





## Connecting Essential Ocean Variables to datasets using the I-ADOPT ontology and smart mappings

Gwenaëlle Moncoiffé<sup>(1)</sup>, Alison Pamment<sup>(2)</sup>, Alexandra Kokkinaki<sup>(1)</sup>

(1) British Oceanographic Data Centre, National Oceanography Centre, UK(2) Centre for Environmental Data Analysis, UKRI Science and Technology Facilities Council, UK



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### Outline of the presentation

- 1- What are we trying to solve?
- 2- What we already have
- 3- Linked Data Approach
  - requirements and steps

## Fast, reliable, reproducible data flows

#### **GOOS Essential Ocean Variables**

Physics	Biochemistry	Biology and Ecosystems
<ul> <li>Sea state</li> <li>Ocean surface stress</li> <li>Sea ice</li> <li>Sea surface height</li> <li>Sea surface height</li> <li>Sea surface temperature</li> <li>Subsurface currents</li> <li>Subsurface currents</li> <li>Sea surface salinity</li> <li>Subsurface salinity</li> <li>Ocean surface heat flux</li> </ul>	<ul> <li>Oxygen</li> <li>Nutrients</li> <li>Inorganic carbon</li> <li>Transient tracers</li> <li>Particulate matter</li> <li>Nitrus oxide</li> <li>Stable carbon isotopes</li> <li>Dissolved organic carbon</li> </ul>	<ul> <li>Phytoplankton biomass and diversity</li> <li>Zooplankton biomass and diversity</li> <li>Fish abundance and distribution</li> <li>Marine turtles, birds, mammals abundance and distribution</li> <li>Hard coral cover and composition</li> <li>Seagrass cover and composition</li> <li>Macroalgal canopy cover and composition</li> <li>Mangrove cover and composition</li> <li>Microbe biomass and diversity ('emerging)</li> <li>Invertebrate abundance and distribution ('emerging)</li> </ul>

#### Cross-disciplinary (including human impact)

Ocean colour
 Marine debris
 (\*emerging)



OBSERVATIONS / MEASUREMENTS (in situ, remote, modeling)



Photos credit @nasa

#### DATASET Repositories

Access and Interoperability

Hindered by diversity of:

Data servers Data formats Vocabularies

## Value what we have and build from it



### Open source tools

### International and cross-discipline collaborations

Atmospheric and Modelling Community Standards

### Oceanographic Community Standards

Photos credit @nasa



## Linked Data Approach - our requirements



## Step 1 - Decompose EOVs

**EOVs** 

1

### DATASET variables

		Temperatur	e			
Oxygen		URI Within Vocab	http://vocabdev.nerc.ac.t AtlantOS Essential Varia	uk/collection/A05/current/E	EV_SEATEMP/	
URI	http://vocabdev.nerc.ac.uk/collection/A05/curr	Alternative Labels Definition	Sea temperature The temperature of seav	Nutrients		
Within Vocab Alternative Labels	AtlantOS Essential Variables Dissolved O2	Date	standard. 2016-06-23T15:58:53	URI Within Vocab	http://vocabdev.ner	rc.ac.uk/collection/A05/current/EV_NUTS/ I Variables
Definition Date	The amount of dissolved oxygen in seawater 2016-06-23T15:58:53	Harither Has Current Version version hasObjectOfInterest	accepted	Alternative Labels Definition	Inorganic nutrients The amount of dissolved inorganic macro nutrients (NO3, PO4, Si and NO2) in seawater using water	
ldentifier Note	SDN:A05::EV_OXY accepted		1 water body	Date Identifier	column measurem 2016-06-23T15:58 SDN:A05::EV_NUT	in measurements. 06-23T15:58:53 A05::EV_NUTS
Has Current Version version	1	hasProperty	lemperature	Note Has Current Version	accepted	
hasConstraint hasMatrix hasObjectOfInterest	dissolved plus reactive particulate water body oxygen			version hasMatrix hasObjectOfInterest	1 water body nitrite	
hasProperty	Concentration				silicate	
					nitrate	

hasProperty

Concentration





# What is novel about our approach?

#### Static mappings

- Time-consuming
- High maintenance
- Logic can be opaque

### Mappings based on reasoning

- Dynamic
- Logic is explicit
- Consistent

"Smart	map	pina	ls"
omart	map	ping	

Nutrients	
URI	http://vocabdev.nerc.ac.uk/collection/A05/current/EV_NUTS/
Within Vocab	AtlantOS Essential Variables
Alternative Labels	Inorganic nutrients
Definition	The amount of dissolved inorganic macro nutrients (NO3, PO4, Si and NO2) in seawater using water column measurements.
Date	2016-06-23T15:58:53
ldentifier	SDN:A05::EV_NUTS
Note	accepted
Has Current Version	1
version	1
hasMatrix	water body
hasObjectOfInterest	nitrite
	nitrate+nitrite
	silicate
	phosphate
	nitrate
hasProperty	Concentration
Narrower	P07:CFSN0516 moles_of_nitrite_per_unit_mass_in_sea_water
	P07:CFSN0519 moles_of_silicate_per_unit_mass_in_sea_water
	P07:CFSN0514 moles_of_nitrate_and_nitrite_per_unit_mass_in_sea_water
	P07:CFSN0518 moles_of_phosphate_per_unit_mass_in_sea_water
	P07:CFSN0515 moles_of_nitrate_per_unit_mass_in_sea_water
	P01:NTRIKGD5 Concentration of nitrite {NO2- CAS 14797-65-0} per unit mass of the water body [dissolved plus reactive particulate <0.2um phase] by filtration and colorimetric autoanalysis
	P01:NTRIKGD1 Concentration of nitrite (NO2- CAS 14797-65-0) per unit mass of the water body Idissolved plus reactive particulate