Marineregions.org

towards a standard for georeferenced marine names

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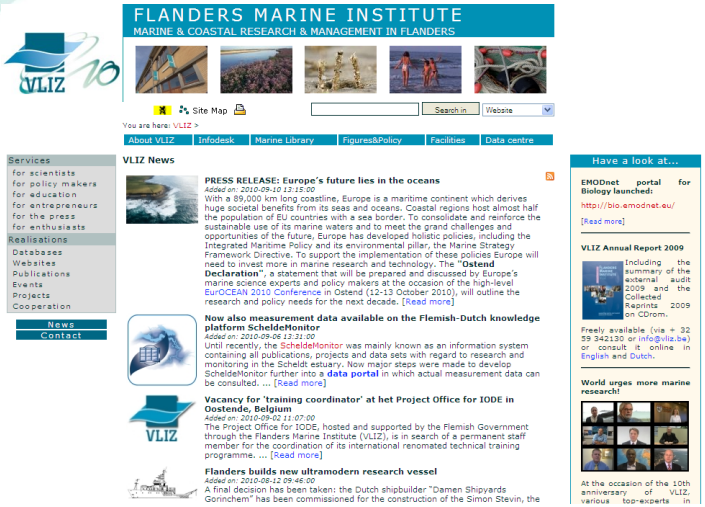
Flanders Marine Institute (VLIZ)

27th SCUFN meeting, 16-20 June, Monaco

Vlaams instituut voor de zee

VLIZ
Flanders Marine Institute



- Created in 1999
- Located in Oostende, Belgium
- Objective: facilitate marine research in Flanders & Belgium
- VLIZ Staff: 67 – datacentre Staff: 28
- 27 international networks

Vlaams instituut voor de zee

VLIZ
Vlaams Instituut voor de Zee

IODE
Intergovernmental Oceanographic Commission of UNESCO
International Oceanographic Data and Information Exchange

OBIS
OCEAN BIOGEOGRAPHIC INFORMATION SYSTEM

WoRMS
World Register of Marine Species

ICSU
WORLD DATA SYSTEM

IOC
SEA LEVEL STATION MONITORING FACILITY

EMODnet
European Marine Observation and Data Network

ESFRI European Strategy Forum on Research Infrastructures

Taxonomic synonyms

Some names are more hard to spell than others

Actinobacillus actimomycetemcomitans
Actinobacillus actimycetemcomitans
Actinobacillus actinmycetemcomitans
Actinobacillus actinomicetemcomitans
Actinobacillus actinomy
Actinobacillus actinomyce
Actinobacillus actinomycemcomitans
Actinobacillus actinomyceremcomitans
Actinobacillus actinomycetam
Actinobacillus actinomycetamcomitans
Actinobacillus actinomycetecomitans
Actinobacillus actinomycetemcmitans
Actinobacillus actinomycetemcomintans
Actinobacillus actinomycetemcomitance
Actinobacillus actinomycetemcomitans
Actinobacillus actinomycetemcomitants

- Difficulties with Latinized Names
- Transcription errors

Actinobacillus actinomycetemcommitans
Actinobacillus actinomycetemocimitans
Actinobacillus actinomycetencomitans
Actinobacillus actinomycetum
Actinobacillus actinomyctemcomitans
Actinobacillus actinomyectomcomitans
Actinobacillus actinomyetemcomitans
Actinobacillus actinonmycetemcomitans
Actinobacillus actionomycetemcomitans
Actinobacillus actynomicetemcomitans
Actinobacillus antinomycetemcomitans

Which one is the correct one?

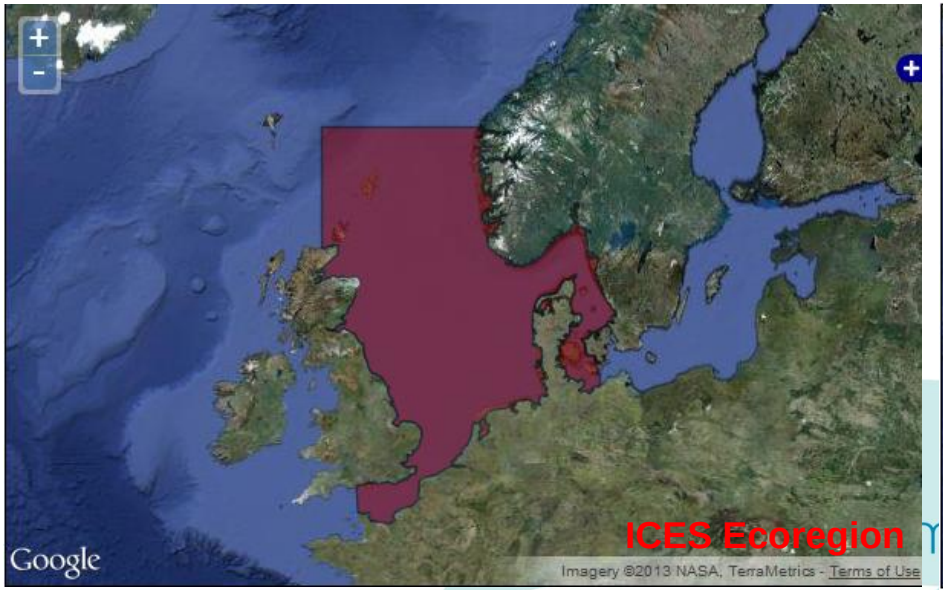
Objectives Marine datasystems @ VLIZ

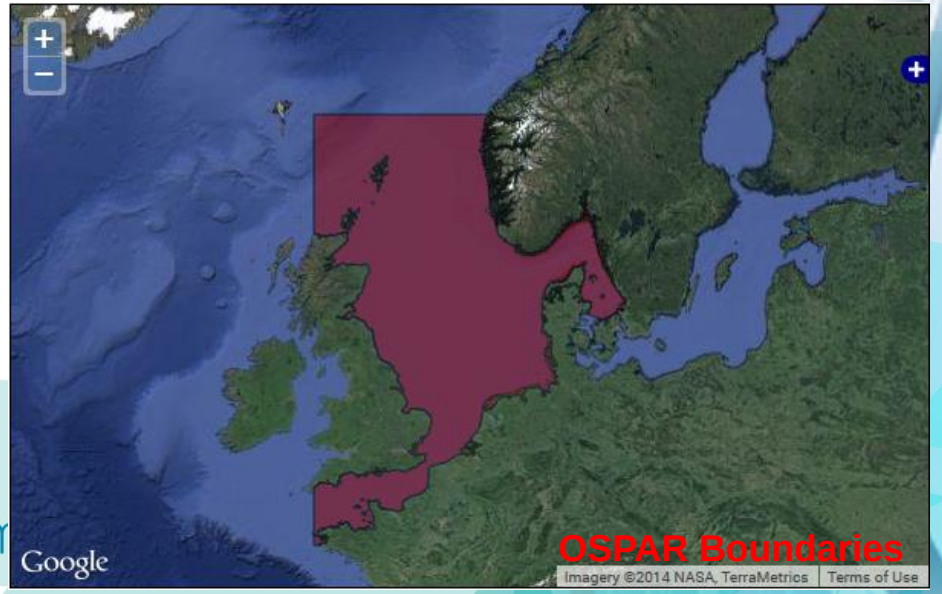
- VLIZ is a National Oceanographic Data Centre (NODC): need to group and structure in a standardized way marine geographic information
  - ➢ to create a standardized list of marine geographic placenames, together with its coordinates and source

Problem….

- Definition of marine placenames not straightforward
  - ➢ Clear definitions lacking
  - ➢ Different definitions and names of same feature

The North Sea?



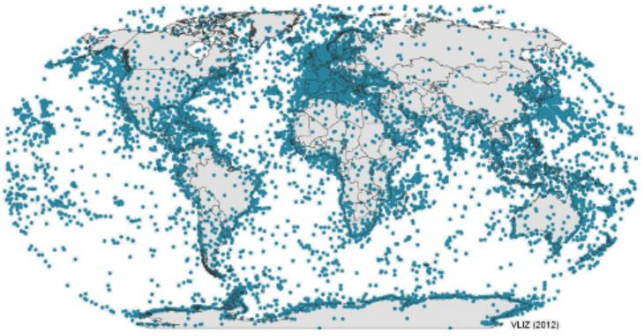


Initiatives

- VLIMAR: Marine gazetteer (2005)
- MARBOUND: The world EEZ boundaries (2005)
- Towards one system: Marine Regions (2012)

Data content Marine Regions (17/06/2014)

40,128 place names, representing 32,402 marine geographic places



- Regional checklists
  (Antarctic, Black Sea, North Sea…)
- Global checklists
  (SCUFN, UNESCO Marine Heritage Sites, ASFA, WoRMS)
- Thematic gazetteers
  (Natura, UNESCO Marine Heritage, Contourites)
- Fishing zones
  (FAO, NAFO, ICES)
- Marine boundaries
  (EEZ, IHO, Seavox, Marine Regions…)
- Ecological classifications
  (LME, Longhurst, MEOW, ICES)

Database structure: one geographic entity (**geoobject**) has

- ✓ Coordinates (centroid, bb, polyline, polygone)
- ✓ Placetype (300)
  - ✓ Physical: bay-trench-sandbank-seamount, sea…
  - ✓ Administrative: Marine protected area, Fisheries zone, EEZ
- ✓ But can have multiple names: name not unique!!
- ✓ Multiple relations between two geoobjects
  - ✓ North Sea part of NEA=>create a hierarchy
  - ✓ Norh Sea adjacant to Norwegian Sea, North Sea is partly part of UK EEZ
  - ✓ But also ‘similar to’, ‘replaced by’!! (cfr synonymy in taxonomy!)
- ✓ **Always refer to datasource!**

Marine Regions: MRGID

Marineregions.org

towards a standard for georeferenced marine names

About | Marine Gazetteer | EEZ boundaries | Sources | Statistics | Downloads

About
Standards
Disclaimer
FAQ
Editors

Standards

Place names change over time, and the same names may be used for different locations. Available gazetteers may find locations of some marine place names, but a truly global standard for marine place names is lacking. Marine Regions tries to establish for the first time a standardized list of georeferenced marine place names and marine areas. In order to preserve the identity of the marine geographic objects from the database, and to name and locate the geographic resources on the web, we promote the Marine Regions Geographic IDentifier, or the **MRGID**.

MRGID

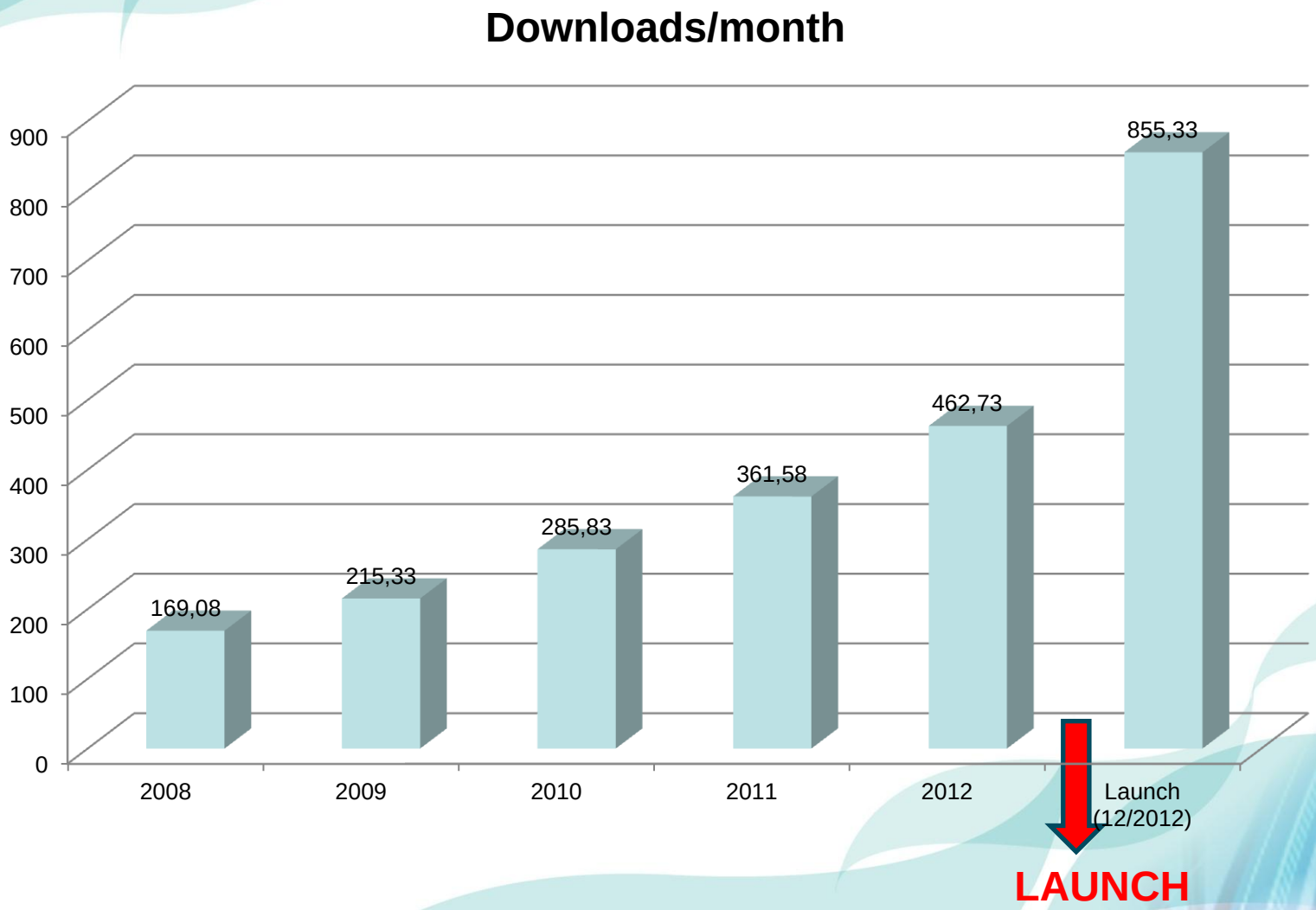
Marine **R**egions **G**eographic **ID**entifier

- unique:
- persistent:
- identifier: to refer to a Geographic Object

For an identifier to be persistent, it requires the governing body to arrange for the identifier to be available for the long term. Use of the MRGID, as URI and persistent identifier has the commitment of the Flanders Marine Institute, issuing the identifier to maintain the http domain registration, and a strategy for managing the domain and the web servers.

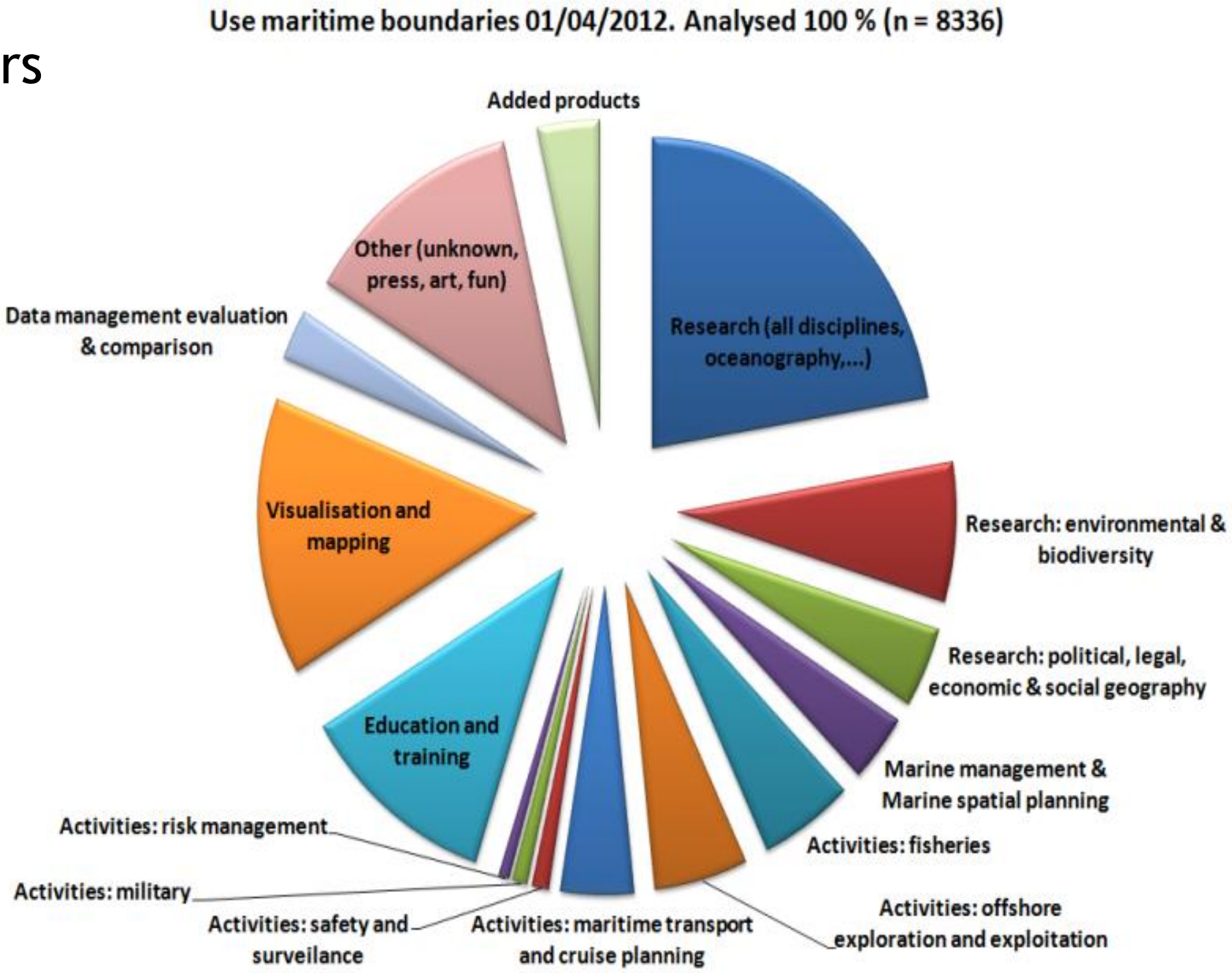
Vlaams instituut voor de zee

Users



Vlaams instituut voor de zee

Users


Use maritime boundaries 01/04/2012. Analysed 100 % (n = 8336)
Added products
Other (unknown, press, art, fun)
Data management evaluation & comparison
Research (all disciplines, oceanography,...)
Visualisation and mapping
Research: environmental & biodiversity
Research: political, legal, economic & social geography
Education and training
Marine management & Marine spatial planning
Activities: risk management
Activities: fisheries
Activities: military
Activities: offshore exploration and exploitation
Activities: safety and surveilance
Activities: maritime transport and cruise planning

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Marine Regions: Towards a Global Standard for Georeferenced Marine Names and Boundaries

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GIS has become an indispensable tool for managing and displaying marine spatial data. However, a unique georeferenced standard of marine place names and boundaries has yet to be established. As such, an online, open-access, standardized, hierarchical list of geographic names, that is, Marine Regions, has been developed, linking each of these names to information and maps of the geographic location. The objectives are to capture all geographic marine names worldwide, including ocean basins, seas, seamounts, sandbanks, ridges, bays, and other marine geographical place names and attributes, and to display univocally the boundaries of marine biogeographic or other managed marine areas in order to facilitate marine data management, marine (geographic) research and the management of marine areas. Marine Regions is freely available at http://www.marineregions.org.

Keywords Marine gazetteer, maritime boundaries, GIS, standards

Introduction

A necessary step in organizing existing knowledge in integrated information systems is the development of appropriate thesauri and classification systems. When integrating quantitative and qualitative natural history and distributional data, the use of geographical hierarchical schemas is essential (Reusser and Lee 2011). Standardized geographic units are needed to perform proper quality control of large-scale integrated biogeographic databases (Vandepitte et al. 2011). For the marine realm, however, such gazetteers are rarely available and generally have a limited geographical scope, or their focus is on a specific geological or biogeographical features. There are national geographical gazetteers available online that contain geographic information on marine place names. The American Geographic Names Data Base (GNDB), available online via the GEOnet Names Server (National Geospatial Agency, 2013), contains more than 4,800 undersea features with names approved by the United States Board on Geographic Names and is probably the most comprehensive world Gazetteer of Undersea Features (Bouma 1990). The Canadian Geographical Names

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Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/umgd.

Integrating GEBCO and ACUF gazetteers into Marine Regions

1. Background
2. GEBCO vs. ACUF
3. Workflow
4. Cases
5. Summary

Vlaan

1. Background

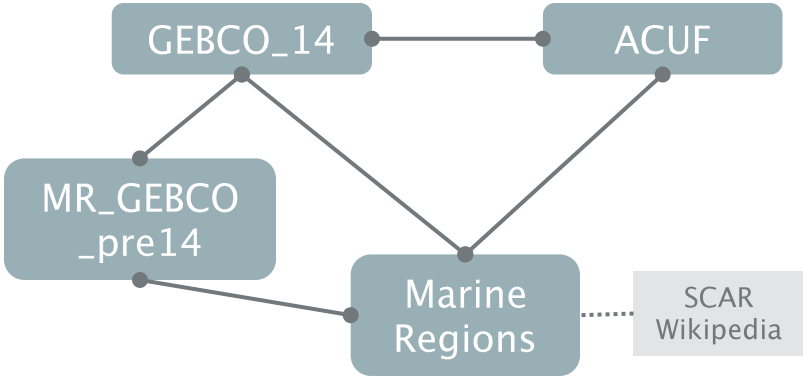
ACUF: Advisory Committee on Undersea Features

GEBCO: General Bathymetric Chart of the Oceans.
SCUFN: Sub-Committee on Undersea Feature Names.

Objective: to incorporate GEBCO and ACUF records into Marine Regions.

But:

- Different data architecture.
- Previous versions of GEBCO are in MR already .
- Some ACUF records will be in GEBCO.
- Other features might be in MR coming from other sources (SCAR, local gazetteers, etc.).



So,

- Set up a clear protocol that specifies which action needs to be taken for each particular situation.

3. Work flow

3.1. Place type matching

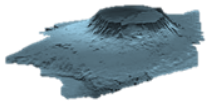
Geo-object =

Coordinates (lat-long)

x=17.13°
y=-177.25°

\+

Place type



Place name(s)

Cape Johnson Guyot
Cape Johnson Tablemount

	Fields		
	Marine Regions	**GEBCO**	**ACUF**
Coordinates	Latitude Longitude	Calculated latitude Calculated longitude	LAT LONG
Place type	PlacetypeID	Generic Term (excel) Type (shapefile)	DSG
Place name	GeoName	Specific Term (excel) Name (shapefile)	FULL_NAME
Synonyms	GeoNameID		UNI
ID	GeoObjectID		UFI

Place type matching

MR Place type	MR ID	GEBCO Place type
Abyssal Plain	67	Abyssal Plain
Apron	97	Apron
Bank(s)	79	Bank
Bank(s)	79	Banks
Basin	25	Basin
Basin	25	Basin and Ridge Province
Borderland	99	Borderland
Caldera(s)	64	Caldera
Caldera(s)	64	Calderas
Canyon(s)	58	Canyon
Canyon(s)	58	Canyons
Gap	140	Cap
Continental Slope	123	Continental Slope
Deep	37	Deep
Deep	37	Deeps
Discordance	263	Discordance
Escarpment	82	Escarpment
Fan	86	Fan
Fan	86	Cone
Fracture zone	55	Fracture Zone
Fracture zone	55	Fracture Zone System
Gap	140	Gap
Ground	35	Ground
Guyot(s)	66	Guyot
Guyot(s)	66	Guyots
Guyot(s)	66	Tablemount
Hill(s)	62	Hill
Hill(s)	62	Hills
Hole	74	Hole
Knoll(s)	84	Knoll
Knoll(s)	84	Knolls
Levee	102	Levee
Mound	317	Mound
Mound	317	Mounds

MR Place type	MR ID	GEBCO Place type
Mud Volcano	265	Mud Volcano
Passage	105	Pass
Passage	105	Passage
Peak(s)	106	Peak
Plain	63	Plain
Plateau	38	Plateau
Promontory	108	Promontory
Province (phys.)	320	Province
Reef(s)	88	Reef
Reef(s)	88	Reefs
Ridge(s)	30	Ridge
Ridge(s)	30	Ridges
Rift	264	Rift
Rise	89	Rise
Saddle	110	Saddle
		Seabight
Seachannel(s)	81	Sea Channel
Seachannel(s)	81	Seachannel
Seachannel(s)	81	Channel
Seamount(s)	57	Seamount
Seamount(s)	57	Seamounts
Seamount Chain	87	Seamount Chain
Seamount(s)	57	Seamount Group
Seamount Province	141	Seamount Province
Shelf	144	Shelf
Shoal(s)	112	Shoal
Shoal(s)	112	Shoals
Sill	113	Sill
Slope	61	Slope
Spur	60	Spur
Terrace	114	Terrace
Trench	91	Trench
Trough	59	Trough
Valley(s)	83	Valley
Valley(s)	83	Valleys

MR Place type	MR ID	Feat. Desig. Code	Feat. Desig. Name
Apron	97	APNU	undersea apron
Undersea arch	325	ARCU	undersea arch
Undersea arrugado	328	ARRU	undersea arrugado
Borderland	99	BDLU	undersea borderland
Bank(s)	79	BKSU	undersea banks
Bench	310	BNCU	undersea bench
Bank(s)	79	BNKU	undersea bank
Basin	25	BSNU	undersea basin
Cordillera	311	CDAU	undersea cordillera
Seachannel(s)	81	CHNM	marine channel
Canyon(s)	58	CNSU	undersea canyons
Canyon(s)	58	CNYU	undersea canyon
Continental rise	101	CRSU	continental rise
Deep	37	DEPU	deep
Shelf Edge	111	EDGU	undersea shelf edge
Escarpment	82	ESCU	undersea escarpment (or scarp)
Fan	86	FANU	undersea fan
Flat	131	FLTU	undersea flat
Fork(s)	312	FRKU	undersea fork
Fork(s)	312	FRSU	undersea forks
Fracture zone	55	FRZU	undersea fracture zone
Furrow	313	FURU	undersea furrow
Gap	140	GAPU	undersea gap
Gas field	94	GASF	gasfield
Gully	185	GLYU	undersea gully
Hill(s)	62	HLLU	undersea hill
Hill(s)	62	HLSU	undersea hills
Hole	74	HOLU	undersea hole
Knoll(s)	84	KNLU	undersea knoll
Knoll(s)	84	KNSU	undersea knolls
Ledge	314	LDGU	undersea ledge
Levee	102	LEVU	undersea levee
Median valley	103	MDVU	undersea median valley
Mesa	315	MESU	undersea mesa
Mound	317	MNDU	undersea mound
Moat	104	MOTU	undersea moat
Undersea mountain(s)	331	MTSU	undersea mountains
Undersea mountain(s)	331	MTU	undersea mountain
Oil field	93	OILF	oilfield
Peak(s)	106	PKSU	undersea peaks
Peak(s)	106	PKU	undersea peak
Platform	319	PLFU	undersea platform
Plain	63	PLNU	undersea plain
Plateau	38	PLTU	undersea plateau
Pinnacle	107	PNLU	undersea pinnacle
Province (phys.)	320	PRVU	undersea province
Ravine	323	RAVU	undersea ravine

MR Place type	MR ID	Feat. Desig. Code	Feat. Desig. Name
Ridge(s)	30	RDGU	undersea ridge
Ridge(s)	30	RDSU	undersea ridges
Reef(s)	88	RF	reef(s)
Reef(s)	88	RFSU	undersea reefs
Reef(s)	88	RFU	undersea reef
Rise	89	RISU	undersea rise
Ramp	321	RMPU	undersea ramp
Range	322	RNGU	undersea range
Seachannel(s)	81	SCNU	seachannel
Seachannel(s)	81	SCSU	seachannels
Saddle	110	SDLU	undersea saddle
Shelf	144	SHFU	undersea shelf
Shoal(s)	112	SHLU	undersea shoal
Shoal(s)	112	SHOL	shoal(s)
Shoal(s)	112	SHSU	undersea shoals
Shelf valley	324	SHVU	undersea shelf valley
Sill	113	SILU	undersea sill
Slope	61	SLPU	undersea slope
Seamount(s)	57	SMSU	seamounts
Seamount(s)	57	SMU	seamount
Spur	60	SPRU	undersea spur
Terrace	114	TERU	undersea terrace
Guyot(s)	66	TMSU	tablemounts (or guyots)
Guyot(s)	66	TMTU	tablemount (or guyot)
Tongue	217	TNGU	undersea tongue
Trough	59	TRGU	undersea trough
Trench	91	TRNU	undersea trench
Terrace	114	TRR	terrace
Historical undersea feature	329	UFHU	historical undersea feature
Valley	83	VALU	undersea valley
Valley	83	VLSU	undersea valleys

A definition is needed or the place type assigned needs to be reviewed. Appendix 1.b.

Incompatible / inconsistent definitions. Appendix 1.d.

Issues

Issues related to place type definitions and matching.

a) **The place type exists/is defined but it is not used (does not appear in the records).**

b) **GEBCO. The place type is used but a definition is not given.**

c) **ACUF. The feature code assigned to the geographic entity seems incorrect**

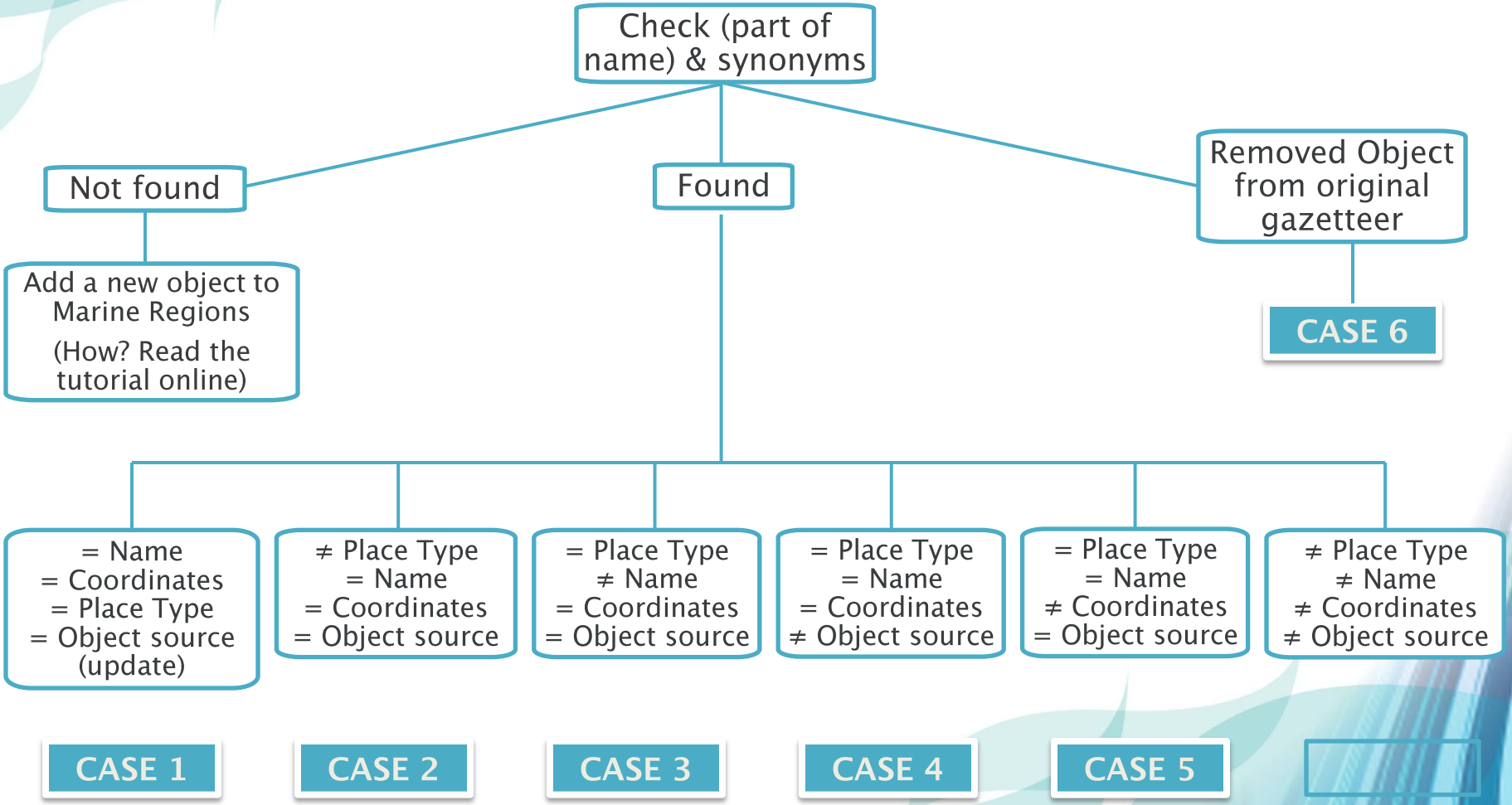
d) **Incompatible or inconsistent definitions.**

Examples of coordinates issues

a) **Coordinates of point features between ACUF and GEBCO different**

b) **Calculated coordinates (from polylines, polygons or multipoints)**

4. Cases

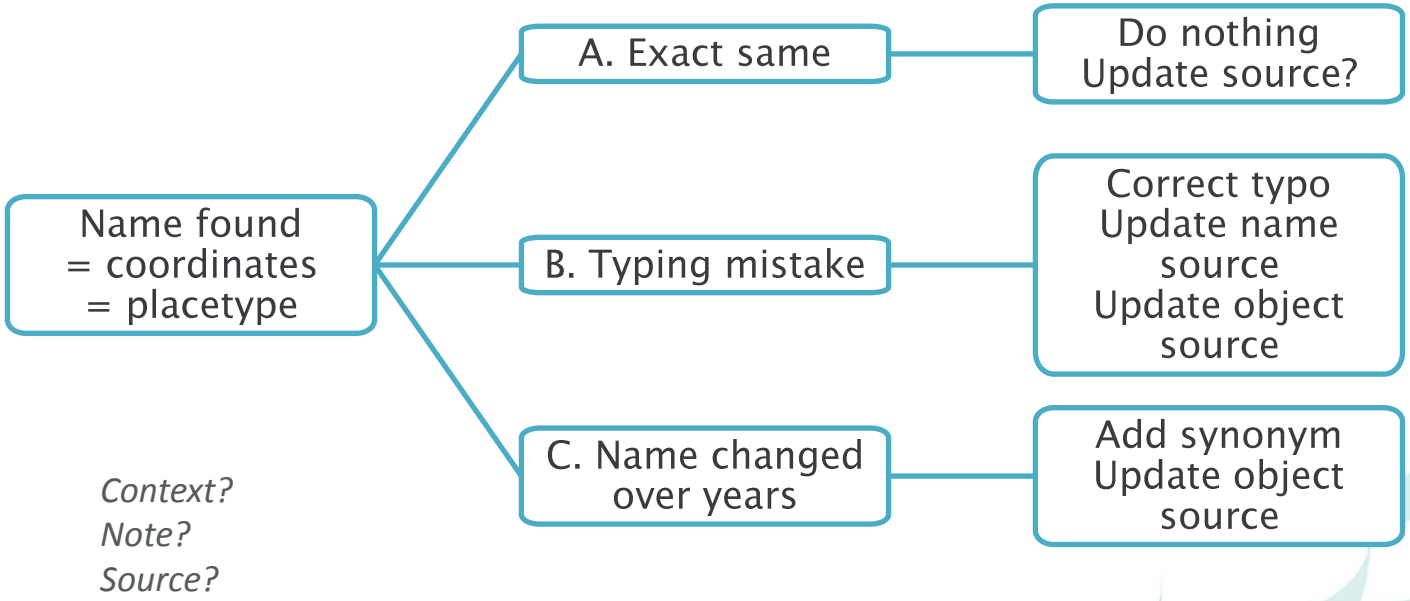

Check (part of name) & synonyms
Not found
Found
Removed Object from original gazetteer
Add a new object to Marine Regions
(How? Read the tutorial online)
CASE 6
= Name
= Coordinates
= Place Type
= Object source
(update)
≠ Place Type
= Name
= Coordinates
= Object source
= Place Type
≠ Name
= Coordinates
= Object source
= Place Type
= Name
= Coordinates
≠ Object source
= Place Type
= Name
≠ Coordinates
= Object source
≠ Place Type
≠ Name
≠ Coordinates
≠ Object source
CASE 1
CASE 2
CASE 3
CASE 4
CASE 5

4. Cases

4.1. Case 1: Exactly same record

4. Cases

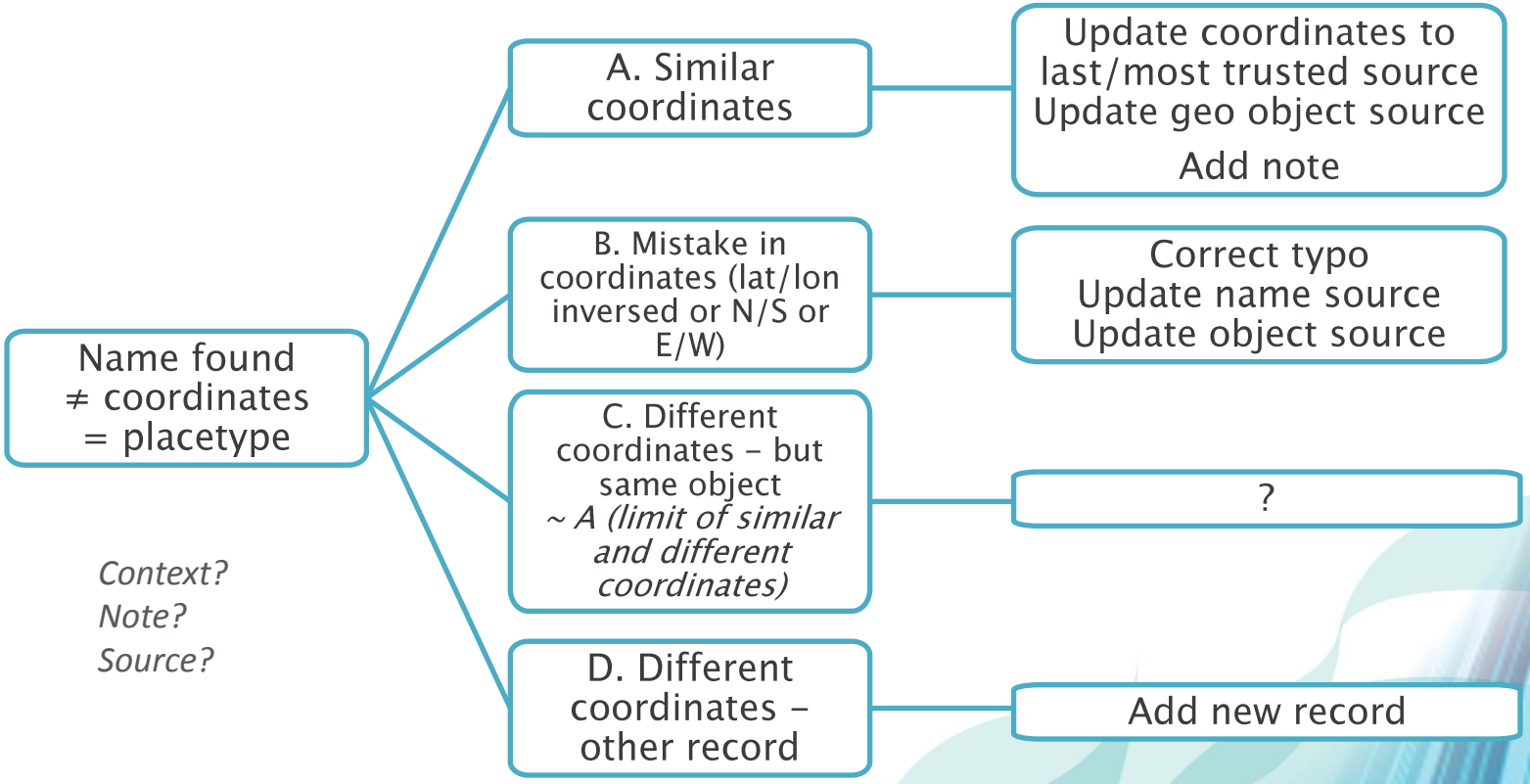
4.3. Case 3: Small spelling change



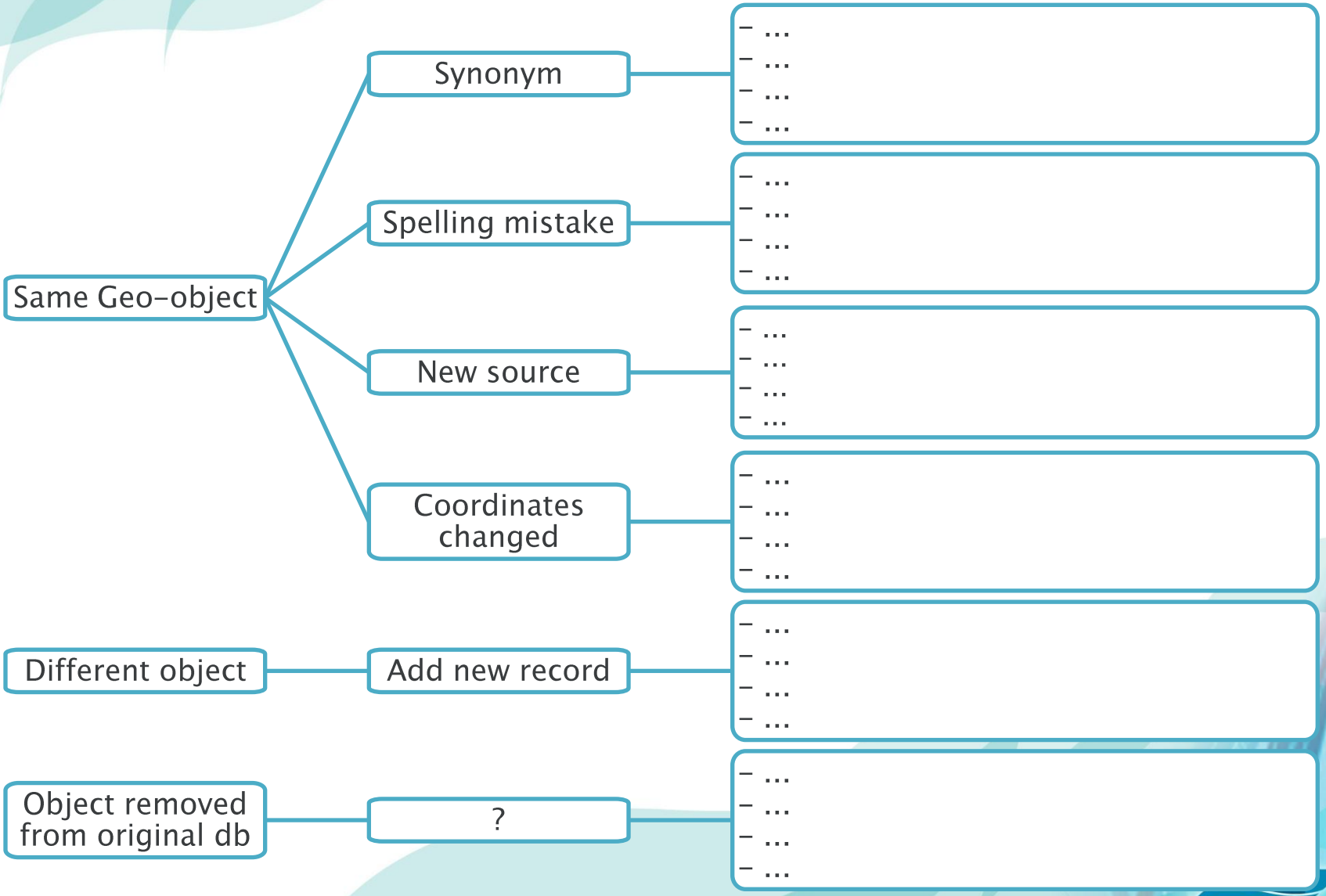
Context?
Note?
Source?

4. Cases

4.5. Case 5: Coordinates changed



5. Summary


Same Geo-object
Synonym
Spelling mistake
New source
Coordinates changed
Different object
Add new record
Object removed from original db
?
– …
– …
– …
– …

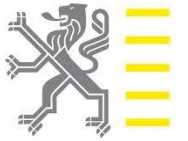
Status SCUFN – Marine Regions

- Actions
  - Feedback from GEBCO/ACUF on identified inconsistencies
  - Synchonization between SCUFN gazetteer-MR
    - Update frequency: RSS Feeds?
    - For geometries, link directly to link directly to database hosted at NOAA (WMS - currently filter issue)
  - If needed, would be happy to provide some technical feedback on db issues

- Relationship MR-SCUFN

Thank you for invitation!

info@marineregions.org



Vlaams instituut voor de zee

2. GEBCO vs. ACUF

GEBCO shapefile	GEBCO excel	Comments
FID		ArcGIS identifier for each feature. Not really a unique identifier.
Shape		Feature geometry (Point, Polyline, Polygon, Multipoint, Multiline, Multipolygon)
Name	**Specific Term**	Place name
Type	**Generic Term**	Place type
		{Specific Term} + {Generic Term}
Meeting	**Associated Meeting**	Meeting in which the feature was approved. E.g: SCUFN-24, SCUFN-16.
Proposer	Proposer	
Proposal_y	Year of Proposal	
Discoverer	Discoverer	
Discovery_	Year of Discovery	
History	Origin of Name	
Comments	**Additional Information**	Important notes about the feature. For example, in some cases the equivalent ACUF feature is mentioned.
Coordinates are not provided in the attribute table but can be calculated	**Coordinates**	String of coordinates (one field). Example: POINT (-126.53, 16.17)
	Secondary Coordinates	String of coordinates. Some features have double geographic information (ex. Polygon of mountain base and point for the summit)??? This info is not displayed on the website. POLYGON ((-126.5633 16.2033, -126.5633 16.1483, -126.5017 16.1483, -126.5017 16.2033, -126.5633 16.2033))

ACUF excel	Meaning	Comments
UFI	Unique Feature Identifier	A number which uniquely identifies a feature.
UNI	Unique Name Identifier	A number which uniquely identifies a feature name.
LAT	Latitude (decimal)	ACUF database contains only point features (no other geometries like polygons, polylines…)
LONG	Longitude (decimal)	
DSG	Feature Designation Code	Indicates place type. (LINK to document)
LC	Language code	
FULL_NAME	Full name reading order	In general it is composed by a specific term and a generic term.
MOD_DATE	Date of modification	
NOTE	Notes	