



**EC Contract No. MARE/2008/03**

**Preparatory Actions for European Marine Observation and  
Data Network. Lot No 2 – Geological data.**

**EMODNET-Geology Project  
First Interim Report  
July 16 2010**

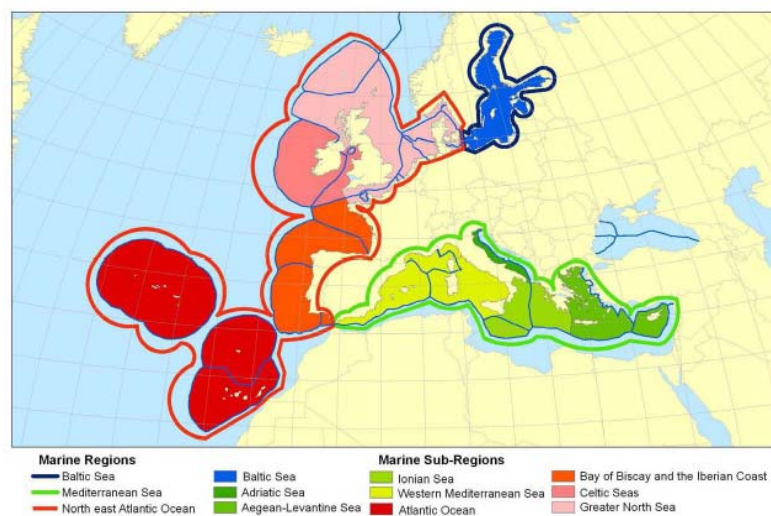


## 1. Introduction

A consortium consisting of the national geological survey organisations of the UK, Ireland, France, Belgium, The Netherlands, Germany, Denmark, Norway, Sweden, Finland, Estonia, Latvia, Lithuania and Poland are working together to deliver the requirements of EC Tender MARE/2008/03. The geological surveys of Europe provide an existing network (through the Association of European Geological Surveys – EuroGeoSurveys) that aims to deliver marine geological information solutions to decision makers in European government and industry, as well as providing baseline information for academic research. The contract between the EC and the EMODNET-Geology project partners was signed on 16 July 2009; this interim report describes progress during the first year of the project.

## 2. Project objectives

The EMODNET-Geology project is compiling information held by the project partners and additional datasets that are publicly available. The outputs will be delivered through the Web using the ‘OneGeology-Europe (1G-E)’ portal (<http://www.onegeology-europe.org/>). Existing metadata will continue to be stored on the EU-SEASED website, currently being developed and upgraded under the EC-funded GeoSeas project (<http://www.geo-seas.eu/>). The consortium is bringing together datasets according to the ‘Preparatory Actions for European Marine Observation and Data Network Tendering Specification’, namely all available sea-bed sediments including rate of accumulation or sedimentation; sea-floor geology (including age, lithology and origin); geological boundaries and faults; rate of coastal erosion and sedimentation; geological events and event probabilities (to include information on submarine landslides, volcanic activity, earthquake epicentres); seismic profiles; minerals (including aggregates, oil and gas). The areas covered are the Baltic Sea, Greater North Sea and Celtic Sea according to the boundaries shown in Figure 1.



**Figure 1. Marine Regions and Sub-Regions as defined by the Marine Strategy Framework Directive.**

### **3. Workplan and Workpackages**

The project is being implemented in four phases. Phases 1-3 are the Development phases and Phase 4 is the Maintenance phase.

Phase 1. Development of the data layers and portal (months 1-12)

Phase 2. Testing and monitoring of the information layers (months 13-18)

Phase 3. Upgrade of the system following testing (months 19-24)

Phase 4. Maintenance of the system (months 25-36)

The project is implemented through 11 workpackages, each led by organisations with experience in the specific fields. These are:

WP1. Project Management (British Geological Survey)

WP2. 1:1 million marine geological data specification and sourcing (British Geological Survey).

WP3. Sea-bed sediment information compilation and harmonisation (Geological Survey of Finland).

WP4. Sea floor geology compilation and harmonisation (Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) - Federal Institute for Geosciences and Natural Resources, Germany).

WP5. Coastal erosion or sedimentation (TNO- Geological Survey of the Netherlands)

WP6. Geological events and probabilities (Geological Survey of Norway).

WP7. Minerals (Geological Survey of Ireland)

WP8. Integration with OneGeology-Europe (including portal development) (British Geological Survey)

WP9. Dissemination (British Geological Survey)

WP10. Liaison with EMODNET lots (British Geological Survey).

WP11. Project analysis and sustainability (British Geological Survey).

Each of the data workpackages (WPs 3-7) consists of a development phase (October 2009 to July 2010), upgrade phase (July 2010 to July 2011) and a maintenance phase (August 2011 to July 2012).

#### **3.1 Workpackage progress**

The objectives and description/deliverables as set out in the original tender are given followed by progress made in each workpackage.

##### ***3.1.1. Workpackage 1. Project Management (British Geological Survey).***

###### ***Workplan objectives and deliverables***

*Objectives:* To manage the overall project, ensure delivery of the outputs and outcomes as agreed with the European Commission. To assess and evaluate the project and its results.

*Description/deliverables:* Provide leadership and co-ordination through the office of the Project Co-ordinator. Prepare, start up, organise, operate and close the project.

Maintain all management documents and implement protocols. Control and monitor the project progress and to deploy the financial and staff resources effectively. Develop and maintain all project and quality plans, schedules and milestones. Report to the EC according the schedule specified by the Commission. Maintain communications across the consortium members and take overall responsibility for organisation of project meetings.

The Project Co-ordinator will be assisted by a Steering Committee that consists of leaders of the Workpackages (some of whom may have responsibility for more than one WP).

### ***Project and Monitoring Meetings***

The project partners met in Edinburgh, UK in October 2009 during which the workpackage leaders were appointed. Further project meeting have taken place in Rovaniemi, Finland from 26-27 January 2010 and in Villefranche-sur-Mer, France from June 14-15 2010. These meetings were planned to co-incide with major project milestones. The next project meeting is planned to take place in November 2010; the meeting is likely to be hosted by the German partner (BGR) in Berlin.

### ***3.1.2. Workpackage 2. 1:1 million marine geological data specification and sourcing (British Geological Survey).***

#### ***Workplan objectives and deliverables***

*Objectives:* To identify relevant data held by the project partners and other national organisations. Update the discovery metadata held on the EU-SEASED metadatabase (note that the seismic profiles layer (layer 6 of Geology lot) included in the tender documents section 2.3.1.5 will be derived from the EU-SEASED metadatabase). Audit existing national geological and value added spatial datasets (i.e. interpreted geological information). Define new Multilingual Geological Metadata Profile in accordance with the OneGeology-Europe project.

*Description/deliverables:* Comprehensive audit and evaluation of national geological spatial datasets that can be compiled at 1:1 million scale in all partner countries. Evaluation of existing metadata profiles for description of geological datasets to provide a basis for a New Multilingual Geological Metadata Profile that will be defined and implemented through the OneGeology-Europe portal.

Report on precision of data and how it has been processed. Where external data are used, this will be on the basis of freely accessible information that is in the public domain. Should any agreements be necessary, these will be developed outside the EC project as these will be deemed to be in the national interest of each country. Any delay in provision of external data will not impact on the project deliverables, as the partners

## ***Progress***

Data sources were identified during the Edinburgh meeting in October 2009 and have been subsequently incorporated into the data workpackages. Discussions on the Multilingual Geological Metadata Profile were initiated during the meeting in France in June 2010 – the existing comprehensive list of geological metadata terms are being reviewed and updated with specific terms related to marine geology.

### ***3.1.3. Workpackage 3. Sea-bed sediment information compilation and harmonisation (Geological Survey of Finland).***

#### ***Workplan objectives and deliverables***

*Objective:* To compile and harmonise all available sea-bed sediment information at a scale of 1:1 million to deliver layer 1 of the Geology lot in the tender documents.

*Description/deliverables:* Harmonisation of data will include an evaluation of the different classification schemes used in each country and the compilation of maps that integrate the datasets to the most appropriate scheme for integration with the hydrographic, chemical and biological lots. Where information on accumulation/sedimentation rates currently exists, they will be included in a separate report. A GIS layer will be delivered in the OneGeology-Europe portal.

## ***Progress***

Harmonisation of data includes an evaluation of the different classification schemes used in each country and the compilation of maps that integrate the datasets into the most appropriate scheme for integration with the hydrographic, chemical and biological lots. The final output of the EMODNET-Geology workpackage 3 is a fully populated GIS layer of harmonised sea-bed sediment information to be delivered in the OneGeology-Europe portal.

During the development phase of the EMODNET Workpackage 3 has focused on identifying available datasets, translating them to a uniform sediment scheme, generalizing them to 1:1 million and finally combining a single sea-bed sediment dataset (see Figure 4). As WP leader, the Geological Survey of Finland (GTK) provided guidelines on each work stage for the project partners to implement. Project partners delivered their harmonised and generalized maps to GTK, where they were combined into a single map. The timeline in compiling and harmonising the sediment map has been very challenging, because the first version of the sea-bed substrate map was needed for EUSeaMap project in January 2010. A draft map was delivered to this schedule; however there are some boundary issues and inaccuracies that are being improved as information that allows us to do this becomes available. The WP will provide information on sedimentation rates where possible. As regional coverage of sediment rates is not available, the project partners are compiling data at point sources as shown in the example from Finland given in Figure 5.

### **Data format**

The data requirement is an ESRI shape file showing polygon features.

### **Coordinate system**

Partners have provided maps in the WGS84 geographical coordinate system (Lat/Lon).

### **Coastline**

The coastline being used in the project GIS maps is VLIZ (2010). Maritime Boundaries Geodatabase, version 5. Available online at <http://www.vliz.be/vmdcdata/marbound>.

### **Index map/data compilation (Figure 2)**

Each partner has identified sea-bed substrate data available in their national waters including EEZ. Partners provided polygon shape files outlining the coverage area of each map type (= congruent by scale and mapping technology). The shape file includes an attribute table that contains information about metadata. The object was to form an attribute table with information on methods used, but which can also be used to analyse confidence. The MESH confidence system (Foster-Smith et al., 2007) was assessed and taken into account when creating the attribute table. The attribute table includes multiple columns for basic information such as the name and owner of each map, but also includes information on remote acquisition techniques, ground truthing and interpretation.

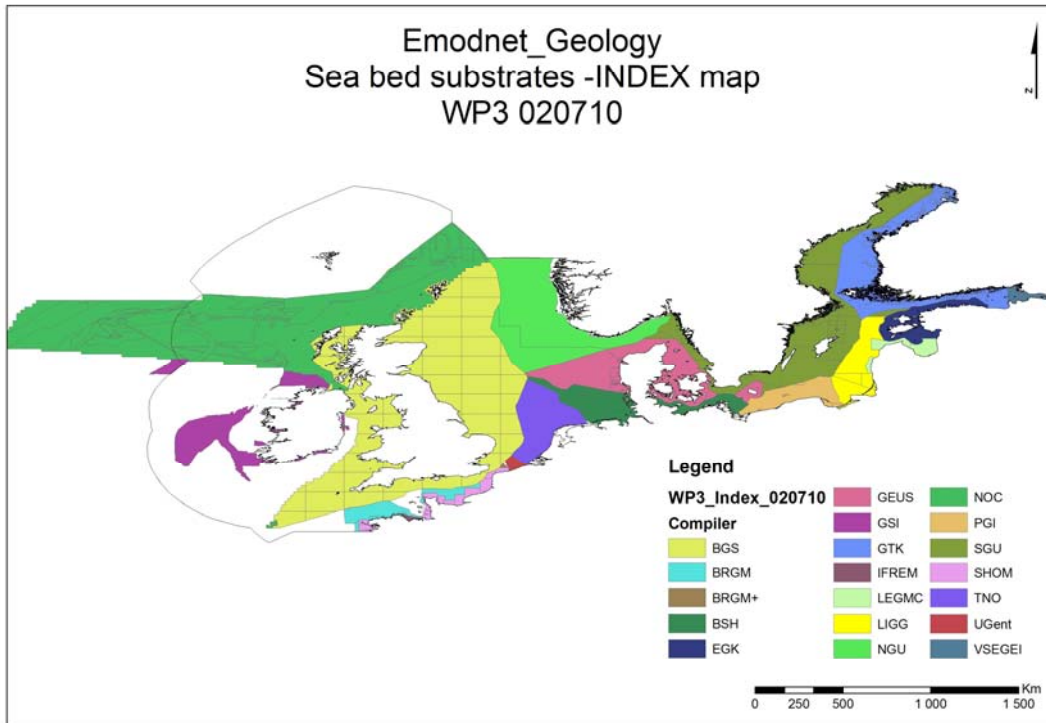
One of the aims of the EMODNET-Geology project is to highlight data gaps and deficiencies, for example the low-resolution data on which many of the national geological interpretations are based. The attribute table was created in order to stress the importance of the metadata; even though the resulting substrate map would look continuous, the datasets behind include variable methodologies, sediment classification and confidence. The confidence of the map is not uniform and so areas are not always comparable. This information is necessary for users and decision-makers to allow them to realize the limitations of the maps.

The index maps include data from 17 organisations and there are more than 200 different map types included in the current version. The methodology used to produce these maps varies significantly, for example the remote sensing coverage varies from poor to full coverage and positioning from modern DGPS (0 – 5 m) to Nautical Charts (>100 m). There are only a few data gaps, mainly in the Channel and in the Celtic Seas.

## Harmonisation

Each partner harmonised their available sea-bed substrate data. Like the index shape file, the sea-bed substrate shape file includes an attribute table that contains information related to the reclassification.

The current sea-bed substrate map was produced on the basis of EUSeaMap requirements. Due to the challenging timeline, the substrate reclassification scheme is simplified and provides an estimate of the substrate from the uppermost 30 cm of

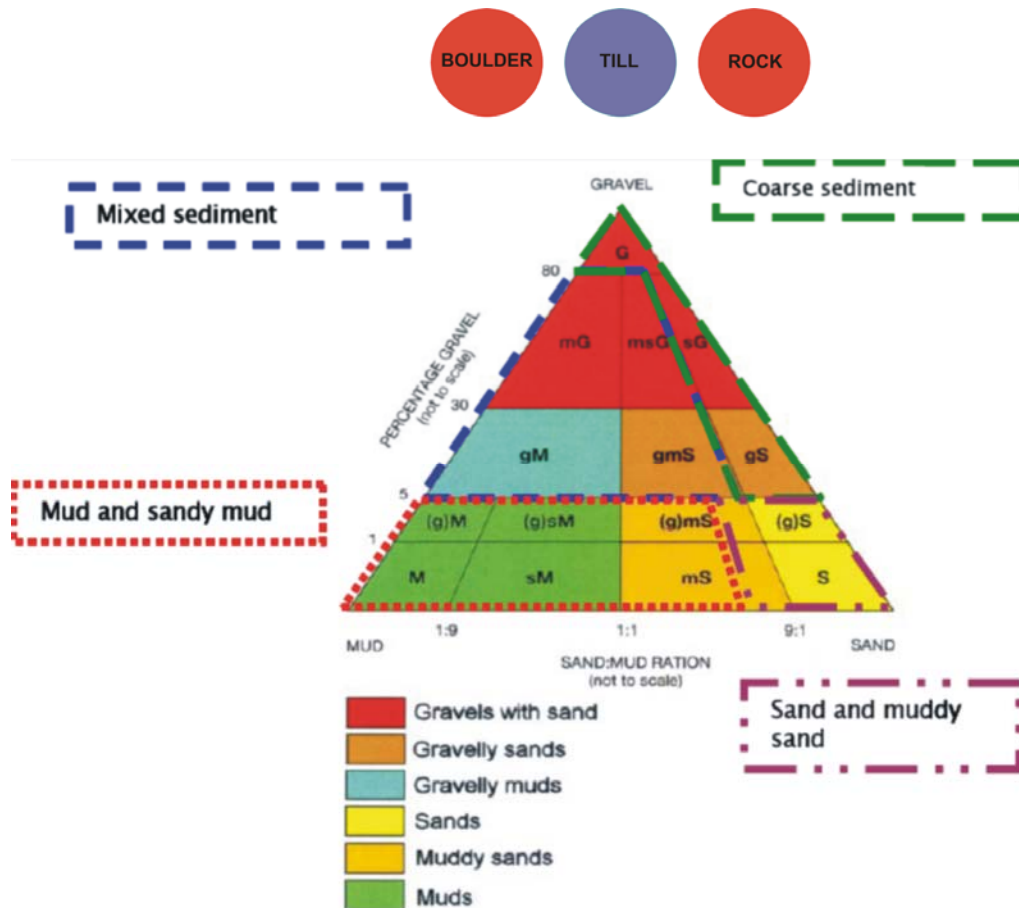


**Figure 2. Index map showing areas where sea-bed substrate data are available. The current version (April 2010) is a compilation of more than 200 maps.**

the sediment column. The BALANCE approach was adapted to reclassification due to its simplicity and transparency (Al-Hamdani et al. 2007). The approach is based on surface material (that is sometimes predicted). At the kick-off meeting in Edinburgh it was decided to include 4 substrate classes on the basis of the modified Folk triangle (mud to sandy mud; sand to muddy sand; coarse sediment; mixed sediment) and take into account 3 additional classes (boulder, till/diamicton, bedrock) (Figure 3). The aim was to compile one sea-bed substrate map that includes all seven classes. Only two boulder fields were defined from the study area. Due to their small coverage and feedback from the EUSeaMap project, boulders were merged with bedrock.

The numerous European national and international sediment datasets are very diverse. Traditionally, European countries have conducted their marine geological surveys according to their own national survey and interpretation standards.

Substrate classifications also vary as different nations have interpreted their data according to national classification schemes. The seabed surface sediment maps that were not originally in the Folk classification system were reclassified. The first step in the reclassification was to analyze the surface material. In ideal cases the substrate content was examined from the actual surface samples and grain-size analysis. If this was not possible, an expert-based prediction of the surface sediments was made.



**Figure 3. The modified Folk classification system.**

The predicted surface sediments were then compared with the modified Folk classification system to find the best fit. In addition, differences in national grain-size classification schemes were identified. Harmonization of national categories into one classification scheme is essential for interoperability. Unfortunately, the substrate reclassification is not unambiguous in every case. In particular, the definition of the mixed sediment class turned out to be somewhat "fuzzy". During the project meeting in Rovaniemi it was found that the term "mixed sediment" had been interpreted different by the partners during the harmonizing process. For example, the following seafloor types and sediments have been identified as "mixed sediment": patchy seafloor; glacial clay; bimodal grain size distribution. Workpackage 3 will clarify this issue during the later stages of the project.



The sea-bed substrate attribute table shows that large portion of the maps is reclassified to the modified Folk system based on expert-based prediction, especially in the Baltic Sea area.

### Generalisation

The scope of WP3 is to deliver a broadscale sediment map of the study area. Broadscale and fine-scale maps are at the opposite ends of the spectra and generally have very different uses. Broadscale maps summarize the knowledge of general trends at the expense of detail to provide an overview of a large area in which more local data can be set in context. Broadscale maps are only intended to show the indicative distribution of features to be mapped with low resolution and accuracy, but with moderately high confidence of the information shown on the maps. (Foster-Smith, R. & al., 2007)

The EMODNET Geology project provides data at 1:1 million scale. If not originally compiled at this scale, more detailed maps were generalized. The WP3 followed the cartographic principles established in MESH project (Foster-Smith, R. & al., 2007). Accordingly the smallest cartographic unit (polygon) on a map of the scale 1:1 million is about 4 km<sup>2</sup>. Thus all sediment polygons less than 4 km<sup>2</sup> were eliminated.

The generalization procedure was implemented in ArcGIS environment and followed GTK's guidelines (Väänänen et al., 2007). This method raises the issue of the deletion of important information. It is important to be aware of these issues to try to improve the generalization methodology in future projects. For example, partners

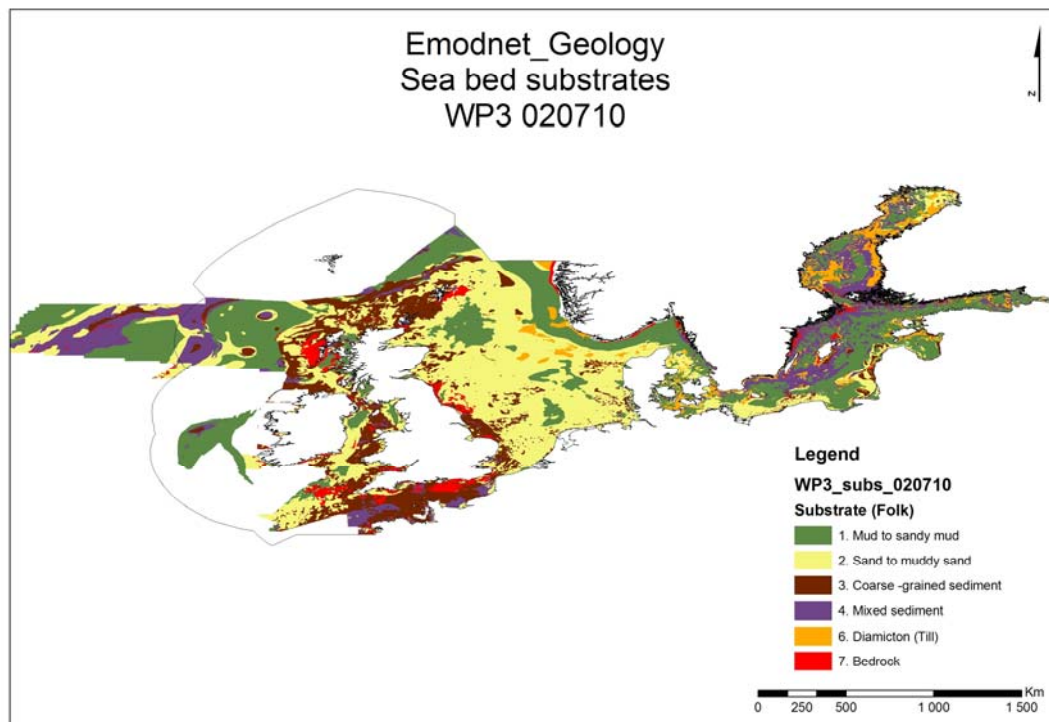


Figure 4. Sea-bed substrate map of the EMODNET geology study area.

could generalize their data individually or could be separate layers that show heterogeneity and special features.

### Combining individual maps

National maps have been combined to form a continuous map of the seafloor from the study area. The current map still includes some discrepancies between national boundaries, but these problems are now being addressed.

### Sedimentation rates

Project partners delivered information also on sedimentation rates available in their national waters including EEZ. GTK combined received information into a single map. At this stage we provide accumulation rates only for the Baltic Sea.

Estimations of modern sediment accumulation rates (cm/year) are based mainly on the  $^{137}\text{Cs}$  that could be used as a timemarker in the sediment column (Kankaanpää et al 1997, Ilus et al. 1998, Isoaari et al. 2002, Mattila et al. 2006). In the sediment column the activity peak of  $^{137}\text{Cs}$  corresponds to the fallout of the Chernobyl nuclear power plant accident of April 1986.

Data suggest that the linear net sedimentation rates at these sites (since 1986) in the Baltic Sea have been between 0.01 and 2.75 cm yr<sup>-1</sup> (Figure 5).

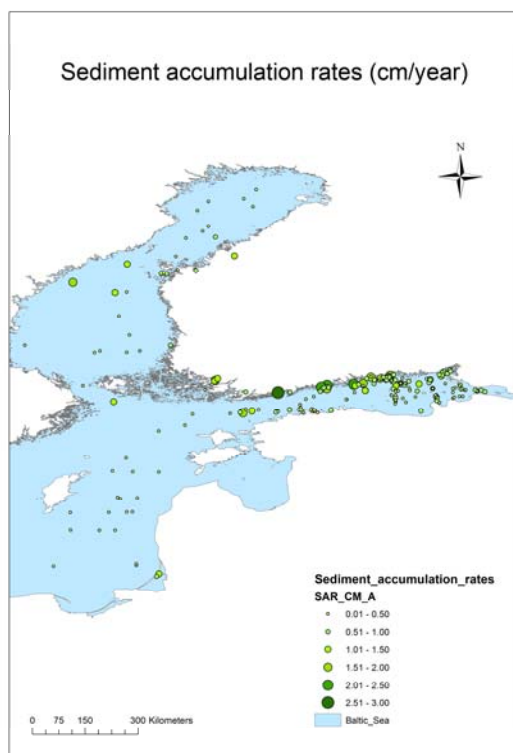


Figure 5. Sediment accumulation rates (cm/year) in the Baltic Sea.

## Confidence assessment

Feedback gained during national mapping activities and within the EMODNET group has shown that users of sea-bed geological information benefit from a confidence assessment of the map products. A number of complex systems have been developed to assess confidence, however a system that has been developed in-house by the British Geological Survey has been discussed and agreed by the EMODNET-Geology partners as a good method for providing users with an easily understood assessment of the data providers confidence in their interpretations. During the next phase of the project, we propose to create a confidence assessment of the entire study area. An example of an area from the UK Continental Shelf is given in Figure 6.

The map is produced on the basis of an ESRI grid (1km cell) created to represent a level of confidence in assessing the presence of hard substrate at a known location. The grid has a numerical score of 0 to 9, from a low to higher level of confidence. Confidence has been assessed only in terms of easily quantifiable parameters. The score is based upon data availability/density and equipment type. No allowance has been made for positional accuracy due to the resolution of final grid cell size. The following is a brief outline of the stages used to develop the grid with a final value of between 0 and 9. Each stage below results in an intermediate grid, with an appropriate score, that are then summed to produce the final confidence grid.

### 1. Sample density

The sample density was calculated using the Point Density function of ArcGIS Spatial Analyst. The density of samples is calculated for a specified area around the centroid of each output raster cell. The specified search area used to calculate density is determined by the total size of study area. The number of points falling within the search area is totalled and divided by the search area. The resulting grid was then reclassified to assign an appropriate score (1-3) for inclusion in the final confidence grid. For example, if a 4km<sup>2</sup> search area is used: 0-0.24 = 1 (no samples); 0.25 – 0.5 = 2 (between 1 and 2 samples); > 0.5 = 3 (more than 2 samples).

### 2. Survey Tracks

Survey track plots were converted into a 1km grid and assigned a score of 1 (low res. seismic was not included).

### 3. Multibeam

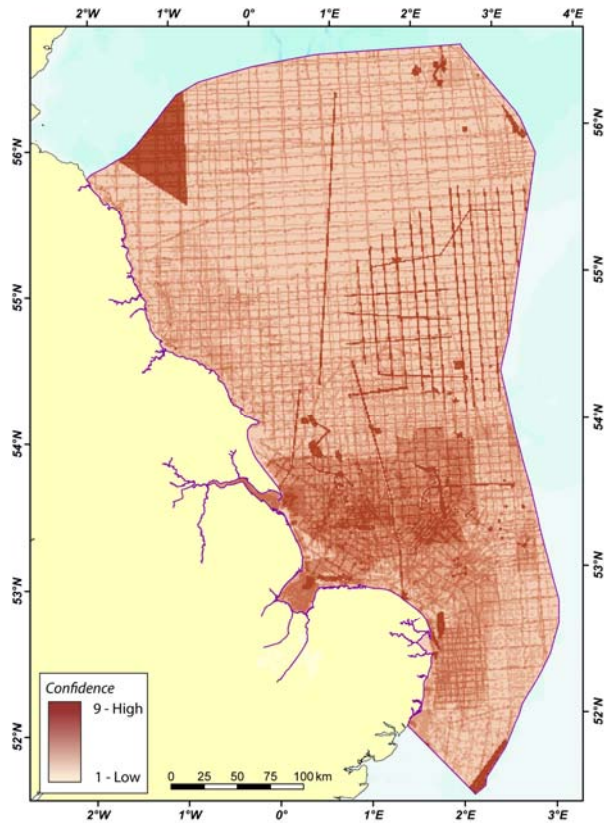
Areas covered by swath survey were converted into a 1 km grid and assigned a high score of 5.

### 4. SeaZone digital bathymetry

Charted areas available via SeaZone, except in areas already covered by multibeam, were assigned a score of 1.

### 5. Side Scan Sonar

Survey track lines where the equipment type was side scan sonar, except in areas already covered by multibeam, were given an additional score of 1.



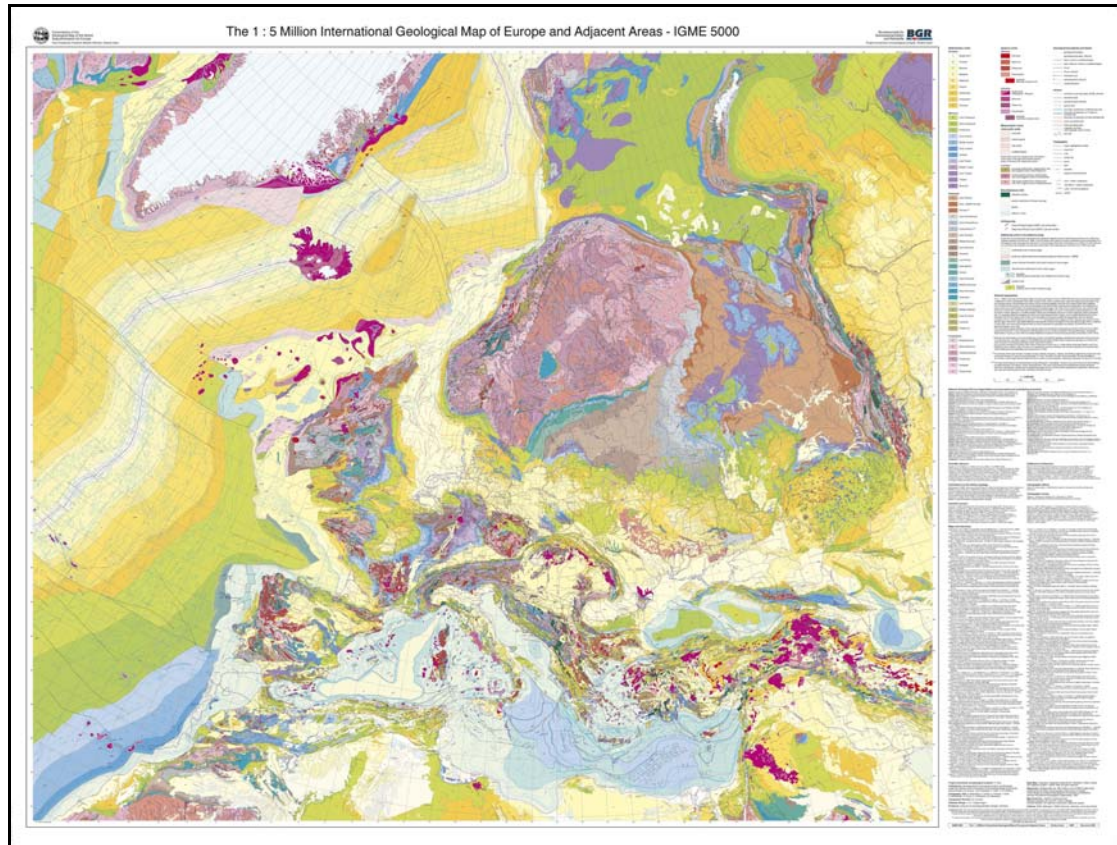
**Figure 6. Confidence map for an area of the North Sea off the coast of the UK**

### **3.1.4. Workpackage 4. Sea-floor geology compilation and harmonisation**

#### ***Workplan objectives and deliverables***

*Objective:* To compile and harmonise all available sea-bed geology (outcrop and sub-Quaternary) information at a scale of 1:1 million.

*Description/deliverables:* Compile all sea-bed geology maps available in each participating country and resolve any major boundary issues at 1:1 million scale. Information on age and lithology of the major stratigraphical units will be included (layer 2 of Geology lot – Section 2.3.1.5 of the tender documents). This workpackage and data layer will include the major geological boundaries and significant faults (layer 3 of Geology lot - Section 2.3.1.5 of the tender documents) that can be portrayed at 1:1 million compilation scale. A GIS layer will be delivered in the OneGeology-Europe portal.



**Figure 7. IGME 5000: 1: 5 Million International Geological Map of Europe and Adjacent Areas - final version for the internet. - BGR, Hannover. Asch, K. (2005). The offshore geology will be revised and compiled at 1:1 million scale in the EMODNET-Geology GIS.**

### ***Progress***

WP4 is building on the the 1: 5 Million International Geological Map of Europe and Adjacent Areas (IGME 5000) compiled by Dr Kristine Asch of BGR, who is now the WP4 leader. The IGME 5000 project is a major European geological GIS project which is being managed and implemented by the Federal Institute for Geosciences and Natural Resources (BGR) on behalf of the Commission for the Geological Map of the World (CGMW) (Figure 7). It follows a long tradition of the BGR and its predecessors to produce international geoscientific maps of Europe. The project involves 48 European and adjacent countries. Its aims are to develop a Geographic Information System (GIS), underpinned by a geological database, and a printed map providing up-to-date and consistent geological information. The main theme of the project is the pre-Quaternary geology of the on-shore and off-shore areas of Europe. A 1:1 million map of the area will be completed by the end of July 2010 and upgraded during the next phase of the project.



**3.1.5. Workpackage 5. Coastal erosion or sedimentation (TNO- Geological Survey of the Netherlands).**

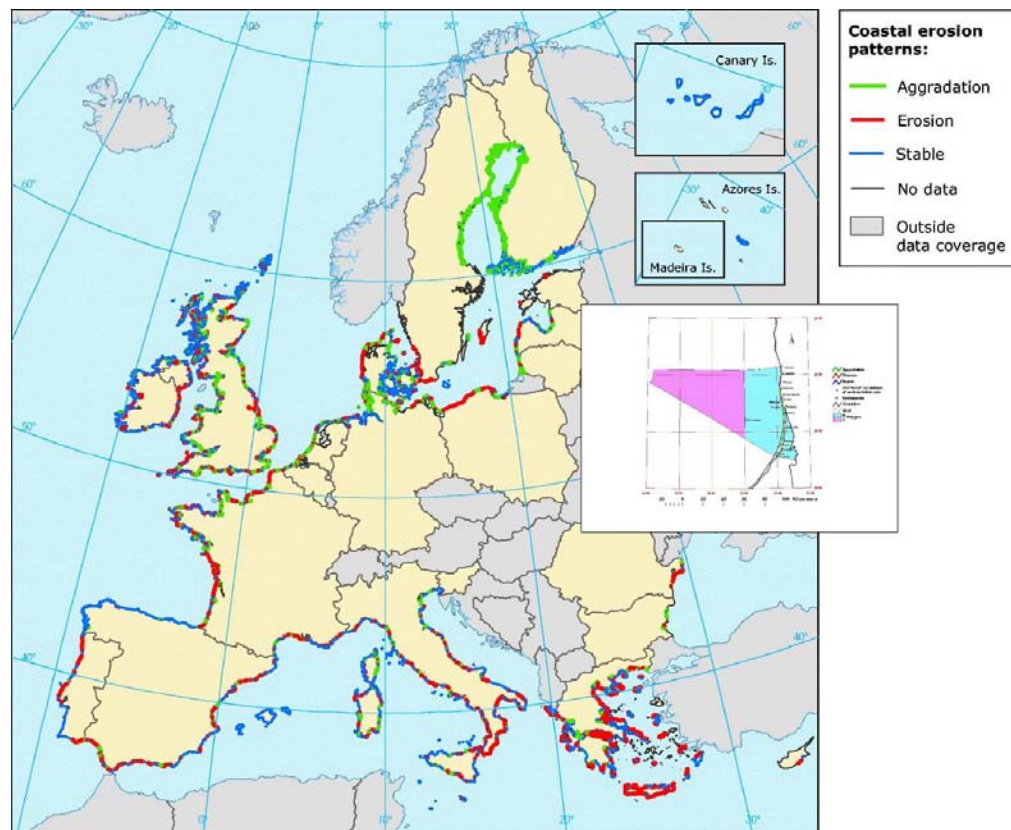
***Workplan objectives and deliverables***

*Objective:* To identify and map areas of erosion and sedimentation in the coastal zone of each participating country based on information available to the project partners, including publicly-available information (published scientific papers etc.)

*Description/deliverables:* Compile all coastal erosion and sedimentation data available in each participating country and resolve any major boundary issues at 1:1 million scale (layer 4 of Geology lot - Section 2.3.1.5 of the tender documents). A GIS layer will be delivered in the OneGeology-Europe portal.

***Progress***

Coastlines can behave in three general ways: they can migrate seaward (progradation), remain in place, or migrate landward (retrogradation). Factors governing this behavior are vertical crustal motion (uplift and subsidence), global (eustatic) sea-level change, sediment availability, wave and tidal processes, slope instability, and human-induced factors such as coastal-engineering and river-basin regulation works.



**Figure 8. Lithuanian update of EUROSION database on coastal erosion and sedimentation.**

The purpose of WP5 is the compilation and merger of all coastline-behaviour databases held by or available to the project partners, and the visualization of these databases in an ArcGIS viewer. The central parameter in the final product will be (rate of) shore-normal coastline migration. To eliminate the impacts of short-lived and/or local events, average values over a period of 10 years are preferred.

WP5 is carried out in four phases: 1) compilation of data on coastline migration in the appropriate format, 2) creation of a GIS file visualizing these data, 3) compilation of data on rates of coastline migration in the appropriate format, and 4) creation of a GIS file visualizing these rate data.

The project group has made a start with the compilation of data on coastline migration. A GIS layer has been created, and the EUROSION database on coastal erosion and sedimentation is being supplemented and updated by the partners (Figure 8). In the Netherlands, data on rates of coastline migration for the period 1999-2009 have been compiled and are being transferred to GIS.

### **3.1.6. Workpackage 6. Geological events and probabilities (Geological Survey of Norway).**

#### **Workplan objectives and deliverables**

*Objective:* To identify and map the locations of all significant geological events and provide information on probabilities of occurrence where available. These will include sites of submarine landslides, and earthquake epicentres located in the offshore study

*Description/deliverables:* Compile all information on geological events that are available in each participating country at 1:1 million scale (layer 5 of Geology lot - Section 2.3.1.5 of the tender documents). A GIS layer will be delivered in the OneGeology-Europe portal.

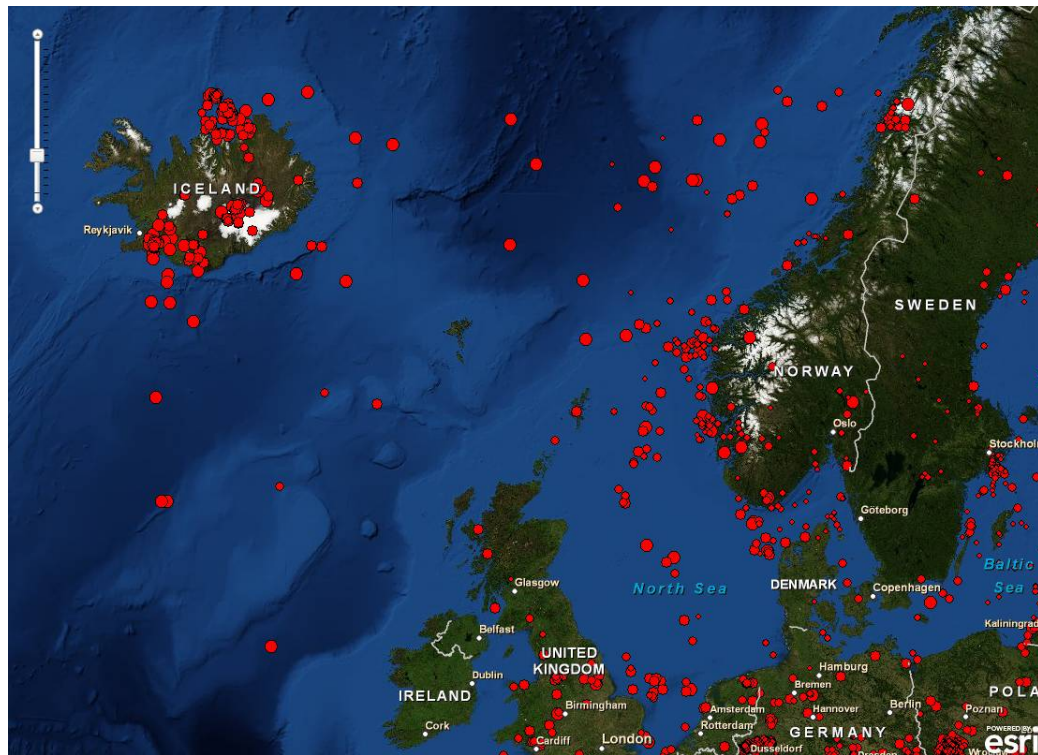
#### **Progress**

Key data holders for submarine landslide and earthquake information were identified and contacted during the spring 2010. For submarine landslides, the main contact was partners of the EU-funded COSTA (**C**ontinental Slope **S**tability) project who have supplied a GIS file with outlines of the slide studied in this project. A template for attribute information based on the COSTA project database has been distributed to all partners, and has been completed by those partners who have slides to report. For earthquakes, three data centers have been contacted – Incorporated Research Institutes for Seismology, IRIS, United States, International Seismological Centre, ISC, United Kingdom, and European-Mediterranean Seismological Centre, EMSC, France. Both the European centers have responded positively towards cooperation and supply of data. The European-Mediterranean Seismological Centre run a portal services, <http://www.seismicportal.eu/jetspeed/portal/> with associated web services. At this

first stage, static data has been supplied by EMSC. The current data coverage is restricted to earthquakes later than 1998, but will be increased in the near future. We will also consider to include data from ISC. The partners will also have the possibility to add data from national archives.

For both submarine landslides and earthquakes, the deliverables are based on existing data compilations, supplemented by national data from the partners. For submarine landslides, the GIS information supplied by the former COSTA partners have been incorporated into ArcMap. A preliminary web map services has been developed (<http://www.ngu.no/mareano/Prosjekt/kart/jordskjelv.htm>), showing the outlines and some attribute information. This will be developed once partners supply attribute information and add their own slides. By July 15 it is expected that the GIS layer will be nearly, but not completely populated. When the technical specifications from the OGE portal are ready, a WMS map service will be provided.

For earthquakes, a static preliminary web map services has been developed (<http://www.ngu.no/mareano/Prosjekt/kart/jordskjelv.htm>) (Figure 9), showing the location and magnitude of natural earthquakes since 1998. This is based on a fully populated GIS layer. Attribute information on date, time, depth and type of magnitude is available. Depending on the technical development of both the 1G-E portal and the SeismicPortal, a dynamic WMS or WFS map service based on QuakeML can be considered as a future option for the dissemination of earthquake data through the EMODNET/1G-E website.



**Figure 9. Screenshot from the preliminary web map image provided by the ArcGisServer, showing the location of earthquakes provided by EMSC. The size of the circles indicate magnitude.**

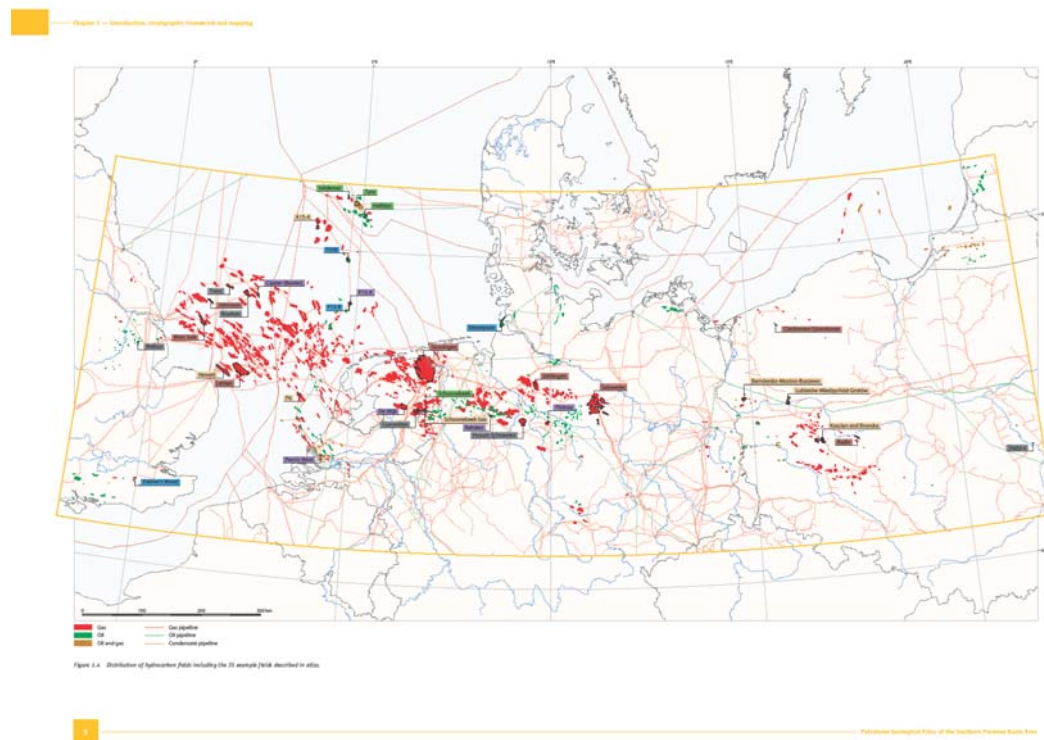


### 3.1.7. Workpackage 7. Minerals (Geological Survey of Ireland)

#### **Workplan objectives and deliverables**

**Objective:** To identify and map areas of minerals (including aggregates, oil and gas and metalliferous minerals) in each of the participating countries based on information available to the project partners, including publicly-available information (published scientific papers etc.).

**Description/deliverables:** Compile all mineral locations at 1:1 million scale (layer 7 of Geology lot - Section 2.3.1.5 of the tender documents). A GIS layer will be delivered in the OneGeology-Europe portal.



**Figure 10. EMODNET-Geology partners (geological surveys of the UK, Netherlands, Belgium, Denmark, Germany and Poland) have recently completed a 5-year project to compile information on the oil and gas resources of most of the study area (extract from the Petroleum Geological Atlas of the Southern Permian Basin: Editors H Doornenbal and A Stevenson, 2010.)**

#### **Progress**

WP7 has identified areas of minerals (including aggregates, oil and gas and metalliferous minerals) in the regional seas based on information available to the project partners, including publicly-available information (published scientific papers etc.). The oil and gas resources have been documented recently in the Southern Permian Basin Atlas (Doornenbal & Stevenson, 2010) was published in June 2010 (Figure10). The SPBA

project was a joint venture between 6 of the EMODNET-Geology partners (UK, Belgium, Netherlands, Denmark, Germany and Poland) and the oil industry and includes the most up-to-date (and previously unpublished) maps and statistical information available. These data will be supplemented in areas of the regional seas that are outside the SPBA area by published information from the Millennium Atlas (Evans et al., 2003) and the websites of the national licensing authorities.

**3.1.8. Workpackage 8. Integration with OneGeology-Europe (including portal development) (British Geological Survey)**

**Workplan objectives and deliverables**

*Objective:* To integrate EMODNET-Geology data layers in the OneGeology-Europe (1G-E) portal to provide interoperable geological spatial datasets at 1:1 million scale for the offshore area included in the tender documents.

*Description/deliverables.* In line with the deliverables and expected results of the 1G-E project, the EMODNET-Geology products will deliver:

1) public access to all interoperable geological spatial datasets 2) scientific and informatics specification for the harmonisation of geological data at 1:1 million resolution and progress towards a harmonised onshore-offshore geological dataset for the European Community 3) multilingual discovery metadata 4) a robust data model, schema and mark-up language for the geosciences, which is OGC compliant and documented and deployed across the EU 5) a web portal providing easy access to marine geological data 6) guidance on re-use of geological data 7) exchange of science, technology, informatics and communications skills across the EU. These deliverables will allow substantial progress towards INSPIRE goals – users will be able to discover, view and download geoscience data across the EU, which will also provide a template for other environmental data themes. The system will also provide a reference base on which other valuable data products and services can be built.

The 1G-E web portal will also include an EMODNET-Geology project area that provides:

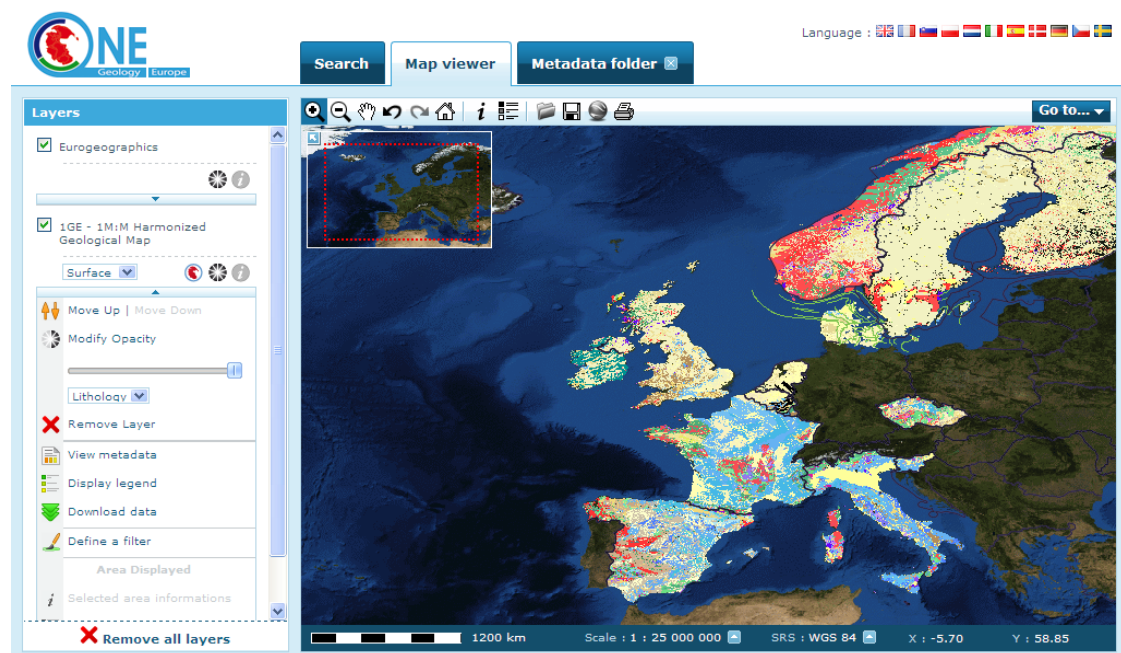
1) on-line instructions allowing users to understand and download the data 2) indications of the precision of the data 3) project progress. The first operational version of the portal will be ready by the end of Phase 1 (Month 12).

**Progress**

The international GeoSciML initiative is developing of an exchange standard for geological data. The OneGeology-Europe (1G-E) project is implementing this standard as part of the 1G-E portal development; through interaction with the 1G-E project task leaders, marine data will be included in this 1G-E portal to enable sharing and exchange of information, both within the geological community and other end users, at an international scale (Figure 11). This will facilitate re-use of added value to a wide range of users in the public and private sectors. The system

will also address the multilingual aspects of access to harmonised data through the 1G-E multilingual discovery portal. Furthermore, a geological SDI will be a major contribution to the INSPIRE Directive, which includes geology as a key dataset (Annex II). It is also fundamental to several of the INSPIRE Annex III Spatial Data Themes including agricultural and aquaculture facilities; area management/restriction/regulation zones and reporting units; natural risk zones; oceanographic geographical features; sea regions; bio-geographical regions; habitats and biotopes; species distribution; energy resources and mineral resources. Marine geological data layers are also needed for the GMES and GEOSS programmes and for the development of the Shared Environmental Information System (SEIS), being developed by the European Environment Agency.

The geological data layers will be delivered through the OneGeology-Europe system. As such, they will be in complete compliance with the objectives of Best Practice Networks and Geographic Information. Interoperability and open standards will be fully addressed. The workpackages will deliver digital content for the layers compiled in WPs 3-7, but will also highlight data gaps and deficiencies, for example the low-resolution data on which many of the national geological interpretations are based. Examples of high-resolution datasets using the latest acquisition and imaging techniques will be included in selected areas of the sub-regional seas under investigation to demonstrate the possibilities that long-term national sea-bed mapping strategies could deliver to the benefit of individual countries and the European Union. These examples can provide incentives to national funding agencies to adopt a strategy for high-resolution mapping, which would strengthen the European research area and underpin all public and commercial activities in the marine environment.

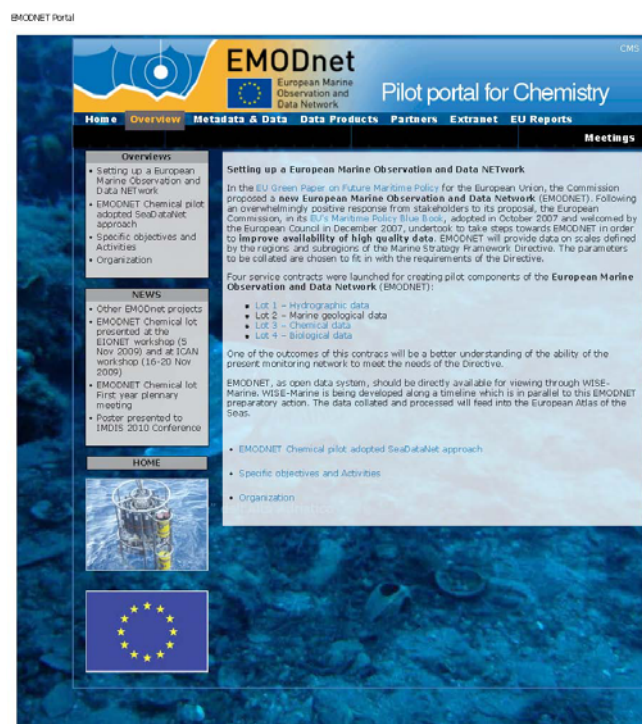


**Figure 11. An example of data in the OneGeology-Europe portal.**

## EMODNET-Geology Portal

As the EMODNET-Geology outputs are being integrated into the OneGeology-Europe portal, the project does not yet have its own portal similar to the other EMODNET lots. Discussions between the EMODNET and 1G-E projects are underway to design and implement a system that provides easy access to the EMODNET GIS layers in the 1G-E portal, but which also provides recognition of the EMODNET project in the same way as the other lots. As a temporary measure to ensure consistency between the lots, the EMODNET-Geology project will develop a simplified portal (by end-August 2010) that will include information about the project, partners etc and which links directly to the EMODNET-Geology layers in the 1G-E portal (Figure12).

A review of the data models used for each of the data layers being delivered by the EMODNET-Geology workpackages will be carried out in collaboration with the IG-E portal team. This will allow the EMODNET-Geology lot to deliver searchable data layers in the IG-E portal using the WFS functionality available in the portal. Additional EMODNET-Geology map layers will be delivered via the 1G-E portal WMS services.



[http://www.emodnet-chemistry.eu/portal/portal/emodnet/Overview\[14/07/2010 18:05:11\]](http://www.emodnet-chemistry.eu/portal/portal/emodnet/Overview[14/07/2010 18:05:11])

**Figure 12. A temporary EMODNET-Geology portal will be set up (similar to the style adopted by the other EMODNET lots e.g. the Chemistry portal shown above) until the integration of EMODNET-Geology and 1G-E has been completed.**

### **3.1.9. Workpackage 9. Dissemination (British Geological Survey).**

#### **Workplan objectives and deliverables**

*Objective:* To ensure widespread dissemination of the EMODNET-geology products, through targeted contact with stakeholders and other users of marine geological information.

*Description/deliverables:* The main focus for dissemination will be the OneGeology-Europe portal, which by integration with EMODNET-Geology will ensure maximum exploitation of dissemination opportunities. 1G-E has already received major publicity (TV and press media) and has an extensive campaign of events planned during the project. The EMODNET-Geology partners will bring their specialist knowledge of the users of marine geological data to this effort and will deliver their own dissemination objectives through participation at national and international meetings, workshops and conferences that focus on marine science. Factsheets and PowerPoint presentations on the specific deliverables of the EMODNET-Geology project will be delivered. Collaboration with other initiatives (see Workpackage 10), will further ensure widespread dissemination.

#### **Progress**

Dissemination of the EMODNET-Geology project includes:

Presentation of project in a talk entitled 'The role of geologists in improving the management of Europe's seas' at the 2009 Qingdao International Blue Economy Summit Forum, Qingdao, China 10-12 August 2009. Presented by Alan Stevenson.

Presentation of project in a talk given at the 'Seabed 10' Conference in Dublin, Ireland, 6-7 October 2009. Presented by Alan Stevenson.

Interview in GTK's journal, Geofoorumi: Heikkinen, S. 2010. Pohjatietoa merestä. p. 18-19

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EMODNET-Geology project included in a presentation at the launch of the UK Natural Environment Research Council's Marine Environmental Mapping Programme (MAREMAP) in London on June 23rd 2010. Presented by Alan Stevenson.

An EMODNET Poster has been submitted as part of the Association of European Geological Surveys (EuroGeoSurveys) contribution to the GEO Ministerial Summit, Beijing, China, 3-5 November 2010. The booth is organized by the European Commission and will mainly include information from the EC (RTD, GMES, JRC), the European Space Agency, European Organisation for the Exploitation of Meteorological Satellites (Eumetsat) and EuroGeoSurveys.

\* Note all international presentations were at the expense of individual partners and did not incur costs to the EMODNET-Geology project.

### **3.1.10. Workpackage 10. Liaison with EMODNET lots (British Geological Survey).**

#### ***Workplan objectives and deliverables***

*Objective:* To ensure that the EMODNET-Geology project is fully aware and complementary to the objectives of other marine science initiatives within European waters. To prepare for better and linked marine data that will have an immediate impact on the planning of environmental policy and mitigation measures within the European Union and to facilitate impact assessments and scientific work.

*Description/deliverables:* To be defined with other project co-ordinators and groups/projects, however at a minimum level to support the aims of the EU Blue Book on an integrated maritime policy for the European Union and the accompanying Action Plan. By providing an overview of the main data and information resources available and the benefits and added value of integration, the workpackage will contribute to proposals for the development of mutually compatible and multi-dimensional mapping of seas in the Member States waters.

#### ***Progress***

In the early stage of the project, the principal liaison with other EMODNET lots has been with the EUSeaMap project to deliver the Sea-bed substrate map described in WP3 by an agreed deadline of January 2010. Feedback has been received and the questions raised are being addressed.

Awareness of other projects and their complementarity to EMODNET is provided by the EMODNET-Geology project partners themselves who have participated, or are participating in a number of other geological initiatives; these include the MESH Project – TNO (Sytze van Heteren) and BGS; BALANCE - GEUS (Jørgen Leth) and GTK (Aarno Kotilainen, Ulla Alanen and Anu Kaskela); EU-SEASED - all partners were involved in the EUMARSIN and EUROSEISMIC projects; Geo-Seas - BGS (Helen Glaves: Project Co-ordinator); BLAST (Bringing Land and Sea Together) - BGS (Alan Stevenson); OneGeology-Europe - BGR (Kristine Asch). Several of the partners are from organisations involved in leading their national multidisciplinary mapping



programmes such as INFOMAR (Geological Survey of Ireland), MAREANO (Geological Survey of Norway) and MAREMAP (British Geological Survey).

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