

TOWARDS A MARINE SDI: A METHODOLOGY TO ALLOW META-DATA INTEROPERABILITY

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Abstract: The INSPIRE Directive (2007/2/EC) is leading the way towards development and creation of a Marine Spatial Data Infrastructure (SDI) of the Institute of Marine Science (ICM-CSIC) and the Marine Technology Unit (UTM-CSIC). As a first step, a Catalog Web Service (CWS) was developed to access geospatial information of the projects, vessels and observatories, under the guidelines of standardization established by the Open Geospatial Consortium (OGC) and International Organization for Standardization (ISO). MIKADO was chosen to edit metadata and GeoNetwork to search, publish and distribute geospatial data across multiple catalogs. A specific Java app (called Forest) was developed to create metadata based on MIKADO XML files. Furthermore, an XML style sheet was developed to import metadata created by MIKADO into GeoNetwork complying with ISO 19139.

Keywords: INSPIRE, GeoNetwork, MIKADO, SDI, XSL.

I. INTRODUCTION

Until recently, oceanographic and geospatial communities have shaped reality differently. The former understands nature as equations with parameters and the latter as different geometries: polygons, points... that can be manipulated from a database. Today, SDI makes possible the convergence of acceptable standards to both communities that will enable the interoperability of applications for data management [1].

Recently, emergence of Google Maps and Google Earth has caused a geosciences revolution. These technologies have proven that all the geo-referenced information can be on the web. The INSPIRE European Directive and the Open Geospatial Consortium (OGC) have promoted the assumption of specifications and standards to go in that way.

This idea has been developed much more for the land context and nowadays, thousands of maps are served through Internet, with different land information layers. Marine SDI has been more difficult to develop because of its special characteristics of dimensionality (ex: 4D) or the need to view models (ex: evolution of 3D volumes over time).

Working with a metadata's standards is critical to ensure the interoperability over the data and to make possible data discovery, representation and retrieval. This project aims to improve the integration of existing technologies for metadata creation and exploitation.

Technical Committee 211 (ISO/TC211) [2] [3], within the International Organization for Standardization (ISO), determines the standards of ISO19100 family in relation with geo-referenced objects or phenomenon. In particular, it is responsible for establishing ISO19115 for geographic information metadata and ISO19139 for its relationship with application in XML schemas.

The development of a CWS was one of the first steps towards the Marine SDI done. It will allow to create a CWS, to search and browse metadata associated with information from the projects, vessels and observatories.

II. METHODOLOGY

A part of the project was to take into account the metadata generated during oceanographic cruises of BIO Hespérides and B/O Sarmiento de Gamboa, two

Singular Scientific and Technological Infrastructure managed by UTM-CSIC.

According to the needs, MIKADO [4] was chosen to create the metadata. IFREMER has developed this tool to generate metadata within SeaDataNet (2006-2010) of the EU Sixth Framework Programme. GeoNetwork [5] was chosen as a catalog application. This is a free and open source application that could manage geo-referenced resources complying open standards for services and protocols as a part of the Open Source Geospatial Foundation (OSGeo-OGC).

Using MIKADO it is possible to edit metadata in a simple way through a graphical interface with tabs and fields. In order to improve MIKADO features a Java application has been developed -Forest-, allowing quick metadata generation during an oceanographic cruise. The program uses templates which comes from MIKADO with common fields and edit the final metadata modifying only the variables (ID, date and coordinates).

MIKADO generates metadata in XML format, using its own metadata from SeaDataNet and others from ISO19115. However, the goal is to get a metadata complying ISO19100 family standards, specifically ISO19139 which could be imported to GeoNetwork. Integration between both tools is achieved using XSL technology. It is starting with 19115to19139 GeoNetwork style sheet which is modified to adapt it to the XML files from MIKADO.

III. CONCLUSION

A CWS has been developed and linked to the metadata creation during an oceanographic cruise. CWS allows to search, view and access to the cruise information. Thus, a pillar is established to the development of Marine SDI which will enable the oceanographic community in the geoscientific world on a level with others research branches.

REFERENCES

- [1] Hankin, S. & Co-Authors (2010). "Data Management For the Ocean Sciences - Perspectives for The Next Decade" in *Proceedings of OceanObs'09: Sustained Ocean Observations and Information for Society (Vol. 1)*, Venice, Italy, 21-25 September 2009, Hall, J., Harrison, D.E. & Stammer, D., Eds., ESA Publication WPP-306, doi:10.5270/OceanObs09.pp.21
- [2] García García, F.J y Rodríguez Pascual, A.F. (2008). "Normalización en Información geográfica". *Cursos de Sistemas de Información Geográfica por internet. GeoCampus. Mapping Interactivo. Revista Internacional de Ciencias de la Tierra. ISSN: 1.131-9.100*. http://www.mappinginteractivo.com/plantilla-ante.asp?id_articulo=1451
- [3] International Organization for Standardization accessed on 23 May 2011 at <http://www.iso.org/>
- [4] MIKADO User manual v.2.1 accessed on 20 May 2011 at http://www.seadatanet.org/content/download/8299/56192/version/1/file/sdn_Mikado_UserManual_V2.1.pdf
- [5] GeoNetwork Open source accessed on 20 May 2011 at <http://geonetwork-open-source.org/>