APPLICATION OF METADATA STANDARD FOR DATA MANAGEMENT IN MARINE GEOLOGICAL FIELD

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ABSTRACT

Specific standards are needed to collect and distribute marine data (data and metadata) investigated and generated by various institutions and researchers.

Commonly used ISO 191115/19139 is an international standard for geographic metadata and is used to distribute standardized data and metadata to users. However, ISO 191115/19139 does not provide information relating to the equipment and platforms used when acquired. In addition, there is no element of metadata that can detail information about each data file that makes up the dataset.

To compensate for these shortcomings, organizations are expanding ISO 19115 to develop new metadata standards or to distribute them to communities.

In this study, we have reviewed metadata standards in the field of marine geography commonly used abroad. Subsequently, the metadata standards and code lists were defined to represent the metadata stored in the seismic binary file that constitutes the equipment and platform information and data sets.

INTRODUCTION

The JOISS (Jurisdictional Ocean Information Sharing System) is a marine observational data retrieval system including GIS information that collects and distributes data investigated and produced by various institutions and researchers. In order to have the function of a data center that combines large capacity and various data to provide users, not just data storage, a distribution format applied with international standards is needed.

Therefore, we are conducting a standardization study on the distribution of marine geographic metadata by referring to international standards and marine data centers at home and abroad. Currently, JOISS applies the Marine Community Profile (MCP), which has been extended from ISO 19115/19139, and standardization of terms (sea area, observation items, equipment, platforms, units, etc.)

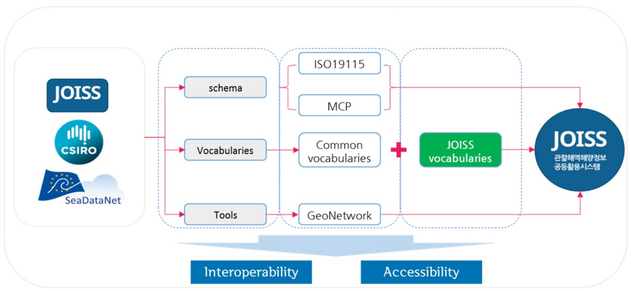

Figure 1. The study on the standardization of metadata in JOISS

However, ISO 191115/19139 does not provide acquisition information related to 'equipment and platform'. In addition, there are no metadata elements that represent the characteristics of each discipline (physical, chemical, biological, geological, etc.) as well as the individual data files included in the data set.

In this study, we have reviewed metadata standards in the field of marine geology commonly used in foreign countries, and have defined standards of matadata and vocabularies.

METHOD

Standards such as ECS Metadata (Extended Continental Shelf Metadata), ISO 19115-2, and Federal Geographic Data Committee-Content Standard for Digital Geospatial Metadata (FGDC-CSDGM) used in the marine geological field are reviewed.

Table 1. Metadata of marine geological feild reviewed to derive metadata standards

	ECS Metadata	ISO 19115-2	FGDC-CSDGM
Author /Institution	NGDC (National Geophysical Data Center)	ISO (International organization for Standardization)	FGDC (Federal Geographic Data Committee)
Purpose	Used to manage production and collection data in the ECS Project	ISO 19115 extended for image and grid data representation	Describe maps, GIS files, images, and other location-based data resources (FGDC-STD-001-1998)
Advantages	Information on data collection methods, specific collection contents, equipment, ships, earthquake peaks, etc. can be expressed. You can express detailed information about SEG-Y files and lines.	Provides information about the characteristics of the measurement equipment used to collect data, the structure of the measurement process used by the equipment, and the production process used to digitize raw data.	Information related to data collection is described in detail along with the equipment (description). But September 2010 FGDC approved ISO 19115 and encouraged federal agencies to switch to ISO metadata

RESULT & DISSCUSION

Metadata for marine geological field applied to JOISS

The types of marine geological data provided by JOISS were classified as Seismic, MBES and sediments.

For **datasetInformation** and **metadataInformation**, the same applies regardless of data type. However for **acquisitionInformation** and **objectInformation**, the components to be created are different because the acquisition equipment and data files vary depending on the types of marine geological data.

In particular, seismic data should contain equipment and platform information as well as individual level information of **acquisitionInformation**. Therefore, elements describing the SEG-Y file have been added and details for each line have been put into the **objectInformation**. Additionally, the vocabulary used for metadata was standardized and structured.

DATASETINFORMATION		
datasetID	free text	FPJ0000001
datasetTitle	free text	EEZ2015_20150501_Seismic_Sparker
datasetStartDate	citationDateType	
date	date	2019-10-17
dateTypeCode	dateTypeCode Vocabulary	creation
datasetDescription	free text	Seismic data performed in the EEZ
dataClass	dataClass Vocabulary	*processed*
dataType	dataType Vocabulary	*Seismic:SourceSparker*
processingParameters	processingParameters	
boundingCoordinates	boundingCoordinates	
northLat	decimal degrees (-90.00 to 90.00)	*37*
southLat	decimal degrees (-90.00 to 90.00)	*36*
eastLong	decimal degrees (-180.0 to 180.00)	*125*
westLong	decimal degrees (-180.0 to 180.00)	*123*
geographicFeatures	geographicFeatures	
featureName	geographicExtentName Vocabulary	*Yellow Sea*
temporalExtent	temporalExtent	
startDate	date	2014-05-01
endDate	date	2014-05-15
timeZone_GMT	integer	GMT+9
resourceProvider	resourceProviderInfromation	
resourceProviderContact	contactInformation	
organization	organizationName Vocabulary	*KIOST*
ACQUISITIONINFORMATION		
acquisitionParameters	acquisitionParameters	
receiverType	deviceType Vocabulary	*AirGun*
sourceType	deviceType Vocabulary	*SCS*
acquisitionSystemName	free text	
acquisitionSystemType	acquisitionSystemType Vocabulary	*Digital*
seismicNavSystem	free text	
surveyDatum	surveyDatum Vocabulary	*WGS84*
cableReceiverDepthRecorded	yesNo Vocabulary	*no*
numberSourceArrays	integer	
flipFlopShooting	yesNo Vocabulary	*no*
sourceVolumeUnits	sourceVolumeUnits Vocabulary	*cubicCentimeters*
shotControl	shotControl Vocabulary	*time*
compassBirds	yesNo Vocabulary	*no*
tailBuoyPositioning	yesNo Vocabulary	*no*
recordingDelay	yesNo Vocabulary	*yes*
sourcePowerSetting	free text	
cruiseInformation	projectSponsor	
organization	organizationName Vocabulary	*KIOST*
platformInformation	platformInformation	
platform	PlatformName Vocabulary	*leodo*
platformOrganization	organizationName Vocabulary	*KIOST*
OBJECTINFORMATION		
seismicLine	seismicLine	
seismicLine/@ID	free text	Seismic_Sparker1.zip
startLat	decimal degrees (-90.00 to 90.00)	129.2369
stopLat	decimal degrees (-90.00 to 90.00)	129.753
startLong	decimal degrees (-180.0 to 180.00)	36.1111
stopLong	decimal degrees (-180.0 to 180.00)	36.489
startDateTime	Date and Time	2015-05-06T23:27:14
endDateTime	Date and Time	2015-05-07T02:00:35
seismicDataObject	seismicDataObject	
seismicDataObject/@ID	free text	*Seismic_Sparker1.seg*
dataMedia	dataMedia Vocabulary	*Online*
dataFileFormat	dataFileFormat Vocabulary	*SEGY*
embeddedNavigation	yesNo Vocabulary	*yes*
seismicNavFile	seismicNavFile	
seismicNavFile/@ID	free text	
surveyDatum	surveyDatum Vocabulary	*WGS84*
offsetsApplied	offsetsApplied Vocabulary	*no*
dataFileFormat	dataFileFormat Vocabulary	*SEGY*
processedDataClass	processedDataClass Vocabulary	*CMPSorted*
dataObjectProcessing	processingParameters	
processingScope	processingScope Vocabulary	*dataObject*
processContact	contactInformation	
organization	organizationName Vocabulary	*KIOST*
name	free text or Person Name Lists	Gildong Hong
email	free text	joiss@joiss.co.kr
role	Role Vocabulary	*processor*
objectAccessControl	accessControl	
accessState	accessState Vocabulary	*open*
Search Keyword	free text	fault
METADATAINFORMATION		
metadataDate	date (YYYY-MM-DD)	2019-06-04
metadataContact	contactInformation	
organization	organizationName Vocabulary	*한국해양과학기술원*
name	free text or Person Name Lists	Younghee Kim
email	free text	yhkim@kiost.ac.kr
role	Role Vocabulary	*publisher*
metadataStandard	free text	Seismic Metadata verson1.0
dateOfSubmission	date (YYYY-MM-DD)	2019-12-11

Includes general contents of data set :
- name of the data set
- creation date
- description of data set,
- range of geographic/temporal,
- provider of the data set etc.

Includes acquisition information of the dataset:
- equipment information
- platform information
- cruise information included etc.

Includes the contents for each file constituting the data set:
- range of geographic/temporal corresponding to the file
- name of file
- file format
- method of data processing
- words that characterizes the file etc.

Includes general information about metadata:
- contact information of the metadata producer
- metadata version
- metadata production date