Controlled vocabularies, google dataset search, oceans, scientists: How we are all connected

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Open call for continuous collaboration



To achieve more by working together than we can alone To learn from each other To understand each other



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Collaboration quotes

Many ideas grow better when transplanted into another mind than the one where they sprang up. —Oliver Wendell Holmes



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Do you want?

- To get **credit** when your data is being used?
- Your datasets to be **easily** discoverable via the web?

- Know the **quality** of the data you are using?
- Find **meaningful** explanations about the data you are using?
- Minimize the pre-processing time by accurately knowing:
 - the measured parameters described
 - the technique/analysis used
 - the matrix
 - The sensor that produced the data
 - The PI in charge



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In general terms, your research data should be 'FAIR', that is Findable, Accessible, Interoperable and Re-usable.

 "H2020 Programme Guidelines on FAIR Data Management in Horizon 2020" Wilkinson, Mark D., Michel Dumontier, IJsbrand Jan Aalbersberg, Gabrielle Appleton, Myles Axton, Arie Baak, Niklas Blomberg et al. "The FAIR Guiding Principles for scientific data management and stewardship." Scientific Data 3 (2016).



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FAIR Data Principles in Brief

• To be Findable:

- (meta)data are assigned a globally unique and persistent identifier
- data are described with rich metadata
- metadata clearly and explicitly include the identifier of the data it describes
- (meta)data are registered or indexed in a searchable resource

• To be Accessible:

- (meta)data are retrievable by their identifier using a standardized communications protocol
- the protocol is open, free, and universally implementable
- the protocol allows for an authentication and authorization procedure, where necessary
- metadata are accessible, even when the data are no longer available

• To be Interoperable:

- (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
- (meta)data use vocabularies that follow FAIR principles
- (meta)data include qualified references to other (meta)data

• To be Reusable:

- meta(data) are richly described with a plurality of accurate and relevant attributes
- (meta)data are released with a clear and accessible data usage license (meta)data are associated with detailed provenance (meta)data meet domainrelevant community standards





Findable

- Persistent ID
- Metadata online

Accessible

- Data online
- Restrictions where needed

Interoperable

- Use standards, controlled vocabs
- Common (open) formats

Reusable

- Rich documentation
- Clear usage licence

FAIR data checklist



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Background

World wide web is evolving from hypertext links (link documents) to hyperdata links (linking data)



"The Semantic Web isn't just about putting data on the web. It is about making links, so that a person or machine can explore the web of data. With **Linked** Data, when you have some of it, you can find other, related, data." •Sir Tim Berners-Lee, 2006



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Background

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*	Bookmarks 🚺 Hibernate 📴 Projects 📴	BODCInternal 🗅 Q&D-RDF 🧧 RDF study 🧧 PHD 🧧 Vocabularies 🥫 rdf_staff	medepad 🗋 Q&D-RDF	29	Other bookm	tark
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	doo minimumElevation	0.000000 (ned double)				
	deo postalCode	• 73100				
	dbo thumbnail	www.commons:Special FilePath/2011_Dimos_Chanion.png?width=300				
	abo wikiPageExternalLink	http://www.chaniacrete.gr/				
		 http://www.visitgreece.gr/en/main_cities/chania 				
		http://www.chania.gr/				
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- 1. Use URIs as names for things
- 2. Use HTTP URIs so that people can look up those names
- 3. When someone looks up a URI, provide useful information using the standards (RDF, SPARQL)
 - Include links to other URIs, so that they can discover more things



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4.



SPARQL is to **Linked Data** (graph data) what SQL is to relational databases

- •W3C standard query language for Resource Description Framework (RDF) data
- •sparql endpoints are publicly available-accessible
- •can all be queried in one standard language, SPARQL



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Impact

- 1. Reusing existing patterns annotate your data and metadata
- Standardised
- Machine readable/comprehensible
- Discoverable
- Better understanding outside of your organisation
- Better interoperability with other organisations







Linked Data-SPARQL endpoints & BODC



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BODC- SPARQL Endpoints

NVS <u>http://vocab.nerc.ac.uk/sparql/</u> - SKOS BODC DATA- <u>http://linked.bodc.ac.uk/</u> - DCAT EDMED <u>- http://edmed.seadatanet.org/sparql/</u> - DCAT, PROV <u>EDIOS - http://edios.seadatanet.org/sparql/</u> - INSPIRE Environmental Monitoring Facilities

CELTIC PARTNERSHIP http://linked.bodc.ac.uk/celticseaspartnership/metadata/ -

CELTIC PARTNERSHIP http://linked.bodc.ac.uk/celticseaspartnership/library/





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Controlled Vocabularies



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What are controlled vocabularies?

A controlled vocabulary is an established list of standardised terminology for use in indexing and retrieval of information.

A collection of concepts that may be used to populate a field in a data model.

At its simplest – a list of terms

Better – terms with definitions

Better still – complies with the Simple Knowledge Organisation System (SKOS) W3C standard: including persistent URIs, preferred and alternative labels, definition and other standardised attributes.







Enabling machine-readable information

Correct words or expressions are not enough



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Semantic ambiguity: same words can map to different concepts







context=food

context=hardware

Did you say you were looking for mixed nuts

People use context to derive the correct meaning.

From: Patterns of Semantic Integration Riding the Next Wave April 2006 Dan McCreary

"Metal fan"

context is room furniture

context is



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IUPAC Name 👔

1-chloro-4-[2,2,2-trichloro-1-(4-chlorophenyl)ethyl]benzene

Synonyms 🗻

1,1'-(2,2,2-trichloroethylidene)bis[4-chlorobenzene]

1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane

1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane

1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane

1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane

1,1-bis(4-chlorophenyl)-2,2,2-trichloroethane

4,4'-DDT

 $a,a-bis(p-chlorophenyl)-\beta,\beta,\beta-trichlorethane$

Clofenotane

clofenotane

DDT

Dichlorodiphenyltrichloroethane

dichlorodiphenyltrichloroethane

p,p'-DDT

 $p,p'\mbox{-dichlorodiphenyltrichloroethane}$

One concept can have many names





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Enabling machine-readable information



Semantic technology – linking of concepts – semantic integration



Controlled Vocabularies at BODC

- Have underpinned BODC data management since the "beginning" (BODC is 50 this year!) – started as simple codelists
- Used for labelling data streams and fields in our oceanographic databases and standard data file formats
- Growth in diversity and complexity in the 1990s to include concepts from **biology**, **biogeochemistry**, **geophysics**
- Accessible online in 2005 as part of the NERC DataGrid and NERC-funded EnParDis projects (NERC Vocabulary Server - NVS)
- Further standardisation and growth as part of European-funded projects **SeaDataNet**, **NETMAR**, **SeaDataCloud**, and **EMODnet**







1980s

1990

20

201 0

2020

A GENERAL FORMATTING SYSTEM

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The NERC Vocabulary Server (NVS)

- The NERC Vocabulary Server provides machine and human readable versions of terms in standards compliant formats
- Includes mappings between concepts to create hierarchies and create explicit relationships between concepts
- Mappings internal and external resources (Linked Data)







An example from the SeaVox Device Catalogue (L22)

1 -- Sea-Bird SBE 41 CTD --

URI	http://vocab.nerc.ac.uk/collection/L22/current/TOOL0668/
Identifier ()	SDN:L22::TOOL0668
Preferred label (en)	Sea-Bird SBE 41 CTD
Alternative label (en)	SBE 41 CTD
Definition (en)	A self-contained unit comprising the MicroCAT temperature, conductivity and pressure sensors and a pump that is designed specifically for deployment on profiling floats, particularly Argo. The unit is designed to provide stable salinity data accurate to 0.005 PSU for periods in excess of three years without any form of maintenance. Temperature is within 0.002 C (stability 0.0002 C/year) and pressure within 2 dbar (stability 0.8 dbar/year). During float ascent spot samples are taken and transmitted to the float controller. More information is given in http://www.seabird.com/products/spec_sheets/41data.htm.
Version Info ()	1
Deprecated()	false
Broader	http://vocab.nerc.ac.uk/collection/L05/current/134/
Broader	http://vocab.nerc.ac.uk/collection/L05/current/130/
Broader	http://vocab.nerc.ac.uk/collection/L05/current/350/
Date ()	2014-03-11 15:55:41.0





NVS content and technical governance

Collections and governance

246 collections accessible through the NVS

73 owned and governed by BODC

56 managed by BODC on behalf of SeaDataCloud, EMODnet, SeaVox, SWE.

Remainder are owned by 29 different governing authorities.

Technical governance and support assured by BODC

Collections library

A01	A02	A03	A04	A05	B02	B03	B04	B05	B06	B07	B09	B11	B12	B20
B21	B22	B39	B75	B76	C00	C10	C16	C17	C18	C19	C30	C31	C32	C33
C34	C35	C36	C37	C38	C39	C40	C41	C43	C45	C46	C47	C48	C60	C61
C62	C64	C67	C71	C72	C75	C77	C86	C87	C88	C89	C96	C97	C98	84
E01	E02	EVO	F02	G01	G02	G03	G04	G05	G06	G07	G08	G09	G10	G11
G12	G13	G14	G15	G17	G18	G20	G21	G22	G23	G25	G26	G28	G29	GBX
GGS	GS1	GS2	G53	GS4	GS5	GS6	G58	G59	GSA	GSB	GSC	GXM	H01	H02
H03	H04	H05	HA2	101	102	103	I10	111	I12	I13	I14	I15	L02	L03
L04	L05	L06	L07	L08	L10	L11	L12	L13	L14	L15	L18	L19	L20	L21
L22	L23	L24	L26	L27	L30	L31	L33	L34	L35	M01	M03	M04	M05	M06
M09	M10	M11	M12	M13	M14	M15	M16	M17	M18	N01	N02	N03	N04	N05
P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15
P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28	P29	P30	P35
P36	P37	P38	P64	Q01	S01	S02	S03	S04	S05	S06	S07	S08	S09	S10
S11	S12	S13	S14	S15	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
V12	V22	V23	W01	W02	W03	W04	W05	W06	W07	W08	W09	W10		





The NERC Vocabulary Server http://vocab.nerc.ac.uk









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BODC Parameter Usage Vocabulary

Codename: P01 collection

A **controlled vocabulary** for labelling data streams and discrete measurements in oceanographic databases and data files

Has underpinned BODC data management systems since 1980s <20 codes in the 1980s ~5000 codes in 2000 over 40000 today

Adopted as a standard for data interoperability by European NODCs (SeaDataNet / SeaDataCloud project consortium)





P01 Collection

 $\leftarrow \rightarrow$ C ■ Natural Environment Research Council [GB] https://www.bodc.ac.uk/resources/vocabularies/vocabulary_search/P01/ NVS editor Structured label opaque 8-NVS vocabulary Search text Concentration of % Vocabulary P01, BODC Parameter Us advanced options Search based on a byte **BODC parameter** codes Found 12533 records | Show (11 - 20) | | « First < Prev | 1 2 3 4 5 6 7 Next > Last > download results | start ag semantic model SeaVoX identifier ▲ Definition ▼ Delivery formats ▲ PrefLabel ▼ Identifie ▲ Date Producto Concentration of methyl hexatriaconta-7E.14E.21E-trienoate {C36:30 methyl ester} per Help and him as chromatography ass spectromtry 2018-FA63GCP1 unit volume of the water body [particulate >GF/F phase] by filtration and gas F/F filtered 02-27 Portals and links chromatography-mass spectrometry Search Concentration of octatriaconta-16E,23E-dien-2-one {C38:2 methyl ketone} per unit as chromatography mass spectromtry 2018-ME82GCP1 volume of the water body [particulate >GF/F phase] by filtration and gas SE/E filtered) 02-27 chromatography-mass spectrometry Concentration of octatriaconta-9E,16E,23E-trien-2-one {C38:3 methyl ketone} per unit as chromatography mass spectromtry 2018volume of the water body [particulate >GF/F phase] by filtration and gas ME83GCP1 SE/E filtered) 02-27 chromatography-mass spectrometry e amount (mass or moles) of the 2018-ESTSED13 Concentration of methyl 2-hydroxy hexadecanoate per unit dry weight of sediment ecified organic compound per unit mass 02-27 dry sediment. e amount (mass or moles) of the 2018-ESTSED14 Concentration of methyl 2-hydroxy heptadecanoate per unit dry weight of sediment ecified organic compound per unit mass 02-27 dry sediment. e amount (mass or moles) of the Concentration of methyl 2-hydroxy docosanoate {behenic acid methyl ester CAS 929-77-2018-ESTSED15 ecified organic compound per unit mass 1} per unit dry weight of sediment 02-27 dry sediment. he amount (mass or moles) of the 2018-Concentration of methyl 2-hydroxy tetracosanoate {CAS 2433-95-6} per unit dry weight





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P01 semantic model

The semantic model is based on the conceptualisation of what constitutes a measurement and the atomisation into its constituent parts.

a **PROPERTY** of an **OBJECT** in **RELATION** to a **MATRIX** by a **METHOD**





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The property element

PROPERTY of an **OBJECT** in **RELATION** to a **MATRIX** by a **METHOD**

- quantitative (Concentration, Practical salinity, Production rate, Abundance)
- qualitative: binary (Presence or absence), ordinal (Abundance category), or nominal (Colour class, Shape class)
- All PROPERTY terms are defined in collection **S06**

http://vocab.nerc.ac.uk/collection/S06/current/

https://www.bodc.ac.uk/resources/vocabularies/vocabulary_search/S06/







Statistical element

Properties can be associated with a statistical term to become

a **PROPERTY STATISTIC** of an **OBJECT** in **RELATION** to a **MATRIX** by a **METHOD**

- examples: standard deviation, mean, annual mean, hourly mean, etc.
- STATISTIC is defined in S07

http://vocab.nerc.ac.uk/collection/S07/current/ https://www.bodc.ac.uk/resources/vocabularies/vocabulary_search/S07/







The object element







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http://vocab.nerc.ac.uk/collection/P01/current/PRSC0217/

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SCIENCE



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http://vocab.nerc.ac.uk/collection/P01/current/LREWAS01/



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http://vocab.nerc.ac.uk/collection/S25/current/BE006418/



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Source: Figueroa et al 2010

http://vocab.nerc.ac.uk/collection/S25/current/BE001841/



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The matrix element



MATRIX is the environment in which the measurement is made or in which the object of interest is embedded

- MATRIX is defined in S26
- MATRIX is a structured compound vocabulary













Matrix biota variant

a **PROPERTY** of an **OBJECT** in **RELATION** to **MATRIX** a **METHOD**

Example of P01 label

Concentration of hexachlorobenzene {HCB CAS 118-74-1} per unit wet weight of biota {Halichoerus grypus (ITIS: 180653: WoRMS 137080) [Subcomponent: blubber]} If the matrix is the biota then the matrix element is the combination of the S26 term "biota" and a biological entity (S25)

http://vocab.nerc.ac.uk/collection/P01/current/IC003116/



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The relationship element

a **PROPERTY** of an **OBJECT** ir **RELATION** a **MATRIX** by a **METHOD**

- RELATION is the LINK between the PROPERTY of the OBJECT and the MATRIX
- It contains important information about the multiple ways of expressing a measured quantity in relation to its environment
- It forces us to be explicit about the way the measurement is reported
- per unit volume of the water body...
- per unit wet weight of biota...
- integrated over depth in the water body...
- The relation terms are defined in S02

Count of Halichoerus grypus (ITIS: 180653: WoRMS 137080) out of the water body

Count of Halichoerus grypus (ITIS: 180653: WoRMS 137080) in the water body Examples of P01 labels





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The method element



- P01 codes with a method defined are mapped to the broader non-method specific codes
- The broader terms are used for aggregation; when the information is stored elsewhere in a schema; or when the information is not available





Anatomy of a BODC Parameter Code in 8 bytes



Parameter hierarchy

p08	Conceptid	Pref la	bel			
0	DS07	Admini	stration and o	dimensions		
0	DS05	Atmosp	here			
•	DS01	Biological ocea		aphy		
	p03	Conceptid	Pref lab	el		
	0	B005	Bacteria	and viruses		
	0	B007	Biota cor	mposition		
	0	B015	Birds, ma	ammals and reptiles		
	0	B020	Fish			
	0	B025	Microzoo	oplankton		
	0	B027	Other bi	ological measurements		
	0	B030	Phytopla	ankton and microphytobenthos		
	•	B035	Pigment	s		
		p02	Conceptid	Preflabel		
		0	AXFX	Sedimentation flux of pigments in the water column		
		0	CARO	Carotenoid and flavenoid pigment concentrations in water bodies		
		•	CARS	Carotenoid pigment concentrations in sediment		
		0	CPCN	Unclassified pigment concentrations in sediment		
		0	CPSD	Chlorophyll pigment concentrations in sediment		
	- 0	0	CPWC	Chlorophyll pigment concentrations in water bodies		
		0	FVLT	Raw fluorometer output		
		0	GPIG	Zooplankton gut pigments		



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p08







SeaDataNet Common Vocabularies

ABOUT US METADATA DATA ACCESS STANDARDS SOFTWARE PRODUCTS EVENTS PUBLICATIONS

a SOAP Application Programming Interface (API) for exchanging structured information across computer networks as the result of calls. It relies upon XML (eXstensible Markup Language) documents for passing messages. Moreover there is an operational SPARQL endpoint for machine interaction.

- More about the Vocabulary Web services
- Query the NVS Common Vocabularies via the SeaDataNet interface
- Query the NVS Common Vocabularies via the BODC interface
- Semantic Model Vocabulary Builder for the P01 vocabulary
- P01 Vocabulary Facet Search on Semantic Components

CONTENT GOVERNANCE

Content governance of the vocabularies is very important and is done by a combined SeaDataNet and MarineXML Vocabulary Content Governance Group (SeaVoX), moderated by **BODC**, and including experts from SeaDataNet, MMI, MOTIIVE, JCOMMOPS and more international groups. SeaVox discussions are based on an e-mail list server.

NVS2.0



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	1	Datas	set	***	Contents
Overview Structured data Article Breadcrumb Book Carousel Corporate contact Course Critic review Dataset Employer Aggregate Rating Event Fact Check Job Posting Livestream Local Business		Datasets are easier to find when you provide supporting information such as their name, description, creator and distribution formats as structured data. Google's approach to dataset discovery makes use of schema.org and other metadata standards that can be added to pages that describe datasets. The purpose of this markup is to improve discovery of datasets from fields such as life sciences, social sciences, machine learning, civic and government data, and more.		Our approach to datas discovery Examples Guidelines Sitemap best practices Source and	
		★ Thi dat	is feature is in pilot, and you may not see rich results for datasets yet. However, we re taset structured data to your site in preparation for new dataset features in Search re	ecommend that you add sults.	provenance best practices Textual property recommendations
		Here are so	ome examples of what can qualify as a dataset:		Known Errors and Warnings Structured data type
		 A table or a CSV file with some data An organized collection of tables A file in a proprietary format that contains data A collection of files that together constitute some meaningful dataset 		definitions Dataset DataCatalog	
				DataDownload Tabular datasets	
Logo		• A stru	uctured object with data in some other format that you might want to load	into a special tool for	Hain and toole



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schema.org

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Dataset

Property Properties f

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issn

Canonical URL: http://schema.org/Dataset

Thing > CreativeWork > Dataset

A body of structured information describing some topic(s) of interest.

Usage: Between 100 and 1000 domains

	Expected Type	Description
om Dataset		
on	DataDownload	A downloadable form of this dataset, at a specific location, in a specific format.
DataCatalog	DataCatalog	A data catalog which contains this dataset. Supersedes <u>catalog</u> , <u>includedDataCatalog</u> . Inverse property: <u>dataset</u> .
	Text	The International Standard Serial Number (ISSN) that identifies this serial publication. You can repeat this property to identify different formats of, or the linking ISSN (ISSN-L) for, this serial publication.
	Text or URL	A technique or technology used in a <u>DataSet</u> (or <u>DataDownload</u> , <u>DataCatalog</u>), corresponding to the method used for measuring the corresponding variable(s) (described using <u>variableMeasured</u>). This is oriented towards scientific and scholarly dataset publication but may have broader applicability, it is not intended as a full representation of measurement, but rather as a high level summary for dataset discovery.
tTechnique		For example, if variableMeasured is: molecule concentration, measurementTechnique could be: "mass spectrometry" or "nmr spectroscopy" or "colorimetry" or "immunofluorescence". If the variableMeasured is "depression rating", the measurementTechnique could be "Zung Scale" or "HAM-D" or "Beck Depression Inventory"
		If there are several variableMeasured properties recorded for some given data object, use a PropertyValue for each variableMeasured

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Google

temperature and salinity

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About 10,600,000 results (0.52 seconds)

Scholarly articles for temperature and salinity

Possible influence of salinity and temperature on ... - Lees - Cited by 379 Quality control of ocean temperature and salinity ... - Ingleby - Cited by 491 Atlantic Ocean atlas of temperature and salinity profiles ... - Fuglister - Cited by 511

People also ask	
How does salinity and temperature affect density?	×
How does temperature affect salt water?	~
How do salinity and temperature affect ocean currents?	~
Is warmer water saltier?	~
	Feedback

More

Temperature Salinity Diagram - Effect of Temperature on Salinity https://www.brighthubengineering.com/.../104494-effect-of-temperature-on-salinity/ -

This effect is prominent in estuaries and other areas near river exits. Additionally, sea salinity variation is caused by temperature, pressure, and depth. The average surface salinity of seawater is 35 ppt, or 3.5%

People also search for

temperature salinity diagram definition	salinity and temperature reef tank
temp effect on salinity	temperature and salinity tools used
salinity temperature calculator	oceanographic variables

The Ocean and Temperature - MarineBio.org

marinebio.org/oceans/temperature/ -

At a temperature of 4°C pure water reaches its maximum or peak density, cooled further it expands and becomes less dense than the surrounding water which is why when water freezes at 0°C it floats. . Seawater is saturated with salts at 35 ppt and at 4°C the salinity causes the density to actually be 1.0278 g/cm3.



In oceanography, temperature-salinity diagrams, sometimes called T-S diagrams, are used to identify water masses. In a T-S diagram, rather than plotting each water property as a separate "profile," with pressure or depth as the vertical coordinate, potential temperature is plotted versus salinity. Wikipedia

Feedback

[PDF] TEMPERATURE & SALINITY

Google Dataset Search



III O 🌘

Feedback

100+ results found



Global Temperature and Salinity Profile Programme (GTSPP) Data

catalog.data.gov data.wu.ac.at Updated Feb 26, 2016



Temperature, salinity, and optical characteristics data from NOAA Office of... catalog.data.gov data.wu.ac.at

Updated Feb 8, 2018



Oceanographic profile temperature, salinity and other measurements collected... catalog.data.gov data.wu.ac.at Updated Feb 8, 2018



ISAS-13-CLIM temperature and salinity gridded climatology www.seanoe.org explore.openaire.eu

Published Mar 12, 2015

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Global Temperature and Salinity Profile Programme (GTSPP) Data

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5 scholarly articles cite this data set (View in Google Scholar)

Data set updated Feb 26, 2016

Data set provided by

National Oceanic and Atmospheric Administration

Description

The Global Temperature-Salinity Profile Programme (GTSPP) develops and maintains a global ocean temperature and salinity resource with data that are both up-to-date and of the highest quality. It is a joint World Meteorological Organization (WMO) and Intergovernmental Oceanographic Commission (IOC) program. It includes data from XBTs, CTDs, moored and drifting buoys, and PALACE floats. For information about organizations contributing data to GTSPP, see http://gosic.org/goos/GTSPP-data-flow.htm . The U.S. National Oceanographic Data Center (NODC) maintains the GTSPP Continuously Managed Data Base and releases new 'best-copy' data once per month. WARNING: This dataset has a lot of data. If you request too much data, your request will fail. If you don't specify a longitude and latitude bounding box, don't request more than a month's data at a time. If you do specify a longitude and latitude bounding box, you can request data for a proportionally longer time period. Requesting data for a specific station_id may be slow, but it works. This ERDDAP dataset has data for the entire world for all available times (currently, up to and including the July 2015 data) but is a subset of the original NODC 'best-copy' data. It only includes data where the quality flags indicate the data is 1=CORRECT, 2=PROBABLY GOOD, or 5=MODIFIED. It does not include some of the metadata, any of the history data, or any of the quality flag date of the original dataset. You can always get the complete, up-to-date dataset (and additional, near-real-time data) from the source: http://www.nodc.noaa.gov/GTSPP/. Specific differences are: Profiles with a position_quality_flag other than 1|2|5 were removed. Rews with a depth (z) value less than -0.4 or greater than 1000 or a z_variable_quality_flag definitions on page 5 and 'Table 2.1: Global Impossible Parameter Values' on page 61 onfhttp://www.nodc.noaa.gov/GTSPP/document/qcmans/GTSPP_RT_QC_Manual_20090916.pdf .The Quality Flag definitions are also athttp://www.nodc.noaa.gov/GTSPP/document/qcmans/GT

Google Dataset Search	Q temperature and salinity	×	About	E O	D ack
Updated Feb 26, 2016	*				-
Temperature, salinity, and optical characteristics data from NOAA Office of catalog.data.gov data.wu.ac.at Updated Feb 8, 2018	ISAS-13-CLIM temperature and salinity gridded climatolog SEANOE Seanoe 7 scholarly articles cite this data set (View in Google Scholar) DOI link https://doi.org/10.17882/45946	ЗХ		<	
Oceanographic profile temperature, salinity and other measurements collected catalog.data.gov data.wu.ac.at Updated Feb 8, 2018	Data set published Mar 12, 2015 Data set provided by SEANOE				
s ISAS-13-CLIM temperature and salinity gridded climatology www.seanoe.org explore.openaire.eu Published Mar 12, 2015	Authors Gaillard, Fabienne Licence https://creativecommons.org/licenses/by/4.0/ Available download formats from providers				
Ocean current velocity, temperature and salinity collected during 2010 and catalog.data.gov data.wu.ac.at +1more Updated Feb 7, 2018	Description The monthly fields of temperature ans salinity produced by the ISAS-13 analysis have been - the annual mean temperature, salinity and pressure fields, - the monthly mean temperatur density: MLDS criteria) the temperature and salinity variance of the data relative to the m	n averaged over the period 2004-2 re, salinity - the monthly mean mi nonthly mean cycle and the numb	2014 to produce a monthly and annual climatology. W ixed layer depth (computed according to temperature ber of avalable data.	/e provide here : MLDT, or	



Overview	
Structured data	
Article	
Breadcrumb	
Book	
Carousel	
Corporate contact	
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Fact Check	
Job Posting	
Livestream	
Local Business	
Logo	
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Occupation	
Product	
Q&A Page	
Recipe	
Review snippet	
Sitelinks searchbox	
Social profile	
Software App 👗	
Speakable	

Recipe

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Mark up your recipe content with structured data to provide rich results and host-specific lists for your recipes, such as reviewer ratings, cooking and preparation times, and nutrition information. Your page is eligible for different features depending on how you add structured data to your page:

- Search: Add recipe structured data to drive better engagement in Search with rich results.
- Guidance: Enable the Google Assistant to guide users through your recipes on Google Home and smart displays.
- Carousel: Add carousel structured data to enable your recipe to appear in a carousel of rich results. This can include images, page logos, and other interesting search result features.
- AMP: Build your recipe pages with AMP to provide instant-loading recipes.

By structuring your content according to this guide, your content may automatically enable the following features:

- Recipe badge in mobile image Search results
- Content action on the Google Assistant
- Note: Support for recipe content on smart displays is currently only available to select partners. If you would like your recipe content to appear on smart displays, fill out the interest form.



Contents Examples Recipe example Carousel example Guidelines

Structured data type definitions ItemList

Show all

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Recipe

RN-201811241727....zip ^

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Looking For Vegan Recipes? | We've Got YO Covered | yosushi.com

Try a range of vegan dishes near you this January at $\pounds3.00$ each, valid Monday - Friday. View Our Menu \cdot Find Your Nearest YOI \cdot YOI Delivery

Vegan recipes | BBC Good Food

https://www.bbcgoodfood.com/recipes/collection/vegan •



From vegan brownies and pancakes to veggie-packed curries, stir fries and salads, these vegan recipes are vibrant and delicious. From BBC Good Food. Vegan chilli Vegan · Vegan brownies · Vegan ramen

 People also search for
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 simple vegan recipes 5 ingredients or less

33 Quick Vegan Recipes Ready in Under 30 Minutes - olivemagazine https://www.olivemagazine.com/.../best-ever-vegan-recipes-ready-in-under-30-minute... •



31 Dec 2018 - Here are our best quick and easy vegan recipes... Tofu fried rice. Vegan pancakes with mixed berry compote. Quick vegan shiitake ramen. Steamed aubergines with peanut dressing. Quick vegan Thai green curry. Californian tofu scramble. Heritage

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SeaDataNet

A pan-European infrastructure set up and operated for managing marine and ocean data in cooperation with the NODCs and data focal points of 34 countries bordering the European seas



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SDN+BODC

NVS underpins the SDN/SDC infrastructure SDN netCDF is NVS annotated EDMED and EDIOS One of the NODCs that compose SDN

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ABOUT US METADATA DATA ACCESS STANDARDS SOFTWARE PRODUCTS EVENTS PUBLICATIONS

VICES

https://www.seadatanet.org/

DOWNLOAD SOFTWARE BROWSE aDATA tools for management of data file formats

(NEMO, OCTOPUS), generation of XML metadata descriptions (MIKADO), analysis and Explore the SeaDataNet CDI catalogue using the pre-defined facets and download your visualisation of data (ODV), and interpolation and variational analysis of data sets (DIVA), selection connection of data centres to SeaDataNet portal (Download Manager), sub-sampling navigation log files (EndsAndBends)

NVS & EU SeaDataNet-2

Data collection by in situ sensors and remote sensing

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SWE MARINE PROFILES LINKED SYSTEMS OCEANIDS

OGC standards & BODC – Applying and Setting the standards

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Sensor Webs and Disaster Management

The marine domain is implementing the SWE standardss

Open Geospatial Consortium's (OGC) Sensor Web Enablement (SWE) standards

• Aim to:

- make all types of sensors, transducers and sensor data repositories discoverable, accessible and useable via the Web
- Include:
 - sensorML
 - O&M
 - SOSensor Model Language (SensorML),
 - Observations and Measurements (O&M)
 - Sensor Planning Service (SPS)

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- Transoucer many Lancoace
 Sensor Alert Service Britsh Oceanographic Exta Centre
- Sensor Observation Service (SOS) and

- can be better understood by machines,
- utilized **automatically** in complex workflows,
- and easily shared between intelligent sensor web nodes.

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Scenario

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BODC Bata Centre NATURAL ENVIRONMENT RESEARCH COUNCIL


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NERC SCIENCE OF THE ENVIRONMENT

Consequences

Soft typing

- Different terms for the same meaning
- Variations in the meaning of the same term
- Terms not properly defined
- Terms not resolvable
- Many different ontologies with variations on the names of same terms
- Terms not mapped with each other

Reduce interoperability and discoverability via the web.











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title-:	SensorML Classification Section Terms
alternative-:	SensorML Classifications
description-:	Terms used in SensorML to describe aspects of an observation system (e.g. the type of process, the typ of sensor, or its intended applications).
date-:	2016-07-21 02:00:02.0
publisher-:	Natural Environment Research Council
creator-:	Sensor Web Enablement Marine Profiles
versionInfo-:	1
RE_RegisterMana	ger: British Oceanographic Data Centre
RE_RegisterOwne	r: Sensor Web Enablement Marine Profiles
comment-:	Governance for vocabularies created for use in SWE Marine Profiles.
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Linked-Systems

OCEANDIS, SENSEOCEAN, ENVRI-PLUS



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BODC Marine Linked Systems



http://linkedsystems.uk/system/instance/TOOL0969_1234/current/



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Ocean Data Interoperability Platform (ODIPI & ODIPII)

- European-USA-Australia collaborative project –
- Supported by:
 - European Commission
 - National Science Foundation (NSF)
 - Australian Government •
- Promoting the development of a common global framework for marine data management by developing interoperability between existing regional e-infrastructures of Europe, USA and Australia and towards global infrastructures such as GEOSS, IOC-IODE and POGO.
- In practice by organising international workshops with leading experts to present, compare and discuss approaches and standards applied.
- Developing prototypes for interoperability solutions or common standards to overcome identified differences. Prototypes projects are worked out in order to evaluate and test solutions.











ODIP INTEROPERABILITY SCOPE

Scope of ODIP is interconnect marine communities worldwide. Global users accessing data from regional data providers in EU, US and Australia

Global Users



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Platform Instrument categories types NODC vocabularies NVS2.0 oxygen AODN salinity vocabularies conductivity

Institutions

Discovery parameters



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Bring all the terms that are the same as NODC:373 (Sea surface height above geoid)

prefix skos:<http://www.w3.org/2004/02/skos/core#> prefix rdf:<http://www.w3.org/1999/02/22-rdf-syntax-ns#> prefix owl:<http://www.w3.org/2002/07/owl#> prefix dc:<http://purl.org/dc/terms/> select * where {?NVSTerm owl:sameAs <http://vocab.aodn.org.au/def/discovery_parameter/entity/643>. ?NVSTerm owl:sameAs ?Translation













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the GYRE is part of the International Oscade of Ocean Explanation / North Pacific Easteriment (IDOE/NORPAN) project from 07 February 1979 to 11

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