EMODnet –GEOLOGY 2

Work Package 3: Sea-bed substrate

Guidance Document II, Harmonisation and Generalisation

Geological Survey of Finland
April 2014

WP3 leader: Geological Survey of Finland (GTK)	
Address: P.O. BOX 96 FI-02151 Espoo Finland **WP3 lead team:** Aarno Kotilainen Anu Kaskela Ulla Alanen	**Telephone:** +358 29 503 0000 **E-mail:** forename.surname@gtk.fi

1. Introduction

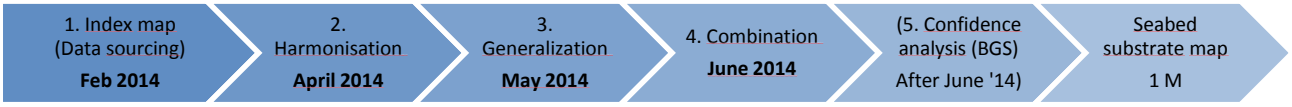
The second phase of the EMODnet – Geology lot aims to compile marine geological data from all European sea areas (e.g. the White Sea, the Barents Sea, the Iberian Coast, and the Mediterranean Sea within EU waters). This guidance document is part of EMODnet –Geology 2 work package 3 (WP3): Sea-bed substrate data. The expected outcome of WP 3 is a fully populated GIS layer of harmonised sea-bed substrate distribution. The sea-bed substrate is a central dataset for the EMODnet Seabed habitats lot, which would need the sea-bed substrate dataset in June 2014 to be able to meet their deadline. Thus it was agreed in the EMODnet Geology Kick Off meeting in Lisbon that WP3 will aim to have the 1st draft of the sea-bed substrate map ready in June 2014. However the 1st draft can be updated during later stages of the EMODnet Geology project.

The WP3 includes several phases:

1. Index map. Aim is to visualize the data/map coverage and gap areas.
2. Generalization. The maps are generalized into a target scale (1:250 000) if not originally at this scale.
3. Harmonisation. The national seabed substrate data are translated into EMODnet substrate classification system.
4. Compilation. The national seabed substrate maps are compiled into a European sea-bed substrate map/EMODnet geology substrate map.
5. Confidence analyses of the seabed substrate map (BGS).
6. Update of the map.

The final output of the WP3 will be a sea-bed substrate map with a confidence analysis.

With this second guidance document, we give guidelines on harmonisation of numerous national data on sea-bed substrates into shared EMODnet substrate classification scheme. If the national data is more detailed than our target scale, 1: 250 000, the data has to be generalized following the principles presented in Appendix 1.



2. Data format requirements and data transfer

Format
The data requirement is ESRI shape file polygon features. Partners are expected to provide their sea-bed substrate data in a map format for WP3 leader, GTK. The data should be uploaded to the WP3 ftp-site. GTK will not do any interpolation on the basis of samples or other raw data as national partners are the best experts to interpret data from their marine areas.

Scale
The EMODNET –Geology project aims to deliver GIS layers of information compiled on a scale of **1: 250 000** wherever possible.

The smallest cartographic unit is 0.3 km^2 and no areas smaller than this should be present in the final map.

Coordinate system
Partners are expected to provide maps in the WGS84 geographical coordinate system (Lat/Lon).

Coastline
EMODnet geology will use a coastline adopted by the European Environment Agency (1:100 000) (last upload 4th of July 2013), which is expected to be the standard coastline adopted by all of the EMODnet projects. The coastline can be found on GTK's ftp-site. All WP3 data should be adapted into this coastline.

Data transfer and distribution
Sea-bed substrate maps, index maps and guidelines will be distributed through GTK's ftp-server:
www: http://weppi.gtk.fi/net2ftp/
Username: EMODnet2
Password: KrHUW6a02h

3. Index map

The EMODnet Sea-bed substrate work package (WP3) was launched with visualization of data coverage i.e. collating an index map of national sea-bed mapping coverage. Partners have provided information on where and what kind of sea-bed substrate data/maps they have available for the project from their national waters including EEZs (Fig. 1). The geographical scope of the project includes The Baltic Sea, The North Sea, The Celtic Seas, the White Sea, Barents Sea, Iceland Sea, the Bay of Biscay and the Iberian Coast, the Western Mediterranean Sea (within EU waters), the Adriatic Sea, the Ionian Sea and the Central Mediterranean Sea (within EU waters), the Aegean-Levantine Sea (within EU waters) and the Black Sea as defined in the Marine Strategy Framework Directive.

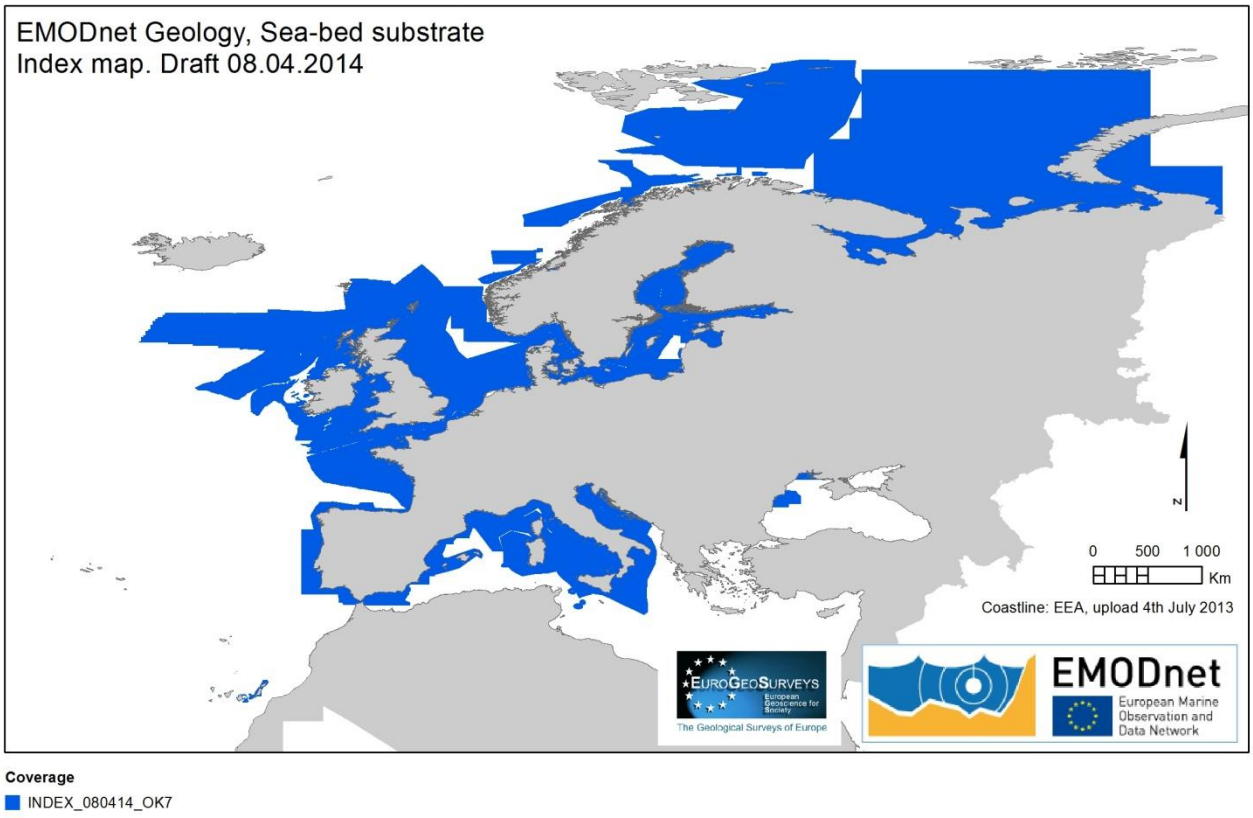


Figure 1. The coverage of the sea-bed substrate data available for EMODnet geology. Last update 8th April 2014.

In the Kick Off meeting in Lisbon it was agreed that WP3 would compare the level of scale to data coverage. If the coverage requirements (e.g. many large gap areas) cannot be met with the scale of 1: 250 000, then the maps will be produced at a broader scale (1: 500 000 – 1 000 000). According to the update from the 8th of April, sea-bed data on scale of 1:250 000 (or more detailed) is mainly available from coastal areas and the Atlantic Ocean (fig. 2). As agreed with the EMODnet Seabed Habitats Lot , WP3 will aim to produce sea-bed substrate data on a scale of 1: 250 000 by June 2014. However, during the next workshop (September-October 2014) we will discuss if there is a need (and time) to produce a map on scale of 1:1 000 000 to expand the coverage area.

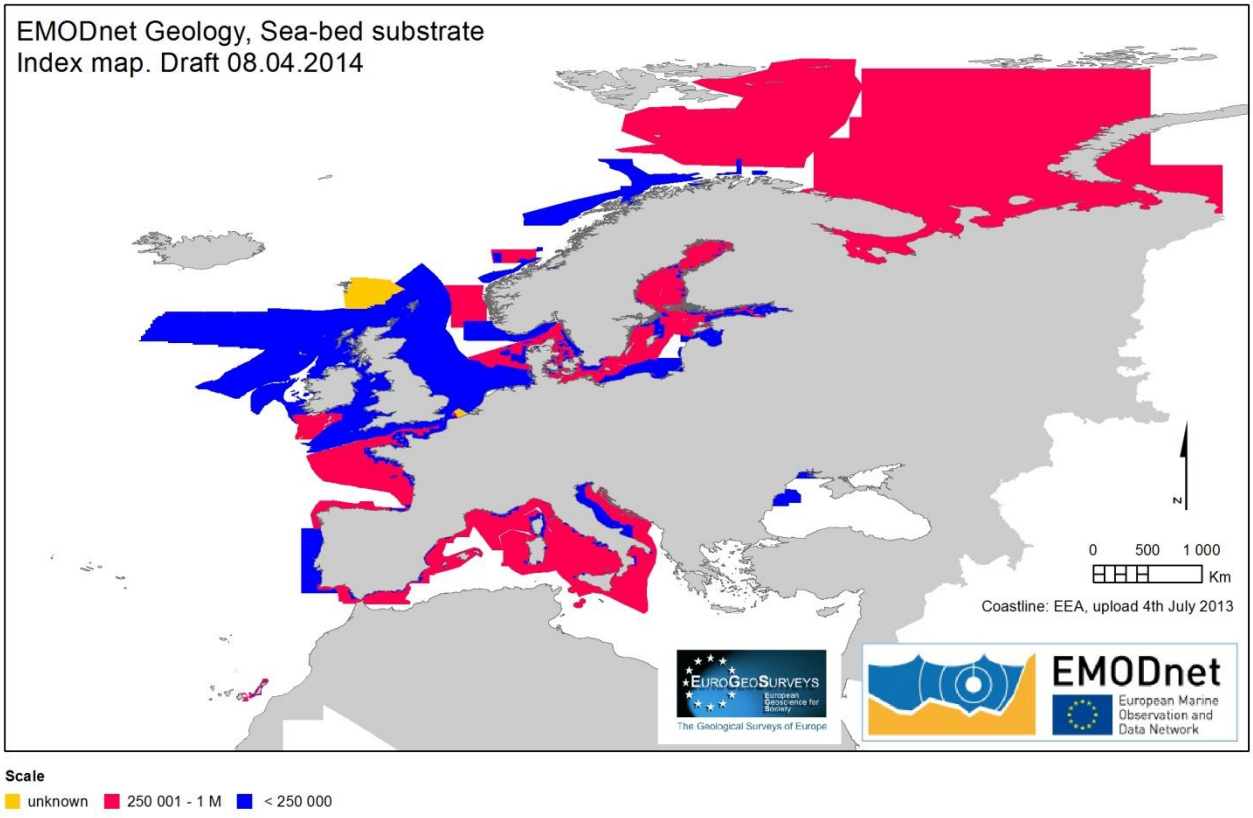


Figure 2. The scale of the available maps.

4. Sea-bed substrate classification schema

This guidance document is about harmonisation of the national sea-bed substrate data into EMODnet substrate classification scheme. Harmonisation of data includes evaluation of the different classification schemes used in each country, classification or translation of the national data into a shared EMODnet classification system that takes into account integration with hydrographic, chemical and biological lots and compilation of maps into a sea-bed substrate map of European sea areas. **The target scale is 1:250 000. If the data is more detailed then it has to be generalised according to the rules defined in the Appendix 1. If the data is coarser it is not taken into account at this phase**.

The WP3 index map (update 8.4.2014) shows that a multitude of sediment classification systems are used in sea-bed mapping in Europe (Fig. 3). Traditionally, European countries have conducted their marine geological surveys according to their own national standards and classified substrates on the grounds of their national classification schemes. These national classifications are now harmonised into a shared EMODnet schema.

During the kick-off meeting held in Lisbon in January 2014 it was decided to follow the Folk sediment classification to include all 15 substrate classes and also data on rock & boulders if possible. Most likely it is not feasible to provide all these 16 classes from all European seas with available data. Thus we have created a hierarchy of Folk classifications (Fig. 4) with 16, 7 and 5 classes. One is able to unite the 16 classes into the proposed 5 classes. The hierarchy is partly

developed on the basis of the discussions with EMODnet Seabed Habitat mapping group to serve their needs as well. The system with 5 classes is almost the same as in the urEMODnet with the exception that the cut-off between “Mud to muddy sand” and Sand is now 9:1 instead of 4:1 to support combination from 16 classes to 5 classes.

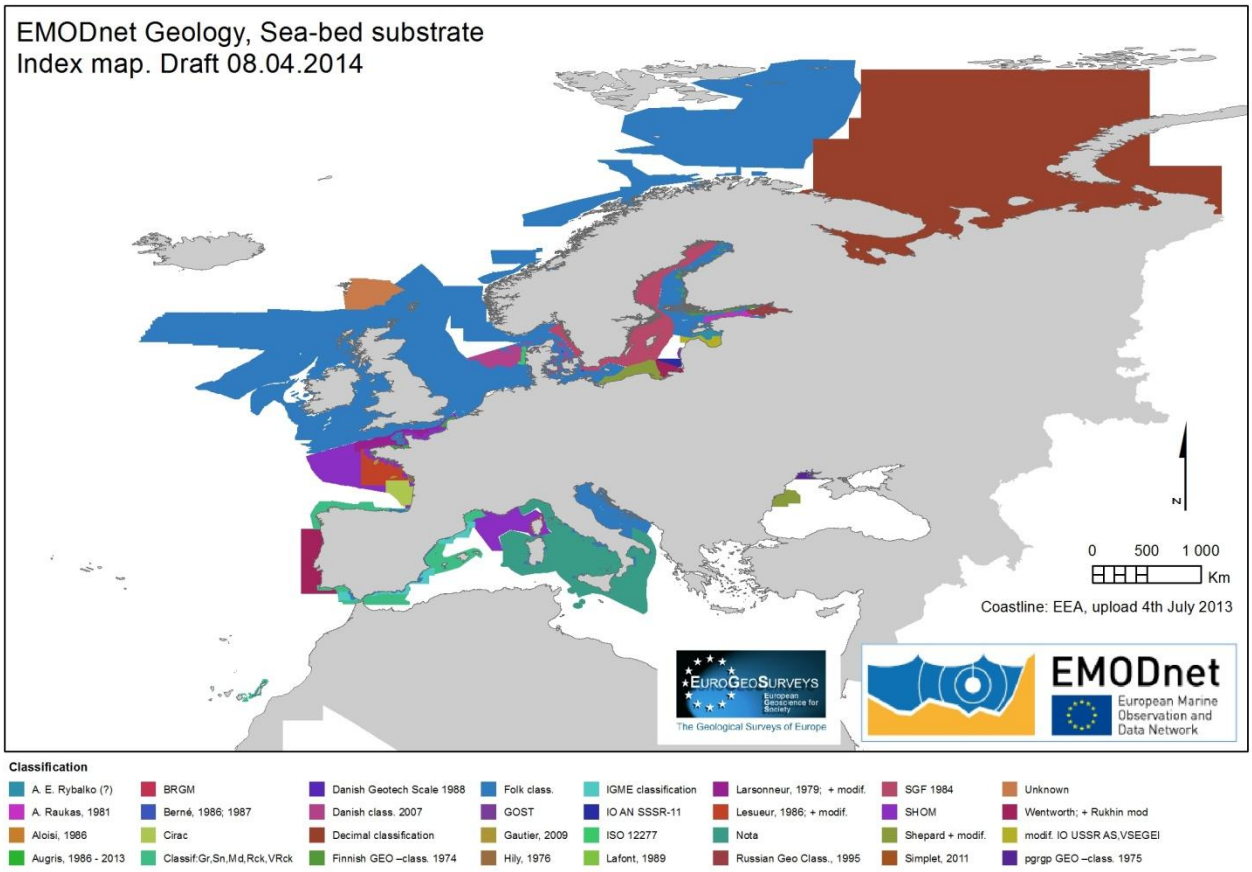
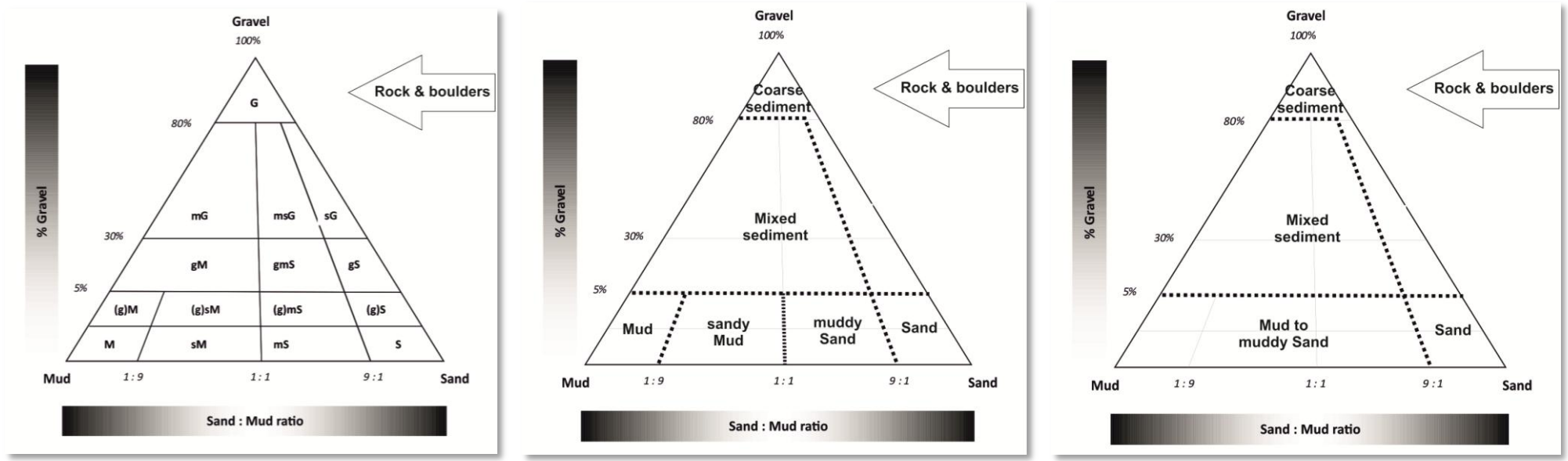


Figure 3. The different sediment classification systems used in seabed mapping in Europe.



Folk, 16 classes	Folk, 7 classes	Folk, 5 classes
Rock & Boulders	Rock & Boulders	Rock & Boulders
Gravel	Coarse sediment	Coarse sediment
sandy Gravel		
gravelly Sand		
muddy Gravel	Mixed sediment	Mixed sediment
muddy sandy Gravel		
gravelly Mud		
gravelly muddy Sand		
(gravelly) Mud	Mud	Mud to muddy Sand
Mud		
(gravelly) sandy Mud	sandy Mud	
sandy Mud		
(gravelly) muddy Sand	muddy Sand	
muddy Sand		
(gravelly) Sand	Sand	Sand
Sand		

Figure 4. The Folk sediment triangle and the hierarchy of combined Folk classification developed for EMODnet geology.

5. Sea-bed substrate classification process

Due to the very challenging timeline the substrate reclassification scheme is very simple and provides sometimes only a rough estimate for the substrate material from **the uppermost 30 cm of the sediment column**. The vertical limit of 30 cm was agreed in urEMODnet as it correlates with the sample resolution in the majority of cases (~ box corer and Van veen). The reclassification approach is the same as in the urEMODnet due to its simplicity and transparency.

Grain sizes

Differences in grain-size classification schemes between Surveys should be identified. In urEMODnet we drafted a table showing grain sizes used in different classification systems (Table 1). If your classification is not yet included or it contains errors, please add/correct your grain-size classification system in an excel file and send it to GTK (using the ftp site).

Rock & boulders (> 50%) class is included in the schema as this information has geological and biological significance. The grain-size boundary of boulders is adapted from the Udden-Wentworth classification system (Table 1).

Table 1. The Grain size limits in different classification systems.

Grain size Mm > Ø	EMODnet FOLK	MNCR	Udden - Wenthworth	GTK & SGU	GEUS	VSEGEI	EGK Raukas 1981	Comments
> 600	**Boulders (> 256)**	Boulder (> 256)	Boulder (> 256)	Boulder (> 600)	Boulder (> 200)	Boulders (> 100)	Boulders >1000	*All defined boulder categories belong to this group. Some of the grain sizes include smaller sizes. Large stones overlap, Boulders (GEUS, VSEGEI) > Boulders*
- 600				Large Stones			Cobbles (100-1000)	
- 256	**Gravel (2– 256)**	Cobble (64 – 256)	Cobble (64 – 256)	(200 – 600)				*All gravels belong here. Also cobbles and pebble sizes fit to gravel grain sizes. Stones, except Large stones, belong here. Large stones overlap with boulder sizes. And some boulder sizes (GEUS, VSEGEI) overlap with gravel category.*
- 200				Small stones (60 – 200)	Stone (20 – 200)			
- 100						Cobbles (10 – 100)	Pebble (10-100)	
- 64		Pebble (16 – 64)	Pebble (4 – 64)					
- 60				Gravel (2 – 60)				
- 20					Gravel (2 – 20)			
- 16		Gravel (4 – 16)						
-10						Gravel (2 – 10)	Granule (1-10)	
- 4		Coarse Sand (1 – 4)	Granule (2 – 4)					
- 2	**Sand (0.0625-2)**		Very coarse sand (1 – 2)	Coarse sand (0.06 – 2)	Sand (0.06 – 2)	Sand (0.05 – 2)		*Quite allright. Some problems with fine sand grain sizes as with MNCR Coarse sand grains.*
- 1		Medium Sand (0.25 – 4)	Coarse sand (0.5 – 1.0)				Sand (0.1-1)	
- 0.6				Medium sand (0.2 – 0.6)				
- 0.5			Medium sand (0.25 – 0.5)					
- 0.25		Fine Sand (0.0625 – 0.25)	Fine sand (0.125 – 0.25)					
- 0.2				Fine sand (0.06 – 0.2)				
- 0.125			Very fine sand (0.0625 – 0.125)					
- 0.0625	**Mud (< 0.0625)**	Mud (< 0.0625)	Mud (< 0.0625)				Silt (0.005-0.1)	*All mud, silt and clay grain sizes belong here. Part of the fine sands (GTK, SGU, GEUS = difference only 0.0025 mm, VSEGEI=difference 0.0125mm) overlap here.*
- 0.06				Silt (0.002 – 0.06)	Silt (0.002 – 0.06)	Silt (0.005 – 0.05)		
- 0.05						Clay (< 0.005)		
- 0.005								
- 0.002				Clay (< 0.002)	Clay (< 0.002)		Clay (<0.005)	

Reclassification
The EMODnet substrate reclassification approach is generated on the grounds of the surface substrate (down to 30 cm depth). The first step in the reclassification is to study/analyse the surface material. Ideally, the substrate content should be examined from the surface samples and grain-size analysis. If this is not possible (as in GTK example case), an expert-based prediction of the surface sediments should be made (that should be validated later on). The predicted surface sediments should be compared with the modified Folk classification system (Fig.4, Table 1) to find the best fit.

- → **Sediment maps that are (semi-) automatically interpolated from an extensive sediment sample archive:**
  - Samples should be classified according to Folk
    - 15 classes + rock and boulders
    - Vertical resolution down to 30 cm depth
  - Automatic interpolation of the substrate distribution on the basis of classified samples
  - Scale 1:250 000, smallest area 0.3 km^2

- → **Sediment maps that are (semi-) automatically interpolated from surface samples and seismo-acoustic data:**
  - Samples should be classified according to Folk
    - 15 classes + rock and boulders
    - Vertical resolution down to 30 cm depth
  - Automatic interpolation of the substrate distribution on the basis of classified samples and seismo-acoustic data
  - Scale 1:250 000, smallest area 0.3 km^2

- → **Sediment maps that are interpreted manually (from seismo-acoustic surveys and/or samples) or if it is impossible/unreasonable to re-interpolate sediment map (e.g. due to time constraints)**
  - Scale 1:250 000, smallest area 0.3 km^2
  - Analysis of the surface material:
    - On the basis of existing sample data or
    - Expert -based prediction on the surface material for each of the original sediment categories
      - → Prediction should take into account Folk triangle and the grain-size limits
  - Correlation to the Folk categories on the grounds of the (predicted) surface material
  - Reclassification of the sediment map to most detailed classification or our EMODnet hierarchy (16-7-5 Folk classes) according to surface material correlation
  - If expert-based prediction, later validation is recommended
  - Note that is not always possible to make one-to-one translation of the substrate category. The resulting class might be more of "compromise" that includes the majority of the substrate variation in that class.

The target scale is 1:250 000. If the data is more detailed then it has to be generalised according to the rules defined in **the Appendix 1**. If the data is coarser it is not taken into account at this phase.

Geodatabase

Similar to the previous phase of EMODnet, GTK has created a geodatabase that includes an empty polygon shape file with an attribute table (Table 2) for the sea-bed substrate maps. The geodatabase can be found on the WP3 FTP-site. Partners are requested to update the geodatabase with data/maps from their marine areas (correlating with the index data) and fill in the substrate attribute table. The attribute table contains 14 columns that go through the data and how the (re)classification was done. Again, the data has to be adjusted to the EMODnet geology coastline.

Partners are requested to upload their data on a scale of 1:250 000 (polygon shape file or geodatabase format) into WP3 FTP site **by 31 May 2014.** GTK will combine the national sea-bed substrate maps and aims to distribute the resulting first version of the EMODnet Sea-bed substrate map to partners for comments during the 1st week of June. Partners will have about one week to comment the map, and the map will be delivered to habitat mapping group by 20 June 2014.

6. Sea-bed substrates, Attribute table

Basic information
The attribute table includes 14 columns:

Table 2. The sea-bed substrate attribute table

Field	Format	Comment/Advise
FID	Number	Feature ID. An internally generated identification number for each polygon (not visible in Excel).
Shape	Text	Polygon. Internally generated text, indicating whether the feature is a polygon, point or line (not visible in Excel). Here they should all be polygons.
Code	Text (6)	Two letter country code, which corresponds to ISO3166- code (http://www.iso.org/iso/english_country_names_and_code_elements) e.g. FI, SE, LV plus 3 digits (numbers) that identify each map. Partners decide map numbers themselves. **The code should be the same as the code in the INDEX map.**
Grain_Size	Text (25)	Used grain-size classification system e.g. Folk, Wentworth, MNCR
Reclassifi	Text	Reclassification. Are the surface substrates reclassified on the basis of sample data or by expert-judgement? S = Sample-based P = Expert based prediction
Method	Number	Is the sediment data interpolated automatically from the surface samples or are the existing sediment categories reclassified on the basis of surface material? 1 = automatic interpolation of reclassified samples 2 = automatic interpolation of reclassified samples and acoustic-seismic-surveys 3 = reclassification of existing substrate categories on the grounds of analyzed surface samples 4 = reclassification of existing substrate categories on the grounds of expert-based predicted surface material, no validation
Sample_n	Number	Sample number. Approximate the minimum number of samples used per original substrate category.
O_substrat	Text	Original substrate category. Name of the original substrate category.
Relation*	Text	Relationship code. Code describes the relationship between two classification schemes (original versus reclassified) 1. =, O_substrate is same as Folk 2. ~ , O_substrate is nearly the same as Folk 3. > , Folk is contained within O_substrate 4. < , O_substrate is contained within Folk 5. # , O_substrate partially overlaps with Folk
FOLK_16cl**	Number	111 = Mud 112 = (gravelly) Mud 121 = sandy Mud 122 = (gravelly) sandy Mud 131 = muddy Sand

		132 = (gravelly) muddy Sand 211 = Sand 212 = (gravelly) Sand 311 = gravelly Sand 321 = sandy Gravel 331 = Gravel 411 = gravelly Mud 421 = muddy Gravel 431 = gravelly muddy Sand 441 = muddy sandy Gravel 5 = Rock & boulders 6 = no data at this level
FOLK_7cl**	Number	11 = Mud 12 = sandy Mud 13 = muddy Sand 2 = Sand 3 = Coarse-grained sediment 4 = Mixed sediment 5 = Rock & boulders 6 = no data at this level
FOLK_5cl**	Number	The (primary) Folk substrate category: 1 = Mud to muddy Sand 2 = Sand 3 = Coarse-grained sediment 4 = Mixed sediment 5 = Rock & boulders
Comments	Text (200)	Free comments
References	Text (200)	References

*If the existing substrate categories have been translated (= no automatic re-interpolation), partners have to choose the relationship code. The relationship code indicates the known relationship between the original substrate class and the target substrate class (Table 3). This allows user to examine how accurate the reclassification has been, i.e. how well the target class represents what was actually mapped originally (adapted from MESH, Coltman et al., 2007).
** One should include information on the most detailed Folk classification that is feasible from their data. If it is not possible to include all 16 classes or 7 classes, choose code 6=no data at this level. At least the classification into 5 Folk classes should be made.

Table 3. Symbols used to describe the relationship between two classification schemes.

Substrate in original classification	**Relationship symbol**	**Substrate in target classification**	**Explanation**
X	=	Y	X is same as Y, one-to-one relationship
X	~	Y	X is nearly the same as Y
X	>	Y	Y is contained within X (~ X has broader definition than Y). All Y categories are included in X. One-to-many relationship.
X	<	Y	X is contained within Y (~ Y has broader definition than X). All X categories are included in Y. Many-to-one relationship.
X	#	Y	The definition of X partially overlaps with that of Y.

7. The geological features

In addition to surface substrates included in Folk, we aim to collate an explanatory feature layer of geologically important features/materials, at least till and hard clay areas. In urEMODnet these were included as subcategories of mixed sediments, but here we consider including them as a separate "feature" layer. The EMODnet sea-bed substrate database includes a feature data layer with an attribute table (Table 4) for these geological features. If there are till or hard clay areas in your marine data, we hope you will include this data in to the feature layer and distribute it to GTK.

Till is dominantly unsorted and unstratified drift, generally unconsolidated, deposited directly by and underneath a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, and boulders ranging widely in size and shape (Glossary of Geology). It has geological meaning and it characteristic especially in deglaciated areas like the Baltic Sea. In the Folk classification scheme till is generally included in the mixed sediments class.

Hard clay (glacial clay) is a special feature of the Baltic Sea (and in other glaciated areas) and it is included in the HELCOM Underwater Biotope and Habitat classification (HUB). Hard clay is of glacial origin and includes substrates covered with a thin (2-20 cm thick) residual sediment (mainly silt/sand and gravel) covering glacial clay. Some epifaunal communities are known to exist on hard clay (HUB). In the Folk classification scheme hard clays are either included in the mixed sediments class, sand, or in coarse sediments depending on the topmost material and its thickness.

We will discuss the addition of other geologically relevant features in our next workshop in September-October 2014 in Malta.

Table 4. The geological feature attribute table

Field	**Format**	**Comment/Advise**
FID	Number	Feature ID. An internally generated identification number for each polygon (not visible in Excel).
Shape	Text	Polygon. Internally generated text, indicating whether the feature is a polygon, point or line (not visible in Excel). Here they should all be polygons.
Code	Text (6)	Two letter country code, which corresponds to ISO3166- code (http://www.iso.org/iso/english_country_names_and_code_elements) e.g. FI, SE, LV plus 3 digits (numbers) that identify each map. Partners decide map numbers themselves. **The code should be the same as the code in the INDEX map.**
Feature	Number	The geological feature type 1 = Hard clay 2 = Till
Comments	Text (50)	Free comments

8. Example, GTK sea-bed substrates

GTK produces marine geological maps on the basis of acoustic-seismic soundings and sediment sampling. Sediment distribution is interpreted manually on the grounds of survey data. The GTK substrate classification includes the following materials: Recent gyttja, Gyttja, Clay and silt, Glacial clay and silt, Glacioaquatic sediment, Secondary Sand and silt, Sand and gravel deposits, Till/Diamicton, Crystalline/sedimentary bedrock. It is not possible to reinterpret these 9 substrate classes into 16 Folk classes, thus we have made a "translation" of the surface material into 7 classes on the basis of expert-judgment (Table 5, 7). The translation includes 4 phases:

1. Prediction of surface substrate in each class
2. Adjusting the surface substrate into the Folk schema. If there are more than several substrate classes then one should analyse the correlation with the hierarchy of 16-7-5 Folk classes and choose the most appropriate on the basis of their expertise.
3. Analysing the relationship between surface material and selected Folk classification
4. Translating the classes to most suitable schema & class.

In some cases there are multiple optional Folk substrate categories (i.e. one-to-many relationship, overlaps, many-to-one relationship). Here, the selection of the most probable category was defined by expert judgment.

If possible it is strongly recommended that the surface material is analyzed on the basis of sample data and proceed with the classification/translation on that basis.

Table 5. Translation of Finnish marine geological categories into EMODnet - Folk hierarchy. The primary Folk category is underlined and has a bold font. As seen from the table Finnish classes include more variability in substrates than Folk system and the relation is not always one-to-one.

GTK classification	Sample-based/ Predicted	Surficial material 1	Possible FOLK Substrates 2	Code 3	FOLK substrate, 7 classes 4	Remarks
Recent gyttja	Predicted	Gyttja/mud	M, (g)M	~	**<u>Mud</u>**	Grains size limits are not the same.
Gyttja*	Predicted	Gyttja/mud, Clay, Silt	sM, (g)sM,	>	**<u>sandy Mud</u>**	Grains size limits are not the same.
(Sulphide) Clay*	Predicted	Clay and silt, sand (Secondary material)	M (g)M, sM, (g)sM, mS, (g)mS	>	Mud	~ Mud to sandy mud Silt in included in Folk category Mud
				>	**<u>sandy Mud</u>**	
				>	muddy Sand	
Glacial clay and silt	Predicted	Gravel, sand, consolidated - clay, silt, Fe-Mn-concretions	mS, (g)mS, S, (g)S gM, gmS, mG, msG	>	muddy sand	
				>	Sand	
				>	**<u>Mixed sediments</u>**	
Glacioaquatic sediment	Predicted	Mixture of sediments, gravel, sand, silt, clay	mS, (g)mS, (g)sM, gM, gmS, mG, msG	>	muddy sand	
				#	sandy Mud	
				>	**<u>Mixed sediments</u>**	
Secondary sand/silt	Predicted	Sand, silt	S, (g)S	~	**<u>Sand</u>**	
Sand and gravel deposits	Predicted	Sand and gravel	S, (g)S, G, sG, gS	>	Sand	Sand in Bothnian Bay.
				>	**<u>Coarse sediment</u>**	
Till/Diamicton	Predicted	Complex bottom: Boulders, Gravel >2% and clay, mud , sand	Boulders, gM, gmS, mG, msG, gS	>	**<u>Mixed sediments</u>**	
				#	Coarse sediment	
Crystalline bedrock	Predicted	Bedrock outcrop, boulders/stones/gravel (~coarse sediment), thin layer of mud in deeper depth	>50% rock, Secondary: boulders	~	**<u>Rock and boulders</u>**	In deeper depth thin layer of mud (might occur occasionally/seasonally at the top)

* update 21.1.2015: Classified as sandy mud

After the translation code was established we have compared the GTK sea-bed substrate maps with the sample data (EUSeaSed). One should take into account that this sample data is biased to soft sediments and especially to muddy sediments (> 60 % of the samples) due to the sampling equipment and research interests. This distortion inhibited the use of the dataset to establish the translation code (not enough reliable samples from coarse seafloors) but we have analysed the validity of our translation by comparing translated GTK map with the sample data (Table 6).

The overall accuracy of the translated data is 57 %. Mud has very high accuracies for data producer and user. Sand has high user's accuracy, but low producer's accuracy. Mixed substrates on the other hand have high producer's accuracy and low user's accuracy. There are a large number of samples with muddy sediments that fall in into areas identified as mixed sediments. The same applies to sand samples falling into categories of coarse and mixed sediments. Most likely the distortion is caused by the sampling gear (box corer, van Veen and vibrohammer) and difficulty to obtain samples from coarser substrates. The number of soft sediment/substrate samples is overrepresented as in areas where the seafloor is covered with mud, sand and coarse substrates, the sample device often returns with muddy or sandy material with only minor appearance of the coarse material as the largest particles remain at the seafloor.

The glacial clay is "varved" clay (rhythmically alternating, glaciolacustrine fine sand to silt and clay couplets) that often has a thin deposit of sand and gravel on top if exposed. Here we have translated glacial clay into the mixed sediment category as if we analyse 30 cm from the top, the material is often a mixture of clay, sand and gravel. The glacial clay is typical to the Baltic Sea and it is included EMODnet as a special feature layer (hard clay). In addition till areas (and moraines) are combined into an explanatory feature layer, but in the Folk classification they are included into mixed sediments.

Table 6. A translation matrix of the GTK translated maps (7 classes) vs EUSeased samples. User's accuracy is the probability that areas placed in a certain class are truly of that class and producers' accuracy is the probability of classifying an area into a correct class for each substrate class. The overall accuracy is the percentage of all samples classified correctly.

Class in map/GTK translation	**Sample data, Observed class, FOLK 7 classes**								**Users accuracy (%)**
	Mud	**sandy Mud**	**muddy Sand**	**Sand**	**Coarse**	**Mixed**	**Rock & bld**	**Total count**	
Mud	337	12	1	19	1	9	0	379	**89 %**
Sand	4	0	0	16	0	0	0	20	**80 %**
Coarse subs.	10	2	3	69	8	9	0	101	**8 %**
Mixed subs.	101	2	4	49	9	59	0	224	**26 %**
Rock & bld.	4	0	1	5	1	2	1	14	**7%**
Total count	456	16	9	158	19	79	1	738	
Producers accuracy (%)	**74 %**	**NoData**	**NoData**	**10 %**	**42 %**	**75 %**	**100 %**	Overall accuracy **57%**	

OBJ	Shape *	CODE	Grainsize	Method	Reclass	Sampl	O_	Relatio	Folk_16cls	Folk_7cl	Folk_5cl	Comments	References	Shape_Length	Shape_Area
1	Polygon	FI-002	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	1	~	5. Rock & Boulders	5. Rock & boulders	5. Rock &	Restricted data.	e.g. Häkkinen, A., 1990. Seafloor Sand and gravel investigations in Gullkrona fjärden, the	36.605586	0.05781
2	Polygon	FI-002	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	2	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Restricted data.	e.g. Häkkinen, A., 1990. Seafloor Sand and gravel investigations in Gullkrona fjärden, the	15.554508	0.030729
3	Polygon	FI-002	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	3	>	6. No data at this le	3. Coarse substrate	3. Coarse	Restricted data.	e.g. Häkkinen, A., 1990. Seafloor Sand and gravel investigations in Gullkrona fjärden, the	6.622535	0.016351
4	Polygon	FI-002	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	4	~	6. No data at this le	2 Sand	2. Sand	Restricted data.	e.g. Häkkinen, A., 1990. Seafloor Sand and gravel investigations in Gullkrona fjärden, the	5.250297	0.009561
5	Polygon	FI-002	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	5	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Restricted data.	e.g. Häkkinen, A., 1990. Seafloor Sand and gravel investigations in Gullkrona fjärden, the	18.117682	0.02534
6	Polygon	FI-002	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	6	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Restricted data.	e.g. Häkkinen, A., 1990. Seafloor Sand and gravel investigations in Gullkrona fjärden, the	43.455423	0.073027
7	Polygon	FI-002	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	7	>	6. No data at this le	1.1 Mud	1. Mud to	Restricted data.	e.g. Häkkinen, A., 1990. Seafloor Sand and gravel investigations in Gullkrona fjärden, the	69.205514	0.221031
8	Polygon	FI-002	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	8	~	6. No data at this le	1.1 Mud	1. Mud to	Restricted data.	e.g. Häkkinen, A., 1990. Seafloor Sand and gravel investigations in Gullkrona fjärden, the	0.06518	0.00001
9	Polygon	FI-002	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	9	~	6. No data at this le	1.1 Mud	1. Mud to	Restricted data.	e.g. Häkkinen, A., 1990. Seafloor Sand and gravel investigations in Gullkrona fjärden, the	38.87403	0.124472
10	Polygon	FI-003	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	1	~	5. Rock & Boulders	5. Rock & boulders	5. Rock &	Restricted data.	Häkkinen, A & Åker, K. 1991. Kotkan, Pyhtään ja Vehkalahden merenpohjan maalajikerros	4.333856	0.007395
11	Polygon	FI-003	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	2	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Restricted data.	Häkkinen, A & Åker, K. 1991. Kotkan, Pyhtään ja Vehkalahden merenpohjan maalajikerros	14.41846	0.031151
12	Polygon	FI-003	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	3	>	6. No data at this le	3. Coarse substrate	3. Coarse	Restricted data.	Häkkinen, A & Åker, K. 1991. Kotkan, Pyhtään ja Vehkalahden merenpohjan maalajikerros	2.743193	0.007106
13	Polygon	FI-003	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	4	~	6. No data at this le	2 Sand	2. Sand	Restricted data.	Häkkinen, A & Åker, K. 1991. Kotkan, Pyhtään ja Vehkalahden merenpohjan maalajikerros	1.285882	0.002414
14	Polygon	FI-003	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	5	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Restricted data.	Häkkinen, A & Åker, K. 1991. Kotkan, Pyhtään ja Vehkalahden merenpohjan maalajikerros	9.08628	0.014314
15	Polygon	FI-003	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	6	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Restricted data.	Häkkinen, A & Åker, K. 1991. Kotkan, Pyhtään ja Vehkalahden merenpohjan maalajikerros	14.798349	0.026925
16	Polygon	FI-003	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	7	>	6. No data at this le	1.1 Mud	1. Mud to	Restricted data.	Häkkinen, A & Åker, K. 1991. Kotkan, Pyhtään ja Vehkalahden merenpohjan maalajikerros	10.71315	0.042775
17	Polygon	FI-003	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	8	~	6. No data at this le	1.1 Mud	1. Mud to	Restricted data.	Häkkinen, A & Åker, K. 1991. Kotkan, Pyhtään ja Vehkalahden merenpohjan maalajikerros	0.018102	0.000003
18	Polygon	FI-003	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	9	~	6. No data at this le	1.1 Mud	1. Mud to	Restricted data.	Häkkinen, A & Åker, K. 1991. Kotkan, Pyhtään ja Vehkalahden merenpohjan maalajikerros	6.112646	0.021039
19	Polygon	FI-004	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	1	~	5. Rock & Boulders	5. Rock & boulders	5. Rock &	Gravel extraction study. Restricted data.	Rantataro, J. 1992. Pääkaupunkiseudun vedenalaiset maa-ainesvarat. helsingin seutukaav	23.162645	0.039856
20	Polygon	FI-004	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	2	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Gravel extraction study. Restricted data.	Rantataro, J. 1992. Pääkaupunkiseudun vedenalaiset maa-ainesvarat. helsingin seutukaav	26.653015	0.03097
21	Polygon	FI-004	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	3	>	6. No data at this le	3. Coarse substrate	3. Coarse	Gravel extraction study. Restricted data.	Rantataro, J. 1992. Pääkaupunkiseudun vedenalaiset maa-ainesvarat. helsingin seutukaav	0.666935	0.001788
22	Polygon	FI-004	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	5	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Gravel extraction study. Restricted data.	Rantataro, J. 1992. Pääkaupunkiseudun vedenalaiset maa-ainesvarat. helsingin seutukaav	4.634728	0.003498
23	Polygon	FI-004	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	6	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Gravel extraction study. Restricted data.	Rantataro, J. 1992. Pääkaupunkiseudun vedenalaiset maa-ainesvarat. helsingin seutukaav	36.474809	0.058156
24	Polygon	FI-004	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	7	>	6. No data at this le	1.1 Mud	1. Mud to	Gravel extraction study. Restricted data.	Rantataro, J. 1992. Pääkaupunkiseudun vedenalaiset maa-ainesvarat. helsingin seutukaav	21.93354	0.055893
25	Polygon	FI-004	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	8	~	6. No data at this le	1.1 Mud	1. Mud to	Gravel extraction study. Restricted data.	Rantataro, J. 1992. Pääkaupunkiseudun vedenalaiset maa-ainesvarat. helsingin seutukaav	0.079183	0.000023
26	Polygon	FI-004	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	9	~	6. No data at this le	1.1 Mud	1. Mud to	Gravel extraction study. Restricted data.	Rantataro, J. 1992. Pääkaupunkiseudun vedenalaiset maa-ainesvarat. helsingin seutukaav	10.609322	0.027634
27	Polygon	FI-004	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	10	#	6. No data at this le	1.1 Mud	1. Mud to	Gravel extraction study. Restricted data.	Rantataro, J. 1992. Pääkaupunkiseudun vedenalaiset maa-ainesvarat. helsingin seutukaav	0.105552	0.000284
28	Polygon	FI-006	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	1	~	5. Rock & Boulders	5. Rock & boulders	5. Rock &	Restricted data.	Vallius (ed.) 2007. Holocene sedimentary environment and sediment geochemistry of the	0.650098	0.001769
29	Polygon	FI-006	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	2	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Restricted data.	Vallius (ed.) 2007. Holocene sedimentary environment and sediment geochemistry of the	3.62992	0.016086
30	Polygon	FI-006	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	3	>	6. No data at this le	3. Coarse substrate	3. Coarse	Restricted data.	Vallius (ed.) 2007. Holocene sedimentary environment and sediment geochemistry of the	0.160529	0.001047
31	Polygon	FI-006	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	6	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Restricted data.	Vallius (ed.) 2007. Holocene sedimentary environment and sediment geochemistry of the	2.992605	0.009114
32	Polygon	FI-006	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	7	>	6. No data at this le	1.1 Mud	1. Mud to	Restricted data.	Vallius (ed.) 2007. Holocene sedimentary environment and sediment geochemistry of the	2.339754	0.006062
33	Polygon	FI-006	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	8	~	6. No data at this le	1.1 Mud	1. Mud to	Restricted data.	Vallius (ed.) 2007. Holocene sedimentary environment and sediment geochemistry of the	0.690713	0.001278
34	Polygon	FI-006	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	9	~	6. No data at this le	1.1 Mud	1. Mud to	Restricted data.	Vallius (ed.) 2007. Holocene sedimentary environment and sediment geochemistry of the	1.564225	0.012099
35	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	1	~	5. Rock & Boulders	5. Rock & boulders	5. Rock &	Ongoing mapping programme. Restricted		40.276871	0.116424
36	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	2	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Ongoing mapping programme. Restricted		69.260781	0.232412
37	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	3	>	6. No data at this le	2 Sand	2. Sand	Ongoing mapping programme. Restricted		4.579551	0.014566
38	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	3	>	6. No data at this le	3. Coarse substrate	3. Coarse	Ongoing mapping programme. Restricted		3.492856	0.009825
39	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	4	~	6. No data at this le	2 Sand	2. Sand	Ongoing mapping programme. Restricted		4.672866	0.015897
40	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	5	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Ongoing mapping programme. Restricted		39.76668	0.072172
41	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	6	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Ongoing mapping programme. Restricted		68.387507	0.119995
42	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	7	>	6. No data at this le	1.1 Mud	1. Mud to	Ongoing mapping programme. Restricted		37.339981	0.073812
43	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	8	~	6. No data at this le	1.1 Mud	1. Mud to	Ongoing mapping programme. Restricted		42.90577	0.097924
44	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	9	~	6. No data at this le	1.1 Mud	1. Mud to	Ongoing mapping programme. Restricted		27.092513	0.086926
45	Polygon	FI-008	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	10	#	6. No data at this le	1.1 Mud	1. Mud to	Ongoing mapping programme. Restricted		0.065263	0.000141
46	Polygon	FI-011	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	1	~	5. Rock & Boulders	5. Rock & boulders	5. Rock &		Hämäläinen, J. 2009. FINMARINET tekninen raportti.	0.872125	0.002359
47	Polygon	FI-011	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	2	>	6. No data at this le	4. Mixed sediment	4. Mixed s		Hämäläinen, J. 2009. FINMARINET tekninen raportti.	0.193747	0.000135
48	Polygon	FI-011	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	5	>	6. No data at this le	4. Mixed sediment	4. Mixed s		Hämäläinen, J. 2009. FINMARINET tekninen raportti.	0.041002	0.000024
49	Polygon	FI-011	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	6	>	6. No data at this le	4. Mixed sediment	4. Mixed s		Hämäläinen, J. 2009. FINMARINET tekninen raportti.	1.848978	0.004664
50	Polygon	FI-011	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	7	>	6. No data at this le	1.1 Mud	1. Mud to		Hämäläinen, J. 2009. FINMARINET tekninen raportti.	0.215802	0.00025
51	Polygon	FI-011	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	8	~	6. No data at this le	1.1 Mud	1. Mud to		Hämäläinen, J. 2009. FINMARINET tekninen raportti.	2.178547	0.006285
52	Polygon	FI-011	Finnish GEO –class. 19	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	9	~	6. No data at this le	1.1 Mud	1. Mud to		Hämäläinen, J. 2009. FINMARINET tekninen raportti.	0.868934	0.002361
53	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	1	~	5. Rock & Boulders	5. Rock & boulders	5. Rock &	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	2.980301	0.002566
54	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	2	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	10.716092	0.016194
55	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	3	>	6. No data at this le	2 Sand	2. Sand	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	1.167316	0.002299
56	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	3	>	6. No data at this le	3. Coarse substrate	3. Coarse	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	0.94071	0.001834
57	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	4	~	6. No data at this le	2 Sand	2. Sand	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	0.080991	0.000006
58	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	5	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	4.732277	0.003876
59	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	6	>	6. No data at this le	4. Mixed sediment	4. Mixed s	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	10.116476	0.013786
60	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	7	>	6. No data at this le	1.1 Mud	1. Mud to	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	7.087734	0.009959
61	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	8	~	6. No data at this le	1.1 Mud	1. Mud to	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	5.280656	0.003841
62	Polygon	FI-012	Folk_4	4. Reclassification on the grounds of expert-based pr	2. Expert -based predictio	0	9	~	6. No data at this le	1.1 Mud	1. Mud to	Compiled from several maps, metdata for	Stevenson et al., 2011. EMODnet Geology Project Draft Final Report. Preparatory Actions	4.823018	0.006308

Table 7. The EMODnet sea-bed substrate attribute table for Finnish data.

9. Generalization

All datasets have to be at 1:250 000 scale where possible. If not originally in this scale, partners will generalize their data according to GTK guidelines (Appendix 1). The generalisation follows ArcGIS methods and **Spatial Analysis tools is used in process**. The procedure is adopted from GTK's guidelines (Väänänen et al., 2007). If the data is going to be reclassified/translated into Folk, **it is recommended to generalize the original data** to include the relation of the original sediment category and the Folk category.

Smallest Cartographic Unit
According to the MESH project polygons with the dimensions of 2 - 3 mm are probably the smallest that can be represented on any printed map (Foster-Smith, R. & al., 2007). Thus the smallest cartographic unit (SCU) in the map is 4 - 9 mm^2. The SCU is roughly equivalent for polygons and clusters of pixels. On a map of the scale 1:250 000 one millimeter represents 250 m and 4 - 9 mm^2 corresponds to 0.25-0.56 km^2.

On the basis of the MESH rules it was agreed in Lisbon that the smallest cartographic unit within our 1: 250 000 map is 0.3 km^2 (30 hectares). No smaller areas should be present in the final map.

Pixel Size
Pixels are meant to be viewed as the clusters of pixels, not alone. A single isolated pixel has little meaning since it could be an artefact due to system error. The clusters of pixels form the SCU of a raster map. According to MESH the visual comfort is lost when pixel size is smaller than 0.5 mm on map (Foster-Smith, R. & al., 2007). Nevertheless on the grounds of the urEMODnet the 0.5 mm (on a map) was too rough for the generalization resulting in to a very broad and general map. Thus we will use a pixel size of 60 m correlating with approximately 0.25 mm on a map.

More on the generalization process is included in the **Appendix 1. Generalization.**

10. Summary

Each EMODnet-Geology partner has to provide their sea-bed substrate data/maps harmonised into the Folk classification and presented on a scale of 1:250 000 to WP3 leader, GTK. The data should be in ArcGIS format (shapefile) with the filled in attribute table. All shape files must use the EEA coastline and maps have to be projected into the geographical WGS 84 coordinate system.

Partners are requested to upload their data on a scale of 1:250 000 (polygon shape file or geodatabase format) into WP3 FTP site **by 31st May 2014**. Note that data that arrives later cannot be guaranteed to be included in the 1st draft. GTK will combine the national sea-bed substrate maps and aims to distribute the resulting first version of the EMODnet Sea-bed substrate map to partners for comments during the 1st week of June. Partners will have about one week to comment the map and the map will be delivered to habitat mapping group by 20 June 2014.

Again, GTK's ftp -server works as "a map transfer point" of WP3. All maps and information will be uploaded to the ftp -server:

www: http://weppi.gtk.fi/net2ftp/
Username: EMODnet2
Password: KrHUW6a02h

EMODnet Sea-bed substrate, Important dates:

1. GTK has provided guidelines and geodatabase for index map by 18 February 2014
2. Partners have uploaded their national sea-bed substrate index map into GTK's FTP site. The updates are still welcomed.
3. GTK will provide guidelines and geodatabase for data generalization and harmonisation in early April 2014
4. Partners will upload their (reclassified) sea-bed substrate map on a scale of 1:250 000 into GTK's FTP site **by 31st May 2014**.
5. Combined Sea-bed substrate data (1st version) for checking to partners by early June 2014
6. Data delivered to the EMODnet Habitat Mapping Project by the end of June 2014
7. Update and confidence assessment at a later stage in the project (to be agreed)

In case there are any questions, do not hesitate to contact us:
ulla.alanen@gtk.fi
anu.kaskela@gtk.fi
aarno.kotilainen@gtk.fi

11. References:

Coltman, N., Gilliland, P. & van Heteren, S. 2007. What can I do with my map? In: MESH Guide to Habitat Mapping, MESH Project, 2007, JNCC, Peterborough. Available online at: (http://www.searchmesh.net/default.aspx?page=1900)

Foster-Smith, R., Connor, D. & Davies, J. 2007. What is habitat mapping? In: MESH Guide to Habitat Mapping, MESH Project, 2007, JNCC, Peterborough. Available online at: (http://www.searchmesh.net/default.aspx?page=1900)

Väänänen, T. (ed), Hyvönen, E., Jakonen, M., Kupila, J., Lerrsi, J., Leskinen, J., Liwata, P., Nevalainen, R., Putkinen, S., Virkki, H. 2007. Maaperän yleiskartan tulkinta- ja kartoitusprosessi. Maaperän yleiskartoitus –hankkeen sisäinen raportti. 17 p.