

### WP8 – WP9 Technical developments

By Dick M.A. Schaap – Technical Coordinator







### WP8 – standards: objectives

- Extending and finetuning the SeaDataNet standards for handling all types of marine and ocean data, in real-time and delayed mode, achieving interoperability and exchange with other relevant data management systems in Europe, and tuning with international standards
- Achieving INSPIRE compliance and contributing to the INSPIRE process for developing implementing rules for oceanography



• To define ISO 19139 Schema based XML formats for the SeaDataNet metadata formats for CDI and CSR, including INSPIRE compliance



 To upgrade all metadata directories to using the new version of the Common Vocabularies NVS2.0



#### **Deliverable: D8.1**

CDI profile extended with extra attributes to support linked data concept CDI and CSR XML encoding adapted to ISO-19139 and using NV2.0 Vocabularies

EDMED, EDMERP, and EDIOS XML migrated to using NVS2.0









 To define extended metadata formats to support operational oceanography and other specific applications, from fixed stations and research vessels to data centres to users





#### **Deliverable: D8.2 and D8.3**

## SensorML and Observation & Measurements (O&M) profiles for selected instruments and concept for integrating SOS services in SeaDataNet





#### **SWE Adoption**

#### Roadmap Research vessels & Fixed Stations





#### **Deliverable: D8.4**

Analysis report for handling the discovery of, and access to marine biological data:

- CDI is fit for purpose
- Extensions for Vocabularies needed
- Adaptations of the SeaDataNet ODV ASCII format



 to make SeaDataNet better fit for handling marine biological data sets and establishing interoperability with biology data infrastructure initiatives.



#### **Deliverable: D8.5**

Formulation of SeaDataNet NetCDF (CF) format next to the existing SeaDataNet ODV ASCII format

- Fit for profiles, trajectories and time series
- Following CF 1.6 specification
- Formulated together with an international community of NetCDF experts

#### **Deliverable: D8.6**

Upgrading of SeaDataNet Common Vocabularies to NVS2.0 and regular maintenance

- Migration to SKOS
- Provision for mappings to external resources
- Available by web services and amended User Interface
- Governance by international SeaVox board



#### **SeaDataNet Common Vocabularies**



PAN-EUROPEAN INFRASTRUCTURE FOR OCEAN & MARINE DATA MANAGEMENT

#### BODC webservices V2 (Libraries) CL12

| Library    | Thesaurus | Title  | A   |
|------------|-----------|--|-----|
| <u>C16</u> |           | SeaDataNet sea areas                                   | 5   |
| <u>C17</u> |           | ICES Platform Codes                                    | 1   |
| <u>C19</u> | View      | SeaVoX salt and fresh water body gazetteer             | 5   |
| <u>C32</u> |           | International Standards Organisation countries         | 1   |
| <u>C34</u> |           | Activity purpose categories                            | F   |
| <u>C35</u> |           | European Nature Information System Level 3<br>Habitats | E   |
| <u>C36</u> |           | Monitoring activity legislative drivers                | ٨   |
| <u>C37</u> |           | Ten-degree Marsden Squares                             | N   |
| <u>C38</u> |           | SeaDataNet Ports Gazetteer                             | S   |
| <u>C45</u> |           | Marine Strategy Framework Directive descriptors        | ٨   |
| <u>C46</u> |           | Marine Strategy Framework Directive criteria           | ٨   |
| <u>C47</u> |           | Marine Strategy Framework Directive indicators         | N   |
| <u>C64</u> |           | United Kingdom Charting Progress 2 sea regions         | ι   |
| <u>C77</u> |           | SeaDataNet Cruise Summary Report data<br>categories    | 5 0 |
| <u>C86</u> |           | SeaDataNet contact and security access roles           | S   |
| <u>C97</u> |           | NERC Vocabulary Server Version 1 mappings<br>index     | N   |
| <u>GS3</u> |           | Geo-Seas adjusted Folk sediment lithology<br>classes   | A   |
| GS4        |           | Geo-Seas geological sample colours                     | C   |
| GS5        |           | Geo-Seas sediment grain-size skewness descriptors      | d   |
| GS6        |           | Geo-Seas sediment grain-size kurtosos<br>descriptors   | C   |
| GS8        |           | Geo-Seas Seismic Methods                               | S   |
| GS9        |           | Geo-Seas Seismic Survey Dimensionality                 | S   |
| GSA        |           | Geo-Seas Seismic Data Product Types                    | S   |
| 000        |           | Can Dana Calamia Danaliyar Tuman                       |     |

| DS04 |                                    | Marine g   | eology      |                                   |  |  |  |  |
|------|------------------------------------|------------|-------------|-----------------------------------|--|--|--|--|
| DS03 |                                    | Physical   | oceanograph | y                                 |  |  |  |  |
| p03  | Conceptid Pref lat<br>D005 Acousti |            |             | И                                 |  |  |  |  |
| •    |                                    |            |             | s                                 |  |  |  |  |
| •    | D015 O                             |            | Optical p   | Optical properties                |  |  |  |  |
| •    | D020 Other p                       |            |             | ysical oceanographic measurements |  |  |  |  |
| •    | D025 Water c                       |            |             | lumn temperature and salinity     |  |  |  |  |
| 0    | D03                                | 0          | Currents    |                                   |  |  |  |  |
| 0    | D03                                | 2          | Sea leve    | -                                 |  |  |  |  |
|      | D03                                | 14         | Waves       |                                   |  |  |  |  |
|      | p0                                 | 02 Concept |             | Pref label                        |  |  |  |  |
|      |                                    |            | GWDR        | Wave dire                         | Wave direction   |  |  |  |
|      | •                                  |            | HEAV        | Wave hei                          | ght estimates  |  |  |  |
|      | •                                  |            | KRTS        | Other wave statistics             |  |  |  |  |
|      | •                                  |            | RBSC        | Radar ba                          | Radar backscatter  |  |  |  |
|      |                                    |            | WVSP        | Spectral wave data parameters     |  |  |  |  |
|      |                                    |            | p01         | Conceptid                         | Pref label   |  |  |  |
|      |                                    | 0          |             | GA2CFS01                          | 2nd order directional energy distribution Fourier cosine coefficient of waves {A2} on the<br>water body by computation from horizontal co-spectra translation after Kuik et al. (1988)                 |  |  |  |
|      |                                    |            |             | GA2CFSV1                          | 1st order directional energy distribution Fourier cosine coefficient of waves {A1} on the<br>water body by waverider and computation from horizontal co-spectra translation after Kui<br>et al. (1988) |  |  |  |
|      |                                    |            | 0           | GA2CFSV2                          | 2nd order directional energy distribution Fourier cosine coefficient of waves (A2) on the water body by waverider and computation from horizontal co-spectra translation after Kuik et al. (1988)      |  |  |  |



#### **Deliverable: D8.7**

#### Analysis and formulation of new access and viewing services

- Enhancing the interoperability of the CDI service with: OGC CS-W, WMS
  - WFS and OpenSearch



Relates to multiple CDI references

Shopping and delivery of data via SeaDataNet CDI portal



SDN in GEOSS portal via CS-W and Brokerage service - operational

SDN by means of OpenSearch dialogue from the GENESI-DEC portal - prototype



#### **Deliverable: D8.7 continued**

#### Analysis and formulation of new access and viewing services

New services directly on the buffers of harvested data sets





Oceanotron supporting interfaces To WMS, SOS, and OPENDAP



#### **Deliverable: D8.8**

#### Method for checking of potential duplicates defined

- Integrated into ODV software
- Tested with large SeaDataNet MyOcean T&S data set (ca 860.000 data sets)
- Now integrated into CDI import and validation process
- Improves the overall quality of the data sets managed within the SeaDataNet infrastructure of distributed data centres

#### **Deliverable: D8.9 - planned early 2014**

SeaDataNet standards submitted to the JCOMM/ IODE Ocean Data Standards (ODS) process

Vocabularies, CDI and CSR Schema's, SeaDataNet NetCDF format

SeaDataNet

PAN-EUROPEAN INFRASTRUCTURE FOR OCEAN & MARINE DATA MANAGEMENT

# WP9 – Development and governance of software tools, services and interoperability solutions

- To support improved and upgraded maintenance of the metadata directories
- To support robust access to a wider range of data types, including real-time from acquisition to data centre
- Interoperability solutions towards IODE Ocean Data Portal, GEOSS and others
- To upgrade the ODV analysis and visualisation software
- To upgrade the DIVA statistical analysis and interpolation software
- To upgrade the OceanBrowser visualisation services for data products



#### **Deliverable: D9.1**

Upgraded MIKADO XML editor software (V3.3)

- Adapted for use of Vocabularies NVS2.0
- Adapted for ISO 19139 XML profiles of CDI and CSR
- Reads both old and new XML files converting it into new XML files

Upgraded NEMO software for conversion of ASCII files (V1.5.2)

 Output to SeaDataNet NetCDF included Adapted for use of Vocabularies NVS2.0



Upgraded Download Manager software for connecting data centres (V1.4.3) - Several improvements and DM\_Checker for checking coherence between CDIs, local coupling table and local data sets / queries



#### **Deliverable: D9.2 – prototype test ongoing**

Central CDI and CSR services upgraded and equipped with CS-W for harvesting of new and updated XML entries from local data centres to central directories

 Test ongoing before wider deployment



#### **Deliverable: D9.5 – outstanding**

Central CDI and CSR services will be equipped with CS-W for wide interoperability, once the harvesting prototype has been finalised (planning end January 2014)



#### **Deliverable: D9.6**

Interoperability solutions with global portals, such as IOC-IODE Ocean Data Portal (ODP) and GEOSS established

| CCEAN DATA PORTAL |                           |            |   |                        |                      |      |             |          |  |
|-------------------|---------------------------|------------|---|------------------------|----------------------|------|-------------|----------|--|
| OMI<br>/IET       | E COMMUNITY DATA - SERVIC | ES 🔻 DI    | ISCLAIMER   |                        | _                    |      |             |          |  |
|                   | Simple search Show        |            | 20  | First Previous 1 2 3 4 |                      |      | 5 Next Last |          |  |
|                   | 3 Any word:               |            | Title:  | Dataset                | Modification<br>date |      |             |          |  |
|                   | ♂ Dataset:<br>SeaDataNet  | (i)        | Cross-discipline from OGS (Istituto Nazionale di<br>Oceanografia e di Geofisica Sperimentale),<br>Department of Oceanography              | SeaDataNet             | 2010-01-14           |      | zmi         | Æ        |  |
|                   | Geography:                | <b>(</b>   | Administration and dimensions from Royal<br>Netherlands Meteorological Institute  | SeaDataNet             | 2008-09-25           |      | ****<br>×mi |          |  |
|                   | 💊 Show/Hide               | (i)        | Chemical oceanography from Elbe River Water<br>Authority  | SeaDataNet             | 2010-05-26           |      | smi         | -        |  |
|                   | Search                    | <u>()</u>  | Administration and dimensions from Dokuz Eylul<br>University, Institute of Marine Science and<br>Technology                               | SeaDataNet             | 2011-09-29           |      | xmi         | <b>F</b> |  |
|                   | × Reset                   | <b>(i)</b> | Chemical oceanography from Elbe River Water<br>Authority  | SeaDataNet             | 2011-10-07           | **** | xmi         | R        |  |
|                   | Advanced search           | <b>(</b>   | Fisheries and aquaculture from IVL Swedish<br>Environmental Research Institute  | SeaDataNet             | 2010-09-08           |      | ****<br>×mi |          |  |
|                   |                           | <u>()</u>  | Administration and dimensions from OGS<br>(Istituto Nazionale di Oceanografia e di Geofisica<br>Sperimentale), Department of Oceanography | SeaDataNet             | 2010-01-14           | ***  | xmi         | <b></b>  |  |



#### Deliverables: D9.7, D9.8 and D9.13

#### Updated versions of the Ocean Data View (ODV) software

- V4.5.0: support for "non-numeric" variables, remote netCDF access and a number of other major improvements and bug fixes
- ODV Application Programming Interface (API) plug-in, giving users full access to the data in an ODV data collection and allowing development of procedures for all kinds of data processing
- ODV API as C++ library and in Java language
- V4.5.3: significant improvements of the SDN file aggregator, duplicates checker, data quality checking facilities as well as message loggers.







#### Deliverables: D9.9, D9.10, D9.11, D9.12 and D9.16

Updated versions of the Data Interpolating Variational Analysis (DIVA) software

- V4.5.1: optimisations and new features including physical constraints with decay rates and source terms support for "non-numeric" variables, s
- DIVAnd: performs an n-dimensional variational analysis of arbitrarily located observations to assess the improvements expected from a truly 3D or 4D analysis
- DIVA-on-Web: online version
- OceanBrowser upgrade: listing of used observation (CDI links) in the data products.
- V4.6.3: parallel and iterative solvers and new features including efficient error field calculations



#### **DIVA OceanBrowser**





## **Conclusions**

- WP8 and WP9 are well on track !
- Many very interesting developments
- All new formats and software products are fully documented and available from the public SeaDataNet portal
- Many components already integrated into the operational infrastructure as part of the 1st Innovation Cycle
- Other components will be finetuned and implemented as part of the 2nd Innovation Cycle such as SWE, new access and viewing services, and handling of biological data