Geo-Seas

Use and implementation of standards

Formatting and viewing geological logs

Sytze van Heteren and Helen Glaves

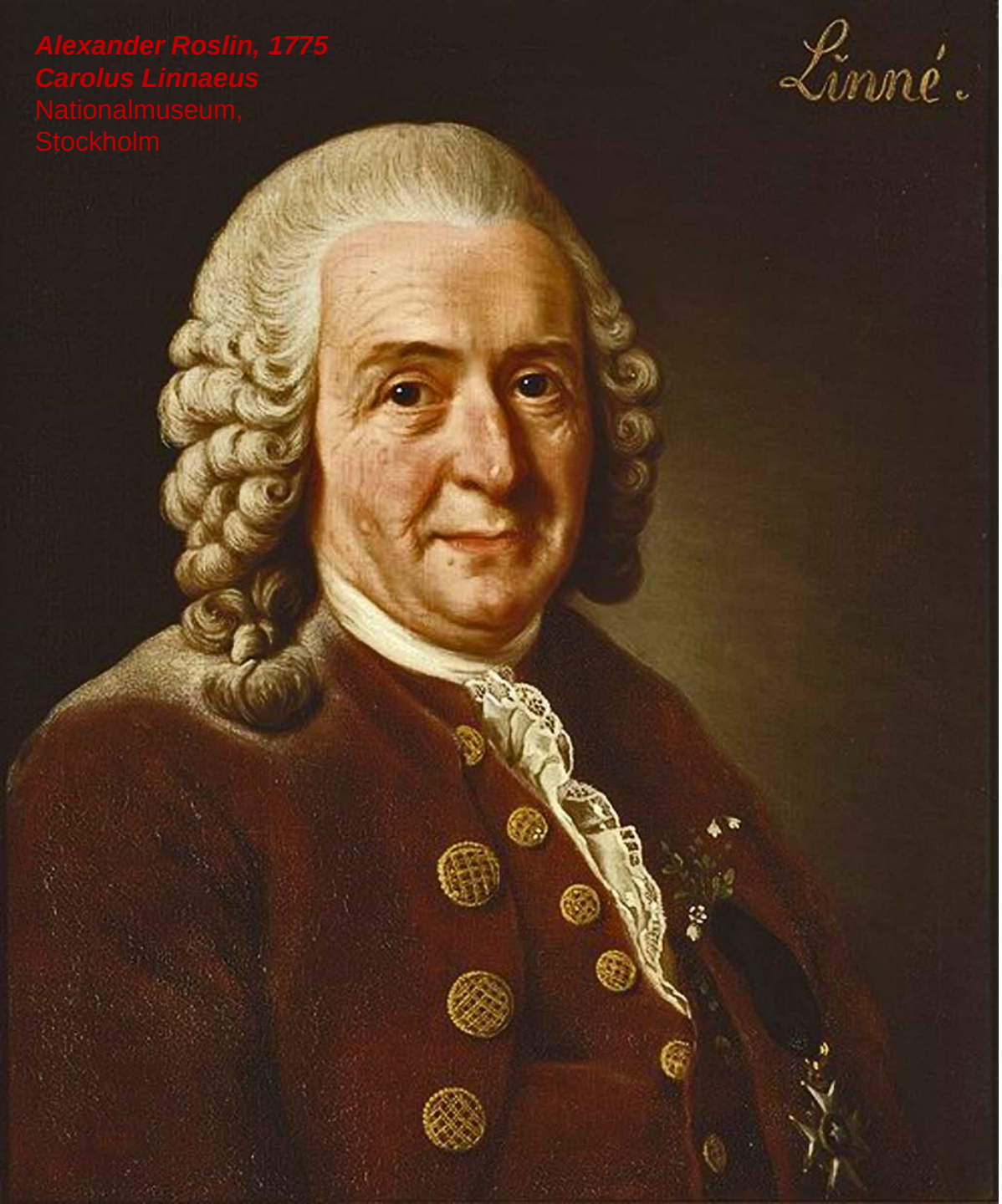
Geo-Seas partners:

NERC-BGS (United Kingdom), NERC-BODC (United Kingdom), NERC-NOCS (United Kingdom), MARIS (Netherlands), IFREMER (France), BRGM (France), TNO (Netherlands), BSH (Germany), IGME (Spain), LNEG (Portugal), IGME (Greece), GSI (Ireland), BGR (Germany), OGS (Italy), GEUS (Denmark), NGU (Norway), PGI (Poland), EGK (Estonia), LIGG (Lithuania), IO-BAS (Bulgaria), NOA (Greece), CIRIA (United Kingdom), MUMM (Belgium), UB (Spain), UCC (Ireland), EU-Consult (Netherlands), CNRS (France), SHOM (France), CEFAS (United Kingdom), and LU (Latvia).

SEVENTH FRAMEWORK PROGRAMME

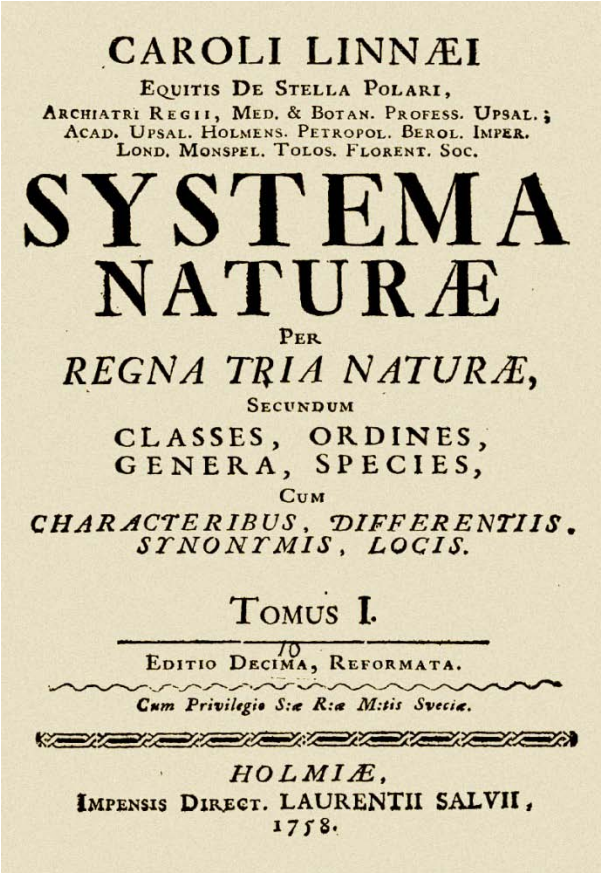
Further information is available at: www.geo-seas.eu


Pieter Bruegel the Elder, ca. 1563
The 'Little' Tower of Babel
Museum Boijmans Van Beuningen, Rotterdam
Why the need for standards?
Confusion of Tongues: many words for sand, clay, …



Alexander Roslin, 1775
Carolus Linnaeus
Nationalmuseum, Stockholm

Linnaeus introduced the method still used to formulate the scientific name of every species: binomial nomenclature



CAROLI LINNÆI
EQUITIS DE STELLA POLARI,
ARCHIATRI REGII, MED. & BOTAN. PROFESS. UPSAL.;
ACAD. UPSAL. HOLMENS. PETROPOL. BEROL. IMPER.
LOND. MONSPEL. TOLOS. FLORENT. SOC.

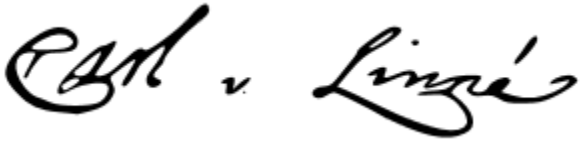
SYSTEMA NATURÆ
PER
REGNA TRIA NATURÆ,
SECUNDUM
CLASSES, ORDINES,
GENERA, SPECIES,
CUM
CHARACTERIBUS, DIFFERENTIIS,
SYNONYMIS, LOCIS.

TOMUS I.

EDITIO DECIMA, REFORMATA.

Cum Privilegio S:æ R:æ M:tis Sveciæ.

HOLMIÆ,
IMPENSIS DIRECT. LAURENTII SALVII,
1758.




Tidal flat
Plouescat, Brittany, France
Linnaeus was a botanist, physician and zoologist
and
Latin was the language of science
so
we know the lugworm / fjæremark / arénicole / wadpier / Wattwurm as …
harena
Arenicola marina

WoRMS
World Register of Marine Species

and have well-developed online registers for organisms

- Home
- About
- Search taxa
- Taxon tree
- Literature
- Distribution
- Specimens
- Match taxa
- Editors
- Statistics
- Users
- Webservice
- Photogallery
- Info downloads
- Glossary
- Log in

RSS
Add provider
@WRMarineSpecies

WoRMS taxon details

Arenicola marina (Linnaeus, 1758)

AphiaID: 129868

Classification: Biota > Animalia (Kingdom) > Annelida (Phylum) > Polychaeta (Class) > Scolecida (Subclass) > Arenicolidae (Family) > Arenicola (Genus)

Status accepted

Record status Checked by Taxonomic Editor

Rank Species

Parent *Arenicola* Lamarck, 1801

Synonymised taxa
Arenicola abildgaardti Castelnau, 1842 (subjective synonym)
Arenicola carbonaria Leach, 1816 (subjective synonym)
Arenicola clavata Ranzani, 1817 (subjective synonym)
Arenicola natalis Girard, 1856 (subjective synonym)
Arenicola piscatorum Lamarck, 1801 (subjective synonym)
Arenicola tinctoria Leach, 1816 (subjective synonym)
Clymenides sulfurea Claparède, 1863
Lumbricus marinus Linnaeus, 1758 (basionym)
Lumbricus papillosus Fabricius, 1780 (subjective synonym)
Nereis lumbricoides Pallas, 1788 (subjective synonym)

Sources

basis of record: Bellan, G. (2001). Polychaeta, ***in***: Costello, M.J. *et al.* (Ed.) (2001). *European register of marine species: a check-list of the marine species in Europe and a bibliography of guides to their identification. Collection Patrimoines Naturels,* 50: pp. 214-231 (look up in IMIS) [details]

basis of record: Ashworth, James Hartley 1912. Catalogue of the Chaetopoda in the British Museum. A. Polychaeta: Part 1. Arenicolidae. 1-175. British Museum of Natural History. London. [details]

basis of record: Hartman, Olga 1959. Catalogue of the Polychaetous Annelids of the World. Parts 1 and 2. Occasional Papers of the Allan Hancock Foundation, 23: 628pp. [details]

basis of record: Malmgren, A. J. 1867. Annulata Polychaeta Spetsbergiae, Groenlandiae, Islandiae et Scandinaviae hactenus cognita. Ex Officina Frenckelliana, Helsingfors. 127pp, & 115 plates, *available online at* http://www.biodiversitylibrary.org/bibliography/13358 [details]

additional source: Hayward, P.J.; Ryland, J.S. (Ed.) (1990). The marine fauna of the British Isles and North-West Europe: 1. Introduction and protozoans to arthropods. Clarendon Press: Oxford, UK. ISBN 0-19-857356-1. 627 pp. (look up in IMIS) [details]

additional source: Linnaeus, C. (1758). Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Editio decima, reformata. Laurentius Salvius: Holmiae. ii, 824 pp., *available online at* http://www.archive.org/details/systemanaturae01linnuoft [details]

additional source: ITIS database, *available online at* http://www.itis.gov [details]

additional source: Brunel, P., L. Bosse, and G. Lamarche. 1998. Catalogue of the marine invertebrates of the estuary and Gulf of St. Lawrence. Canadian Special Publication of Fisheries and Aquatic Sciences, 126. 405 p. [details]

from synonym: Claparède, Edouard. 1863. Beobachtungen über Anatomie und Entwicklungsgeschichte wirbelloser Thiere an der Küste von Normandie angestellt. 1-120. W. Engelmann. Leipzig., *available online at* http://www.biodiversitylibrary.org/bibliography/10030 [details] [view taxon]

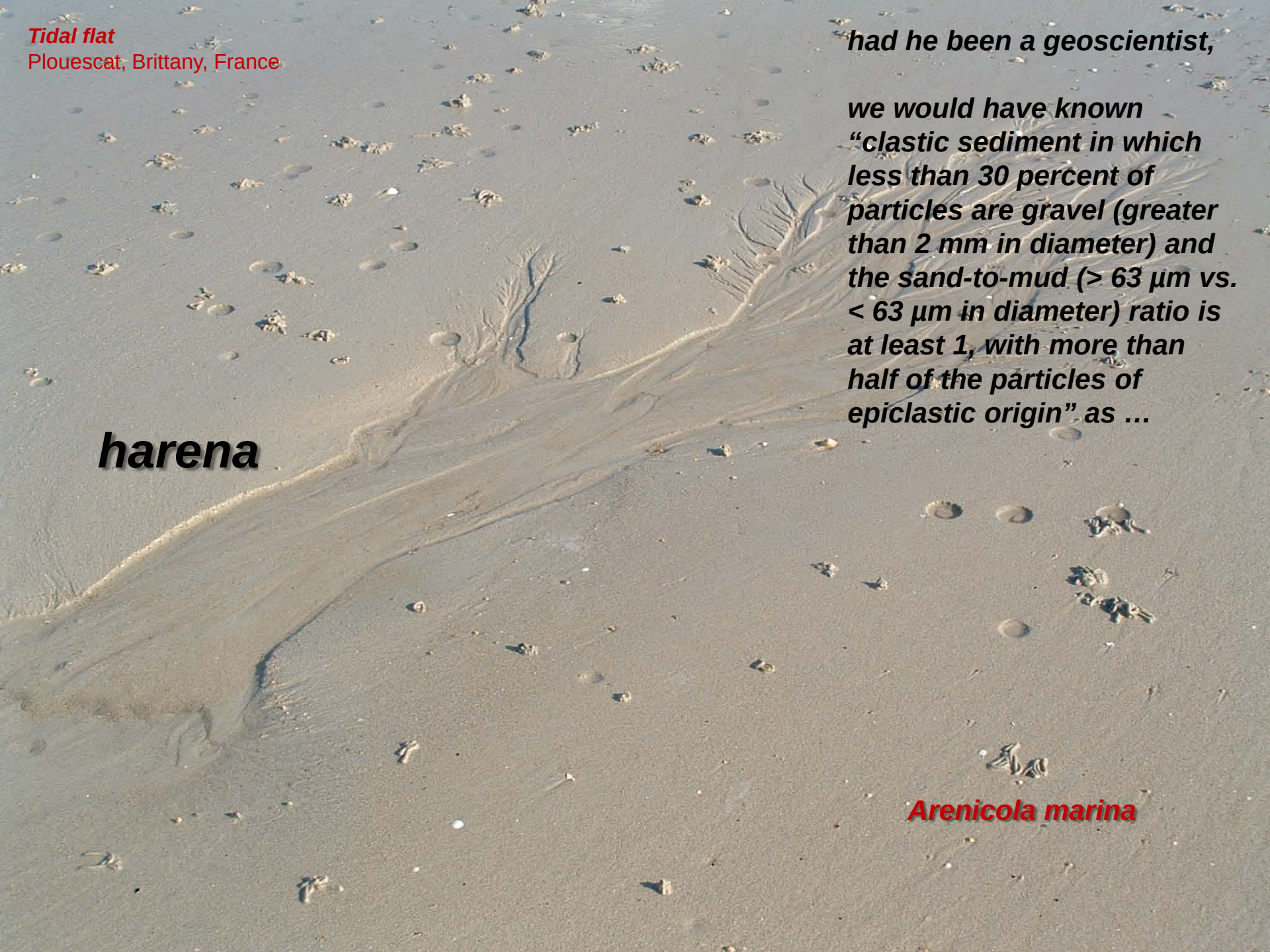
from synonym: Fabricius, Otto 1780. [POLYCHAETA & ANNELIDA DATA. p.266-315; 374-384] Fauna Groenlandica, systematice sistens, Animalia Groenlandiae occidentalis hactenus indagata, quoad nomen specificum, triviale, vernaculumque synonyma auctorum plurium, descriptionem, locum, victum, generationem, mores, usum, capturamque singuli prout detegendi occasio fuit, maximaque parte secundum proprias observationes: Hafniae [Copenhagen] et Lipsiae., *available online at* http://www.biodiversitylibrary.org/bibliography/13489 [details] [view taxon]

from synonym: Linnaeus, C. (1753). Species plantarum, exhibentes plantas rite cognitas ad genera relatas cum differentiis specificis, nominibus trivialibus, synonymis selectis, locis natalibus, secundum systema sexuale digestas. Stockholm. [details] [view taxon]

from synonym: Fauchald, K. 1977. The polychaete worms, definitions and keys to the orders, families and genera. Natural History Museum of Los Angeles County: Los Angeles, CA (USA) Science Series 28:1-188, *available online at* http://www.vliz.be/imisdocs/publications/123110.pdf [details] [view taxon]

Vernacular Names

Language	Name	
Albanian	shumëketëshi i rërave	[details]
Bokmål (Norwegian)	fjæremark	[details]
Dutch	wadpier	[details]
Dutch	zeepier	[details]
English	blow lugworm	[details]
English	lugworm	[details]
French	arénicole	[details]
German	Köderwurm	[details]
German	Wattwurm	[details]
Nynorsk (Norwegian)	fjøremakk	[details]


Tidal flat
Plouescat, Brittany, France
had he been a geoscientist,
we would have known "clastic sediment in which less than 30 percent of particles are gravel (greater than 2 mm in diameter) and the sand-to-mud (> 63 µm vs. < 63 µm in diameter) ratio is at least 1, with more than half of the particles of epiclastic origin" as …
harena
Arenicola marina

Babylon Beach
Marseille, France
http://www.aipotu.org/European%20Tour%2005/Marseille/babylonbeach.html

today, English is the language of science, and in the international geoscientific arena,

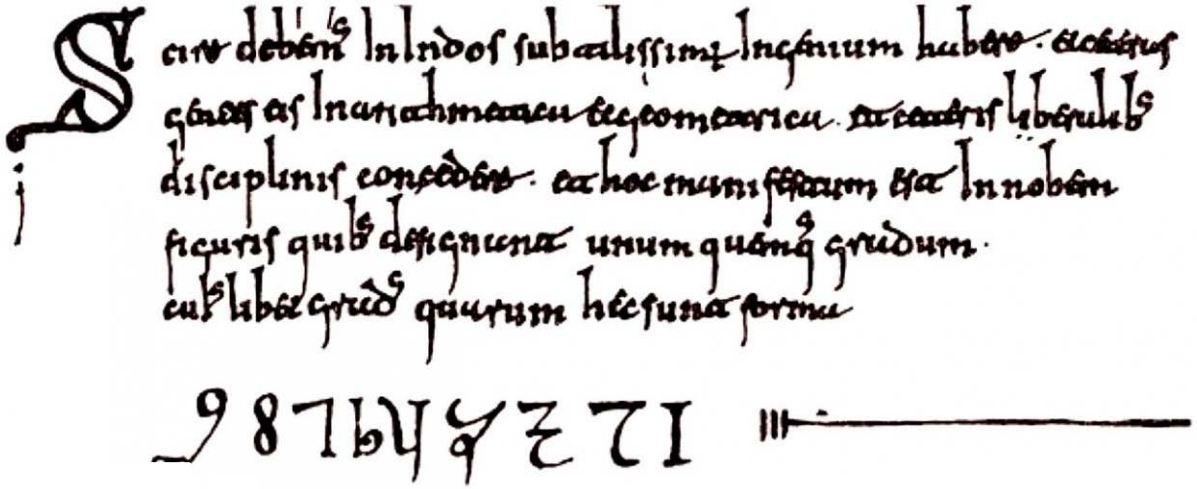
sand

is the common term for …

North Sea
Petten, the Netherlands

in close collaboration with the Commission for the Management and Application of Geoscience Information, Geo-Seas contributes to e-Infrastructure development in the area of Standards (data management, metadata, formats, delivery)

http://www.pictokon.net/bilder/10-bildermaterial/arabische-ziffern-im-codex-vigilanus-escorial.html



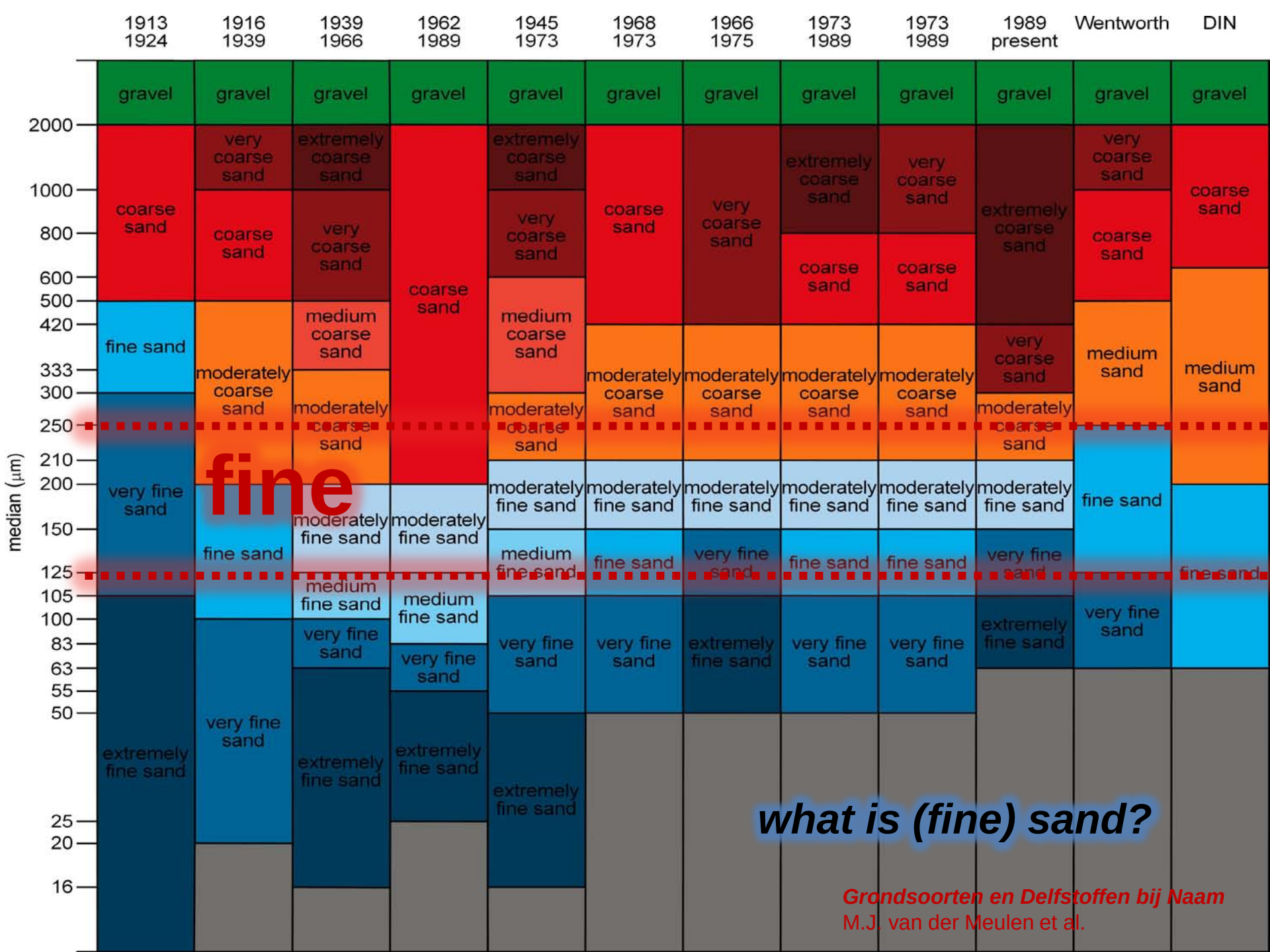
http://infoport.blogspot.com/2006/02/links-for-lecture-9.html

challenge is not the translation of numerical fields in databases, thanks to an even older standard: the Hindu-Arabic numerals introduced in Europe more than 1000 years ago

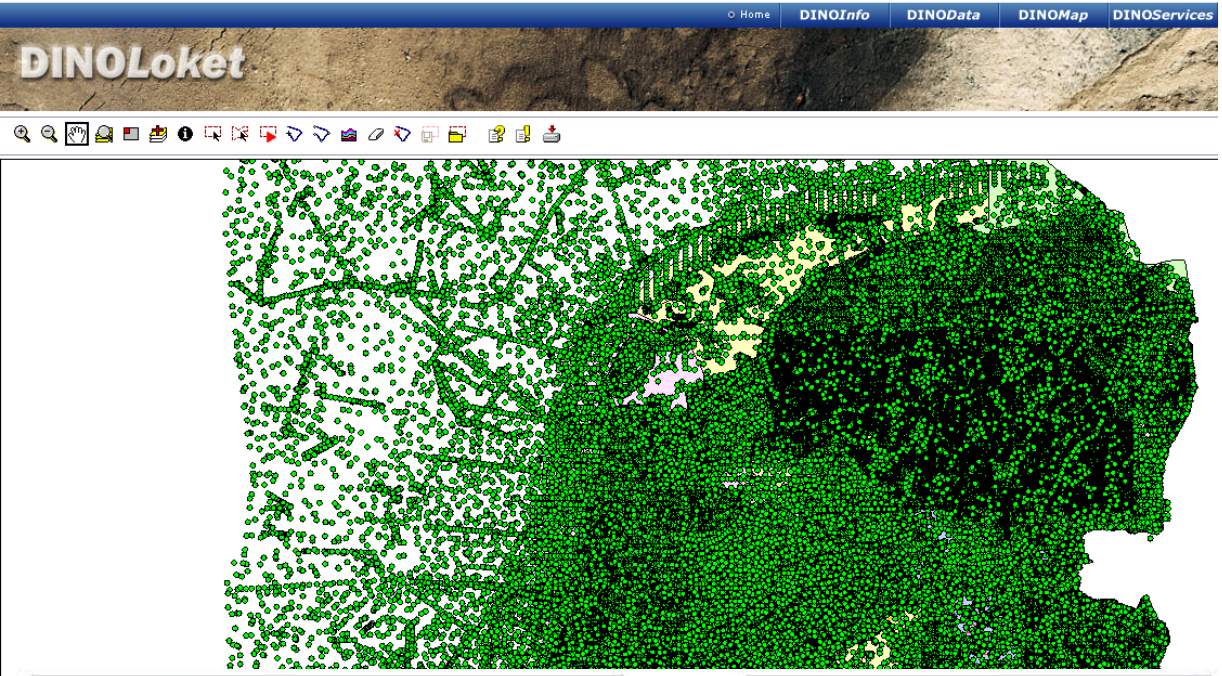
most laboratory analyses are provided in a "common language"

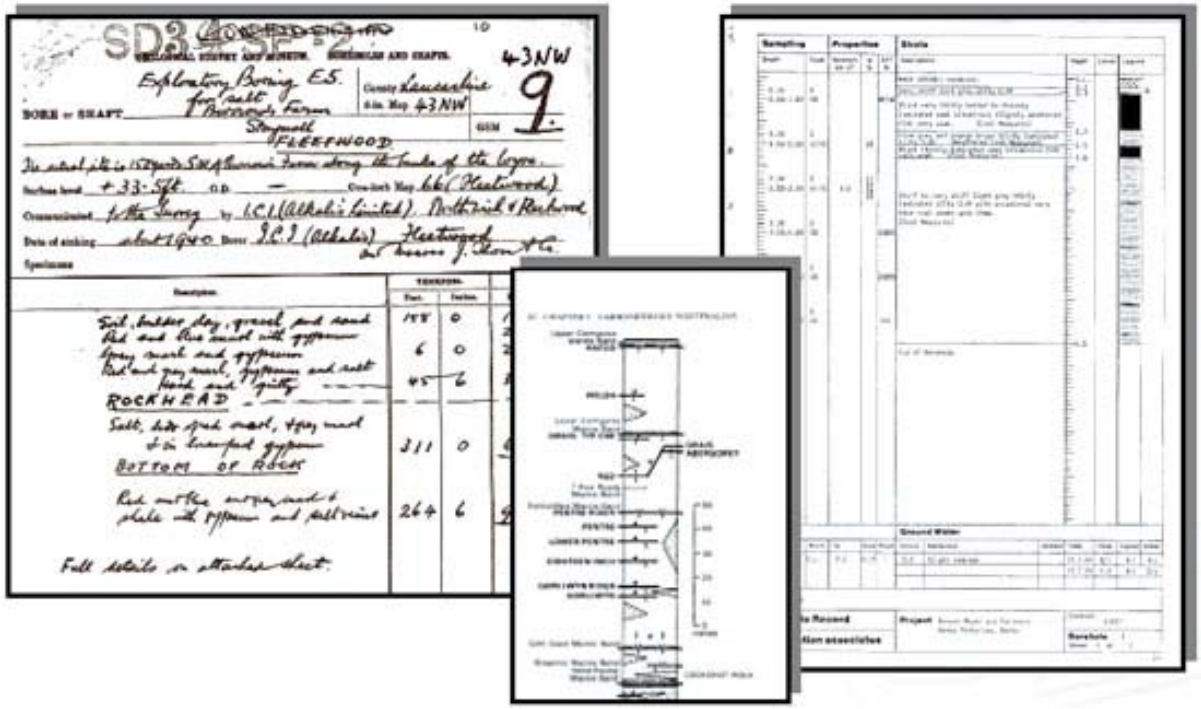
challenge lies in translating geoscientific terms or descriptions presented as text, from various languages into English and from many different classifications into a single one

within countries or even institutes, terminology has not been applied consistently; therefore, automated one-on-one translation is not always possible


1913 1924
1916 1939
1939 1966
1962 1989
1945 1973
1968 1973
1966 1975
1973 1989
1973 1989
1989 present
Wentworth
DIN
median (µm)
2000
1000
800
600
500
420
333
300
250
210
200
150
125
105
100
83
63
55
50
25
20
16
gravel
coarse sand
very coarse sand
extremely coarse sand
medium coarse sand
moderately coarse sand
fine sand
very fine sand
extremely fine sand
moderately fine sand
medium fine sand
fine
what is (fine) sand?
Grondsoorten en Delfstoffen bij Naam
M.J. van der Meulen et al.

TNO innovation for life





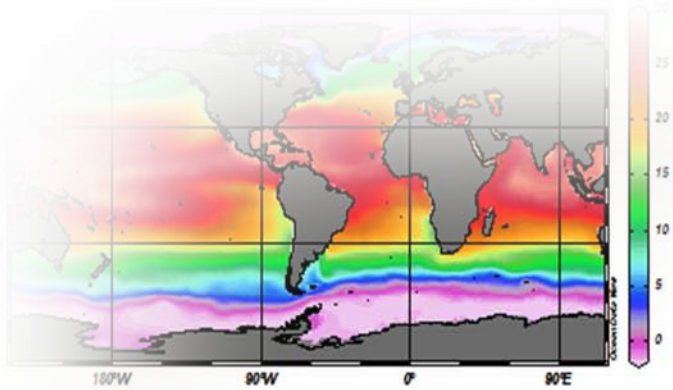
definition of standards for geological data-exchange formats, considering practices in the international community and at individual Geo-Seas partners

among the partners, we have INSPIRE-compliant relational databases as well as collections of hand-written sheets of paper

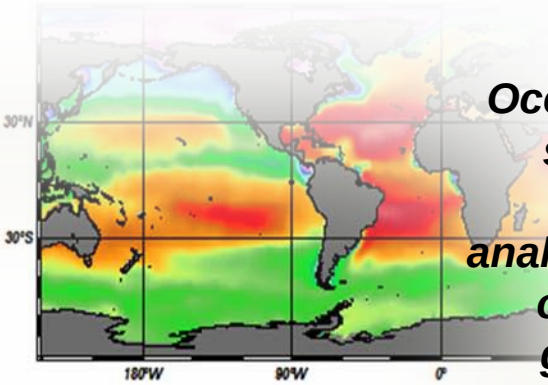
World Ocean Atlas 2009
http://odv.awi.de/en/data/ocean/world_ocean_atlas_2009/

to ensure consistency, the ODV format is used as the common transfer format

Ocean Data View (ODV) is a software package for the interactive exploration, analysis and visualisation of oceanographic and other geo-referenced profile or sequence data



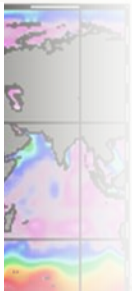
Oxygen [ml/l] @ Depth [m]=0

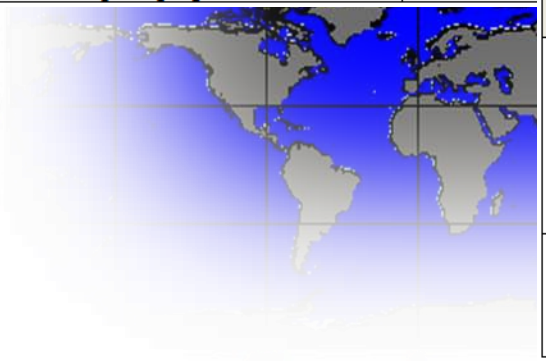


Phosphate [µmol/l] @ Depth [m]=0

ODV4Guide

Meta Variables	Values
Cruise	Cruise, expedition, or instrument name
Station	Unique station identifier
Type	*B* for bottle or *C* for CTD, XBT or stations with >250 samples
yyyy-mm-ddThh:mm:ss.sss	Date and time of station (instrument at depth)
Longitude [degrees_east]	Longitud
Latitude [degrees_north]	Latitude
Bot. Depth [m]	Bottom d





Unlimited number of other meta variables	Text or numeric; user defined text length or 1 to 8 byte integer or floating point numbers
Collection Variables	***Comment***
Depth or pressure in water column, ice core, sediment core, or soil; elevation or height in the atmosphere; etc.	To be used as primary variable
Unlimited number of other measured or calculated variables	Must be numeric; 1 to 8 byte integer or floating point numbers

Persians and Medes on a relief from Persepolis
http://riversfromeden.files.wordpress.com/2011/12/persians-and-medes-in-bas-relief.jpg

not a static set of rules set in stone

user feedback, Geo-Seas partner experience and input from outside Europe for further improvement

a full set of `common vocabularies

(GS30) Geo-Seas adjusted Folk sediment lithology classes

Back to overview

| Export subset of list | Export full list | New query | Found 17 | Show (1-15) | Previous | Next 2

Entrykey	Entryterm	Entrytermabbr	Entrytermdef	Entrytermlastmod
(g)M	slightly gravelly mud	slGravMud	Sand:mud ratio = <1:9 and gravel percentage 1-5	2010-10-14
(g)mS	slightly gravelly muddy sand	slGravMudSand	Sand:mud ratio = 1:1 to 9:1 and gravel percentage 1-5	2010-10-14
(g)S	slightly gravelly sand	slGravSand	Sand:mud ratio = >9:1 and gravel percentage 1-5	2010-10-14
(g)sM	slightly gravelly sandy mud	slGravSandMud	Sand:mud ratio = 1:9 to 1:1 and gravel percentage 1-5	2010-10-14
(m)S	slightly muddy sand	slMudSand	Sand:mud ratio = 3:1 to 19:1 and gravel percentage <1	2010-10-14
(s)M	slightly sandy mud	slSandMud	Sand:mud ratio = 1:19 to 1:3 and gravel percentage <1	2010-10-14
G	gravel	gravel	Sand:mud ratio = all ratios and gravel percentage >80	2010-10-14
gM	gravelly mud	gravMud	Sand:mud ratio = <1:1 and gravel percentage 5-30	2010-10-14
gmS	gravelly muddy sand	gravMudSand	Sand:mud ratio = 1:1 to 9:1 and gravel percentage 5-30	2010-10-14
gS	gravelly sand	gravSand	Sand:mud ratio = >9:1 and gravel percentage 5-30	2010-10-14
M	mud	mud	Sand:mud ratio = <1:19 and gravel percentage <1	2010-10-14
mG	muddy gravel	mudGrav	Sand:mud ratio = <1:1 and gravel percentage 30-80	2010-10-14
mS	muddy sand	mudSand	Sand:mud ratio = 1:1 to 3:1 and gravel percentage <1	2010-10-14
msG	muddy sandy gravel	mudSandGrav	Sand:mud ratio = 1:1 to 9:1 and gravel percentage 30-80	2010-10-14
S	sand	sand	Sand:mud ratio = >19:1 and gravel percentage <1	2010-10-14

| Export subset of list | Export full list | New query | Found 17 | Show (1-15) | Previous | Next 2

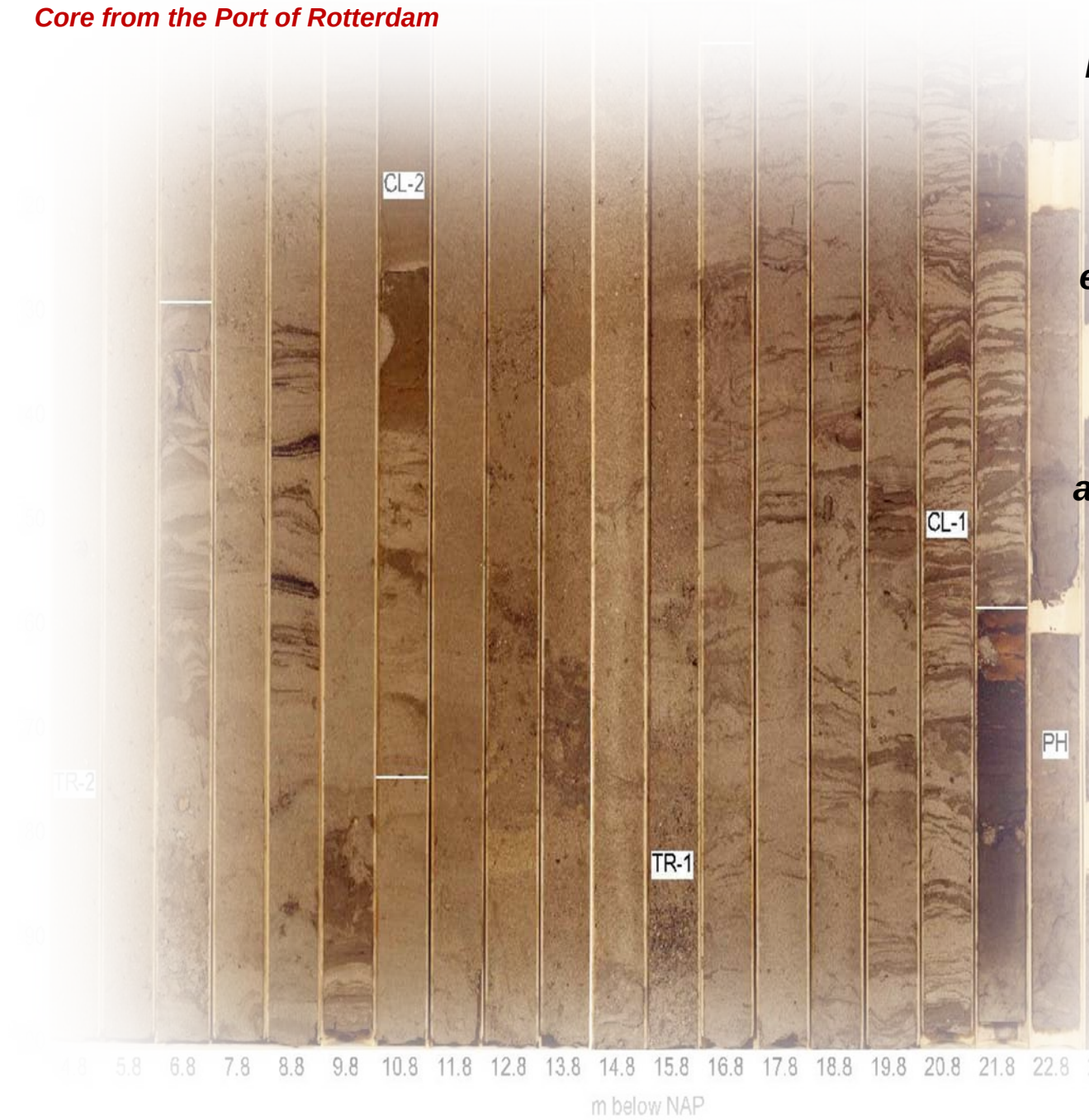
two types of parameters:

- ***estimated visually***
- ***measured***

in fitting these to the ODV format

- ***a balance must be struck between completeness of the downloadable data and relevance to the majority of end users***
- ***adhere as much as possible to international standards for the classification of geological data***

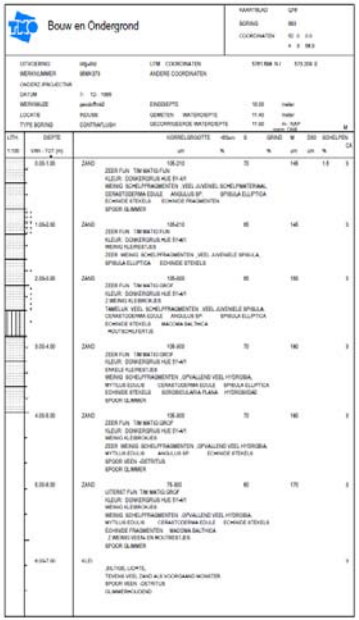
Core from the Port of Rotterdam



lithological characteristics listed in core logs, focusing on the macroscopic description of sediment per depth interval

essential elements: position and water depth, depth interval of the layer, main lithology

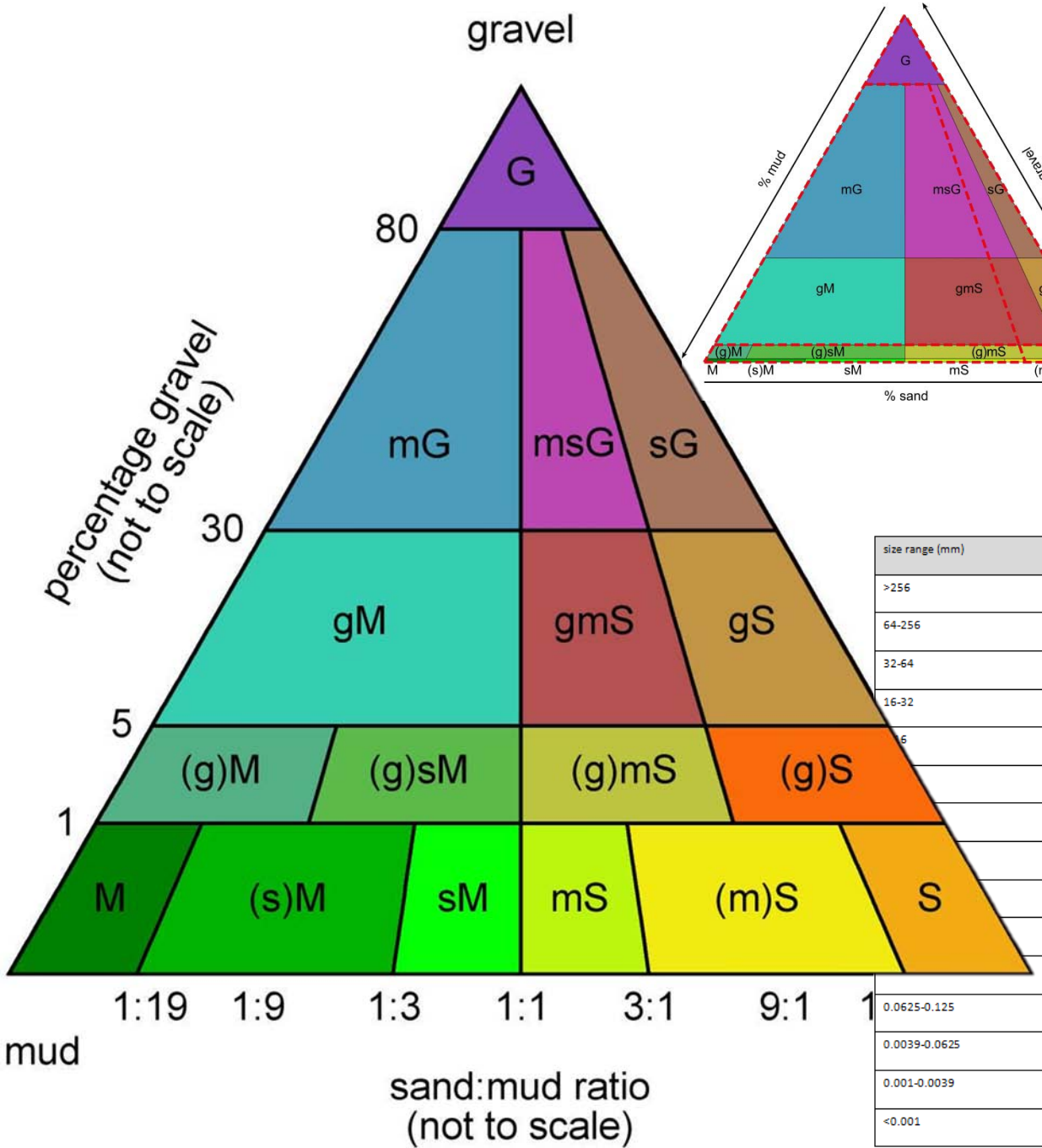
also included: admixtures of secondary material, colour, median grain size, sorting and sedimentary structures

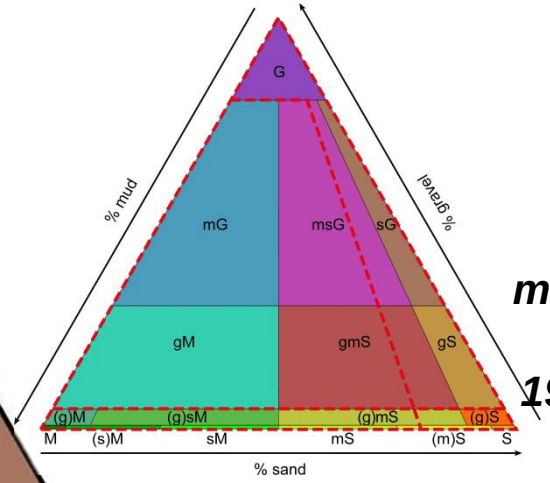


Udden-Wentworth and modified Folk classifications

organic units are gyttja and peat

for clastic units, the most commonly used classification system for main lithology is the Udden-Wentworth scale (Udden, 1914; Wentworth, 1922); the most commonly used system to describe admixtures is the Folk classification (Folk, 1954)





size range (mm)	Phi range	Wentworth class	Code
>256	<-8	Boulder	BOUL
64-256	-8 to -6	Cobble	COBB
32-64	-6 to -5	Very coarse gravel (pebble)	GRVC
16-32	-5 to -4	Coarse gravel (pebble)	GRC
6	-4 to -3	Medium gravel (pebble)	GRM
	-3 to -2	Fine gravel (pebble)	GRF
	-2 to -1	Very fine gravel (granule)	GRVF
	-1 to 0	Very coarse sand	SDVC
	0 to 1	Coarse sand	SDC
	1 to 2	Medium sand	SDM
	2 to 3	Fine sand	SDF
0.0625-0.125	3 to 4	Very fine sand	SDVF
0.0039-0.0625	4 to 8	Silt (mud)	SILT
0.001-0.0039	8 to 10	Clay (mud)	CLAY
<0.001	>10	Colloid (mud)	COLL

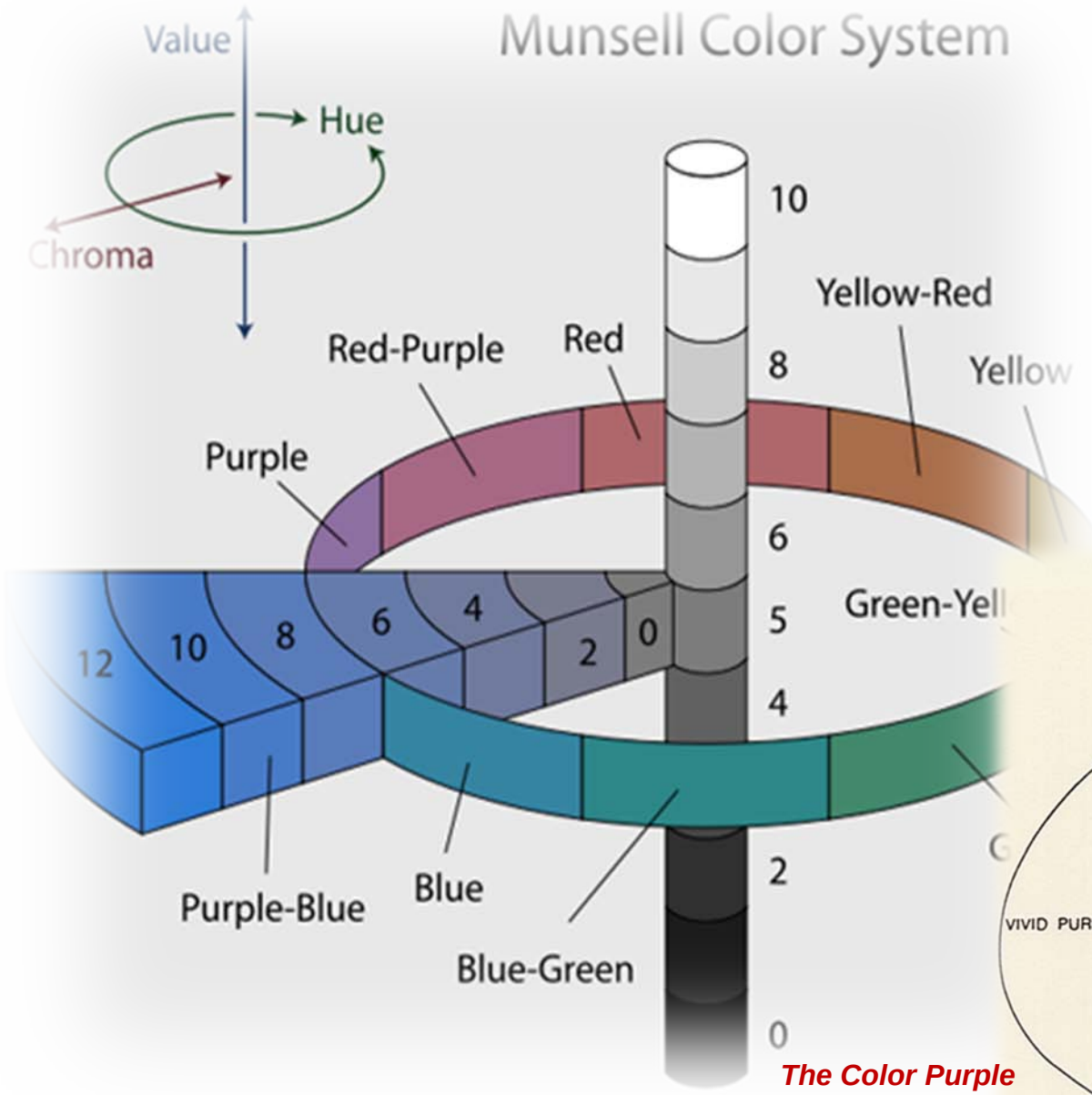
Shells in Zeeland
http://deianira-fraser.deviantart.com/art/Shells-in-Zeeland-North-Sea-174076486

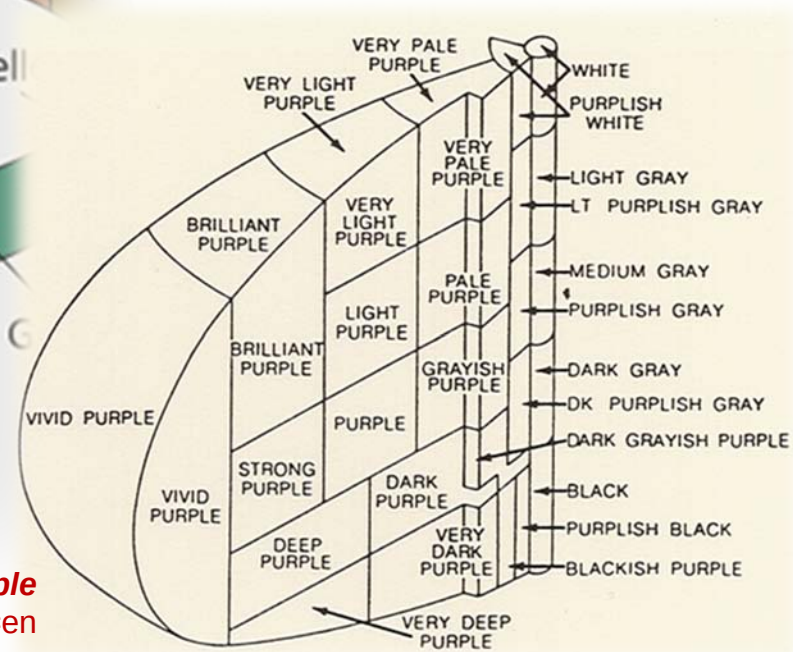
specific issues:
- ***non-clastic sediments such as peat and gyttja***
- ***differentiation between gravel-sized shells / shell fragments and siliciclastic gravel***

English North Sea coast
http://certainhush.blogspot.com/2011_01_01_archive.html

Munsell system
http://en.wikipedia.org/wiki/Munsell_color_system

colour provides:
- ***information on depositional conditions***
- ***commonly assigned using subjective methods, and entered as text – link to ISCC-NBS System of Color Designation, naming colours***
- ***objective method for assigning colour is the Munsell colour system, adopted by the USDA***





The Color Purple
http://www.colorsystem.com/?page_id=955&lang=en

Sorting
http://www.thisoldearth.net/Sedimentary-Rocks-sorting.html

additional parameters:

- ***median grain size***
- ***sorting***
- ***sediment structures***

Netherlands coastal dunes

Pollen diagram

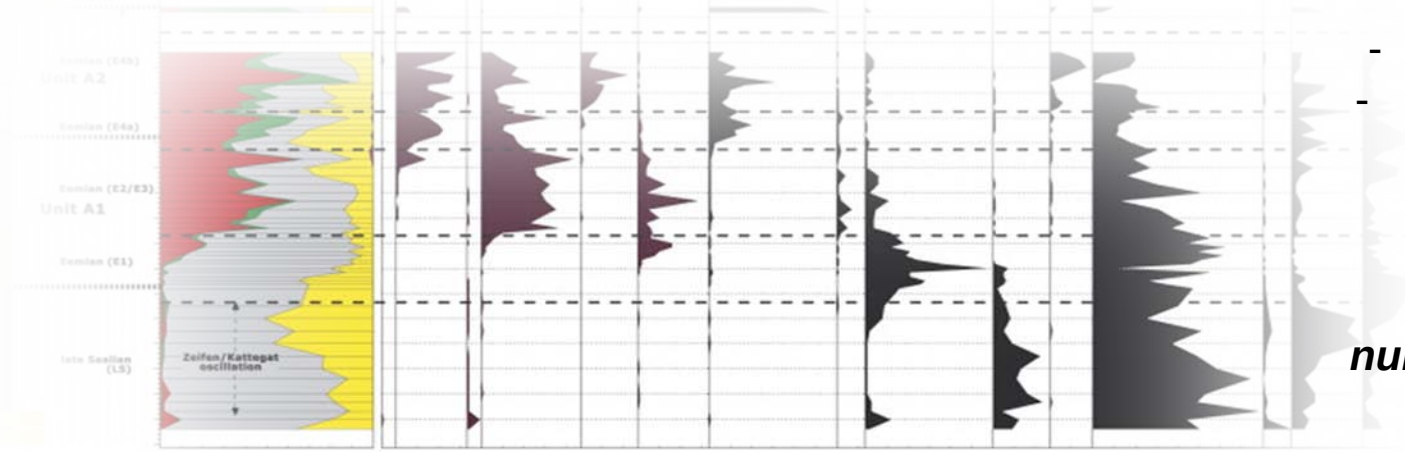
http://www.sciencedirect.com/science/article/pii/S0277379107002004

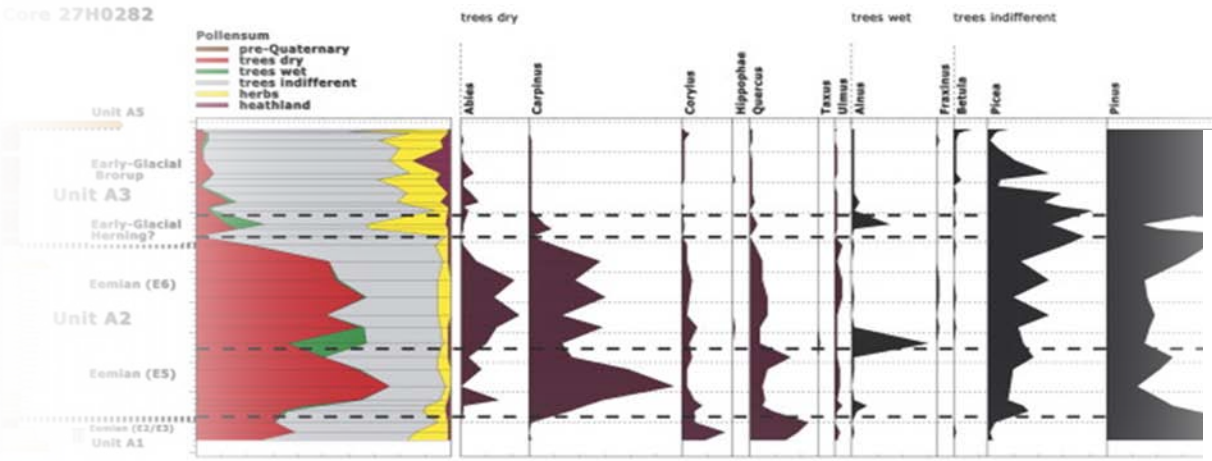
analyses and measurements:

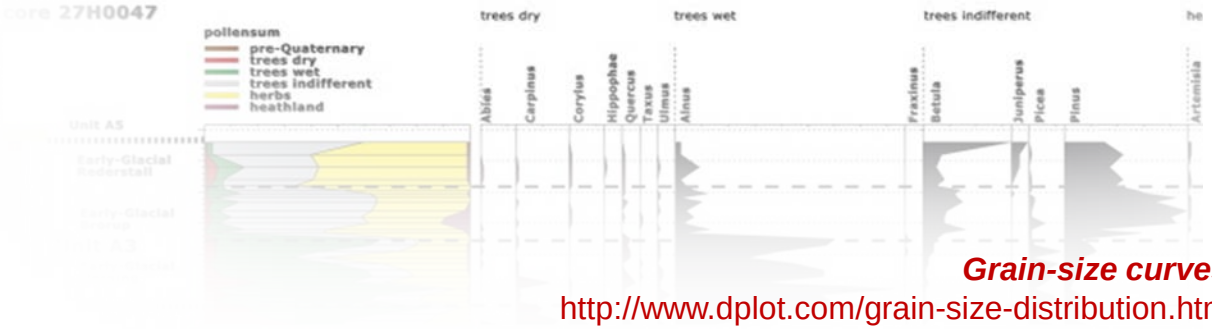
- ***dating results***
- ***grain-size analyses***
- ***micropalaeontology***
- ***geochemistry***
- ***geotechnical characteristics***

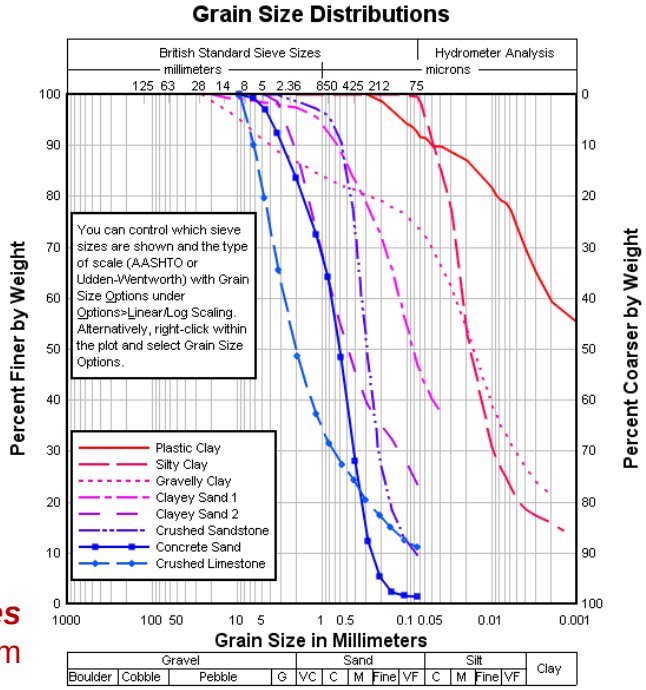
numeric values easy to transfer

metadata on methodology important









Grain-size curves

http://www.dplot.com/grain-size-distribution.htm

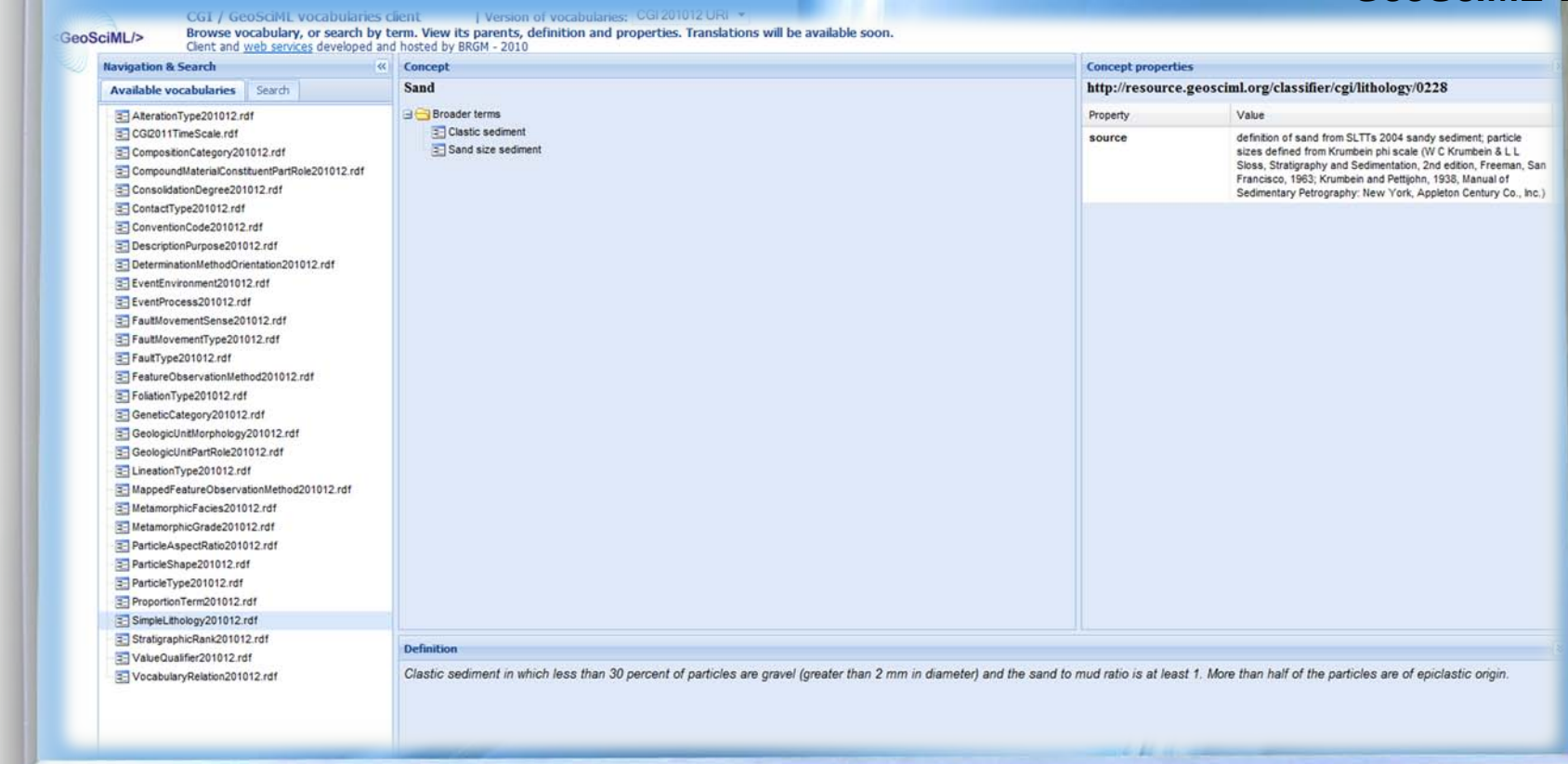
GeoSciML definition of sand

http://srvgeosciml.brgm.fr/eXist2010/brgm/client.html

- CGI/GeoSciML vocabs are listed on http://srvgeosciml.brgm.fr/eXist2010/brgm/client.html
- SeaDataNet vocabs on http://seadatanet.maris2.nl/v_bodc_vocab/welcome.aspx/

in anticipation of a future shift to GeoSciML, it is wise to use and create transfer formats that share codes

we populate many fields using URNs from the GeoSciML vocab



using the ODV4 format definition, a number of ODV4 example files have been prepared, one for a lithological log and one for a core with a combination of lithological log, geochemical analysis and grain-size analysis

```
SDN:LOCAL:Depth below seabed</subject><object>SDN:P011::COREDIST</object><units>SDN:P061::ULAA</units>
SDN:LOCAL:Sample length</subject><object>SDN:P011::SEGMLENG</object><units>SDN:P061::ULAA</units>
SDN:LOCAL:Simple lithology</subject><object>SDN:P011::SIMPLITH</object><units>SDN:P061::UUUU</units>
SDN:LOCAL:Colour</subject><object>SDN:P011::COLSEDIM</object><units>SDN:P061::UUUU</units>
SDN:LOCAL:Grain-size minimum [micron]</subject><object>SDN:P011::GRSIZEMN</object><units>SDN:P061::UXMM</u
SDN:LOCAL:Grain-size maximum [micron]</subject><object>SDN:P011::GRSIZEMX</object><units>SDN:P061::UXMM</u
SDN:LOCAL:Class grain-size minimum [micron]</subject><object>SDN:P011::WENTCLMN</object><units>SDN:P061::U
SDN:LOCAL:Class grain-size maximum [micron]</subject><object>SDN:P011::WENTCLMX</object><units>SDN:P061::U
SDN:LOCAL:Gravel percentage minimum</subject><object>SDN:P011::GRAVMNZZ</object><units>SDN:P061::UPCT</uni
SDN:LOCAL:Gravel percentage maximum</subject><object>SDN:P011::GRAVMXZZ</object><units>SDN:P061::UPCT</uni
SDN:LOCAL:Sand percentage minimum</subject><object>SDN:P011::SANDMNZZ</object><units>SDN:P061::UPCT</units
SDN:LOCAL:Sand percentage maximum</subject><object>SDN:P011::SANDMXZZ</object><units>SDN:P061::UPCT</units
SDN:LOCAL:Mud percentage minimum</subject><object>SDN:P011::MUDPMNZZ</object><units>SDN:P061::UPCT</units>
SDN:LOCAL:Mud percentage maximum</subject><object>SDN:P011::MUDPMXZZ</object><units>SDN:P061::UPCT</units>
SDN:LOCAL:Organics percentage minimum</subject><object>SDN:P011::ORGPERMN</object><units>SDN:P061::UPCT</units>
SDN:LOCAL:Organics percentage maximum</subject><object>SDN:P011::ORGPERMX</object><units>SDN:P061::UPCT</units>
SDN:LOCAL:Shells percentage minimum</subject><object>SDN:P011::SHLPERMN</object><units>SDN:P061::UPCT</units>
SDN:LOCAL:Shells percentage maximum</subject><object>SDN:P011::SHLPERMX</object><units>SDN:P061::UPCT</units>
SDN:LOCAL:Sorting</subject><object>SDN:P011::SRTCVIES</object><units>SDN:P061::UUUU</units>
SDN:LOCAL:Sand median</subject><object>SDN:P011::SND50VIS</object><units>SDN:P061::UMIC</units>
SDN:LOCAL:Adjusted Folk class</subject><object>SDN:P011::FOLKADJU</object><units>SDN:P061::UUUU</units>
SDN:LOCAL:Stratification</subject><object>SDN:P011::SSSTRATF</object><units>SDN:P061::UUUU</units>
SDN:LOCAL:Bioturbation</subject><object>SDN:P011::SSBIOTUR</object><units>SDN:P061::UUUU</units>
```

Station	Type	yyyy-mm-ddThh:mm:ss.sss	Longitude [degrees_east]		Latitude [degrees_north]		LOCAL_CDI_ID	EDMO_code	Bot. Depth [m]	Depth be
BV050123	*	1986-10-08T12:00:00.000	3.269616365	5.149089813	BV050123	635	23.2 0	1	0.8 1	urn:cgi:classifier:CGI:SimpleLithology:201001
			0.8	1	1.9	1	urn:cgi:classifier:CGI:SimpleLithology:201001:sand	1	brownish grey: SDN:GS40::brgrey	
			2.7	1	0.4	1	urn:cgi:classifier:CGI:SimpleLithology:201001:mud	1	dark grey: SDN:GS40::dgrey	1
			3.1	1	1.3	1	urn:cgi:classifier:CGI:SimpleLithology:201001:sand	1	mid grey: SDN:GS40::mgrey	1
			4.4	1	3.1	1	urn:cgi:classifier:CGI:SimpleLithology:201001:mud	1	dark grey: SDN:GS40::dgrey	1
			7.5	1	5.6	1	urn:cgi:classifier:CGI:SimpleLithology:201001:sand	1	mid grey: SDN:GS40::mgrey	1
			13.1	1	0.1	1	urn:cgi:classifier:CGI:SimpleLithology:201001:peat	1	black: SDN:GS40::black 1	
			13.2	1	2.6	1	urn:cgi:classifier:CGI:SimpleLithology:201001:sand	1	mid grey: SDN:GS40::mgrey	1
			15.8	1	1.3	1	urn:cgi:classifier:CGI:SimpleLithology:201001:sand	1	mid grey: SDN:GS40::mgrey	1
			17.1	1	4.5	1	urn:cgi:classifier:CGI:SimpleLithology:201001:sand	1	brownish grey: SDN:GS40::brgrey	
			21.6	1	13.2	1	urn:cgi:classifier:CGI:SimpleLithology:201001:sand	1	brownish grey: SDN:GS40::brgrey	
			34.8	1	5.6	1	urn:cgi:classifier:CGI:SimpleLithology:201001:mud	1	dark grey: SDN:GS40::dgrey	1
			40.4	1	2.5	1	urn:cgi:classifier:CGI:SimpleLithology:201001:sand	1	mid grey: SDN:GS40::mgrey	1
			42.9	1	13.5	1	urn:cgi:classifier:CGI:SimpleLithology:201001:gravel	1	brown: SDN:GS40::brown 1	

Blue binary code
http://www.geekwallpapers.com/blue-binary-code-wallpaper/

an example:

borehole description in database of the Geological Survey of the Netherlands

in Dutch

NITG-Boornummer	BE050010	**Coordinatenstelsel**	
X-coordinaat	526851		
Y-coordinaat	6071830	**Bepaling lokatie**	
Maaiveld (m tov NAP)		**Beschrijvingsmethode**	
Datum boring	25-09-1985	**Vertrouwelijkheid**	
Plaatsnaam		**Werknummer**	
Provincie			
Kaartblad			
Soort boring			E05-00010
Einddiepte (m)	9.00		E5;10
Uitvoerder	RGD/RWS		
Boormethode	Counter-flushboring		
Opmerkingen	ms. Volans Hyperfix (3-1) 1207.23 (3-5) 1489.57		

Lithologie

Beschrijver lagen	
Organisatie beschrijver	
Nat/droog	Onbekend

Laagbeschrijving

Boven	Onder	Grondsoort	Omschrijving	M63	LU	SI	ZA	GR	OR	CA
0.00	4.25	zand	grijs-bruin, 5Y 5/2, Opm.: AAN DE BASIS WEINIG KLEIHOUDEND , CA INHOUD NEEMT AF NAAR BOVEN	105						3
		oude omschr.	*GRONDSOORT: Z; KORRELGR: 63- 150; M63: 105; CA: CA3; MUNSELL_CODE: 5Y 5/2; SCHELPNAAM: CERASTODERMA EDULE,TURRITELLA COMMUNIS,SPISULA ELLIPTICA,ECHINIDE STEKELS,DONAX VITTATUS,HYDROBIA ULVAE; ORGANISCH_MAT: SPOOR -DETRITUS; SCHELPINH: ZEER WEINIG SCHELPGRUIS; KLEUR: GRIJS BRUIN; SPREIDING: 70; INH: HOEKIG EN HOEKIG AFGEROND UITERST FIJN T/M ZEER FIJN*							
4.25	5.25	klei	donker-grijs, 2Y 4/1							3
		oude omschr.	*GRONDSOORT: K; SCHELPINH: SPOOR SCHELPGRUIS W.O.JUVENIELE; SCHELPNAAM: MACOMA BALTHICA,HYDROBIA ULVAE; MUNSELL_CODE: 2Y 4/1; INH: AAN DE BASIS HUMEUS; CA: CA3; KLEUR: DONKERGRIJS*							
5.25	5.75	veen	zwart, 5Y 2/5							1
		oude omschr.	*GRONDSOORT: V; ORGANISCH_MAT: UITERST VEEL PLANTEN - RESTEN; MUNSELL_CODE: 5Y 2/5; INH: HIEROP LIGT SLAPPE HUMEUZE KLEI; CA: CA0; KLEUR: ZWART*							
5.75	6.10	grind	zandig, bruin, 5Y 5/2, Opm.: GRIND IS UITWASSING KEILEEM							1
		oude omschr.	*GRONDSOORT: GZ; MUNSELL_CODE: 5Y 5/2; GRINDINH: UITERST VEEL MATIG FIJN T/M FIJN GRIND W.O. VUURSTEEN WITTE KWARTS KWARTSIET KALKSTEEN; KLEUR: BRUIN; INH: HOEKIG EN AFGEROND*							

an example:

translation of text necessary, including header info

From Dutch to English

Boornr	EINDD	TYPE	VERKWIJZI	UTMX	UTMY	POS_E	POS_N	HTVOERDE	Gocad_SL	cad_SL_Br	REF_VLAK
BE050010	9	CFL	GEODOFF	526934,1	6072038	3 25 8.0E	54 47 37.0N	RGD	-42,6	GEM_WT RD	

Borehole	End depth	Type	Method	UTM X-coordinate	UTM Y-coordinate	Longitide	Latitude	Operator	Water depth	e of water	Reference datum
BE050010	9	Counterflush	Geodoff	526934,1	6072038	3 25 8.0E	54 47 37.0N	Geological Survey of the Netherlands	42.6	Measured	1985

Van	Tot	Monstbesch/Anal	Grondsoo	Inh	Grindinh	Korrelgr	%CaCO3_	%CaCO3_grd	D50	M63	<63um	Spreiding
0	4,25	M	Z	HOEKIG EN HOEKIG /		63- 150					105	70
4,25	5,25	M	K	AAN DE BASIS HUMEUS								
5,25	5,75	M	V	HIEROP LIGT SLAPPE HUMEUZE KLEI								
5,75	6,1	M	GZ	HOEKIG EI	UITERST VEEL	MATIG FIJN T/M FIJN GRIND W.O. VUURSTEEN WITTE KWARTS KWARTSIET KALKSTEEN						
6,1	9	M	ZK	DIAMICT	UITERST VEEL	MATIG FIJN T/M FIJN GRIND W.O. VUURSTEEN KWARTSIET KALKSTEEN						

From	To	Visual sample descr	Sediment	Content	Gravel cor	Grain size	% CaCO3	% CaCO3 in gravel	D50 (med	M63 (sand median)	Mud %	Sorting
0	4.25	V	sand	angular and subroun		63-150					105	70
4.25	5.25	V	clay	at the base organic								
5.25	5.75	V	peat	on this lies soft humic clay								
5.75	6.1	V	gravel san	angular ar extremely much moderately fine to fine gravel including flint white quartz quartzite limestone								
6.1	9	V	sandy clay	diamicton extremely much moderately fine to fine gravel including flint quartzite limestone								

Geo-Seas

Grondsoo	Inh	Grindinh	Korrelgr	%CaCO3_
Z	HOEKIG EN HOEKIG /		63- 150	
K	AAN DE BASIS HUMEUS			
V	HIEROP LIGT SLAPPE HUMEUZE KLEI			
GZ	HOEKIG EI	UITERST VEEL	MATIG FIJN T/M FIJN GRIND W.O	
ZK	DIAMICT	UITERST VEEL	MATIG FIJN T/M FIJN GRIND W.O	

Sediment	Content	Gravel cor	Grain size	% CaCO3
sand	angular and subroun		63-150	
clay	at the base organic			
peat	on this lies soft humic clay			
gravel san	angular ar extremely much moderately fine to fine gravel			
sandy clay	diamicton extremely much moderately fine to fine gravel			

an example:

mapping of translated (English) text and of code fields to GeoSciML- and ODV-compliant text and code

from pluriform to standardised

Mapping key:	Source	Step
Cruise	No information	
Station	From A41	
Type	No information	
yyyy-mm-ddThh:mm:ss.sss	From M41 N41 O41	
Longitude [degrees_east]	From G41	Translate degrees-minutes-seconds to decimal degrees
Latitude [degrees_north]	From H41	Translate degrees-minutes-seconds to decimal degrees
LOCAL_CDI_ID	From A41	
EDMO_code	Code for TNO	
Bot. Depth [m]	From J41	
Depth below seabed [m]	From D52-56	
Sample length [m]	From E52-56	
Simple lithology	From G52-56 H52-56	Default is G (with gravel = gravel, sand = sand, peat = peat, clay = mud, gravel sand = gravel, sandy clay = mud, shelly sand = shell hash; lutum = clay); modifiers are terms distinction and th
Colour	From R52-56	
Grain-size minimum [micron]	From J (52)	Use smallest number, but not when Simple lithology is mud or clay and value ≥ 63
Grain-size maximum [micron]	From J (52)	Use largest number, but not when Simple lithology is gravel and value ≤ 2000
Wentworth class minimum	From G52-56 H52-56	From G if H and I are unavailable (gravel = 2000; gravel sand, shelly sand and sand = 63; silt = 4; lutum, clay and sandy clay = 0; others = no value); from H and I use grain-size ranges associated
Wentworth class maximum	From G52-56 H52-56	From G if H and I are unavailable (gravel and gravel sand = 64000; shelly sand = 32000; sand = 2000; silt = 63; lutum, clay and sandy clay = 4; others = no value); from H and I use grain-size range
Gravel percentage minimum [%]	From G52-56 H52-56	From T (value) or AV (code) if available; from G if gravel (30) or gravel sand (15), from H, I and BA use ranges associated with modifying terms
Gravel percentage maximum [%]	From G52-56 H52-56	From T (value) or AV (code) if available; from G if gravel (100) or gravel sand (30), from H, I and BA use ranges associated with modifying terms
Sand percentage minimum [%]	From G52-56 H52-56	From G if gravel sand (70), shelly sand (70), sand or sandy clay (50); from H, AU and BA depending on modifying term (such as slightly or very).
Sand percentage maximum [%]	From G52-56 H52-56	From G if gravel sand (85), shelly sand (85), sand (100) or sandy clay (92); from H, AU and BA depending on modifying term (such as slightly or very).
Mud percentage minimum [%]	From G52-56 H52-56	From G if lutum (50) , clay (8), silt (50) or sandy clay (8); from O (percentage - takes precedence over the non-numerical terms); from AQ depending on code; from H, AS, AT and BA dependin
Mud percentage maximum [%]	From G52-56 H52-56	From G if lutum (100) , clay (100), silt (100) or sandy clay (25); from O (percentage - takes precedence over the non-numerical terms); from AQ depending on code; from H, AS, AT and BA dep
Organics percentage minimum [%]	From G52-56 H52-56	From G if peat (23); from AP depending on code; from H, V, AO or BA depending on modifying term
Organics percentage maximum [%]	From G52-56 H52-56	From G if peat (100); from AP depending on code; from H, V, AO or BA depending on modifying term
Shells percentage minimum [%]	From G52-56 H52-56	From G if shelly sand (15); from K, L and U (percentage - takes precedence over other terms); from H, AK and BA depending on modifying terms
Shells percentage maximum [%]	From G52-56 H52-56	From G if shelly sand (30); from K, L and U (percentage - takes precedence over other terms); from H, AK and BA depending on modifying terms
Sorting	From H52-56 P52-56	From P (numeric - transfer to class - takes precedence over other terms); from H and BA depending on text terms
Sand median [micron]	From M52-56 N52-5	From M or N (numeric - N takes precedence over M)
Adjusted Folk class	From AJ52-56	If AJ blank, then use mean mud, sand and gravel % ((minimum + maximum)/2) normalized to total of 100%

Gravel percentage minimum [%]	From G52-56 H52-56 From T (value) or AV (code) if available; from G if gravel (30) or gravel sa
Gravel percentage maximum [%]	From G52-56 H52-56 From T (value) or AV (code) if available; from G if gravel (100) or gravel s
Sand percentage minimum [%]	From G52-56 H52-56 From G if gravel sand (70), shelly sand (70), sand or sandy clay (50); from
Sand percentage maximum [%]	From G52-56 H52-56 From G if gravel sand (85), shelly sand (85), sand (100) or sandy clay (92);

an example:

using the mapping to fill the fields in the standardised ODV-format

from standardised terms to a standardised database

Wentworth class minimum (for intervals 2, 4 and 5)

List of text strings and associated values	Term from G	Term from H or I
	clay	no modifier
	gravel sand	no modifier
	sandy clay	no modifier

Wentworth class maximum

List of text strings and associated values	Term from G	Term from H or I
	clay	no modifier
	gravel sand	moderately fine
	sandy clay	moderately fine


```
GRSIZE
63011::WENTCLMN</object><units
16000011::WENTCLMX</object><units
16000RAVMNZZ</object><units>SDN:
//<subject>SDN:LOCAL:Gravel percentage maximum</subject><object>SDN:P011::GRAVMXZZ</object><units>SDN:
//<subject>SDN:LOCAL:Sand percentage minimum</subject><object>SDN:P011::SANDMNZZ</object><units>SDN:P
//<subject>SDN:LOCAL:Sand percentage maximum</subject><object>SDN:P011::SANDMXZZ</object><units>SDN:P
//<subject>SDN:LOCAL:Mud percentage minimum</subject><object>SDN:P011::MUDPMNZZ</object><units>SDN:P
//<subject>SDN:LOCAL:Mud percentage maximum</subject><object>SDN:P011::MUDPMXZZ</object><units>SDN:P
//<subject>SDN:LOCAL:Organics percentage minimum</subject><object>SDN:P011::ORGPERMN</object><units>SD
//<subject>SDN:LOCAL:Organics percentage maximum</subject><object>SDN:P011::ORGPERMX</object><units>SD
//<subject>SDN:LOCAL:Shells percentage minimum</subject><object>SDN:P011::SHLPERMN</object><units>SDN:P
//<subject>SDN:LOCAL:Shells percentage maximum</subject><object>SDN:P011::SHLPERMX</object><units>SDN:P
```


Depth below seabed [m]	QV:SEADA	Sample length [m]	QV:SEADA	Simple lithology	QV:SEADA	Colour	QV:SEAD
0	1	4.25	1	urn:cgi:classifier:CGI:SimpleLithology:201001:sand	1	greyish brown: SDN:GS40::grybrn	1
4.25	1	1.00	1	urn:cgi:classifier:CGI:SimpleLithology:201001:mud	1	dark grey: SDN:GS40::dgrey	1
5.25	1	0.50	1	urn:cgi:classifier:CGI:SimpleLithology:201001:peat	1	black: SDN:GS40::black	1
5.75	1	0.35	1	urn:cgi:classifier:CGI:SimpleLithology:201001:gravel	1	brown: SDN:GS40::brown	1
6.10	1	2.90	1	urn:cgi:classifier:CGI:SimpleLithology:201001:diamicton	1	greyish brown: SDN:GS40::grybrn	1

Geo-Seas

summing up:

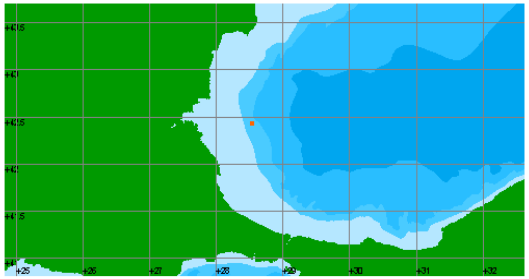
- ***Geo-Seas helps define standards for geoscience data***
- ***Geo-Seas partners fill marine geoscience database that meets these standards***
- ***end users may query this database***

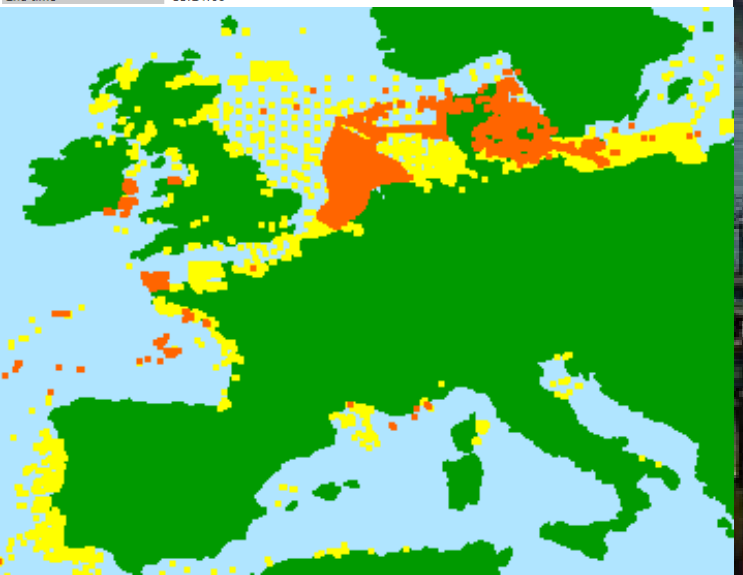
and …

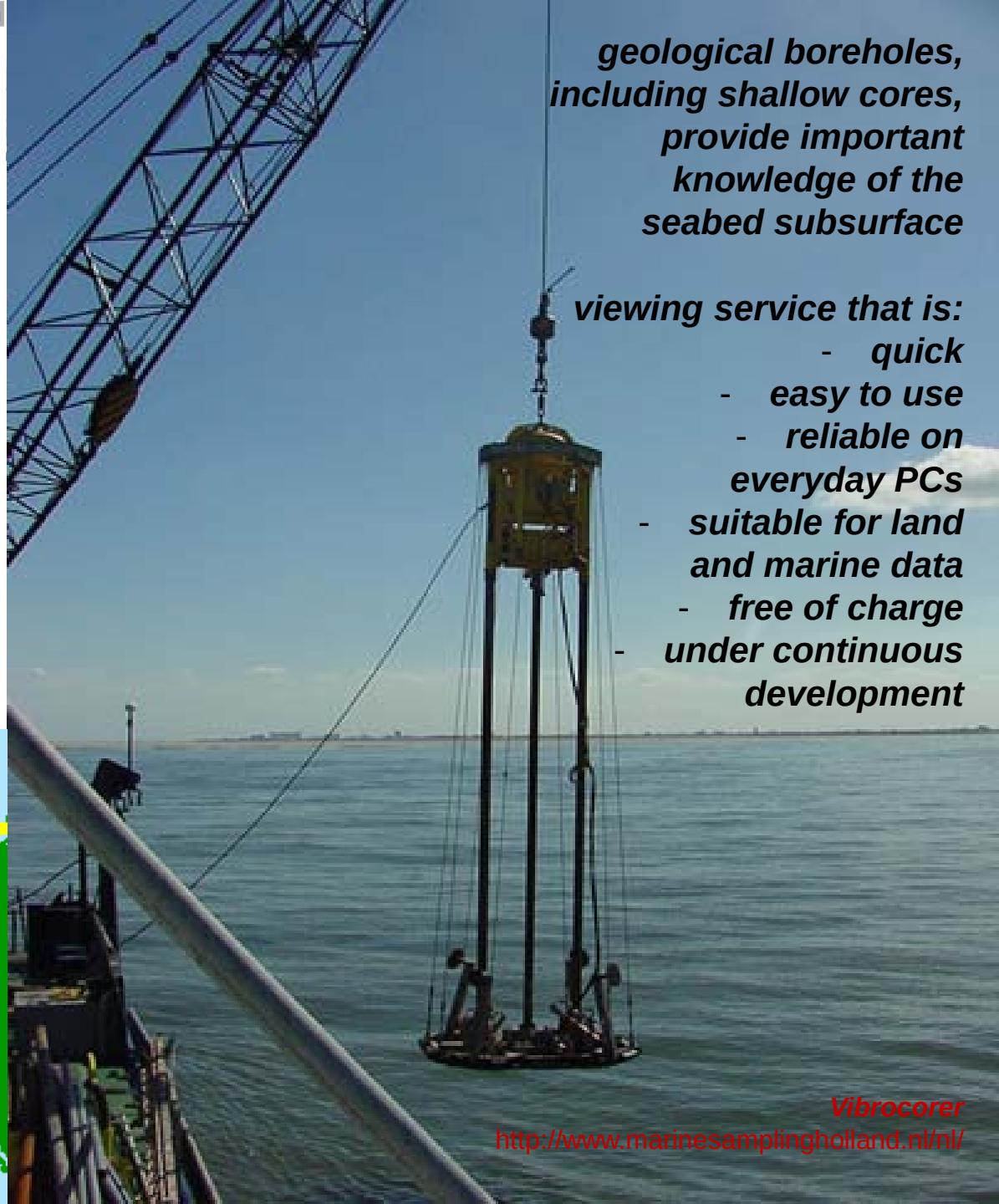
- ***uniform database can be visualised with viewing tools →***

BOREHOLE LOG VIEWING TOOL

DETAILS

WHAT?	
Data set name	PLC-210
Discipline	Cryosphere Environment Marine geology Terrestrial
Category	Geochronology and stratigraphy Palaeoclimate Rock and sediment lithology and mineralogy
Variables measured	Lithology Sediment age
Abstract	Geological sampling by gravity corer with digital image and core detail at water depth 575 m. from Black Sea.
Data format	Ocean Data View ASCII input **Version** 0.4
Data set creation date	20111118
WHERE?	
Map	
Latitude 1	42.4009548
Longitude 1	28.5801055
Datum	World Geodetic System 84
Measuring area type	point
Water depth (m)	575
Depth reference	sea floor
Minimum instrument depth (m)	0
Maximum instrument depth (m)	2.6
WHEN?	
Start date	20060331
Start time	11:24:00
End date	20060331
End time	11:24:00





geological boreholes, including shallow cores, provide important knowledge of the seabed subsurface

viewing service that is:

- ***quick***
- ***easy to use***
- ***reliable on everyday PCs***
- ***suitable for land and marine data***
- ***free of charge***
- ***under continuous development***

Vibrocorer
http://www.marinesamplingholland.nl/nl/

GSI3D Research Consortium

{Geological surveying and investigation in three dimensions}

British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

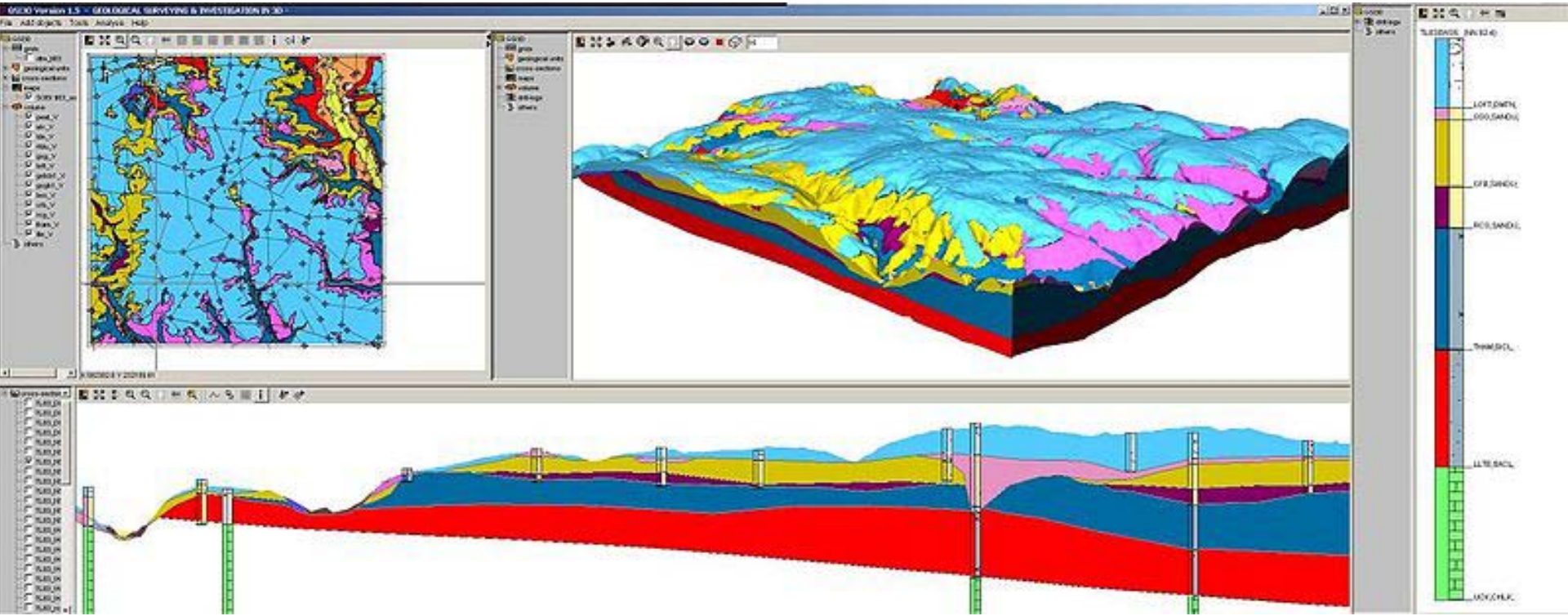
Geological Surveying and Investigation in 3D:

methodology and associated software tool for 3D geologic modelling developed by Hans-Georg Sobisch: INSIGHT Geologische Softwaresysteme

BGS has been acting as a test bed for the system; now lead in development

GSI3D Interface

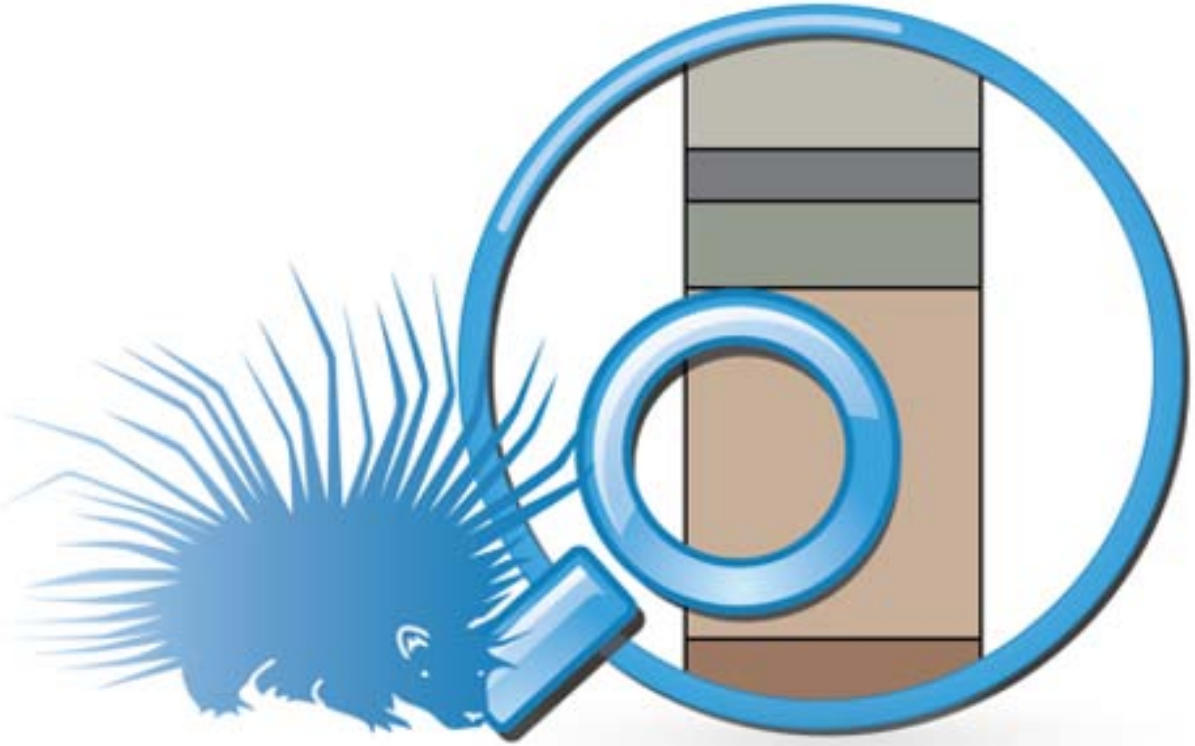
http://en.wikipedia.org/wiki/File:GSI3D_interface.jpg



log viewer Porcupine developed within BGS:

is able to visualise data provided in several formats through Mole, a tool that changes core data provided in these formats to code readable by log viewer

Mole successfully modified to read ODV files



BGS PORCUPINE®