RV Mtafiti training workshop
Mombasa, April 2016

Station sampling data storage and processing

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A. Environmental data

1. Data recording sheets

Data recording sheets

- FAO guidelines for developing an at-sea fishery observer programme

Food and Agriculture Organization of the United Nations

1. SAMPLING FORM A - STATION AND CATCH

This form can be used as the principal form to which all other forms are linked. It records the station (fishing event) information. A form such as this is vital for any sampling.

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3. SAMPLING FORM C - LENGTH FREQUENCY BY 1CM CLASS

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4. SAMPLING FORM D - BIOLOGICAL SAMPLES FOR INDIVIDUAL FISH

This form is used for biological sampling of fish. More than one species can be used per form and the columns can then be completed as appropriate.

SAMPLING FORM D - Biological Samples for Individual Fish

5. SAMPLING FORM E - CRAB SAMPLES

This form has been included as an example of a specialist form for specific species with unusual requirements. Other forms like this can be developed for other special species.

SAMPLING FORM A - Station and Catch

For office use:	1st Punch:	2nd Punch:	Sheet ID:

STATION INFORMATION:

Vessel Name:	Trip No:	Target Species:
IRCS or Licence No:	Station No:	Haul No:

1. Observer / Sampler Name:	1. Observer No / Sampler No:
2. Observer / Sampler Name:	2. Observer No / Sampler No:

Date Set:	Time Set:	Date Hauled:	Time Hauled:

	Latitude South		Longitude East	
Position Set:	Degrees:	Minutes:	Degrees:	Minutes:
Position Hauled:	Degrees:	Minutes:	Degrees:	Minutes:

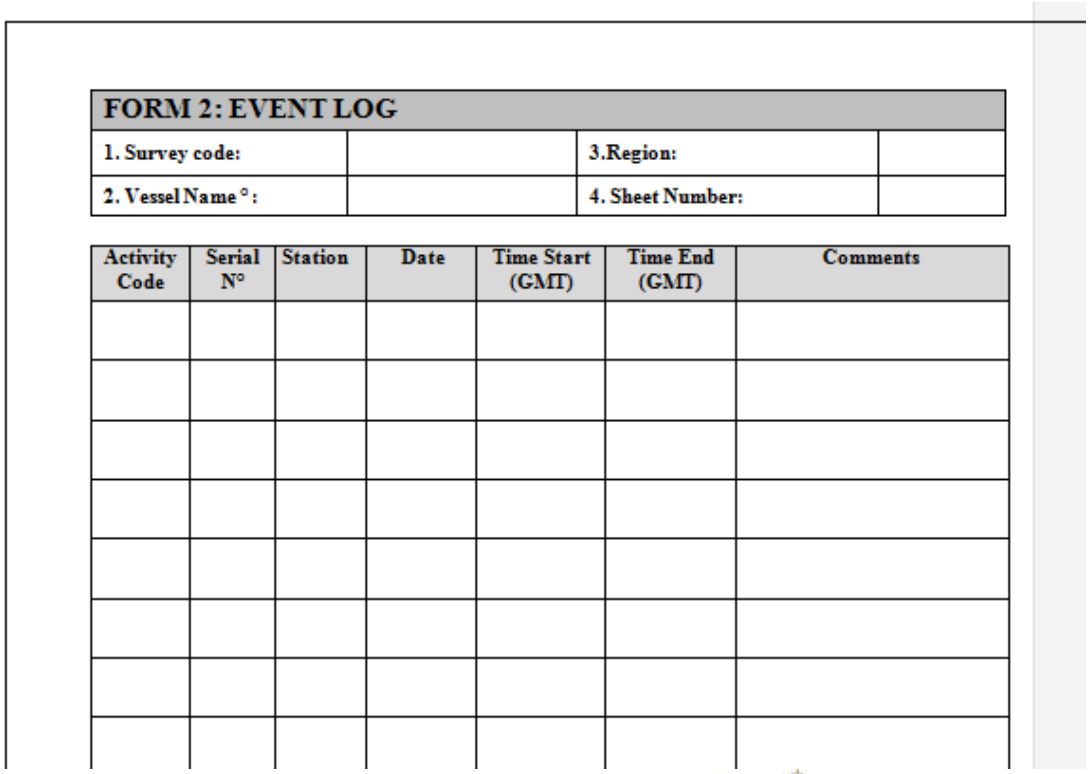
Area Fished:	Wind Direction:	Wind Speed:	Sky Cover:
Sea Surface Temp:	Bottom or Gear Temp:	Sea State:	Sea Colour:
Gear Type:	Gear No / Mesh:	Bottom Depth (m):	Gear Depth (m):

CATCH INFORMATION:

					Forms Used				
No:	Species:	Total Catch: (kg)	No Sampled:	Weight Sampled : (kg)	2A Lfreq	2B Size Bin	2C Biological	2D Crab	2E Lobster
1									

Data recording sheets

- South West Indian Ocean Fisheries Programme (SWIOFP) data sheets



FORM 2: EVENT LOG

1. Survey code:		3.Region:	
2. Vessel Name °:		4. Sheet Number:	

Activity Code	Serial N°	Station	Date	Time Start (GMT)	Time End (GMT)	Comments

2. Data storage

Data storage

- Relational databases vs spreadsheets
- Advantages of relational databases

1. Use of spreadsheets or relational databases

Spreadsheets: designed primarily for number manipulation and calculations → used for data storage

Relational database: designed for storing large amounts of data in a space efficient way

1. Use of spreadsheets or relational databases

Spreadsheets

Advantages:

- Simple to use
- Easy data manipulation
- Graphics easier to setup
- Cell formulas & Calculations

Disadvantages:

- Repeated data
- Data entry & validation
- Easy data manipulation
- Search & retrieval (sorting)
- Data sharing / collaboration
- Upper row limit (65000 for Excel)

1. Use of spreadsheets or relational databases

Relational database

Advantages:

- Multi-user sharing
- User level security
- Data entry & validation
- Search & retrieval
- Can eliminate repeated data
- No upper row limit
- Tabular or other display formats

Disadvantages:

- Harder to setup
- Graphics harder to setup
- Calculations are not cell based

1. Use of spreadsheets or relational databases

Repeated data

3	Cruise	Station	Type	mon/day/yr	Lon (°E)	Lat (°N)	Bot. Depth [m]	Depth [m]	QF	Temperature [°C]	QF
4	WOD98_90_8528	24	B	9/11/1986	5	6.83	740	0	0	8.45	0
5	WOD98_90_8528	24	B	9/11/1986	5	6.83	740	10	0	8.45	0
6	WOD98_90_8528	24	B	9/11/1986	5	6.83	740	20	0	8.46	0
7	WOD98_90_8528	24	B	9/11/1986	5	6.83	740	29	0	8.46	0
8	WOD98_90_8528	24	B	9/11/1986	5	6.83	740	48	0	8.46	0
9	WOD98_90_8528	24	B	9/11/1986	5	6.83	740	73	0	8.46	0
10	WOD98_90_8528	24	B	9/11/1986	5	6.83	740	100	0	8.49	0
11	WOD98_90_8651	46	B	7/02/1987	0.68	0.48	1000	0	0	27.9	0
12	WOD98_90_8651	46	B	7/02/1987	0.68	0.48	1000	10	0	27.9	0
13	WOD98_90_8651	46	B	7/02/1987	0.68	0.48	1000	20	0	27.92	0
14	WOD98_90_8651	46	B	7/02/1987	0.68	0.48	1000	29	0	24.88	0
15	WOD98_90_8651	46	B	7/02/1987	0.68	0.48	1000	49	0	21.02	0
16	WOD98_90_8651	46	B	7/02/1987	0.68	0.48	1000	73	0	19.35	0
17	WOD98_90_8651	46	B	7/02/1987	0.68	0.48	1000	97	0	16.5	0
18	WOD98_90_8651	47	B	7/02/1987	1.45	0.93	1000	0	0	28.58	0
19	WOD98_90_8651	47	B	7/02/1987	1.45	0.93	1000	10	0	28.43	0
20	WOD98_90_8651	47	B	7/02/1987	1.45	0.93	1000	20	0	28.38	0
21	WOD98_90_8651	47	B	7/02/1987	1.45	0.93	1000	30	0	28.29	0
22	WOD98_90_8651	47	B	7/02/1987	1.45	0.93	1000	50	0	22.12	0
23	WOD98_90_8651	47	B	7/02/1987	1.45	0.93	1000	75	0	17.65	0
24	WOD98_90_8651	47	B	7/02/1987	1.45	0.93	1000	100	0	15.64	0

1. Use of spreadsheets or relational databases

Repeated data

	A	B	C
1	Cruise ID	Cruise	
2	1	WOD98_90_8528	
3	2	WOD98_90_8651	
4			

	A	B	C	D	E	F	G	H
1	Station ID	Cruise ID	Station	Type	mon/day/yr	Lon (°E)	Lat (°N)	Bot. Depth [m]
2	1	1	24	B	9/11/1986	5	6.83	740
3	2	2	46	B	7/02/1987	0.68	0.48	1000
4	3	2	47	B	7/02/1987	1.45	0.93	1000
5								

	A	B	C	D	E
1	Station ID	Depth [m]	QF	Temperature [°C]	QF
2	1	0	0	8.45	0
3	1	10	0	8.45	0
4	1	20	0	8.46	0
5	1	29	0	8.46	0
6	1	48	0	8.46	0
7	1	73	0	8.46	0
8	1	100	0	8.49	0
9	2	0	0	27.9	0
10	2	10	0	27.9	0
11	2	20	0	27.92	0
12	2	29	0	24.88	0
13	2	49	0	21.02	0
14	2	73	0	19.35	0
15	2	97	0	16.5	0
16	3	0	0	28.58	0
17	3	10	0	28.43	0
18	3	20	0	28.38	0
19	3	30	0	28.29	0
20	3	50	0	22.12	0
21	3	75	0	17.65	0
22	3	100	0	15.64	0
23					

Relational databases

- Information exists in:
  - Entities
  - Attributes of entities
  - Relations between entities

- Example
  - Entities: project, person
  - Attributes: person has name, age, adress
    project has title, duration, budget
  - Relations:

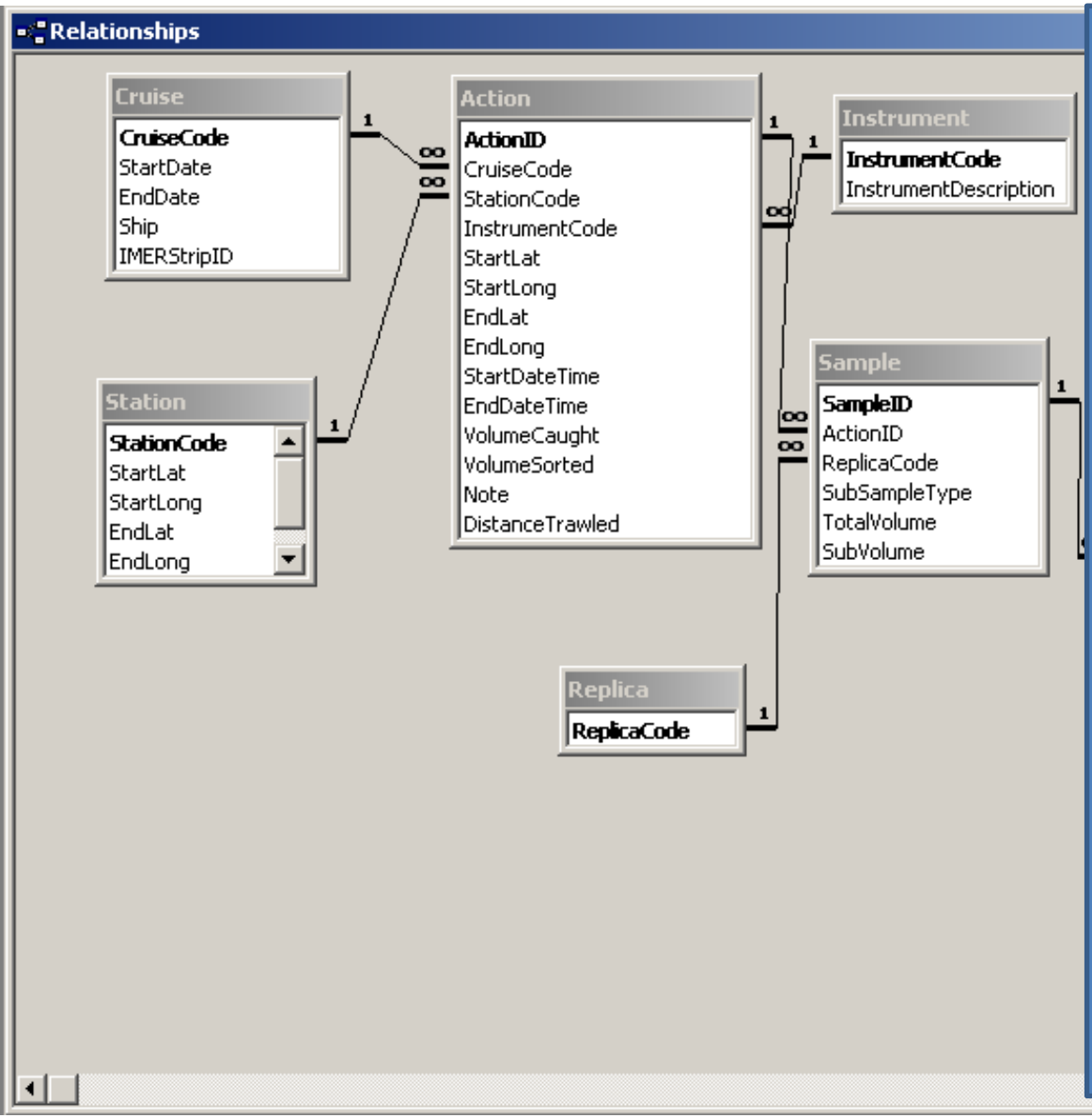
Project ⊂ Person

Person ⊂ Project

Project ⊃⊂ Person

Data storage

- Relational database sceme
- Cruise – event – sample – measurements model



Value
Parameter
Unit
Method
SampleID

Relational databases in ecology

1) Correct data is crucial for good science: you want maximum error control

- There's only a single storage location for any piece of information, so:
  - data updates are simple with no need to change same info in 15 different files
  - info is always up-to-date - there's no chance of old data remaining in some forgotten files
- Numbers are numbers, and dates are dates:
  - no typos like *1o, i0, l0*, instead of 10
  - avoid data-typing problems
  - avoid unwanted text-to-date conversions
  - such as "MAR03" becoming 3rd March 1900

- Error check data as they're entered
  - data are validated on entry, to filter impossible values
  - data can be cross-checked against existing information (no more pregnant males!)

Relational databases in ecology

2) Easy combination of different data.

- No more intermediate spreadsheets generated while putting data together
- No errors during cut and paste operations
- Data manipulation is performed using *Queries*

Data storage

- Standard data formats
  - NetCDF
  - ODV data format

- Standard vocabularies
  - CF standard names
  - BODC parameter name vocabularies

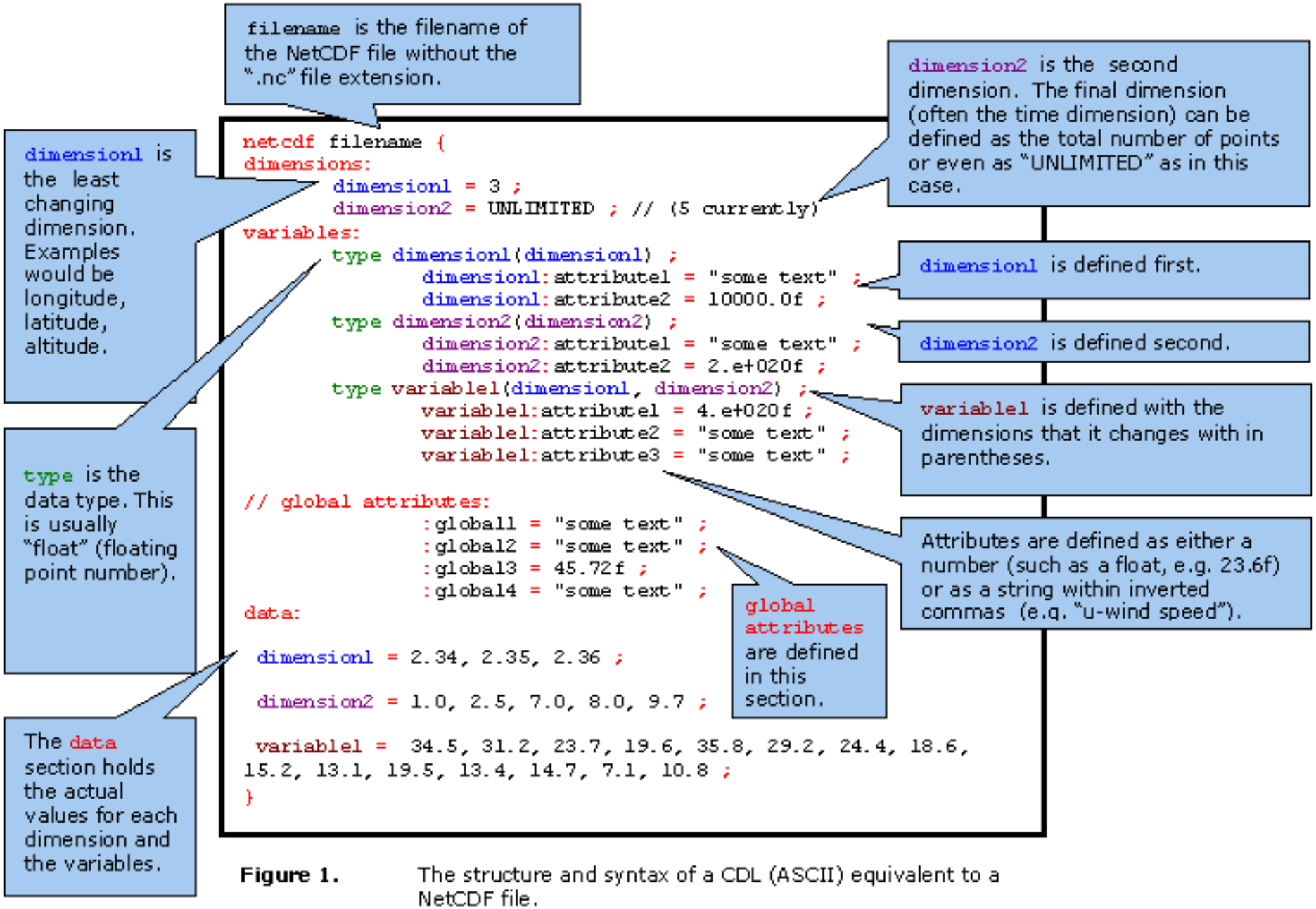


Figure 1. The structure and syntax of a CDL (ASCII) equivalent to a NetCDF file.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	//Data documentation at http://www.bodc.ac.uk/data/documents/series/49486/												
2	//SDN_parameter_mapping												
3	//<subject>SDN:LOCAL:Chronological Julian Date</subject><object>SDN:P011::CJDY1101</object><units>SDN:P061::UTAA</units>												
4	//<subject>SDN:LOCAL:CurrDir</subject><object>SDN:P011::LCDAEL01</object><units>SDN:P061::UABB</units>												
5	//<subject>SDN:LOCAL:CurrSpd</subject><object>SDN:P011::LCSAEL01</object><units>SDN:P061::UVBB</units>												
6	//<subject>SDN:LOCAL:Temp</subject><object>SDN:P011::TEMPPR01</object><units>SDN:P061::UPAA</units>												
7	//												
8													
9	Cruise	Station	Type	yyyy-mm-	Longitude	Latitude [	LOCAL_CD	EDMO_co	Bot.Depth	Chronolog	QV:SEADA	CurrDir [d	QV:SEADA
10	RCM.C	1185/C/BC	*	1983-08-2	1.4153	54.5855	49486	43	27	2445568	1	322	1
11										2445568	1	321	1
12										2445568	1	321	1
13										2445568	1	322	1
14										2445568	1	323	1
15										2445568	1	324	1
16										2445568	1	322	1
17										2445568	1	323	1
18										2445568	1	324	1
19										2445568	1	327	1
20										2445568	1	328	1
21										2445569	1	329	1
22										2445569	1	333	1
23										2445569	1	334	1
24										2445569	1	342	1
25										2445569	1	351	1
26										2445569	1	354	1
27										2445569	1	28	1
28										2445569	1	56	1
29										2445569	1	103	1
30										2445569	1	126	1
31										2445569	1	129	1
32										2445569	1	128	1
33										2445569	1	132	1
34										2445569	1	133	1
35										2445569	1	128	1
36										2445569	1	134	1

http://cfconventions.org/standard-names.html

Search

nitrate sea water | Search Standard Names | Show All Standard Names

AND OR (separate search terms with spaces)

Also search help text

Found 6 standard names matching query: nitrate sea water

View by Category

Atmospheric Chemistry	Atmosphere Dynamics	Carbon Cycle	Cloud	Hydrology
Ocean Dynamics	Radiation	Sea Ice	Surface	

Standard Name	Canonical Units	AMIP	GRIB
mole concentration of nitrate and nitrite in sea water	mol m-3		
mole concentration of nitrate in sea water	mol m-3		
mole ratio of nitrate to phosphate in sea water	1		
moles of nitrate and nitrite per unit mass in sea water	mol kg-1		
moles of nitrate per unit mass in sea water	mol kg-1		
tendency of mole concentration of particulate organic matter expressed as carbon in sea water due to nitrate utilization	mol m-3 s-1		

BODC Vocab Library

(P011) BODC Parameter Usage Vocabulary

Back to overview

| Export subset of list | Export full list | New query | Found 152 | Show (1-15) | Previous | Next 15

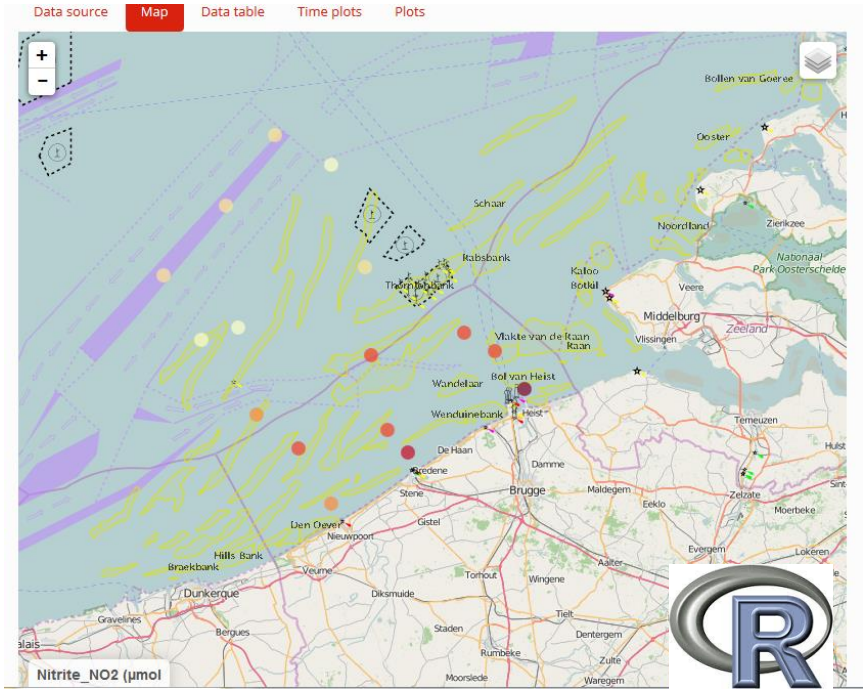
Entrykey	Entryterm	Entrytermabbr	Entrytermdef	Entrytermlastmod
ACNITA01	Concentration of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol <1um phase] by filtration and ion chromatography	conc_NO3_aerosol_<1um	Unavailable	2015-08-27
ACNITA02	Concentration of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol >1um phase] by filtration and ion chromatography	conc_NO3_aerosol_>1um	Unavailable	2015-08-27
ACNITSE1	Concentration standard error of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol <1um phase] by filtration and ion chromatography	SE_NO3_aerosol<1um	Unavailable	2015-08-27
ACNITSE2	Concentration standard error of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol >1um phase] by filtration and ion chromatography	SE_NO3_aerosol>1um	Unavailable	2015-08-27
ACNO3X01	Concentration of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol phase] by filtration and ion chromatography	AtPartNO3	Unavailable	2015-08-27
AMSNO301	Concentration of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol <1um phase] by aerosol mass spectrometer	NO3_AMS	Unavailable	2015-08-27
ASDNIT01	Concentration standard deviation of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol <1um phase] by filtration and ion chromatography	SD_NO3_aerosol_<1um	Unavailable	2015-08-27
ASDNIT02	Concentration standard deviation of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol >1um phase] by filtration and ion chromatography	SD_NO3_aerosol_>1um	Unavailable	2015-08-27
ASDNIX01	Concentration standard deviation of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol phase] by filtration and ion chromatography	SD_NO3_aerosol	Unavailable	2015-08-27
CCI1NO3X	Concentration of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol 0.16-1um phase] by cascade impaction and ion chromatography	NO3_atmos_HCCI-0.16-1um	Unavailable	2015-08-27
CCI2NO3X	Concentration of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol 1-5um phase] by cascade impaction and ion chromatography	NO3_atmos_HCCI-1-5um	Unavailable	2015-08-27
CCI3NO3X	Concentration of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol 5-10um phase] by cascade impaction and ion chromatography	NO3_atmos_HCCI-5-10um	Unavailable	2015-08-27
CCI4NO3X	Concentration of nitrate {NO3- CAS 14797-55-8} per unit volume of the atmosphere [aerosol >10um phase] by cascade impaction and ion chromatography	NO3_atmos_HCCI->10um	Unavailable	2015-08-27

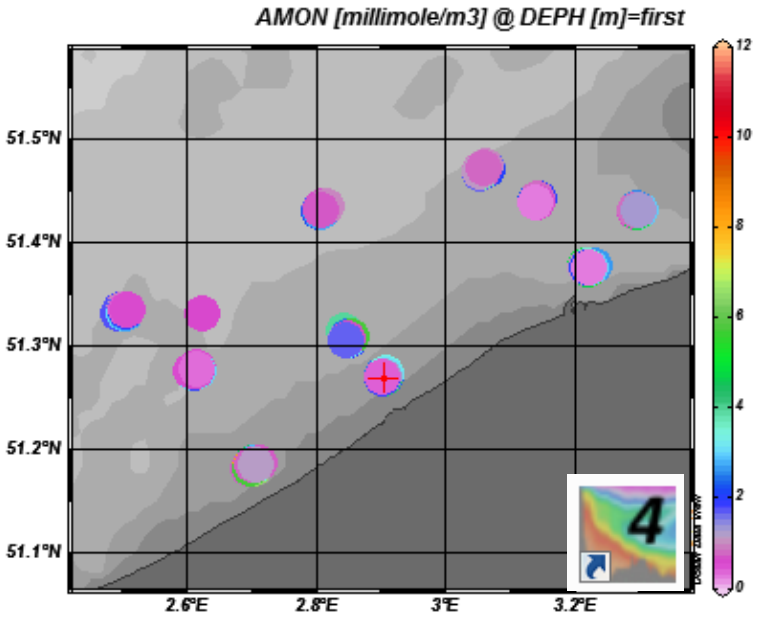
Quality control

- QC procedure for nutrients @ VLIZ

Manual	**Stap 1: Detection limit:** X < detection limit -> X= Value below detection limit **Stap 2: Known lab analysis:** Known lab analysis issues -> X= Probably bad data **Stap 3: Geographic:** X is beyond trajectory Simon Stevin -> X=Probably Bad If no coordinates can be assigned -> X=Bad data
Automated	**Stap 4: Global Impossible values** X<MinGlob or X>MaxGlob -> X= Bad data **Stap 5: Regional values:** X < MinRegional and x > MaxRegional -> X= Probably Bad **Stap 6: Tripoutliers:** X > 4SD binnen 1 trip -> X=Probably Good **Stap 7: Temporal outliers:** X > 4SD binnen 3 maand -> X=Probably Good **Stap 8: Approval:** Flag is Null -> X = Good data

Visualisation and analysis





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Benthos & Fish

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STATION INFORMATION:

Vessel Name:	Trip No:	Target Species:
IRCS or Licence No:	Station No:	Haul No:

1. Observer / Sampler Name:	1. Observer No / Sampler No:
2. Observer / Sampler Name:	2. Observer No / Sampler No:

Date Set:	Time Set:	Date Hauled:	Time Hauled:

	Latitude South		Longitude East	
Position Set:	Degrees:	Minutes:	Degrees:	Minutes:
Position Hauled:	Degrees:	Minutes:	Degrees:	Minutes:

Area Fished:	Wind Direction:	Wind Speed:	Sky Cover:
Sea Surface Temp:	Bottom or Gear Temp:	Sea State:	Sea Colour:
Gear Type:	Gear No / Mesh:	Bottom Depth (m):	Gear Depth (m):

CATCH INFORMATION:

					Forms Used				
No:	Species:	Total Catch: (kg)	No Sampled:	Weight Sampled : (kg)	2A Lfreq	2B Size Bin	2C Biological	2D Crab	2E Lobster
1									

SAMPLING FORM B - Length Frequency For Individual Fish

For office use:	1st Punch:	2nd Punch:	Sheet ID:

Vessel ID:	Trip No:	Station No:	Date:	First Sampler No:

No	Species	Length	No	Species	Length	No	Species	Length	No	Species	Length
1			26			51			76		
2			27			52			77		
3			28			53			78		
4			29			54			79		
5			30			55			80		
6			31			56			81		
7			32			57			82		
8			33			58			83		
9			34			59			84		
10			35			60			85		
11			36			61			86		
12			37			62			87		
13			38			63			88		

SAMPLING FORM C - Length Frequency by 1cm class

For office use:	1st Punch:	2nd Punch:	Sheet ID:

Vessel ID:	Trip No:	Station No:	Date:	First Sampler No:

Species Code:	please note - only one species can be recorded on each form

Length	Tallies	Total
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		
1		
2		

Length	Tallies	Total
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		
1		
2		

SAMPLING FORM D - Biological Samples for Individual Fish

For office use:	1st Punch:	2nd Punch:	Sheet ID:

Vessel ID:	Trip No:	Station No:	Date:	First Sampler No:

No	Species	Length (cm)	Sex	Maturity	Weight (g)			Sample Type
					Total	Gutted	Gonad	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								

SAMPLING FORM E - Crab Samples

For office use:	1st Punch:	2nd Punch:	Sheet ID:

Vessel ID:	Trip No:	Station No:	Date:	First Sampler No:

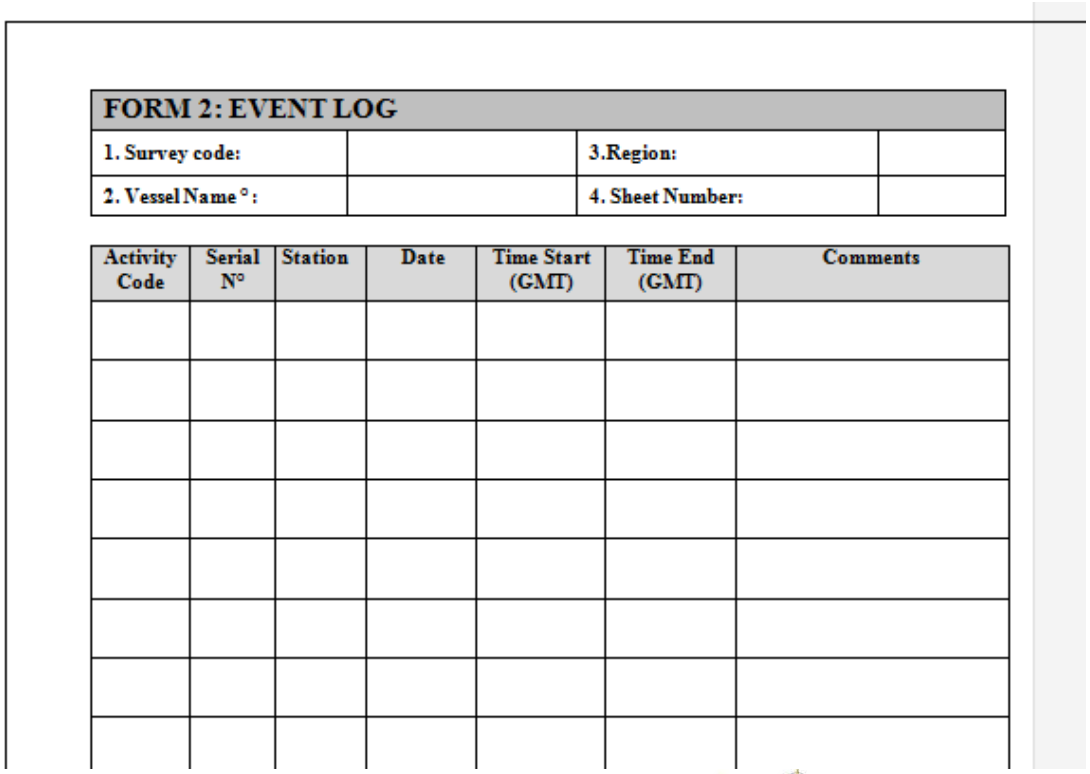
Species Code:

No	Width (mm)	Sex	Berry	Shell State	Maturity	Weight (g)	Sample Type
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

No	Width (mm)	Sex	Berry	Shell State	Maturity	Weight (g)	Sample Type
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							

Data recording sheets

- South West Indian Ocean Fisheries Programme (SWIOFP) data sheets



FORM 2: EVENT LOG

1. Survey code:		3.Region:	
2. Vessel Name °:		4. Sheet Number:	

Activity Code	Serial N°	Station	Date	Time Start (GMT)	Time End (GMT)	Comments

FORM 3	Dropline Fishing StationLog
Recorder Name:	Event Number: DL
Survey Code: *MRT2012C315*	Date: / 7 / 2012 Form No:

SETTING									
Flag Colour	1			2			3		
Time Weight dropped									
Latitude (deg S)									
Longitude (deg E)									
Depth (m)									
Wind direction (dir)									
Wind speed (Beaufort)									
Current Speed (kn)									
Current direction (deg)									
Hook Size									
Bait									
HAULING	:::::	:::::	:::::	:::::	:::::	:::::	:::::	:::::	:::::
Time Buoy lifted									
Latitude (deg S)									
Longitude (deg E)									
Depth (m)									
Fishing interactions PET	Yes No			Yes No			Yes No		
Section of Line	**Top**	**Mid**	**Bot**	**Top**	**Mid**	**Bot**	**Top**	**Mid**	**Bot**
Hooks with NO bait (N)									
Hooks missing (N)									
Fish landed (N)									
Fish lost or returned (N)									

ADL FORM 4: BIOLOGICAL DATA COLLECTION

Recorder Name:		Event N°	*DL*	Date (GMT)	
Survey Code:		Form N°		Time (GMT)	

Catch Bin N° (dropline N° + Bin Letter)		Fish N°	Spp code	SL (mm)	TL (mm)	Total Weight (g)	Gutted weight (g)	Gutted weight in water (g)	Sex	Mat	Stom. Fullness	Stom. contents	Otolith (Y/N)	Genetic (Y/N)	Photo N°

ADL FORM 5: MARINE MAMMALS, SEABIRDS AND TURTLES OBSERVATION

This form must be completed if a YES was entered in Form 3 - fisheries interactions with PET's

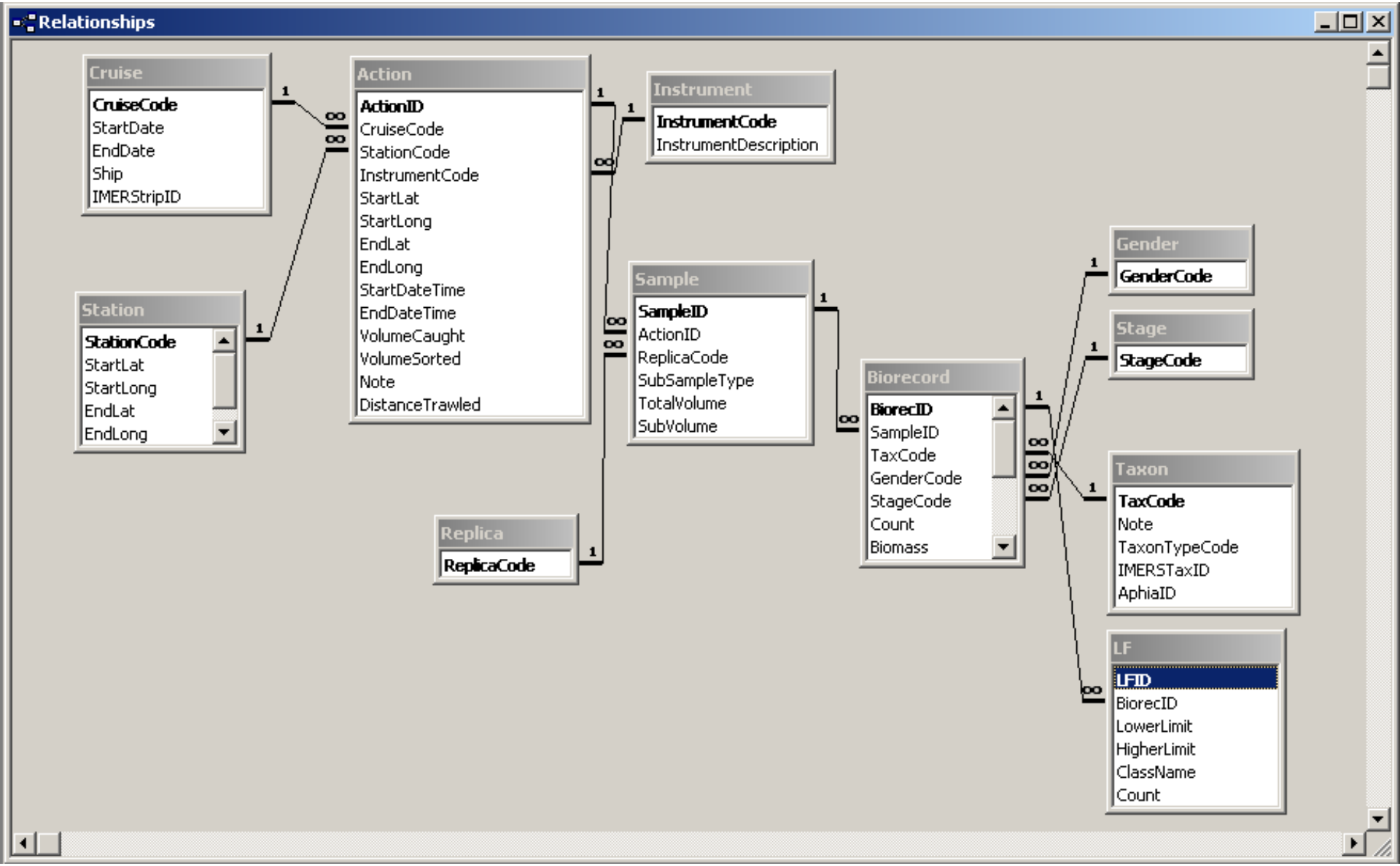
1. Observer Name:		**3. Vessel name:**	
2. Trip N°:		**4. Vessel Reg. N°:**	

Event N°	Type of Observation	Ships activity	Species code	Fisheries Interaction	Group size	N° of calves	Brought on board (Y/N)	Photo N°	
								First	Last

2. Data storage

Data storage

- Relational database sceme
- Cruise – event – samples – biorecords – biometry


Relationships
Cruise
CruiseCode
StartDate
EndDate
Ship
IMERStripID
Action
ActionID
CruiseCode
StationCode
InstrumentCode
StartLat
StartLong
EndLat
EndLong
StartDateTime
EndDateTime
VolumeCaught
VolumeSorted
Note
DistanceTrawled
Instrument
InstrumentCode
InstrumentDescription
Station
StationCode
StartLat
StartLong
EndLat
EndLong
Sample
SampleID
ActionID
ReplicaCode
SubSampleType
TotalVolume
SubVolume
Replica
ReplicaCode
Biorecord
BiorecID
SampleID
TaxCode
GenderCode
StageCode
Count
Biomass
Gender
GenderCode
Stage
StageCode
Taxon
TaxCode
Note
TaxonTypeCode
IMERSTaxID
AphiaID
LF
LFID
BiorecID
LowerLimit
HigherLimit
ClassName
Count

Data input

Forms: Direct manual data base input

Imports: fixed format spreadsheet imports

Nansis

File Edit View Data entry Report A

Surveys in scope:

20141217

Summary:

Survey Type: Demersal
Vessel: R/V Dr. Fridtjof Nansen

Regions: Pta.das Palmeirinhas - Congo River [4054]
Date: 19/03/13 - 28/10/14
Distance Travelled: 8785.595
BT Station: 12
CTD Station: 11

In database:
Imported CTD station : 1 of 11

Imported Thermosalinograph data : None

Imported Acoustic data from :21/06/13 to :29/07/13

Imported plstation data : None

Trawl entry

Survey: 20141217

Station: 1

Start date: 19/03/13

Stop date: 20/03/13

Start position:

		Deg.:	Min.:
Lat.:	S	8	35.34
Lon.:	E	12	49.58

Stop position:

		Deg.:	Min.:
Lat.:	S	8	34.01
Lon.:	E	12	48.96

	Start:	Stop:		
Time(UTC):	23:37:23	00:06:54	Dur:	30.00
Log:	1219.71	1221.17	Dist:	1.46
Gear-dep.:	719	708	Mean:	713.5
Bot-dep.:	719	708	Mean:	713.5
Wire out:	1300	CatchID: 1	Speed:	3.0

Region: 4054-Pta.das Pal
Purpose: 3-Random statior
Gear cond.: 0-N/A
Validity: 0-N/A
Gear: BT
Gear no.: 21
Sample weight: 26.090
Total weight: 288.300
Weight / hour: 576.600

Comments

1

Spec. code	Scientific name	Tot. weight	Tot. num.	Weight/hour	No / hour	Sample
SHRAR22	Aristeus varidens	2.970	121.00	5.940	242	
MERME03	Merluccius polli	1.020	1.00	2.040	2	
CRAGE12	Chaceon maritae, male	0.300	1.00	0.600	2	
LOBPO20	Stereomastis sp.	16.500	781.00	33.000	1562	
SHRNE21	Nematocarcinus africanus	151.800	32395.00	303.600	64790	
TRHHO01	Hoplostethus cadenati	21.890	638.00	43.780	1276	

Sum Catch/Hour in kg: 578.420

Catch/hour in %: 100.316%

Help Close

: localhost

EN 09/56 27/04/2016

Nansis

File Edit View Data entry Report Analysis Tools Window Backup Help

Surveys in scope:

20141217

Summary:

Survey Type: Demersal
Vessel: R/V Dr. Fridtjof Nansen

Regions: Pta.das Palmeirinhas - Congo River [4054]
Date: 19/03/13 - 28/10/14
Distance Travelled: 8785.595
BT Station: 12
CTD Station: 11

In database:
Imported CTD station : 1 of 11

Imported Thermosalinograph data : None

Imported Acoustic data from :21/06/13 to :29/07/13

Imported plstation data : None

Length frequency entry

Survey: 20141217 Sex: X Start length: 24.0 cm

Station: 2 Length type: TL Stop length: 47.0 cm

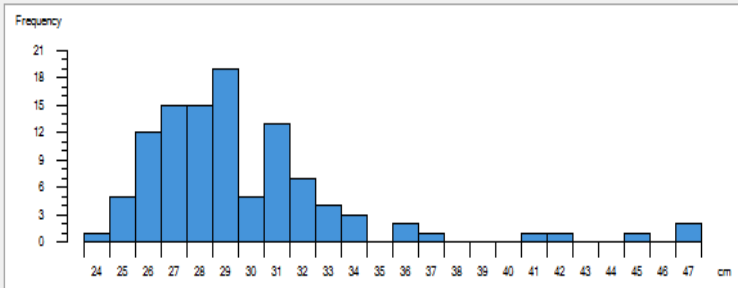
Species: MERME03 Name: Merluccius polli

Sample: 1 Weight: 23.360 kg Length interval: 1.0 cm

Total number of individuals measured: 107

24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
1	5	12	15	15	19	5	13	7	4	3		2	1				1	1	

44	45	46	47
	1		2



Total:
107

Close

Logged in User : admin

Database : localhost

EN 09/55 27/04/2016

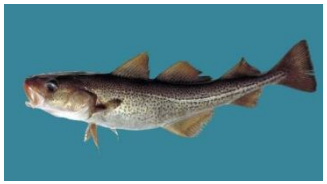
Data export

- Queries or reports from Database
- Standard data formats
  - Types of biological data
  - Sharing biodiversity data
  - OBIS data schema

Types of biological data

- Observation and results
  - Occurence
  - Density
  - Biomass
  - Body morphology
  - Condition
  - Substance concentrations or ratios
  - Sequencing material

- Biological components
  - benthos, plankton, fish, birds, mammals, ...

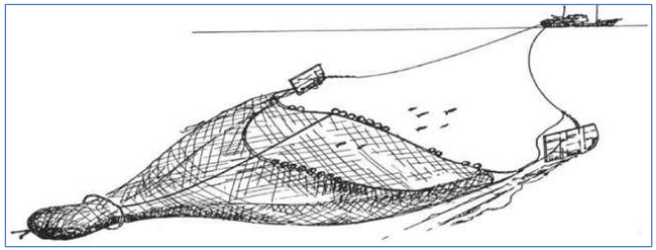


Geometry and Sampling Protocol

- **Point**
  - soft-bottom grabs & cores (depth layer separation possible)
  - vertical net and water samples (multiple depths possible)
  - static net samples
  - hard-bottom sampling (scraping or visual)
  - static observations/underwater photography

- **Curve**
  - net trawl, dredge or sledge
  - transect observations/underwater video

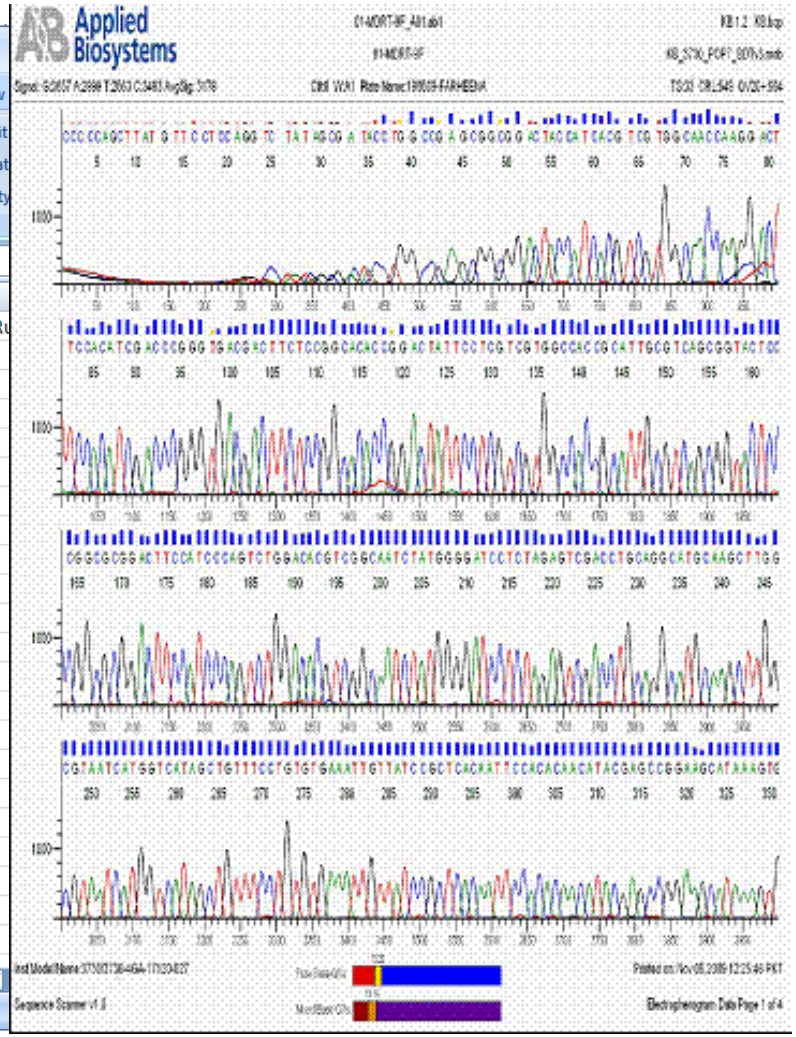
- **Surface (Area)**
  - surface observations



Data Formats

Vissoort :	Schol		Datum :	04/07/2008	
Vaartuig :	O.89	PK :		Visserij :	bokken
Zone :	N	Visuren :		Totale vangst :	11060

Sortering	1	2	3	4	5
Tot. vangst	1880	3491	4289	1210	190
Monster	25.460	36.450	48.100	61.200	91.200
24					
25					
26	3				
27	7				
28	20				
29	23				
30	27	1			
31	14	12			
32	5	29			
33	1	29	5		
34		21	16		
35		6	20		
36		1	27	4	
37			15	8	
38			7	21	2
39			7	28	2
40			2	16	2
41			1	14	4
42				3	10
43				3	10
44				1	9
45				1	22
46					10
47				1	5
48					10
49					4
50					2



Sharing Marine Biodiversity Data

Sharing Marine Biodiversity Data

- Data needs to adhere to common standards so everyone can understand it, and compare like for like

- Common Standard for Biodiversity Data is "Darwin Core" (Flexible, Adaptable, Extendable)

  see http://rs.tdwg.org/dwc/index.htm

  Terms Quick Reference Guide
  http://rs.tdwg.org/dwc/terms/index.htm#dcindex

Darwin Core

- Darwin Core is a body of data standards for biodiversity informatics applications
- Facilitates the discovery, retrieval, and integration of information about organisms, their spatio-temporal occurrence, and associated biological collections.
- Provides a stable standard reference for sharing information on biological diversity.
- Aims to facilitate data sharing in biodiversity research by minimizing the barriers to adoption, and maximizing reusability.
- Maintained by Biodiversity Information Standards, formerly known as the Taxonomic Databases Working Group (TDWG).

Sharing Marine Biodiversity Data

- Darwin Core consists of “Terms” and “Vocabularies” that can be used describe different fields (and values) of biodiversity data sets

- The OBIS Schema is an “extension” of Darwin Core, specifically for marine biodiversity.

OBIS data schema

The OBIS SchemaVersion 1.1

08 July 2005

An extension of DarwinCore 2

The OBIS Schema Version 1.1: Definition of the data standard OBIS uses

WHAT?

Scientific Name	Required	Text	The full name of lowest level taxon the Cataloged Item can be identified as a member of; includes genus, specific epithet, and subspecific epithet (zool.) or infraspecific rank abbreviation, and infraspecific epithet (bot.) Use name of suprageneric taxon (e.g., family name) if Cataloged Item cannot be identified to genus, species, or infraspecific taxon.

+

WHERE?

Latitude	Required	Numeric	The latitude of the location from which the specimen was collected. This value should be expressed in decimal degrees (East & North = +; West & South = -). GPS-derived data must use the WGS 84 geodetic reference system (http://www.wgs84.com/).
Longitude	Required	Numeric	The longitude of the location from which the specimen was collected or in which the sample/observation/record event occurred. This value should be expressed in decimal degrees (East & North = +; West & South = -). GPS-derived data should be referenced to the WGS/84 datum.

OBIS data schema (2)

BY WHO?

Institution Code	Required	Text	A "standard" code identifier that identifies the institution to which the collection belongs, if there is one. Use the code that is "standard" in your discipline, if there is one (no global registry exists for assigning institutional codes). If not, use a short version of the name of the institution. (e.g. "NMNH" for Smithsonian National Museum of Natural History or "Duke" for Duke University) .
Collection Code	Required	Text	A unique alphanumeric value which identifies the collection within the institution (e.g. "FishBase") .
Catalog Number	Required	Text / Numeric	A unique alphanumeric value which identifies an individual record within the collection, i.e. the key. It is recommended that this value provides a key by which the actual specimen/observation can be identified. If the specimen/observation has several items such as various types of preparation, this value should identify the individual component of the specimen

OBIS data schema (2)

WHEN?

Year Collected	Highly Recommended	Numeric	The year (expressed as an integer) the sample/observation/record event occurred. The full year should be expressed (e.g. 1972 must be expressed as "1972" not "72"). Must always be a four digit integer. Where the event covers a range of values for year, indicates the mid-point of that range.
Month Collected	Highly Recommended	Numeric	The month of year the sample/observation/record event occurred in the field. Where the event covers a range of values for month, indicates the mid-point of that range. Leave blank if even spans multiple years.
Day Collected	Highly Recommended	Numeric	The day of the month the sample/observation/record event occurred in the field. Possible value ranges from 01..31 inclusive. Where the event covers a range of values for day, indicates the mid-point of that range. Leave blank if event spans multiple months.
Time of Day	Highly Recommended	Numeric	The time of day a specimen was collected expressed as decimal hours from midnight (e.g. 12.0 = mid day, 13.5 = 1:30pm)
Time Zone	Highly Recommended	Text	Indicates the time zone for the Time of Day measurement, given as +hh:mm or -hh:mm from Coordinate Universal Time (also called Greenwich Mean Time). For example, a local time for Tokyo would have "+09:00" in the Time Zone field.

- It is highly recommended to include date information!
- Note “Time of Day” in decimal hours
- All 5 fields can be supplied together in one “**eventDate**” field using the ISO 8601 International Standard for Dates.

OBIS data schema (3)

HOW MANY?

Individual Count	Optional	Numeric	The number of individuals present in the lot or container. Not an estimate of abundance or density at the collecting locality.
SampleSize	Highly Recommended	Text	Samplesize: the size of the sample from which the collection/observation was drawn. It can be a volume (e.g. for a phytoplankton sample), a linear distance (e.g. for a visual transect or net haul), a surface area (e.g. for a benthic core), etc. This field must also include the units, e.g. ?200 m? for a transect, or ?0.25 m^2? for a benthic grab (use ^ to denote a superscript). Note that when multiple collections/observations are reported from the same physical sample, a code identifying the sample can be placed in the Field_Number field to allow all collections/observations from a single sample to be connected.
Observed Individual Count	Highly Recommended	Numeric	The number of individuals (abundance) found in a collection/record event.
Observed Weight	Optional	Numeric	The total biomass found in a collection/record event. Expressed as kg.

Individual Count: the number of specimens that were saved or subsampled (museum collections)

Observed Individual Count: the total number per species that were caught / observed (OBIS addition)

Observed weight: Biomass

Sample Size: indication of the size of the studied sample (area, volume, distance)

=> Without this, the 'count' values are almost meaningless…

2. Quality control

- Taxonomic quality control

Dataset	Before tax. check		After tax. check
1	*Amphiura sunderali*		
2	*Amphiura sundevali*		*Amphiura sundevalli*
3	*Amphiura sundvali*		
4	*Amphiura sundevalli*		

WoRMS
World Register of Marine Species

Taxonomic QC – the concept

<table>
<tr><th colspan="3">1. Level: Quality control of taxonomy</th></tr>
<tr><th colspan="2">Species name matches with database?
NO</th><th>YES</th></tr>
<tr><th>Spelling error or synoym of an existing record?
NO</th><th>YES</th><th rowspan="2">Record was used as correct</th></tr>
<tr><td>Identification uncertain (cf), not identified to species level (sp.; spp.) or two different species names were given</td><td rowspan="2">Correction of spelling or mapping to actual name</td></tr>
<tr><td>Taxonomy was reduced to the first common higher and certain classification level</td><td></td></tr>
</table>

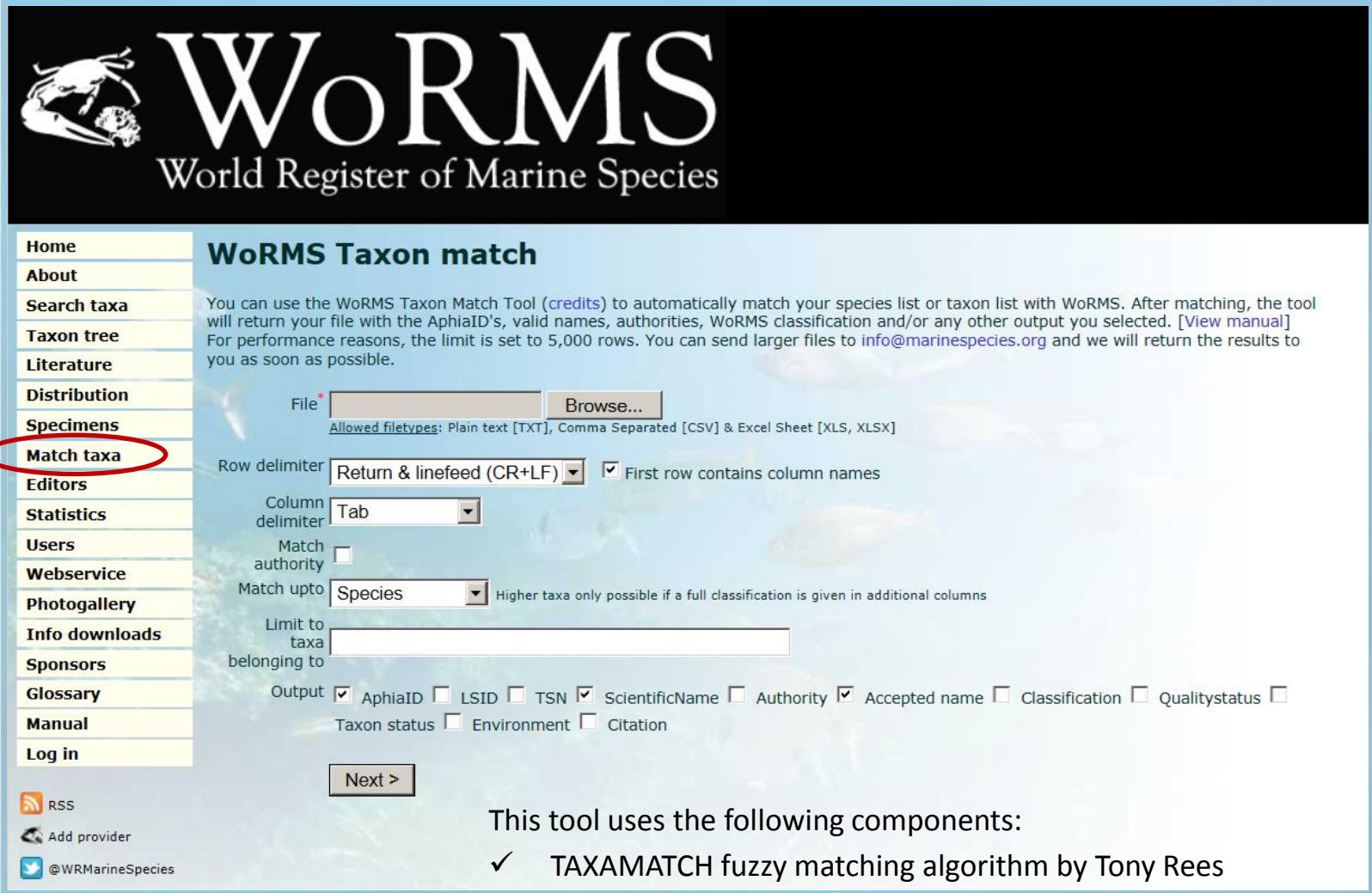
Need to comply with a certain taxonomic standard,

to be able to compare data from different datasets

VLIZ

QC tools: WoRMS Taxon Match Tool

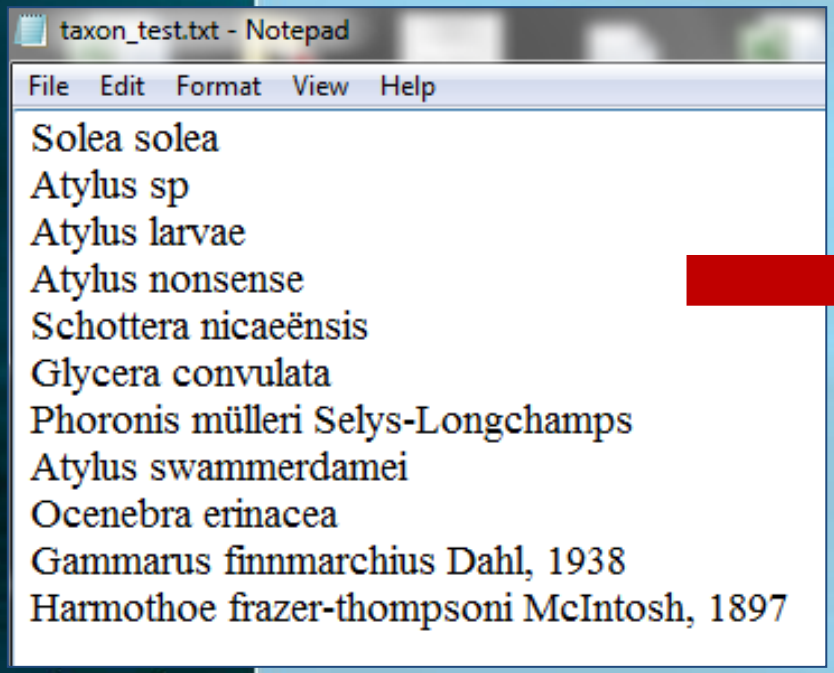
Freely available, no password/login required



This tool uses the following components:

- ✓ TAXAMATCH fuzzy matching algorithm by Tony Rees
- ✓ PHP/MySql port of TAXAMATCH by Michael Giddens
- ✓ Scientific Names Parser by Dmitry Mozzherin

- ✓ Prepare your own file (Plain text [TXT], Comma Separated [CSV] & Excel Sheet [XLS, XLSX]
- ✓ For convenience => colum “scientific_name”
- ✓ Upload onto website



Taxonomic QC

Aphia Taxon match

Match preview for the file 'taxon_test2.txt' - matching: 91.67% [new match]
If available, please select the Aphia taxon that corresponds to your taxon. Then click 'Download'.

ScientificName	Aphia match
Solea solea	Solea solea (Linnaeus, 1758)
Atylus sp	Atylus Leach, 1815
Atylus larvae	Atylus Leach, 1815
Atylus nonsense	(none)
Buccinum fusiforme	(ambigous - select below)
Schottera nicaeënsis	
Glycera convulata	
Phoronis mülleri Selys-Longchamps	
Atylus swammerdamei	Atylus swammerdami (Milne-Edwards, 1830)
Ocenebra erinacea	Ocenebra erinaceus (Linnaeus, 1758)
Gammarus finnmarchius Dahl, 1938	Gammarus finmarchicus Dahl, 1938
Harmothoe frazer-thompsoni McIntosh, 1897	Harmothoe fraserthomsoni McIntosh, 1897

(ambigous - select below)
(ambigous - select below)
Buccinum fusiforme Broderip, 1830 accepted as Turrisipho fenestratus (Turton, 1834) [exact]
Buccinum fusiforme Kiener, 1834 accepted as Buccinum humphreysianum Bennet, 1824 [exact]

Excel sheet Excel 2007 sheet Text file SGML

< Back Download

VLIZ

Taxonomic QC

	A	B	C	D	E	F	G
1	**ScientificName**	**AphiaID**	**Match typ**	**LSID**	**TSN**	**Qualitystatus**	**Taxon status**
2	Solea solea	127160	exact	urn:lsid:marinespecies.org:taxname:127160	173002	Checked by Taxonomic Editor	accepted
3	Atylus sp	101497	exact	urn:lsid:marinespecies.org:taxname:101497	93514	Checked by Taxonomic Editor	accepted
4	Atylus larvae	101497	exact	urn:lsid:marinespecies.org:taxname:101497	93514	Checked by Taxonomic Editor	accepted
5	Atylus nonsense						
6	Schottera nicae	494793	exact	urn:lsid:marinespecies.org:taxname:494793		Checked by Taxonomic Editor	unaccepted
7	Glycera convulata	155109	exact	urn:lsid:marinespecies.org:taxname:155109		Added by Database Management Team	unaccepted
8	Phoronis m	128549	phonetic	urn:lsid:marinespecies.org:taxname:128549	206663	Checked by Taxonomic Editor	accepted
9	Atylus swammerdamei	102131	phonetic	urn:lsid:marinespecies.org:taxname:102131	93523	Checked by Taxonomic Editor	accepted
10	Ocenebra erinacea	140405	near_1	urn:lsid:marinespecies.org:taxname:140405	73249	Checked by Taxonomic Editor	accepted
11	Gammarus finnmarchius Dahl, 1938	102277	near_2	urn:lsid:marinespecies.org:taxname:102277	206449	Checked by Taxonomic Editor	accepted
12	Harmothoe frazer-thompsoni McIntosh, 1897	130764	near_2	urn:lsid:marinespecies.org:taxname:130764	64526	Checked by Taxonomic Editor	accepted

	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	**ScientificName**	**Authority**	**AphiaID_a**	**ScientificName_accepted**	**Kingdom**	**Phylum**	**Class**	**Order**	**Family**	**Genus**	**Species**	**Citation**	
2	Solea solea	(Linnaeus, 1758)	127160	Solea solea	Animalia	Chordata	Actinopterygii	Pleuronect	Soleidae	Solea	solea	Bailly, N. (2011). Sole	
3	Atylus	Leach, 1815	101497	Atylus	Animalia	Arthropoda	Malacostraca	Amphipoda	Atylidae	Atylus		Lowry, J.; De Broyer,	
4	Atylus	Leach, 1815	101497	Atylus	Animalia	Arthropoda	Malacostraca	Amphipoda	Atylidae	Atylus		Lowry, J.; De Broyer,	
5													
6	Schottera nicaeënsis	(J.V.Lamouroux ex	145666	Schottera nicaeensis	Plantae	Rhodophyta	Florideophyceae	Gigartinale	Phyllophor	Schottera	nicaeënsis	Guiry, M.D. (2011). S	
7	Glycera convulata		130120	Glycera convoluta	Animalia	Annelida	Polychaeta	Phyllodoci	Glyceridae	Glycera	convulata	WoRMS (2010). Glyc	
8	Phoronis muelleri	Selys-Lonchamps,	128549	Phoronis muelleri	Animalia	Phoronida				Phoronis	muelleri	Emig, C. (2011). Phor	
9	Atylus swammerdami	(Milne-Edwards, 18	102131	Atylus swammerdami	Animalia	Arthropoda	Malacostraca	Amphipoda	Atylidae	Atylus	swammerdami	Costello, M.; Bellan-S	
10	Ocenebra erinaceus	(Linnaeus, 1758)	140405	Ocenebra erinaceus	Animalia	Mollusca	Gastropoda	Neogastro	Muricidae	Ocenebra	erinaceus	Houart, R.; Gofas, S.	
11	Gammarus finmarchicus	Dahl, 1938	102277	Gammarus finmarchicus	Animalia	Arthropoda	Malacostraca	Amphipoda	Gammarid	Gammarus	finmarchicus	Costello, M.; Bellan-S	
12	Harmothoe fraserthomsoni	McIntosh, 1897	130764	Harmothoe fraserthomsoni	Animalia	Annelida	Polychaeta	Phyllodoci	Polynoidae	Harmothoe	fraserthomsoni	Fauchald, K.; Barnich	

VLIZ

- **WoRMS taxon match results:**
  - Exact match
  - Phonetic match
  - Near_1 match
  - Near_2 match
  - No match

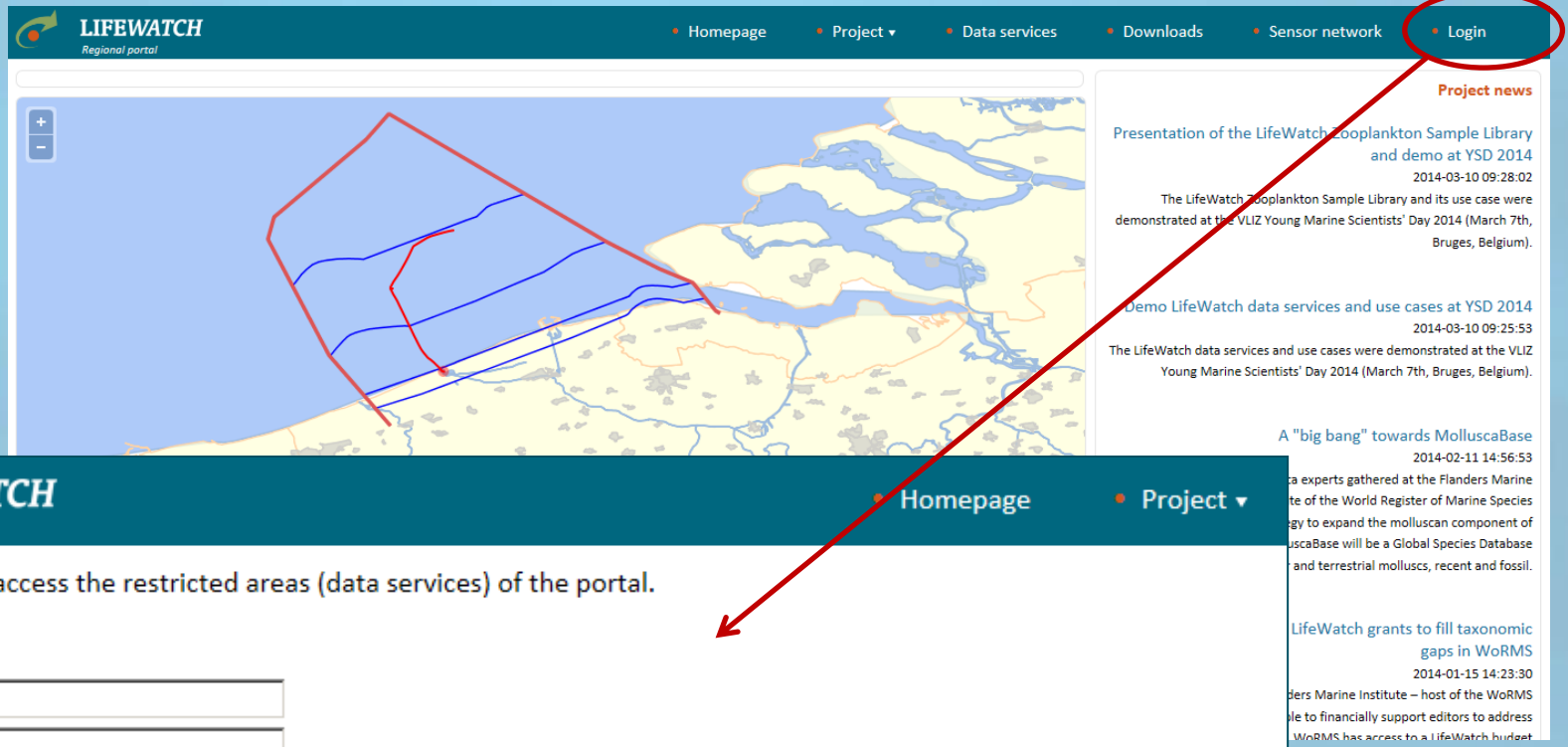
  Check and verify everything that is not an exact match…

- **Some examples:**
  - Phonetic: *Fragilaria auriviIIii => Fragilaria auriviIii*
  - Near_1: *Chaetoceros seychellarum => Chaetoceros seychellarus*
  - Near_2: *Gammarus finnmarchius => Gammarus finmarchicus*

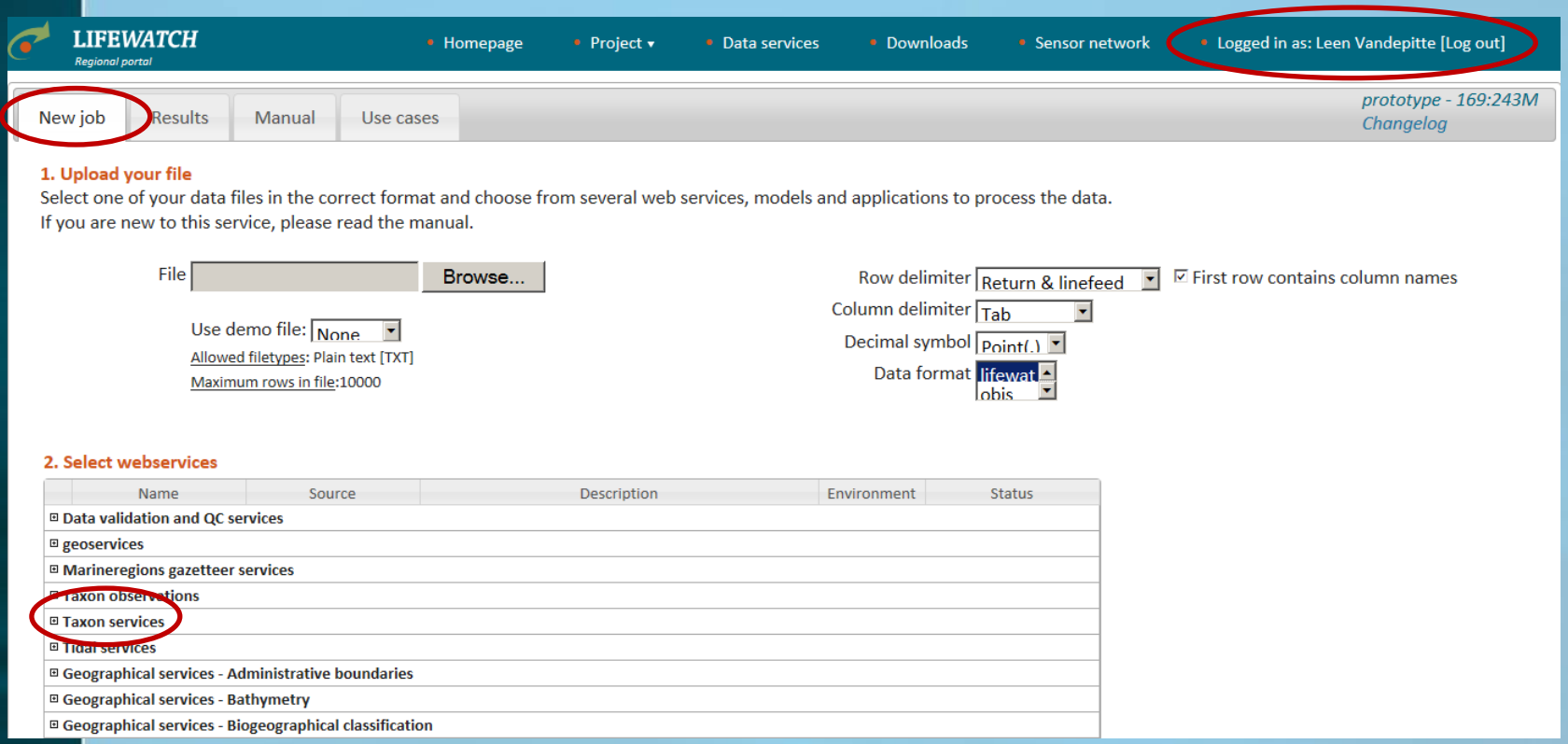
    Syllis armoricanus => Syllis armoricana

LifeWatch web services for non-WoRMS-matching taxa

- Login / password required
- System keeps track of all your “jobs”



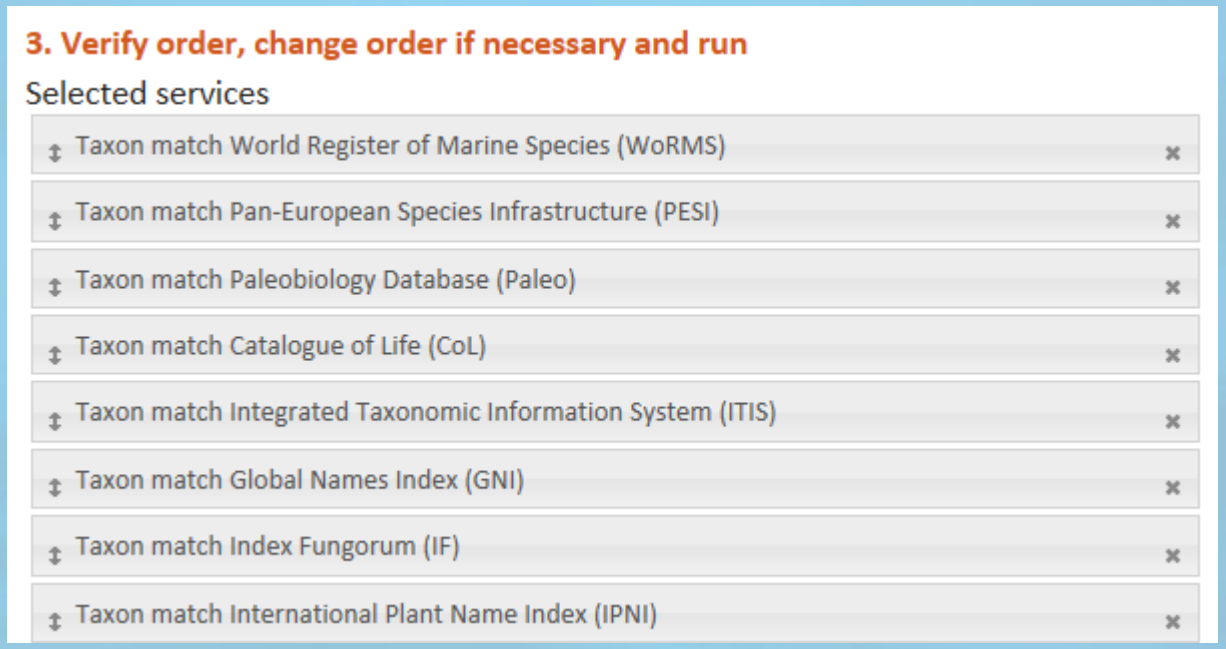
Taxonomic QC



Taxon services					
☑	Taxon match	WoRMS CoL ITIS PESI IPNI	Matches your taxon list with the World Register of Marine Species (WoRMS), Catalogue of Life (CoL), ... Read more	Marine & terrestrial	Taxon list is limited to 5000 records; The current status of PaleoDB is unconfirmed

VLIZ

- **Currently available taxon services**

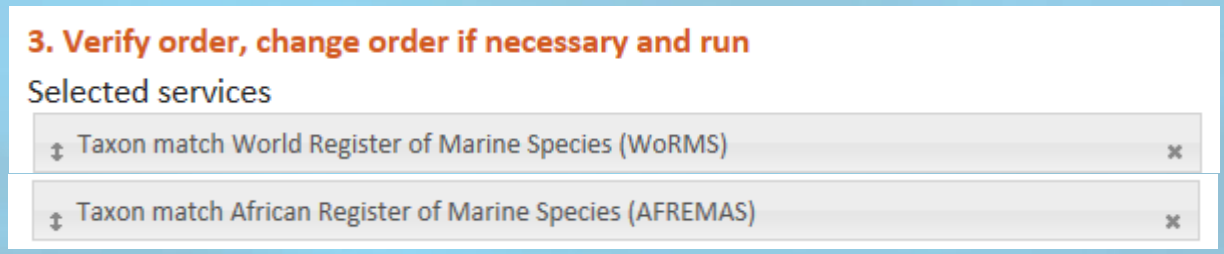


If a taxon is not in WoRMS:
- Send email to info@marinespecies.org
- Let us know if it is available in any of the other registers

VLIZ

Does my species list make “African” sense?

- **Check your species list against AfReMaS**
  - LifeWatch web services
  - Taxon services
  - Taxon match
  - Taxon match African Register of Marine Species



If a taxon is in WoRMS, but not in AfReMaS:
- Send email to info@marinespecies.org

Option 1: AfReMaS (=work in progress) is incomplete
Option 2: the dataset contains a wrong identification

Taxonomic QC

Preview of the file 'test_file_use_case_1.txt' (first 20 records)

Please select a columnname from the dataformat term that corresponds to your column and click 'Start'.

column 0	column 1	column 2
ScientificName	Latitude	Longitude
scientificname	**latitude**	**longitude**
Abludomelita obtusata	51.14	2.376667
Abra	51.29117	2.524167
Abra alba	51.12267	2.53333
Abra prismatica	51.12183	2.603333
Acanthomysis longicornis	51.12183	2.603333
Acari	51.09076	2.370717
Acartia clausi	51.30833	2.626333
Achelia	51.185	2.701167
Achelia hispida	51.185	2.701167
Acidostoma obesum	51.27917	2.616667
Acrocnida brachiata	51.27083	2.905

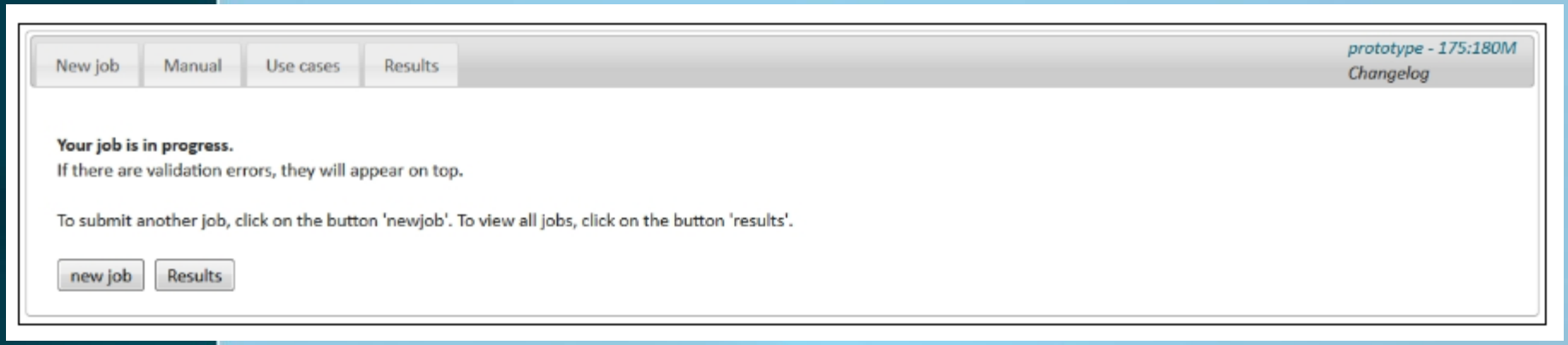
Your concatenated webservices are stated below.

1. Taxon match World Register of Marine Species (WoRMS)
2. Number of observations in a 1000m radius around a point

legend :

- Field is present in the inputfile.
- Field is present in the output of previous webservices.
- Field is missing from inputfile and from the output of previous webservices.
- There are more than one possible input fields, choose the preferred field.

VLIZ



New job | Results | Manual | Use cases

Below you will find a list of previously executed jobs. refresh table

jobs

date	filename	resultreport	resultfile	status	comment
2014-03-12 14:29	test_file_geographical_services.t	open	6139_test_file_geographical_services.tab	done	
2014-03-12 14:26	test_file_geographical_services.t	open	6138_test_file_geographical_services.tab	done	
2014-01-14 16:31	gbif_8006_geo.txt	open	5209_gbif_8006_geo.txt	done	
2013-12-03 17:12	testfile_taxonmatch.txt	open	5003_testfile_taxonmatch.txt	done	
2013-11-29 15:25	testfile_taxonmatch.txt	open	4906_testfile_taxonmatch.txt	done	
2013-11-29 11:58	testfile_taxonmatch.txt	open	4881_testfile_taxonmatch.txt	done	test taxon match worms op lifewatch
2013-11-29 10:32	testfile_taxonmatch.txt	open	4866_testfile_taxonmatch.txt	done	test op w1
2013-07-30 15:38	test_coscinodiscus_wailesii.txt	open	20130730153840_test_coscinodiscus_wailesii.txt	done	
2013-07-30 15:29	test_coscinodiscus_wailesii.txt	open	20130730152944_test_coscinodiscus_wailesii.txt	done	
2013-07-02 17:06	gbif_3363_geo.csv	open	20130702170525_gbif_3363_geo.csv	done	
2013-06-27 15:37	gbif_8006_geo.txt	open	20130627153737_gbif_8006_geo.txt	done	demofile
2013-05-07 15:25	testfile_lifewatch_services.txt	open	20130507152541_testfile_lifewatch_services.txt	done	
2013-05-07 15:08	occurrence_IPT_test.txt	open	20130507150850_occurrence_ipt_test.txt	done	
2013-04-22 15:46	Autherkeywords_lifewatchTest.t	open	20130422154557_autherkeywords_lifewatchtest	done	

VLIZ

EXERCISE

=> Find the dataset "*KMFRI_data_arch_12909*".

=> Dataset contains hyperbenthos data of the Gazi Bay in Kenya, collected in 1994.

=> Perform a quality control on this fictional dataset, and find all the mistakes.
(both typical and less obvious mistakes)

=> Use the Belgian LifeWatch e-Lab web services and your common sense.

- Taxonomic QC: LifeWatch "Taxon match"
  Check everything without an exact Aphia match

- Geographic QC: LifeWatch "Show on map"
  LifeWatch "MarineRegions gazetteer services"

- Other checks: Dates, Units, etc. (Hint: use the filters in the Excel file!)

3. Retrieve additional data from OBIS

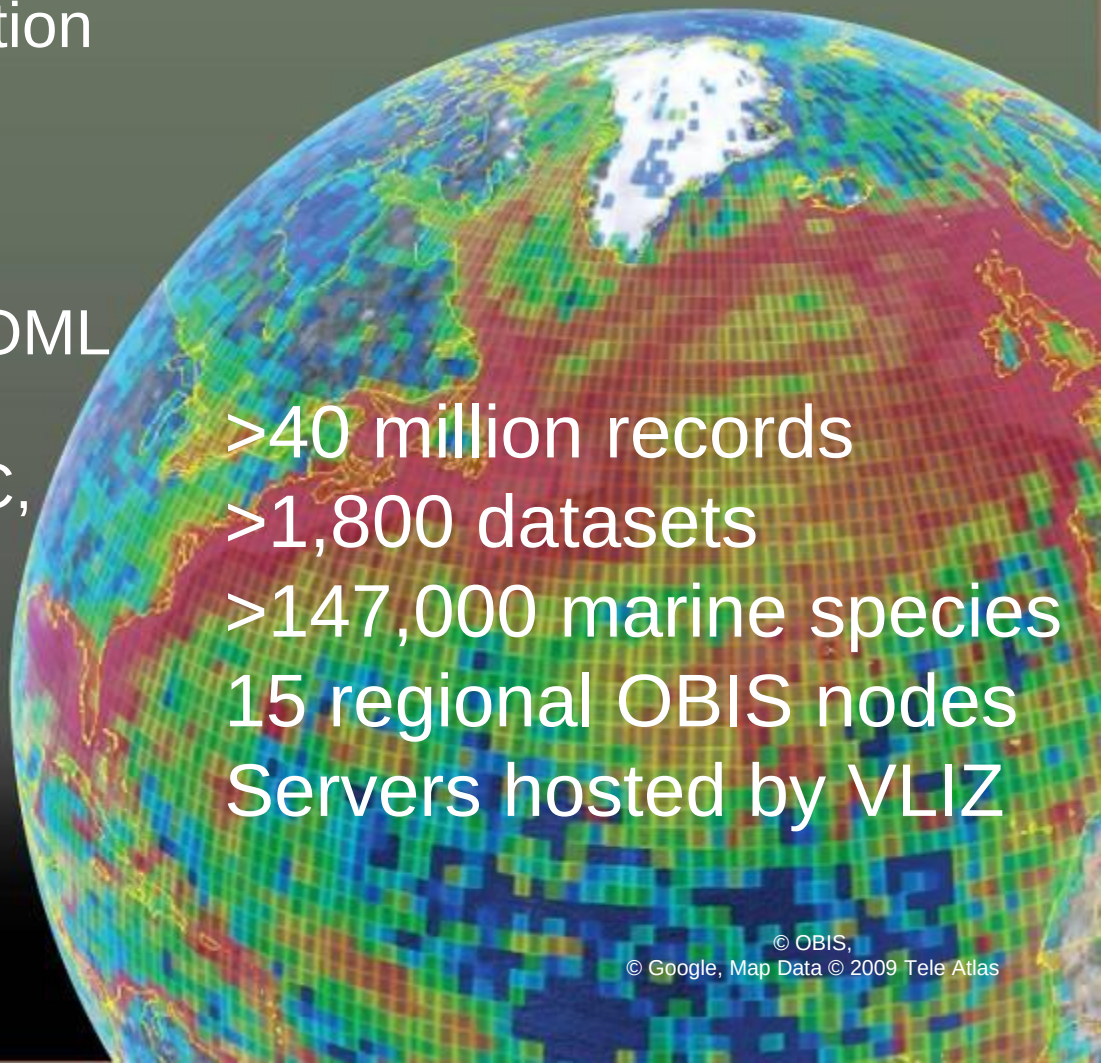
Ocean Biogeographic Information System

Largest source of information on marine species distributions

Data legacy of 10-year COML

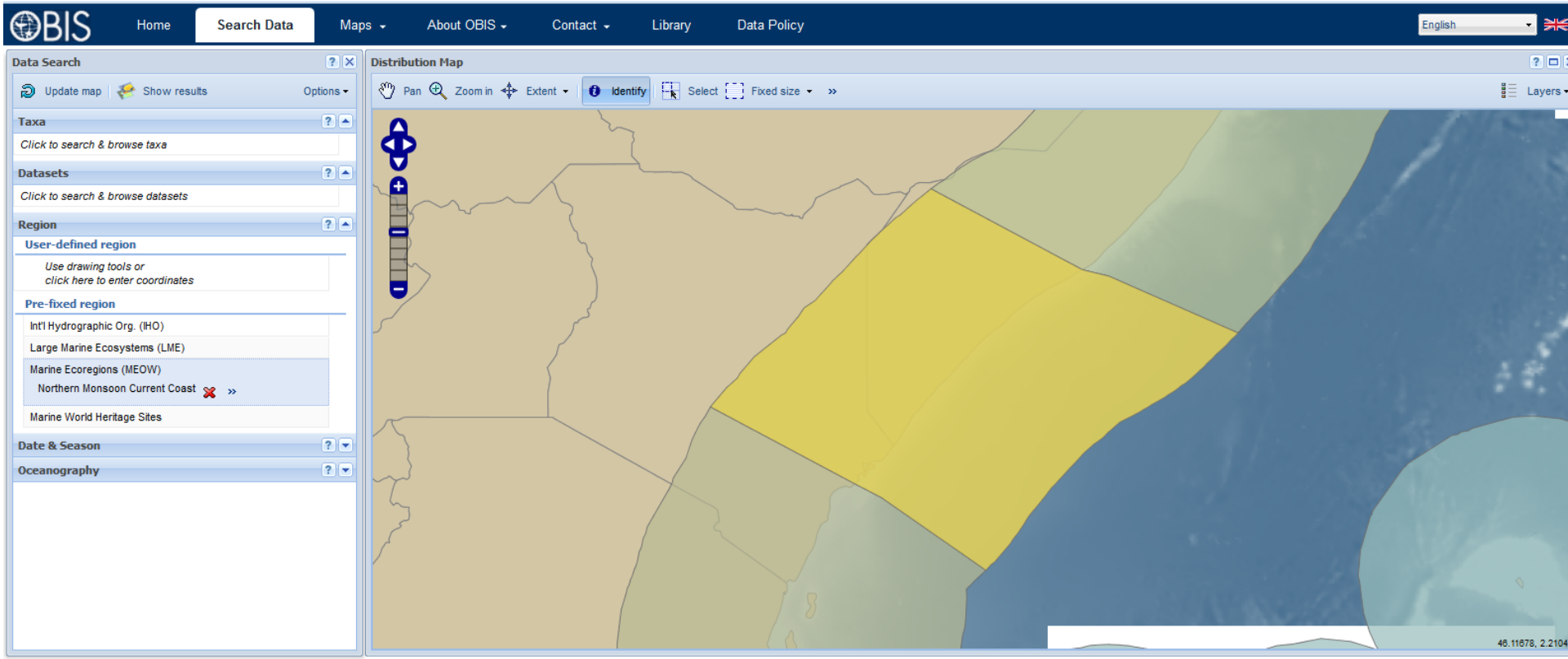
Adopted by UNESCO-IOC, project of IODE

http://www.iobis.org



UNESCO

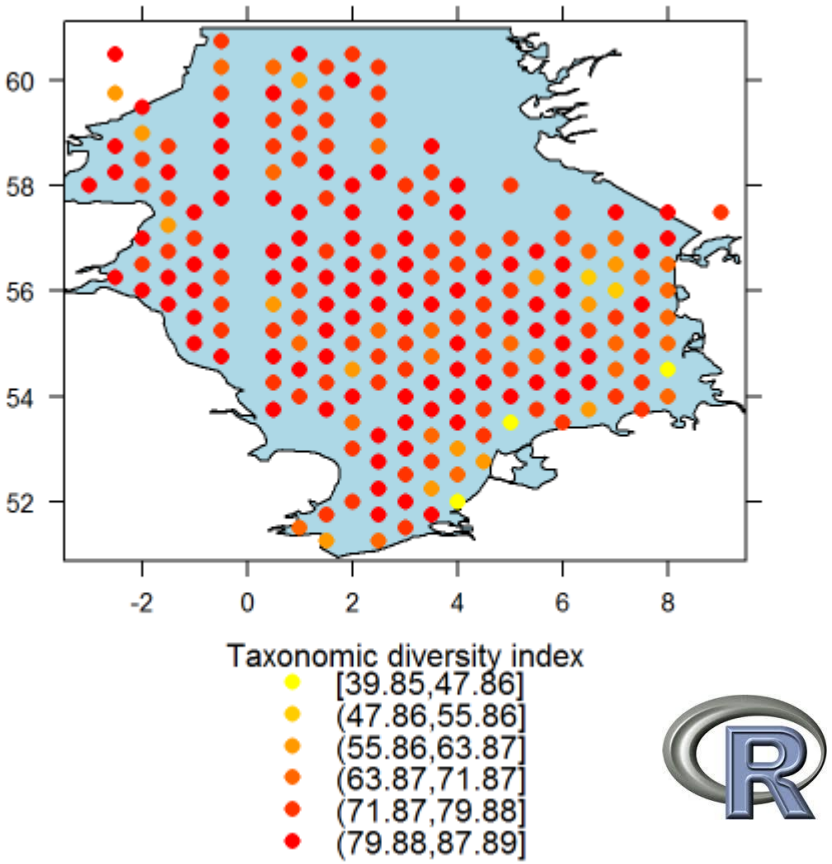
http://www.iobis.org/



Data Center VLIZ , KMFRI

Mtafiti training workshop

4. Visualisation and analysis


60
58
56
54
52
-2
0
2
4
6
8
Taxonomic diversity index
[39.85,47.86]
(47.86,55.86]
(55.86,63.87]
(63.87,71.87]
(71.87,79.88]
(79.88,87.89]