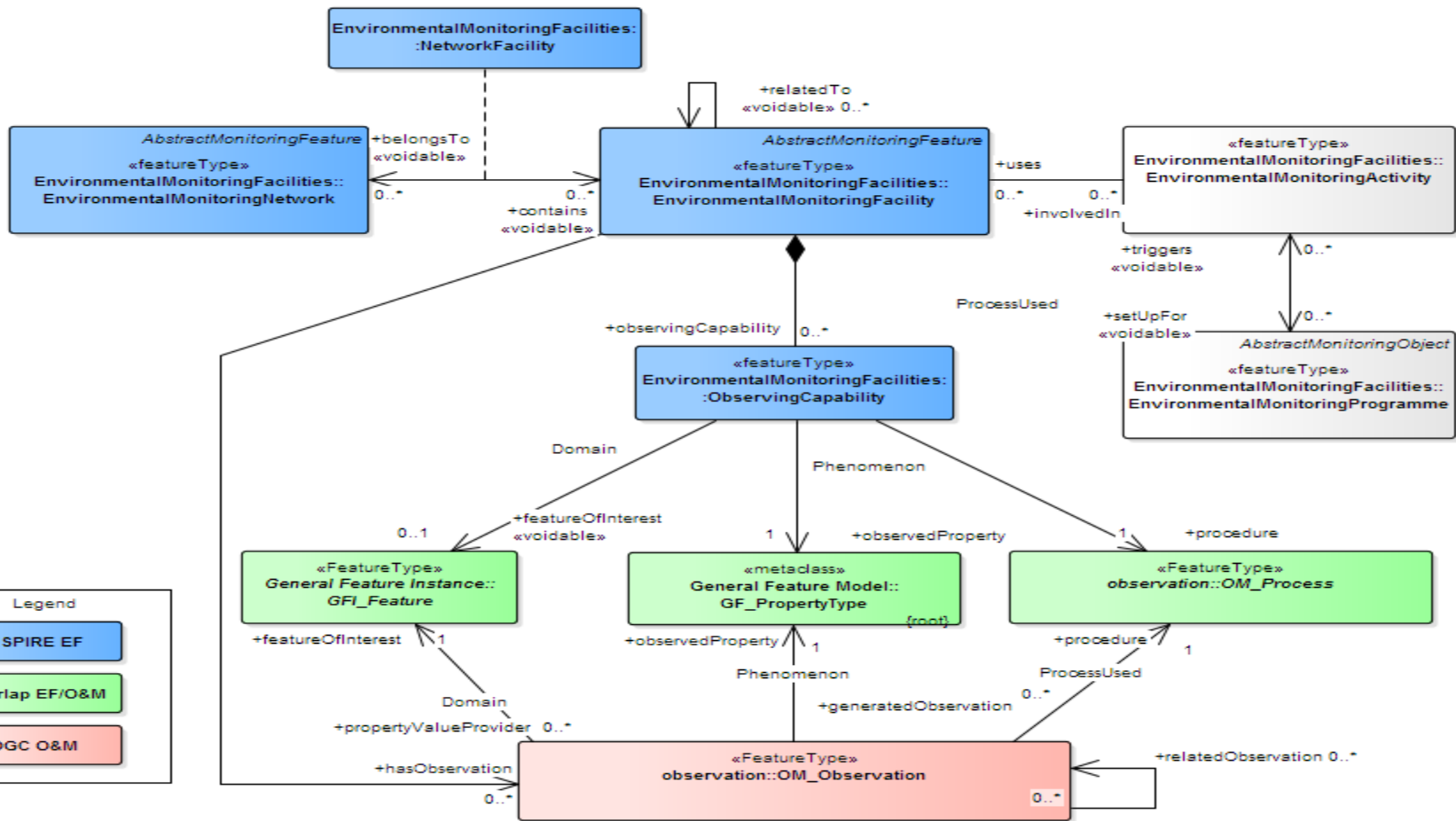
- Oceanographic Geographic Features, OF
  - O&M Specialised Observation types to use for provision of marine data in INSPIRE
- INSPIRE Observations & Measurements (O&M) data model of GCM

[sdn-userdesk@seadatanet.org](mailto:sdn-userdesk@seadatanet.org) – [www.seadatanet.org](http://www.seadatanet.org)





class eVisual



(Kathi Schleidt 2017)

# Step three: How to map and encode?

- Do a proof-of-concept mapping from SeaDataNet data sources to a selection of INSPIRE application schemas

Type : OM\_Observation - TimeSeriesObservation

Attribute Association role Constraint	Values/Enumerations	Multiplicity	Visible/ Non-visible	Example	Source	Path
<b>Application Schema - provide the name of the application schema</b>						
gml:id	NCName	1		OFTS_D278_TEMPPR01 A single series of Currents - subsurface Eulerian data collected between 25 March 2004 00:00 and 11 May 2005 00:00.	OFTS + {CruiseID} + + {ObservedProperty}	/gml:MD_Metadata/gml:identificationInfo/da:SDN_DataIdentification/gml:abstract/gco:CharacterString
gml:description	gml:StringOrRefType	0..1			CDI	/gml:MD_Metadata/gml:identificationInfo/da:SDN_DataIdentification/gml:citation/gml:CI_Citation/gml:title/gco:CharacterString
gml:name	gml:CodeType	0..*		36113/1156 http://inspire.ec.europa.eu/featureconcept/PointTimeSeriesObservation	CDI	
om:type	gml:ReferenceType	0..1				
parameter	NamedValue	0..*				
om:name@xlink:href	gml:ReferenceType	1		relatedMonitoringFeature		relatedMonitoringFeature
om:value	xi:Any	1		EFSF_D278_TEMPPR01	ODV	EFSF + {CruiseID} + + {ObservedProperty}
phenomenonTime	TM_Object	1				
gml:id	NCName	1		OFTS_PT_D278_TEMPPR01		OFTS_PT_ + {CruiseID} + + {ObservedProperty}
beginPosition	gml:TimePositionType	1		2004-03-25T00:00:00	CDI	/gml:MD_Metadata/gml:identificationInfo/da:SDN_DataIdentification/gml:extent/gml:EX_Extent/gml:temporalElement/gml:EX_TemporalExtent/gml:extent/gml:TimePeriod/gml:beginPosition
endPosition	gml:TimePositionType	1		2005-05-11T00:00:00	CDI	/gml:MD_Metadata/gml:identificationInfo/da:SDN_DataIdentification/gml:extent/gml:EX_Extent/gml:temporalElement/gml:EX_TemporalExtent/gml:extent/gml:TimePeriod/gml:endPosition
resultQuality	DQ_Element	0..*				
resultTime	TM_Instance	1				
gml:id	NCName	1		OFTS_RT_D278_TEMPPR01		OFTS_RT_ + {CruiseID} + + {ObservedProperty}
beginPosition	gml:TimePositionType	1		2005-05-11T00:00:00	CDI	/gml:MD_Metadata/gml:identificationInfo/da:SDN_DataIdentification/gml:extent/gml:EX_Extent/gml:temporalElement/gml:EX_TemporalExtent/gml:extent/gml:TimePeriod/gml:beginPosition
validTime	TM_Period	0..1				
metadata	MD_Metadata	0..1		http://seadatanet.maris2.nl/v_cdi_v3/print_xml.asp?n_code=2075842	ODV	//da_reference@xlink:href

```
<?xml version="1.0" encoding="UTF-8"?>
<omso:PointTimeSeriesObservation gml:id="OFTS_D278_TEMPPR01" xmlns:om="http://www.opengis.net/om/2.0"
xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:tsml="http://www.opengis.net/tsml/1.0"
xmlns:wml2="http://www.opengis.net/waterml/2.0"
xmlns:sams="http://www.opengis.net/samplingSpatial/2.0"
xmlns:omso="http://inspire.ec.europa.eu/schemas/omso/3.0"
xsi:schemaLocation="
  http://inspire.ec.europa.eu/schemas/omso/3.0
  http://inspire.ec.europa.eu/schemas/omso/3.0/SpecialisedObservations.xsd
  http://www.opengis.net/tsml/1.0
  http://schemas.opengis.net/tsml/1.0/timeseriesML.xsd">
  <gml:description>
    <!-- Description -->
    A single series of Currents -subsurface Eulerian data collected between 25 March 2004 00:00 and 11 May 2005 00:00.
  </gml:description>
  <gml:name>36113/1156</gml:name>
  <!-- Name -->
  <om:type xlink:href="http://inspire.ec.europa.eu/featureconcept/ProfileObservation"/>
  <om:metadata xlink:href="http://seadatanet.maris2.nl/v_cdi_v3/print_xml.asp?n_code=2075842"/>
  <!-- Type -->
  <om:phenomenonTime>
    <!-- Phenomenon Time -->
    <gml:TimePeriod gml:id="OFTS_PT_D278_TEMPPR01">
      <gml:beginPosition>2004-03-25T00:00:00</gml:beginPosition>
      <gml:endPosition>2005-05-11T00:00:00</gml:endPosition>
    </gml:TimePeriod>
  </om:phenomenonTime>
  </om:PointTimeSeriesObservation>
</omso:PointTimeSeriesObservation>
```

## Matching tables and GMLs

- Environmental Monitoring Facilities (EF):
  - EMF: Platform and EMA: Activity
  - EMF: Sampling Point
- EF/OF
  - Feature of Interest
  - Process
- Oceanographic Geographic Features (OF):
  - OF/Specialised Observations: Time Series
  - OF/Specialised Observations: Profile
  - OF/Specialised Observations: Trajectory

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Examples have been published at the INSPIRE Thematic Cluster for feedback and re-use

## Step four: Open issues?

- Document the work and report issues  
Feedback to SeaDataNet (SDN), eg:
  - Data (ODV) and metadata (CDI+CSR) needed in mapping
  - Insufficient Process information in SDN
  - Need to set up namespace strategy
  - Need for validation and feedback on the encoding
  - Need to take decisions on provision

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Review of data formats,  
also considering INSPIRE  
data models (O&M)

WP8 - Deliverable 8.6 - Part a



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SeaDataNet - The pan-European infrastructure for marine and ocean data management

## Five, six, seven...: Things to change?

- Feedback to INSPIRE
  - Request to provide change requests on behalf of SDN and the marine community
    - Request to support WGS84 as this is not a default CRS in INSPIRE
    - Errors and inconsistencies found in TrajectoryObservation
    - Lack of guidance for out-of-band encoding in the INSPIRE documents
  - Kathi Schleidt, Facilitator of the Environmental Monitoring and Observations Thematic Cluster
    - Issues related to the provision of Coverages and ProfileObservation (pressure= depth) has been brought forward

To be continued..



Plans to build a  
SeaDataCloud  
INSPIRE  
Transformation  
Service  
soon...