



IMDIS 2013

Vocabulary enhancements for the Australian Ocean Data Network (AODN)

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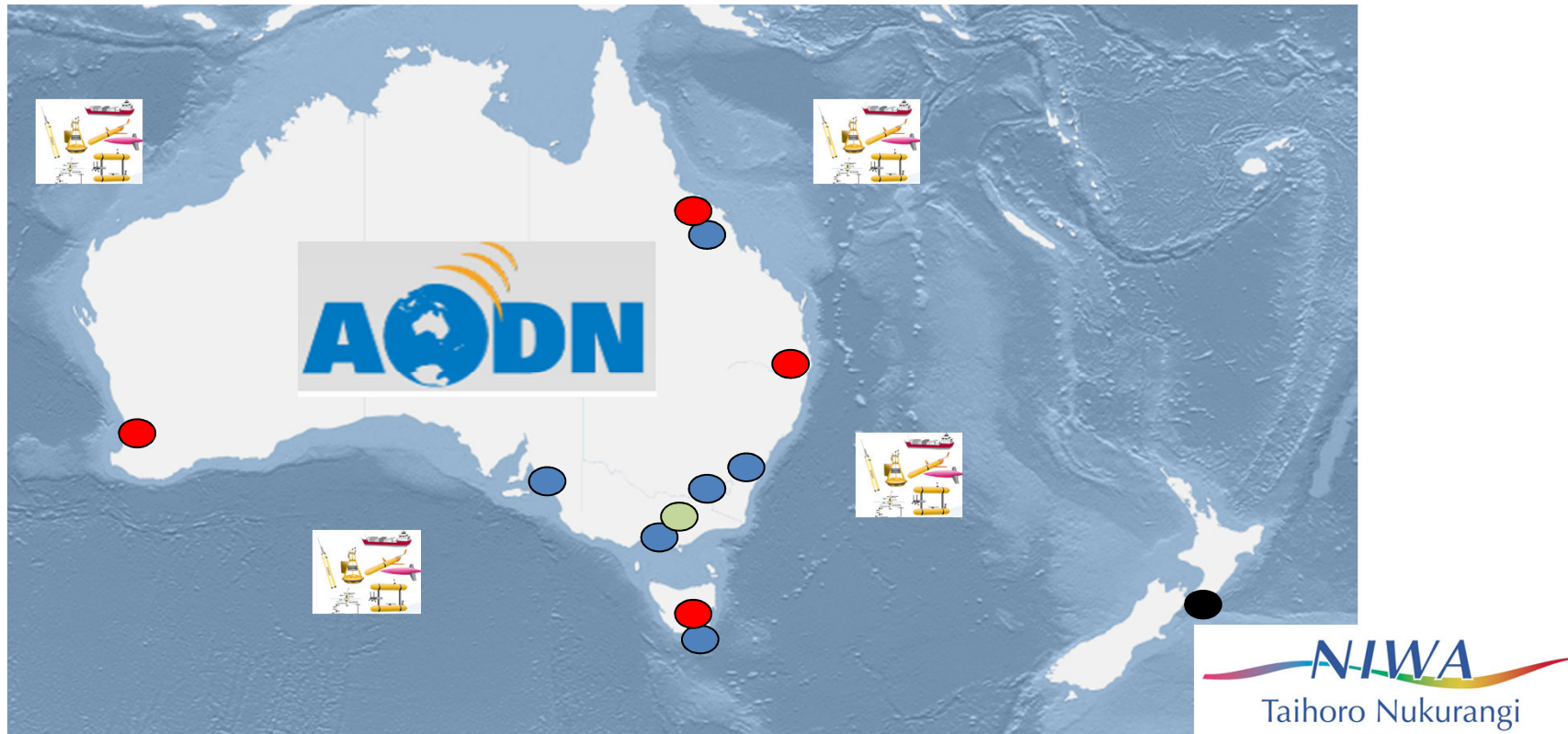
Dr Kim Finney, Australian Antarctic Division and IMOS

Dr Roger Proctor, IMOS eMII

Outline of the presentation

- What is AODN?
- Data discovery using the AODN data Portal
- Introduction of controlled vocabularies (e.g for parameters) in the AODN infrastructure to improve data discovery
 - Background analysis
 - Implementation
 - Perspectives

Australian Ocean Data Network (AODN)



- Commonwealth Agencies (AAD, AIMS, BOM, CSIRO, GA, RAN)
 - Integrated Marine Observing System (IMOS)
 - Universities (IMAS, UWA, UQ, JCU...)
 - State Government Agencies (EPA Victoria ...)
- + New-Zealand



<http://portal.aodn.org.au/webportal>

The screenshot displays the Australian Ocean Data Network Portal (AODN) website. At the top left is the AODN logo, followed by the text "Australian Ocean Data Network Portal". To the right of this are navigation buttons for "Home", "Map", and "Search". The "Map" button is circled in red. Further right, there are links for "Log in or Register", "eMII", "AODN", and "Help". The main content area is a map of Australia and the surrounding oceans, overlaid with a complex network of colored lines (blue, green, orange, yellow) representing data collection tracks. A vertical toolbar on the left side of the map includes various icons for map interaction. At the bottom left of the map, there is a scale bar showing "500 km" and "500 mi", and a coordinate display showing "158.62061, -43.41797".

Data Discovery in AODN: Search View

Welcome Sebastien Mancini | Log out - Administration | eMII | IMOS | Help

Integrated Marine Observing System

Home | Map | **Search**

Map Layer Chooser

Map Layers | Add WMS Servers

- Animal Tagging and Monitoring (AATAMS)
- Argo Floats
 - Argo Floats
 - Argo Floats Measuring Oxygen
 - Argo Aggregated data
 - Argo Floats by ABOS
- Autonomous Underwater Vehicle (AUV)
- Deep Water Moorings (ABOS)
- National Moorings Network (ANMN)
- Ocean Gliders (ANFOG)
- Ocean Radar (ACORN)
- Satellite Remote Sensing (SRS)
- Ships of Opportunity (SOOP)
 - Bio Acoustic
 - Fluorometry
 - Temperate Merchant Vessel (Spirit of Tasmania)
 - Tropical Research Vessels (AIMS)
 - Underway CO2 - All Cruises
- Air-Sea Fluxes
- Continuous Plankton recorder (CPR)
- Sea Surface Temperature
- XBT
- Wireless Sensor Networks (FAIMMS)
- Climatology
- Model Outputs
- Open Street Map

Logo	Description	Actions
	IMOS - SOOP Ocean Carbon Dioxide Data from RV Aurora Australis voyage AA1112V3 (Hobart-Fremantle) This data was collected in January/February 2012 by the IMOS Ship of Opportunity Underway CO2 Measurement research group on RV Aurora Australis (IMOS platform code: VNAA) voyage AA1112V3. Departed: Hobart, Tasmania, January 05, 2012 Arrived: Fremantle, Western Australia, February 12, 2012 CO2 System Overview: The fugacity of carbon dioxide (f ...	
	IMOS - SOOP Ocean Carbon Dioxide Data from RV Aurora Australis voyage AA1112V4 (Fremantle-Hobart) This data was collected in February/March 2012 by the IMOS Ship of Opportunity Underway CO2 Measurement research group on RV Aurora Australis (IMOS platform code: VNAA) voyage AA1112V4. Departed: Fremantle, Western Australia, February 15, 2012 Arrived: Hobart, Tasmania, March 15, 2012 CO2 System Overview: The fugacity of carbon dioxide (fCO2) ...	
	IMOS - SOOP Ocean Carbon Dioxide Data from RV Aurora Australis voyage AA1112V6 (Hobart-Hobart) This data was collected in April/May 2012 by the IMOS Ship of Opportunity Underway CO2 Measurement research group on RV Aurora Australis (IMOS platform code: VNAA) voyage AA1112V6. Departed: Hobart, Tasmania, April 16, 2012 Arrived: Hobart, Tasmania, May 01, 2012 CO2 System Overview: The fugacity of carbon dioxide (fCO2) in surface seawater wa ...	
	IMOS - SOOP Ocean Carbon Dioxide Data from RV Aurora Australis voyage AA1112V1 (Hobart-Hobart) This data was collected in July/August 2011 by the IMOS Ship of Opportunity Underway CO2 Measurement research group on RV Aurora Australis (IMOS platform code: VNAA) voyage AA1112V1. Departed: Hobart, Tasmania, July 19, 2011 Arrived: Hobart, Tasmania, August 05, 2011 CO2 System Overview: The fugacity of carbon dioxide (fCO2) in surface seawat ...	
	IMOS - SOOP Ocean Carbon Dioxide Data from RV Aurora Australis voyage AA1112V5 (Hobart-Hobart) This data was collected in March/April 2012 by the IMOS Ship of Opportunity Underway CO2 Measurement research group on RV Aurora Australis (IMOS platform code: VNAA) voyage AA1112V5. Departed: Hobart, Tasmania, March 17, 2012 Arrived: Hobart, Tasmania, April 14, 2012 CO2 System Overview: The fugacity of carbon dioxide (fCO2) in surface seawat ...	
	IMOS - SOOP Ocean Carbon Dioxide Data from RV Aurora Australis voyage AA2011VMS (Hobart-Hobart) This data was collected in January/February 2011 by the IMOS Ship of Opportunity Underway CO2 Measurement research group on RV Aurora Australis (IMOS platform code: VNAA) voyage AA1011_VMS. Departed: Hobart, Tasmania, January 04, 2011 Arrived: Hobart, Tasmania, February 07, 2011 CO2 System Overview: The fugacity of carbon dioxide (fCO2) ...	
	IMOS - SOOP Underway CO2 Measurements Research Group The IMOS Ship of Opportunity Underway CO2 Measurements group is a research and data collection project working within the IMOS Ship of Opportunity Multi-Disciplinary Underway Network sub-facility. The CO2 group sample critical regions of the Southern Ocean and the Australian shelf waters have a major impact on CO2 uptake by the ocean. These are reg ...	
	IMOS - SOOP Ocean Carbon Dioxide Data from RV Southern Surveyor voyage ST012008 This data was collected in April 2008 by the IMOS Ship of Opportunity Underway CO2 Measurement research group on RV Southern Surveyor (IMOS platform code: VLHJ) voyage ST012008. Departed: Hobart, Tasmania, April 10, 2008 Arrived: Sydney, New South Wales, April 14, 2008 CO2 System Overview: The fugacity of carbon dioxide (fCO2) in surface seawat ...	

Page 1 of 5 | Add all

My Search: CO2

Limit search to: [dropdown]

New [dropdown] Search

View metadata record

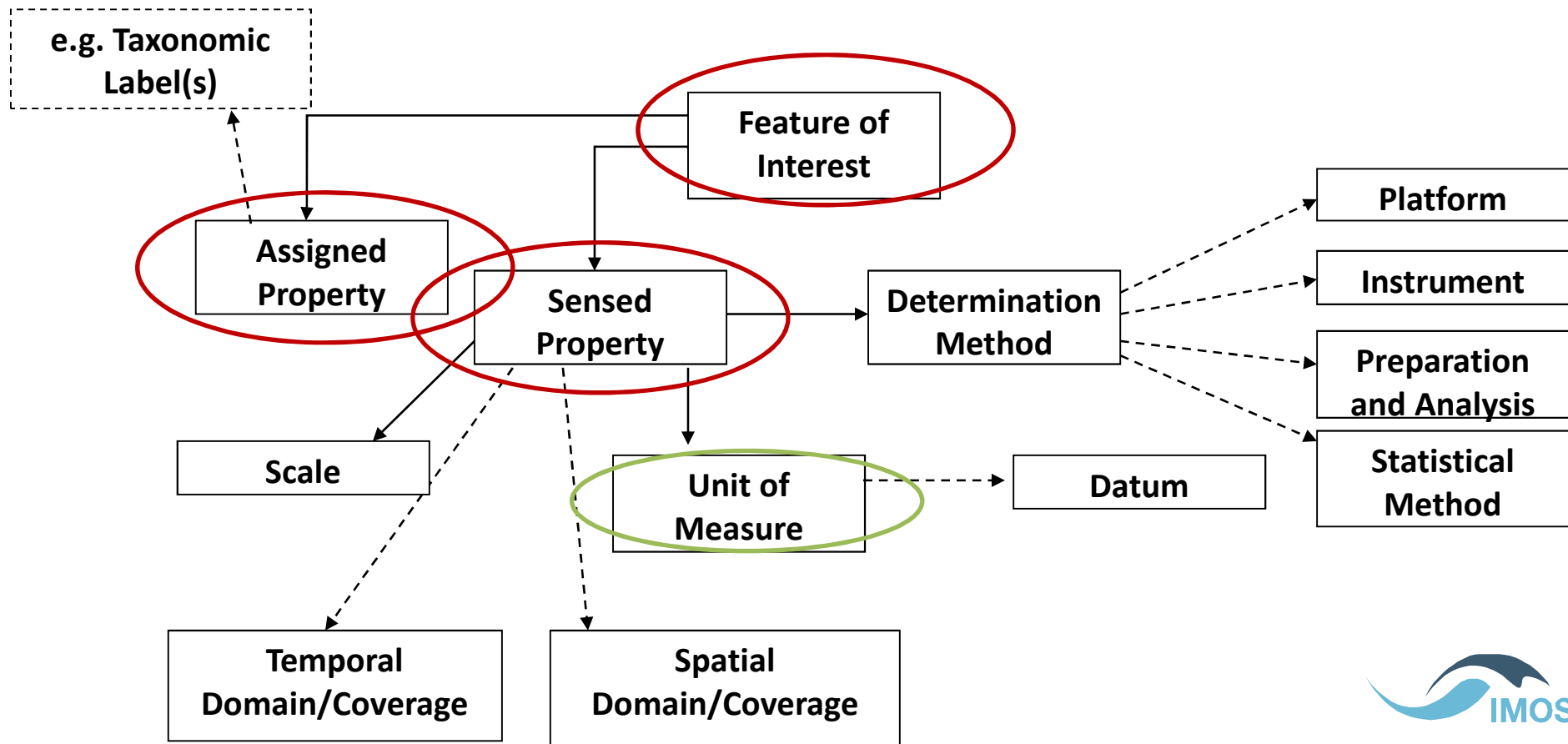
Links to data (e.g THREDDS ...)

Add data to download cart

Add related layer to map

Background analysis

- Examination of how the concept of a 'parameter' have been used in AODN metadata records
- Define basic semantic elements of an observation/measurement



Background analysis

- Examination of how the concept of a 'parameter' have been used in AODN metadata records
- Define basic semantic elements of an observation/measurement
- Investigate existing controlled vocabularies : BODC , CF, GCMD, US IOOS...
and Determine suitability of existing vocabulary with the terms used in AODN

The BODC vocabulary offers the best semantic model

But

We think too much information is being attributed to the 'parameter' name

A more modular approach is preferred

Implementation of controlled vocabularies in the AODN infrastructure

- Design database to store information
- Populate relevant vocabulary in database
- Update/Edit Marine Community Profile (MCP)

The image displays a software interface with two main panels. The left panel, titled 'Data Parameters', shows a tree view with a sub-section 'Data Parameter' containing fields: Parameter Name, Parameter unit of measurement, Min.Value in dataset, Max.Value in dataset, Parameter Description, Determination Instrument, Analysis Method, and Platform. The right panel, titled 'Taxonomic Coverage', shows a tree view with a sub-section 'mcp:TC_Taxon' containing 'Taxonomic Information' and 'Darwin Core Taxonomic Information'. The latter includes fields: Taxonomic ID, Scientific Name, Common Name, Kingdom, Phylum, Class, Order, Family, Genus, Specific Epithet, and Authorship. Red rectangular boxes are overlaid on the right side of the interface, corresponding to the input fields for Taxonomic ID, Scientific Name, Kingdom, Phylum, Class, Order, Family, Genus, Specific Epithet, and Authorship.

Implementation of controlled vocabularies in the AODN infrastructure

- Design database to store information
- Populate relevant vocabulary in database
- Update/Edit Marine Community Profile (MCP)
- Provide tool in Geonetwork for mark-up purposes

The image displays a software interface for managing data parameters. On the left, a form titled 'Data Parameter' includes fields for:

- Parameter Name *
- Parameter unit of measurement *
- Min.Value in dataset +
- Max.Value in dataset +
- Parameter Description +
- Determination Instrument
- Analysis Method
- Platform

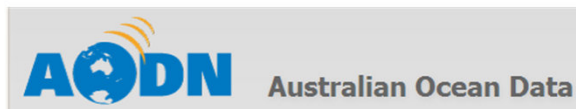
On the right, four 'Term selection' windows are shown, each with a search bar and a list of terms. Red text labels are overlaid on these windows:

- Unit**: Points to the list of units in the top-left window (e.g., Bytes, Decibars, Degrees Celsius).
- Parameter**: Points to the list of parameters in the top-right window (e.g., Skin temperature of the water body, Sound velocity of the water body).
- Instrument**: Points to the list of instruments in the bottom-left window (e.g., hydrophones, metal analysers, meteorological packages).
- Platform**: Points to the list of platforms in the bottom-right window (e.g., land/onshore structure, lowered unmanned submersible, moored surface buoy).

Implementation of controlled

vocabularies in the

- Design database to store
- Populate relevant vocabularies
- Update/Edit Marine C
- Provide tool for Geone
- Develop code to enable



Map Layers | Faceted Search | Add WMS Servers

Faceted Search

This feature is currently under development, but available for use. We are currently working to improve the metadata for all layers and this will improve the results from this search. We welcome feedback about this feature via info@aodn.org.au.

Find layers by:

- Measured parameter
- Theme
- Collection method
- Location
- Organisation

Map Layers | **Faceted Search** | Add WMS Servers

Measured parameter (111)

- Fluorescence (111)
- Turbidity (103)
- depth (1)
- device_wmo_ref (1)
- latitude (1)
- longitude (1)
- sea_water_pressure (2)
- sea_water_salinity (113)
- sea_water_temperature (113)

Theme

Collection method

- Acoustic Equipment/Echo Sounders (3)
- Bathythermographs (4)
- Buoys (8)
- Current Meters/Profilers (7)
- Data Loggers (3)
- Fluorometers (9)
- Profiling Float (4)
- Tags and Tracking Devices (3)
- Thermistors (3)
- Thermosalinographs (112)

(more..)

structure

es

AODN portal

Log in or Register | eMII | AODN | Help

Auto zoom to layer
 Hide layer details
 Remove All Layers | Reset Map
 Choose a Base Layer

Active Layers
No layers added to map

Background Analysis	Implementation
Done	In progress
Examination of how 'parameter concepts have been recorded in AODN	Design database to store information
Define Basic semantic elements of an observation/measurement	Populate relevant vocabulary in database
Investigate existing controlled vocabularies	Update Marine Community Profile (MCP)
Determine suitability of existing vocabularies	Provide tool for mark-up purposes in Geonetwork
	Develop code to enable faceted search via the AODN portal

Background Analysis	Implementation	Perspectives
Done	In progress	Next
Examination of how 'parameter concepts have been recorded in AODN	Design database to store information	Tool to support the addition, moderation and governance of vocabulary source
Define Basic semantic elements of an observation/measurement	Populate relevant vocabulary in database	Provide online access to agreed vocabulary list
Investigate existing controlled vocabularies	Update Marine Community Profile (MCP)	Feedbacks to existing vocabularies (e.g BODC)
Determine suitability of existing vocabularies	Provide tool for mark-up purposes in Geonetwork	Development of community schema for Web Feature Service
	Develop code to enable faceted search via the AODN portal	



Australian Government

Department of Industry, Innovation, Science, Research and Tertiary Education

www.imos.org.au

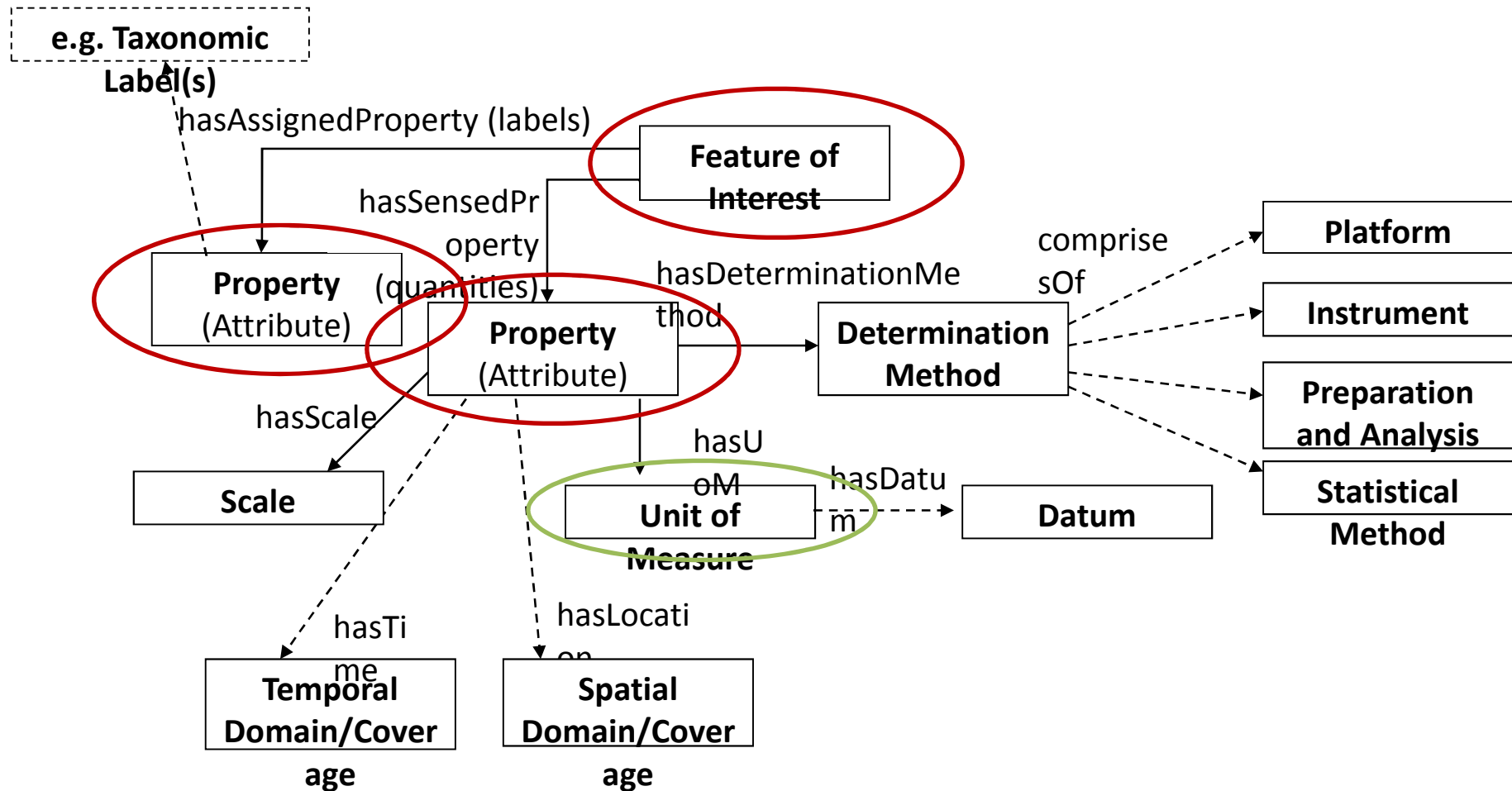
IMOS is supported by the Australian Government through the National Collaborative Research Infrastructure Strategy and the Super Science Initiative. It is led by the University of Tasmania on behalf of the Australian marine and climate science community.



Integrated Marine Observing System
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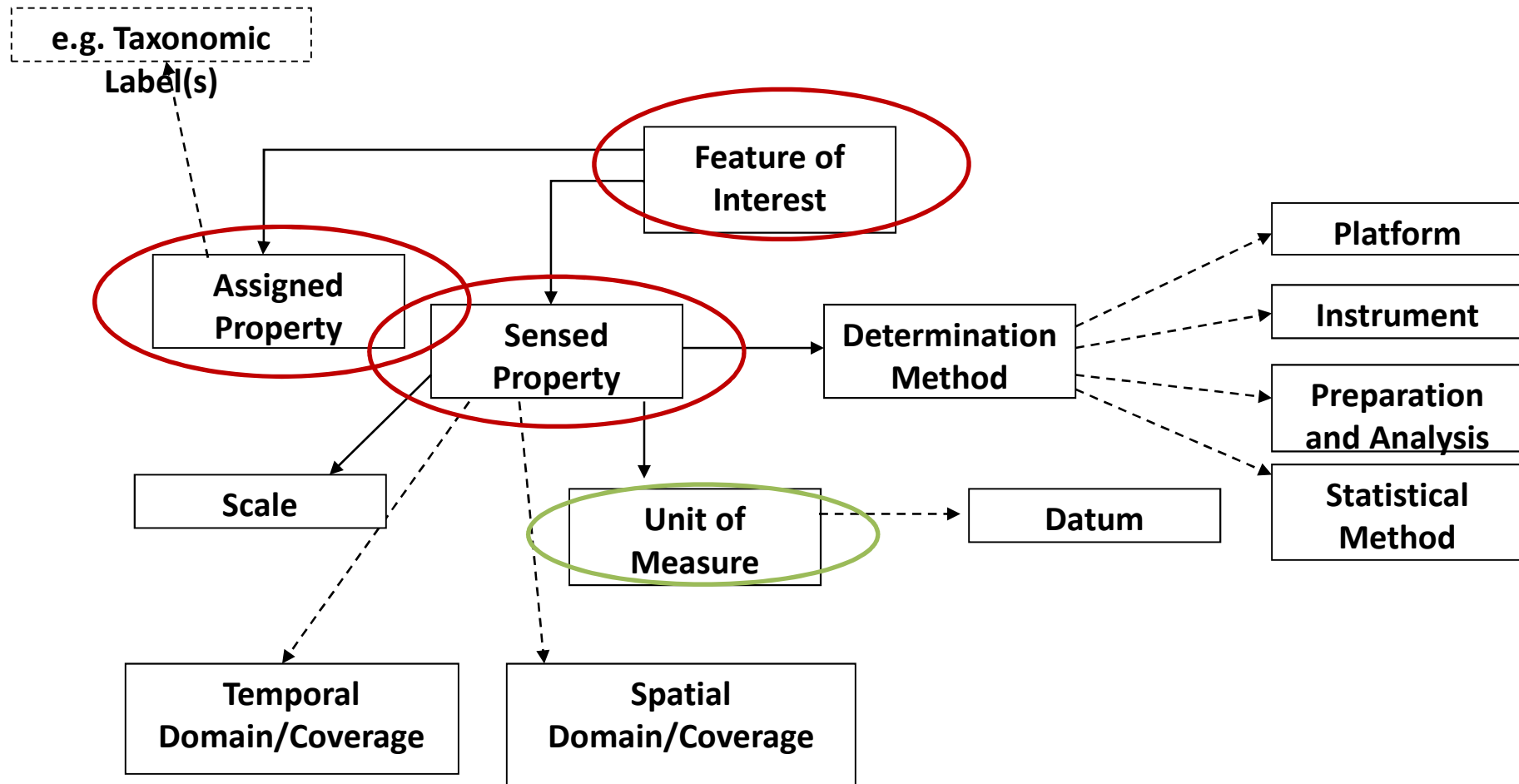
Simplified basic semantic elements of an observation or measurement



Parameters are sensed and assigned properties of Features of Interest (if we start from the view-point of an observation/measurement model). Highly granular (simplistic) 'parameter' names include a sensed property, like 'concentration' plus the Feature Of Interest (e.g. Concentration of Carbon). To be of value, most parameter names should



Simplified basic semantic elements of an observation or measurement



Background analysis

- Examination of how the concept of a 'parameter' have been used in AODN metadata records
- Define basic semantic elements of an observation/measurement



Geographic element

Temporal element

Vertical element

Supplemental Information

Sampling Frequency

Bounding Polygon (gmd:EX_BoundingPolygon)

Spatial Temporal Extent (gmd:EX_SpatialTemporalExtent)

Data Parameters

Data Parameter

Parameter Name *

Parameter unit of measurement *

Min.Value in dataset

Max.Value in dataset

Parameter Description

Determination Instrument

Analysis Method

Platform

Taxonomic Coverage

mcp:TC_Taxon

Taxonomic Information

Darwin Core Taxonomic Information

Taxonomic ID *

Scientific Name *

Common Name

Kingdom *

Phylum *

Class *

Order *

Family *

Genus *

Specific Epithet *

Authorship *

Vocabulary List URL

Vocabulary List Version

Vocabulary List Authority

HTML presentation of Taxonomic Information

Identification info

Data identification (MCP) (mcp:MD_DataIdentification)

Type Metadata

▼ **Data Parameters** [X]

▼ **Data Parameter** [+

Parameter Name * [📄]

Parameter unit of measurement * [📄]

Min.Value in dataset [+

Max.Value in dataset [+

Parameter Description [+

Determination Instrument [📄]

Analysis Method [📄]

Platform [📄]

▼ **Taxonomic Coverage** [X]

▼ **mcp:TC_Taxon**

▼ **Taxonomic Information**

▼ **Darwin Core Taxonomic Information**

Taxonomic ID *

Scientific Name *

Common Name [+

Kingdom *

Phylum *

Class *

Order *

Family *

Genus *

Specific Epithet *

Authorship *



GeoNetwork - The portal to spatial data and ... | sandbox.aodn.org.au/geonetwork/srv/eng/metadata.update

Language: ISO Language code (gmd:LanguageCode) | Character set: utf8 | Topic category code: oceans

Extent

- Geographic element
 - Geographic bounding box
 - North bound
 - West bound
 - East bound
 - South bound

Data Parameters

- Data Parameter
 - Parameter Name
 - Parameter unit of measurement
 - Min.Value in dataset
 - Max.Value in dataset
 - Parameter Description
 - Determination Instrument
 - Analysis Method
 - Platform

Identification info: Data identification (MCP) (mcp:MD_DataIdentification)

Type: Metadata

Buttons: Reset, Save, Save and close, Check, Other actions, Cancel, Minor edit

Unit

Parameter

Instrument

Platform

▼ Data Parameters ☒

▼ Data Parameter +

Parameter Name * 🏠

Parameter unit of measurement * 🏠

Min.Value in dataset +

Max.Value in dataset +

Parameter Description +

Determination Instrument 🏠

Analysis Method 🏠

Platform 🏠

☒ Term selection

Max Terms 50

- Bytes
- Decibars
- Decibels
- Degrees
- Degrees Celsius
- Degrees Kelvin
- Degrees True
- Dimensionless
- Hertz
- Kilograms
- Kilograms per cubic metre
- Litres

Used In Dataset add

Unit

☒ Term selection

Max Terms 50

- Skin temperature of the water body
- Sound velocity of the water body
- Specific humidity of the atmosphere
- Speed (over ground) of measurement platform
- Temperature of the atmosphere
- Temperature of the water body
- Thickness of precipitation amount
- Total alkalinity per unit mass of the water body
- Turbidity of the water body
- Upward current velocity in the water body
- Wet bulb temperature of the atmosphere
- Wind from direction in the atmosphere

Used In Dataset add

Parameter

☒ Term selection

Max Terms 50

- hydrophones
- metal analysers
- meteorological packages
- nutrient analysers
- optical backscatter sensors
- pH sensors
- plankton nets
- plankton recorders
- precipitation gauges
- precipitation samplers
- radar altimeters
- radiometers

Used In Dataset add

Instrument

☒ Term selection

Max Terms 50

- land/onshore structure
- lowered unmanned submersible
- moored surface buoy
- mooring
- offshore structure
- orbiting satellite
- research vessel
- satellite
- ship
- subsurface mooring
- vessel of opportunity
- vessel of opportunity on fixed route

Used In Dataset add

Platform

Implementation of controlled vocabularies in the AODN infrastructure

- Design database to store information
- Populate relevant vocabulary in database
- Update/Edit Marine Community Profile (MCP)
- Provide tool for Geonetwork for mark-up purposes