Preparatory Actions for European Marine Observation and Data Network

2nd INTERIM REPORT FOR THE PERIOD JUNE 2011 – NOVEMBER 2011

Version 1.0

Service Contract No. "MARE/2009/07 – Seabed Mapping – SI2.563144"

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Date: 7th December 2011

CONTENT:

1. INTRODUCTION

EMODnet (European Marine Observation and Data Network) is a contribution to the EU Integrated Maritime Policy. The European Commission, represented by the Directorate-General for Maritime Affairs and Fisheries (DG MARE), has concluded several service contracts for creating pilot components of the EMODnet. The overall objective is to create pilots to migrate fragmented and inaccessible marine data into interoperable, continuous and publicly available data streams for complete maritime basins.

The results will help to define processes, best technology and approximate costs of a final operational European Marine Observation and Data Network. It will also provide the first components for a final system which will in themselves be useful to the marine science community.

This Second Interim Report describes the activities undertaken and progress made for the **Seabed Mapping Lot** during month 13 to month 18.

The overall objectives of the Seabed Mapping Lot are to fill gaps in the EU's low-resolution bathymetry map and to assemble a complete inventory of high resolution seabed mapping data held by public and private bodies.

In a previous call in June 2008 already a first batch of preparatory actions were issued, including the **Hydrography Lot**. The implementation of the Hydrography action has started in May 2009 and as part of this action a portal has been set up and is being further developed and maintained to grant access to low-resolution bathymetric maps and other hydrographic data products for the following maritime basins:

- the Greater North Sea, including the Kattegat and stretches of water such as Fair Isle, Cromarty, Forth, Forties,Dover, Wight, and Portland.
- the English Channel and Celtic Seas
- Western Mediterranean, the Ionian Sea and the Central Mediterranean Sea.

Task 1 of the Seabed Mapping Lot is to build upon the on-going Hydrography Lot and to extend the coverage of low-resolution bathymetry data with bathymetric data products for the following maritime basins:

- the Iberian coast and the Bay of Biscay
- the Adriatic Sea
- the Aegean-Levantine Sea

Task 2 of the Seabed Mapping Lot is to lay the foundations for a future higher resolution mapping of seabeds in the maritime basins of Europe.

Task 3 of the Seabed Mapping Lot is to maintain and keep operational the multibeam portal from M24 to M36.

The Seabed Mapping Lot is undertaken by a consortium of 10 partners consisting of:

- Mariene Informatie Service 'MARIS' BV (MARIS) – The Netherlands (coordinator)
- Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) – France
- ATLIS – The Netherlands
- NERC - National Oceanography Centre, Southampton (NERC-NOCS) – United Kingdom
- Institute of Oceanography (IEO) – Spain
- Geological Survey of Ireland (GSI) – Ireland
- Service Hydrographique et Océanographique de la Marine (SHOM) – France

- Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS) - Italy
- Hellenic Centre for Marine Research (HCMR) - Greece
- UNEP/GRID-Arendal - Norway

The partners combine expertises and experiences of collecting, processing, and managing of bathymetric data together with expertises in distributed data infrastructure development and operation and providing OGC services for viewing and distribution.

The first 7 partners are also together undertaking the Hydrography Lot. This has as added-value that the task 1 of the Seabed Mapping Lot is performed with a methodology which is overall consistent with the methodology as applied for the Hydrography Lot. The bathymetric data products for the new maritime basins are generated following a coherent QA/QC and production process. And these data products can be integrated seamlessly in the Hydrography portal.

The Hydrography portal is operational at http://www.emodnet-hydrography.eu and has been developed by adopting SeaDataNet standards and services. SeaDataNet (http://www.seadatanet.org) is the leading infrastructure in Europe for marine & ocean data management. It operaties and further develops a Pan-European infrastructure for managing, indexing and providing access to ocean and marine data sets and data products, acquired via research cruises and other observational activities, in situ and remote sensing. It is also developing and governing common standards for metadata and data formats, common vocabularies and quality flags as well as standard software tools.

For the Hydrographic portal the following approach has been applied:

- Involve research institutes, monitoring authorities, and HO's, in providing hydrographic data sets from which **Digital Terrain Models (DTM)** are produced with resolution of 0,25 * 0,25 minutes for each geographical region and that are loaded and integrated afterwards into a spatial database at the Portal
- Outfit the spatial database as a **powerful and a high-end Hydrographic data products viewing and downloading service** that is complemented with WMS services (OGC) to serve users and to provide map layers for e.g. the other EMODnet portals, the prototype European Atlas of the Seas, and the broad-scale European Marine Habitats map;
- Include in the portal a metadata discovery and access service by adopting the **SeaDataNet Common Data Index (CDI) data discovery and access service** that gives clear information about the hydrographic survey data used for the DTM, their access restrictions and distributors; this also ensures the connection of the Hydrographic portal with the SeaDataNet portal, which includes a shopping mechanism for requesting access to basic measurements data.

This 2nd Interim Report gives an overview of the activities undertaken for the Seabed Mapping Lot from June 2011 till December. In the 1st year already very good progress has been made with Task 1 activities, while preparatory activities have been undertaken for Task 2 . This report describes the progress made with each of the Work Packages for Task 1 and Task 2 in the next period from Month 13 to Month 18. It also gives an outlook on the activities for the next 6 months of development (M19-M24).

2. WP1: PROJECT MANAGEMENT

2.1 Contract

The contract between MARIS and the European Commission DG-MARE was signed 8th of June 2010.

2.2 Subcontracts

During the data gathering contacts have been made with data providers that have been invited to contribute to the project. This has resulted in the 1st year to a wider cooperation whereby a number of data providers have become subcontractors.

MARIS now manages subcontracts with:

- the Portuguese Hydrographic Office IHPT for contributing to the Portuguese EEZ areas, including coastal waters and areas around Madeira and Azores;
- the LNEG institute from Portugal for contributing to the Gulf of Cadiz area;
- the UTM-CSIC institute from Spain for contributing to the Atlantic Ocean area around the Iberian peninsula;
- the RIMA division of OGS from Italy for contributing to the Ionian Sea area;
- the CNR-ISMAR institute for contributing to the Adriatic Sea area.

2.3 Project Meetings

- MARIS and some other partners participated in the EMODnet Concertation Meeting in Brussels – Belgium at the EU on 7th - 8th June 2011. A presentation about the progress so far for the EMODnet Hydrography and Seabed Mapping projects was presented to the Commission and the other lots. A short summary has been drafted by MARIS and distributed to all partners.
- MARIS had a bilateral meeting with geodetic experts from the University of Delft on 9th September 2011 to discuss the INSPIRE draft implementing rules and their possible implication for the EMODNet set-up.
- A 3rd full project group meeting with all partners from both the Hydrography and Seabed Mapping projects and representatives of subcontractors CNR-ISMAR, IHPT, LNEG and OGS-RIMA took place 12th – 13th September 2011 in Athens, Greece, hosted by HCMR. Minutes and an extensive action list of the meeting have been drafted by MARIS and distributed to all partners.
- MARIS participated in the NL national hearing, organised by GeoNovum on 15th September 2011, about the INSPIRE draft implementing rules for oceanographic features to discuss with INSPIRE TWG experts these draft implementing rules and to analyse how SeaDataNet standards, which are adopted in EMODNet, can be promoted to become INSPIRE compliant.
- MARIS participated in the EMODnet MODEG Meeting in Brussels – Belgium at the EU on 12th - 13th October 2011, in which MARIS gave a presentation about the INSPIRE compliance of the EMODNet Hydrography - Seabed Mapping portal, considering formats of metadata and data, common vocabularies and services.

Further communication and tuning took place mostly by e-mail using the established project mailing list.

2.4 Progress Reports

- MARIS has prepared and submitted the extensive 1st Interim Report for the 1st year of the project for the period June 2010 - May 2011. This report has been accepted by the EU.

2.5 Website and Extranet

The Seabed Mapping Lot is included in the already existing website, extranet and mailing list for the Hydrography lot.

The website is operational at:

http://www.emodnet-hydrography.eu.

It gives access to the various services and gives users background information about the EMODNet project and the applied approach and philosophy for the Hydrography and Seabed Mapping lots.

The website also gives access to the Extranet that gives partners and associate partners (subcontractors) an archive of all contract documents and project documents.

2.6 Dissemination and promotion

The EMODnet Hydrography - Seabed Mapping project has been presented by MARIS on 31st August - 2nd September 2011 at the 5th Workshop of the International Coastal Atlas Network (ICAN) that took place in Ostend - Belgium. More info about ICAN and this Workshop can be found at: http://ican.science.oregonstate.edu/

The progress and interim results of the EMODNet Hydrography - Seabed Mapping project have also been presented at the GEBCO Science Day in La Jolla, USA, 4th October 2011. The presentations were given by:

- Marzia Rovere and Federica Foglini of CNR-ISMAR about "The Bathymetry of the Central Mediterranean Sea in the framework of the EMODnet project - a case study of bathymetric data integration and processing"
- Thierry Schmitt of SHOM about "Quality control for multibeam echosounders at SHOM - European bathymetric database and Digital Elevation Model (EMODNet Hydrography project)"

The presentations were well received and further cooperation with GEBCO is agreed in principle, because the EMODNet project can provide a serious improvement of the GEBCO bathymetry in large parts of the European seas.

All the given presentations can be downloaded from the EMODNet Hydrography portal.

Early June 2011 an important milestone was achieved with the release of updated digital bathymetry products for the EMODnet Hydrography maritime regions and the first release of digital bathymetry products for the EMODnet Seabed Mapping maritime regions as well as the launch of a considerably upgraded Hydrography portal. For that purpose a press release was drafted by MARIS that has been distributed to a list of online and traditional publications that are frequented by potential users and data providers from government, research and private industries. The press release encourages wider use and feedback of the portal and its services by users; it also calls up managers of additional survey data sets for European maritime regions to come forward and to contribute to the project.

The following publications have been approached:

- Dredging News Online (http://www.sandandgravel.com/); this has already resulted in publication (see http://www.sandandgravel.com/news/article.asp?v1=14770)
- Offshore Shipping Online (http://www.oilpubs.com/oso/); this has already resulted in publication (see http://www.oilpubs.com/oso/article.asp?v1=10915)

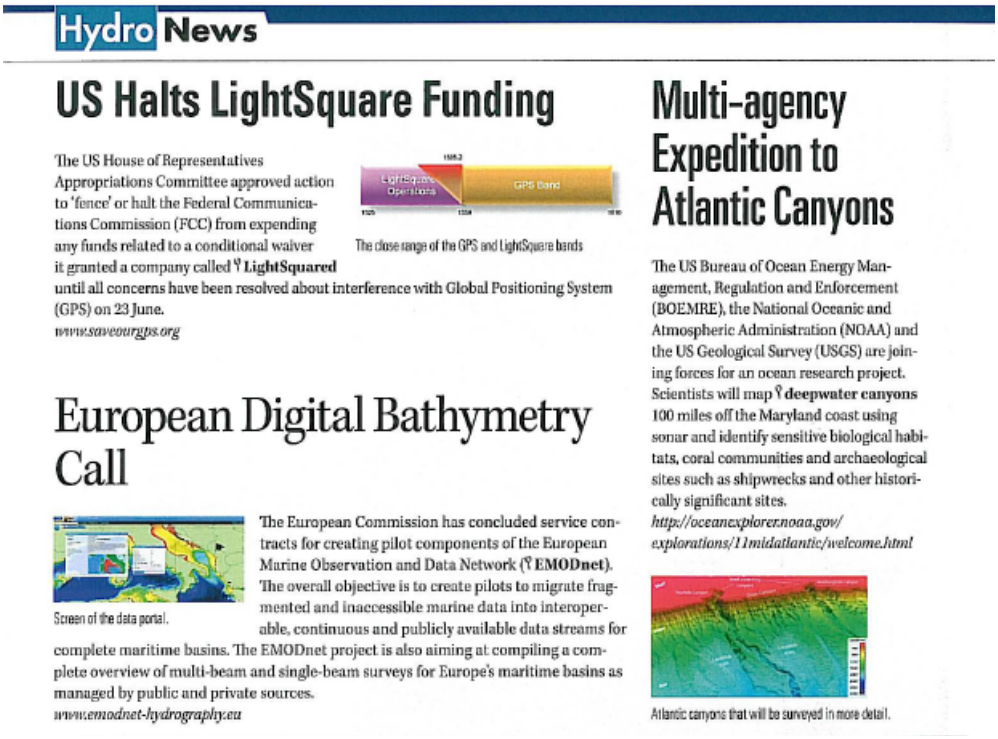
- Oil & Gas Observer (http://www.oilandgasobserver.com/news); this has already resulted in publication (see http://www.oilandgasobserver.com/news/new-portal-with-digital-bathymetry-for-european-seas---call-for-cooperation-emodnet/008581)
- OilVoice (http://OilVoice.com); this has already resulted in publication (see http://www.oilvoice.com/post/Main_Discussion/EMODnet_New_portal_with_digital_bathymetry_for_European_seas_call_for_cooperation/395ce96d71.aspx)

Image: Press release at the OilVoice website

- The Hydrographic Society website
- The EUROGOOS website
- The Central Dredging Association (CEDA) website
- Upstreamonline.com website and newspaper
- Rigzone.com and SubSeaIQ.com websites
- Pennwell Offshore Magazine and website
- youroilandgasnews.com and yoursubseanews.com websites
- Scandinavian Oil-Gas magazine and website
- European Oil and Energy News
- Pipelines International

- Hydro International and GIM International journals and websites

  http://www.hydro-international.com/news/id4882-European_Digital_Bathymetry_Call.html



Hydro News

US Halts LightSquare Funding

The US House of Representatives Appropriations Committee approved action to 'fence' or halt the Federal Communications Commission (FCC) from expending any funds related to a conditional waiver it granted a company called **LightSquared** until all concerns have been resolved about interference with Global Positioning System (GPS) on 23 June.
www.saveourgps.org

The close range of the GPS and LightSquare bands

European Digital Bathymetry Call

Screen of the data portal.

The European Commission has concluded service contracts for creating pilot components of the European Marine Observation and Data Network (**EMODnet**). The overall objective is to create pilots to migrate fragmented and inaccessible marine data into interoperable, continuous and publicly available data streams for complete maritime basins. The EMODnet project is also aiming at compiling a complete overview of multi-beam and single-beam surveys for Europe's maritime basins as managed by public and private sources.
www.emodnet-hydrography.eu

Multi-agency Expedition to Atlantic Canyons

The US Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), the National Oceanic and Atmospheric Administration (NOAA) and the US Geological Survey (USGS) are joining forces for an ocean research project. Scientists will map **deepwater canyons** 100 miles off the Maryland coast using sonar and identify sensitive biological habitats, coral communities and archaeological sites such as shipwrecks and other historically significant sites.
http://oceanexplorer.noaa.gov/explorations/11midatlantic/welcome.html

Atlantic canyons that will be surveyed in more detail.

Image: News flash on page 3 of the Hydro International magazine August 2011

- Iro.nl
- Maritime Journal
- Offshore Technology journal
- SubseaWorld.Com website
- IHO Review (IHR Journal)
- AGU Journals or newsletters
- The UNEP- GRID/Arendal website

Many of these publications have posted the press release.

3. WP2.1: Bathymetric data collection and metadata compilation for 3 maritime basins

3.1 Objectives and approach of WP2.1

The Seabed Mapping Lot concerns the following 3 geographical regions:

- the Iberian coast and the Bay of Biscay
- the Adriatic Sea
- the Aegean-Levantine Sea

The objectives of the work package WP2.1 are:

- To identify and gather hydrographic data sets for these regions
- To compile metadata for all hydrographic data sets in CDI format

The consortium has focused on Hydrographic Offices, Authorities and Research Institutes. Approaches towards Industry are undertaken by means of the promotional campaign (see 2.5) and also in the framework of Task 2 (see 9.).

The explained access policy is as follows:

- The CDI metadata in the EMODnet portal are public domain and freely available for all users.
- The resulting DTM data products (GIS layers) are freely available for all users as OGC WMS service and for downloading in several formats.
- The access to background data sets as detailed in the CDI data inventory and as used for the products respects the data copyrights of owners. The CDI metadata includes a value for data access restriction for every data set it manages, as well as a clear indication of the distributor. The SeaDataNet CDI shopping mechanism is fit for dealing with different access restrictions.

It is emphasized to potential suppliers, that they will stay in control of their data sets, that their data sets are to be used internally by the project partners for generating a digital bathymetry with a gridsize of .25 minute by .25 minute (ca 500 * 500 m2) and that metadata describing their data sets will be provided to users with the SeaDataNet functionality for requesting access to the actual data sets. This way, the EMODnet portal can offer to data providers an excellent shop window to reach other users in search of data and to promote their services. The implementation and cooperation can be further encouraged by making limited financial arrangements with data suppliers for preparing the appropriate metadata. For this purpose the project has a budget set aside. This approach in combination with naming data suppliers as associate partners at the website and in other promotional activities encourages potential suppliers to cooperate and contribute data sets for the EMODnet Seabed Mapping Lot.

3.2 Types of bathymetric data sources

An important objective of the EMODnet Hydrography and Seabed Mapping Lots is to produce a digital bathymetry for the maritime regions as a Digital Terrain Model (DTM) with a gridsize of .25 minute by .25 minute. This must be based upon available bathymetric data sources. In practice there are 3 types of bathymetric data sources:

- **Bathymetric surveys**, such as single and multibeam surveys, echosoundings and even historic leadline soundings. These data sets are most preferred as data source because of their high resolution.
- **Composite data sets**, giving a gridded bathymetry. In practice it appears that Hydrographic Offices (HO's) do not want or can not deliver primary surveys but

- **GEBCO 30” gridded data.** GEBCO is used by the EMODnet project to complete area coverage in case there are no survey data or composite data sets available to the partners.

3.3 Metadata formats

3.3.1 Metadata format for survey data sets

The SeaDataNet Common Data Index (CDI) data discovery and access service provides the basis for giving overviews and access to the **high resolution survey data sets**, that are used to produce the digital bathymetry DTM for the selected maritime regions. The project aims to describe all identified bathymetric survey data by means of the ISO 19115 based CDI format, supported by the SeaDataNet Common Vocabularies. Also data providers that only deliver a composite DTM are urged to provide CDI metadata for the underlying surveys. This way users can identify all available surveys with their basic specifications and data originators and can request access to the data sets in a standard way. Moreover this way traceability can be achieved between the produced and downloadable DTM and the sources used for producing the parameters in each DTM grid cell.

3.3.2 Metadata format for composite data sets

Traceability of sources used for the produced DTM is an important issue. Therefore not only surveys need to be described and indicated with metadata, but also composite DTMs that are delivered by a number of data providers.

Initially it was planned to adopt the format and CAMIOON catalogue service as earlier developed by IFREMER in the GMES MyOcean project for describing MyOcean data products and services. However in recent months it has become clear that the CAMIOON service and format are too much dedicated towards MyOcean and not flexible enough to serve also as Catalogue Service for the integrated DTM and composite DTMs as in use in EMODNet Hydrography and Seabed Mapping as well as for data products and WMS services in general as provided also by other EMODNet lots and SeaDataNet. Therefore IFREMER has recently proposed to make use of the existing SEXTANT Catalogue Service, that IFREMER operates for GIS product layers. The SEXTANT service is based upon OGC CS-W and makes use of ISO19139 XML profiles. The proposal by IFREMER has been accepted and recently IFREMER has delivered a dedicated XML profile (within ISO19139) to describe in large detail the EMODnet DTM products, and which uses codes from the SeaDataNet Common Vocabularies and EDMO for marking up content fields. This has been validated by MARIS and IFREMER is finalising at present an online Content Management System (CMS) by which EMODNet partners can complete the descriptions of their composite DTMs and the overall integrated DTM. Moreover IFREMER will organise a Training Workshop for partners in the CARAIBES software for bathymetric processing. This Training Workshop will take place in Brest - France from 5th to 9th December 2011 and also includes an instruction block for working with the SEXTANT CMS.

So after earlier delay it is now expected that soon there will be a dedicated EMODNet Catalogue service operational for displaying the composite DTM metadata factsheets in the portal. This will make it possible to complete the data referencing in each of the DTM cells, which point to individual surveys by means of a CDI reference and else to composite DTMs by means of a SEXTANT DTM reference. Otherwise it will refer to GEBCO for those cells which are not covered by surveys or composite DTMs.

3.4 Progress of data and metadata gathering per maritime region

In the first year good progress has been made with gathering survey and composite DTM data sets for the 3 new maritime regions and with populating the CDI metadata service. Also regional DTMs have been produced which are available from the portal since June 2011. In the Annex a detailed inventory is given of all survey data sets and composite DTM's that have been compiled so far and used for the production of the present Digital Bathymetry.

In the reporting period no new DTM release has been prepared and no new metadata has been added to the existing CDI service, but partners do have explored possible additional data sources. These will be incorporated in the coming months with the aim to deliver and launch updated and refined versions of the regional DTM at the portal around Month 24 (June 2012).

In this section it will be indicated per maritime region what additional data sources have been identified that will be further processed in the coming months.

3.4.1 the Iberian coast and the Bay of Biscay

The DTM production for the Atlantic region is coordinated by IFREMER. The present DTM is based upon data sources from IFREMER, SHOM, IEO, IHPT, LNEG, NIOZ and UTM-CSIC. The western boundary of the DTM is set at W14 and the southern boundary at N34.

In the reporting period the following data sources have been identified and will be added:

- IHPT from Portugal brings in surveys for the EEZ around Madeira and the Azores

Image: IHPT single and multibeam data sets (light blue = single beam; dark blue = multibeam). The surveys on the right have already been included. Activities are now underway for Madeira and the Azores

- IEO from Spain has identified additional Spanish surveys and composite DTMs for the area. IEO has been in contact for Northern Spain with AZTI, DG Costas, Ecomarge, IHM-ZEE, JREY, MARCONI, PROSECAN and SIG-IEO and for Southern Spain with CMIMA-CSIC, DG Costas, HERCULES+TARIK, IEO Maroc, IGME, IHM and SIG-IEO to achieve cooperation. IEO has made good progress and expects to be able to include many new data sets for the new DTM release. These surveys include wide stretches of multibeam surveys. As before IEO will not deliver the survey data themselves but produce composite DTMs that will be sent over to IFREMER for integration into the public DTM for the maritime region.

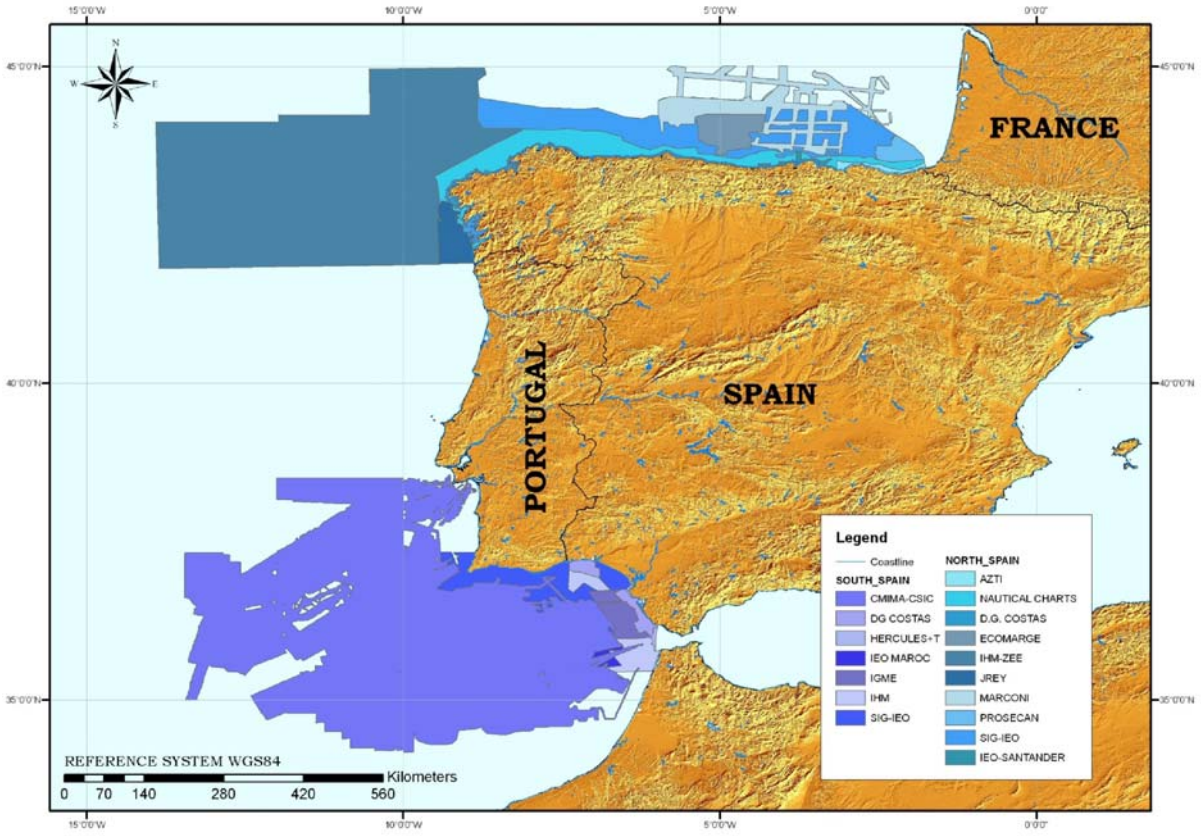


Image: Spanish data sources

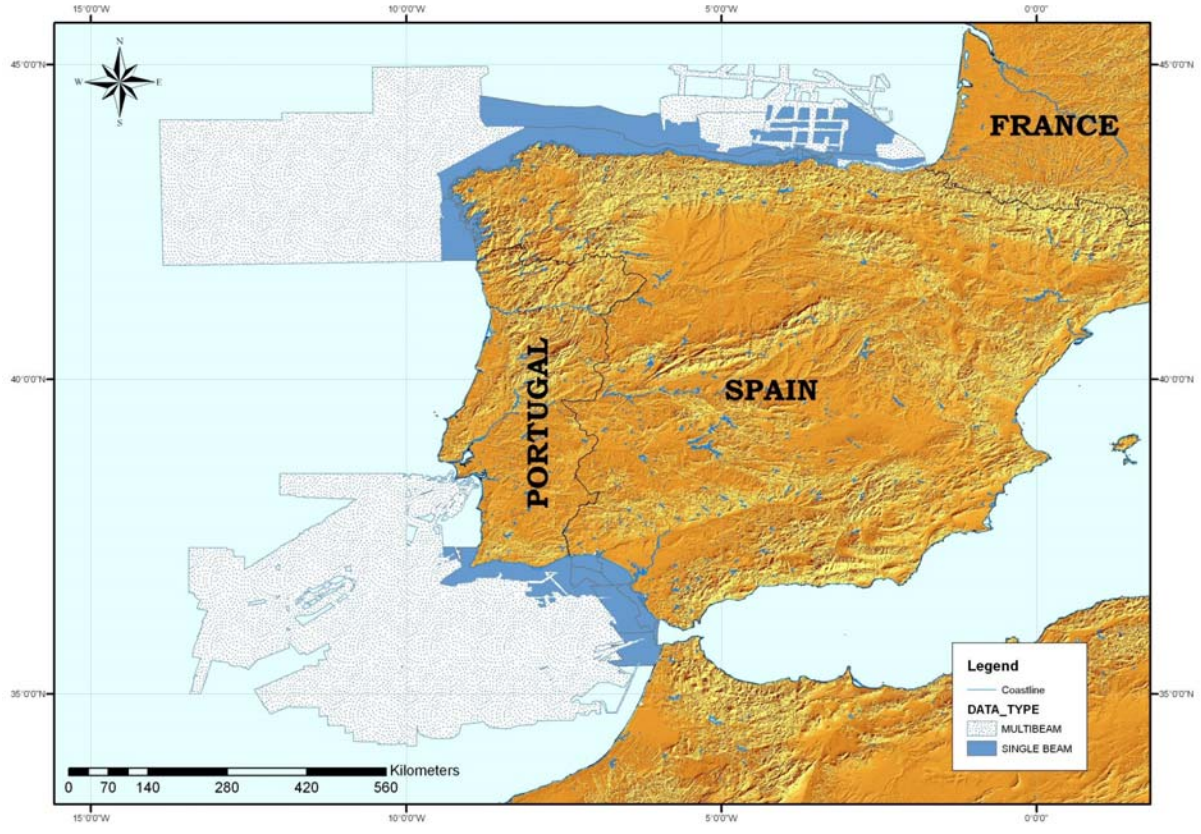


Image: Division in single beam and multibeam surveys for Spanish data sources

- LNEG from Portugal has identified additional Portuguese data sources for several areas along the Portuguese coast as indicated in the image below. LNEG is now in negotiation with its data holders for including the data sets in EMODNet. LNEG is also in contact with EMAM that is studying an extension of the Portuguese EEZ and that might give access to additional data.

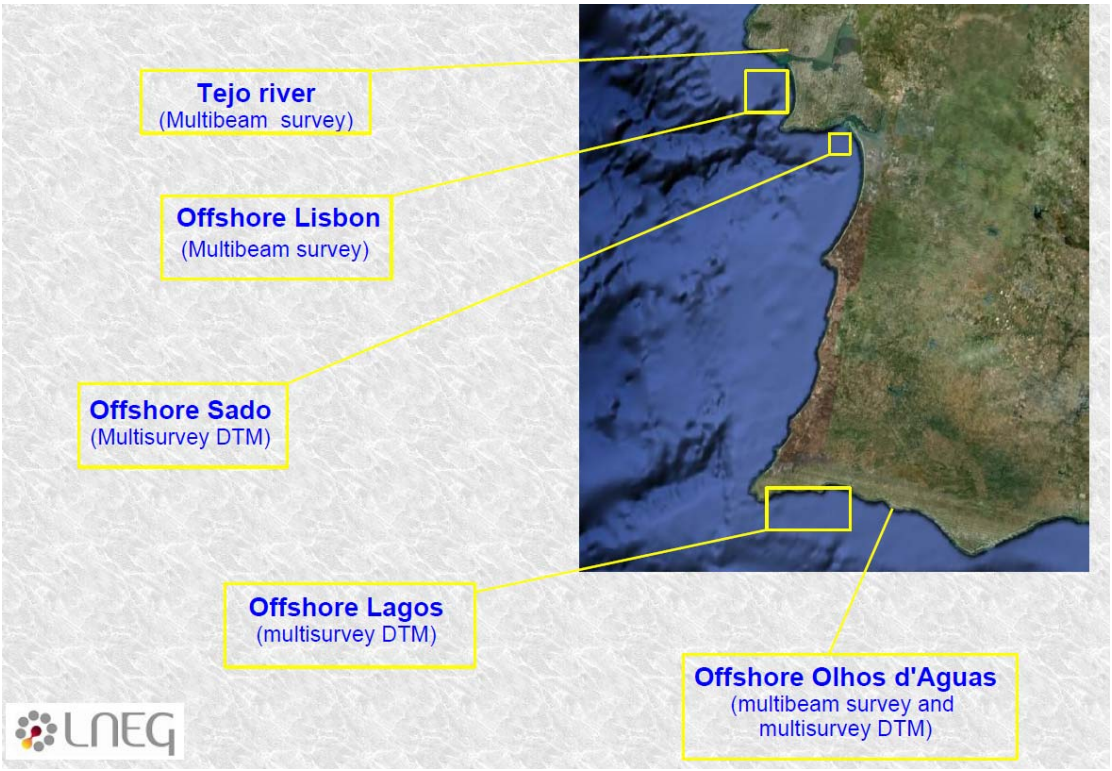


Image: additional data sources identified by LNEG from Portugal

- UTM-CSIC from Spain has recently participated in the TOPOMED cruise that can contribute new multibeam survey data for the Gulf of Cadiz.

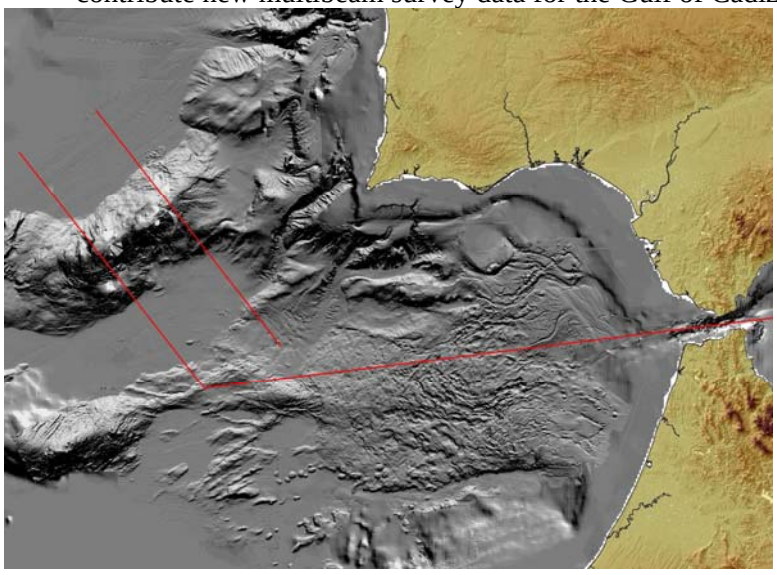


Image: Tracks of the TOPOMED (September – October 2011) cruise of CSIC

3.4.2 the Adriatic Sea

The DTM production for the Adriatic region is officially coordinated by OGS, but in practice by CNR-ISMAR, because of their expertise and knowledge of the region. The present DTM is based upon data sources from OGS, CNR-ISMAR, IFREMER and SHOM.

In the reporting period the following data sources have been identified and will be added:

- OGS continued negotiations with the Italian Hydrographic Office (IIM) to get access to their survey data sets and to prepare CDI records. A subcontract as associate partner is being prepared. This will not only focus on the Adriatic Sea, but also on the Italian west coast and the islands Sardinia and Sicilia. Also some discussions have taken place with the Croatian Hydrographic Institute.
- CNR-ISMAR has access to some additional multibeam surveys from the MAGIC project for the area around the heal of Italy as illustrated below.

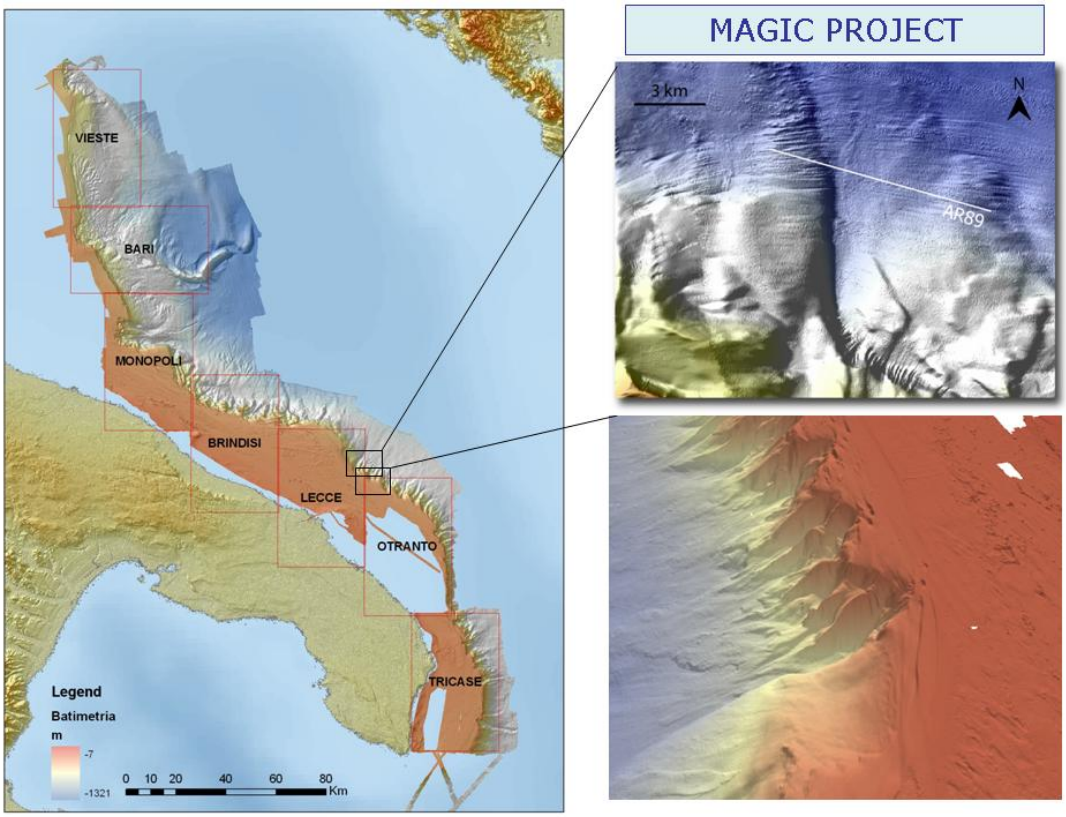


Image: Additional survey data for the Adriatic Sea of the MAGIC project - Italian sources

CNR-ISMAR expects to improve the existing DTM in the coming months including the additional data from IIM, Croatia and the MAGIC project. Anyway the present DTM will be finetuned. This might be done also evaluating the use of the U.S. Navy Unclassified bathymetric data base DBDB1, which has a 1 minute resolution, for areas that are now done by GEBCO. Following the GEBCO Science meeting CNR-ISMAR will engage GEBCO in this evaluation.

3.4.3 the Aegean - Levantine Sea

The DTM production for the Eastern Mediterranean region is coordinated by HCMR, but in practice the first released DTM has been generated by IFREMER, because HCMR

experienced some start problems. The present DTM is based upon data sources from HCMR, IFREMER, SHOM, OGS-RIMA and NIOZ.

In the reporting period the following data sources have been identified and will be added:

- HCMR held a meeting with the Greek Hydrographic Office to identify their possible data sets and possible contribution to the project. This has resulted in the identification of a large set of multibeam and single beam surveys for which activities are now underway for including these in the EMODNet project. These are illustrated in the images below.
- UNEP has identified some contacts in Israel, Lebanon, Egypt and Tunesia, but so far the follow-up has been difficult also because of the political turmoil in the latter 3 countries.
- The Turkish Hydrographic Office (SHODB) has recently become a partner in the SeaDataNet II project. MARIS will explore whether they are interested to contribute to the EMODnet project.
- HCMR has also explored the bathymetric data portal of US NOAA, that advertises some surveys in the region. However the quality and navigation accuracy of these old surveys proved to be not sufficient for use in EMODNet.

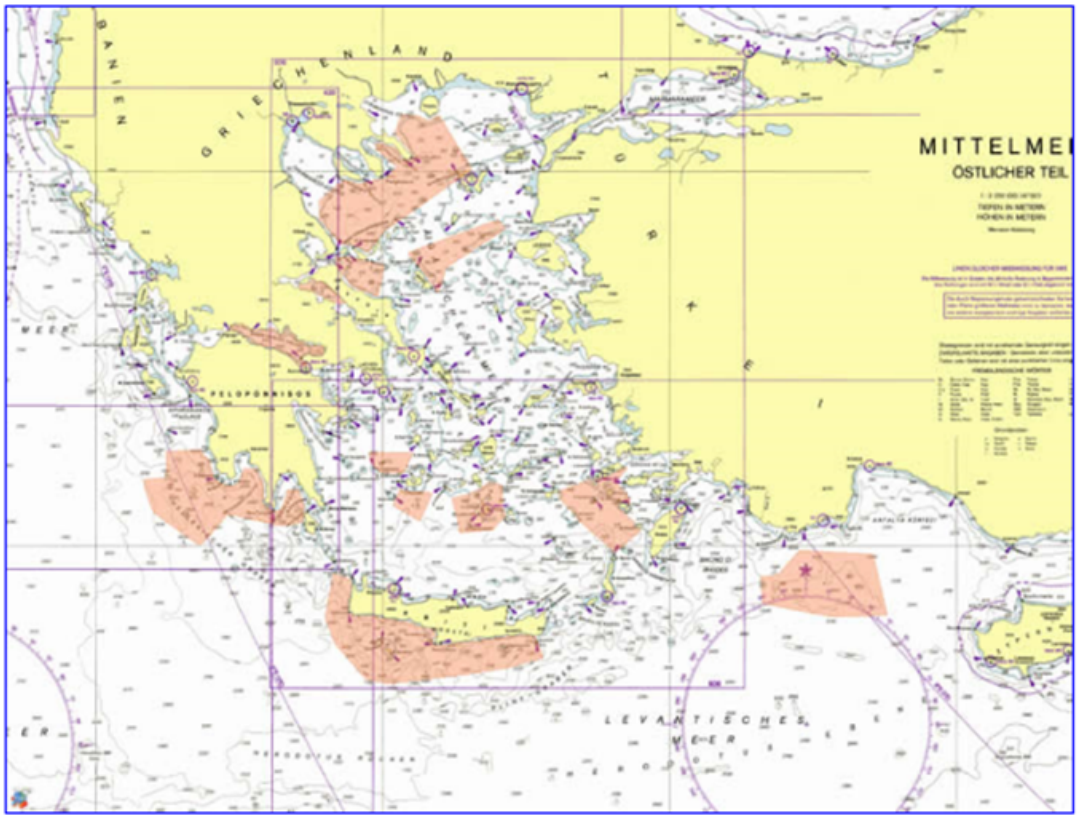


Image: Additional multibeam surveys from HCMR which have not yet been included

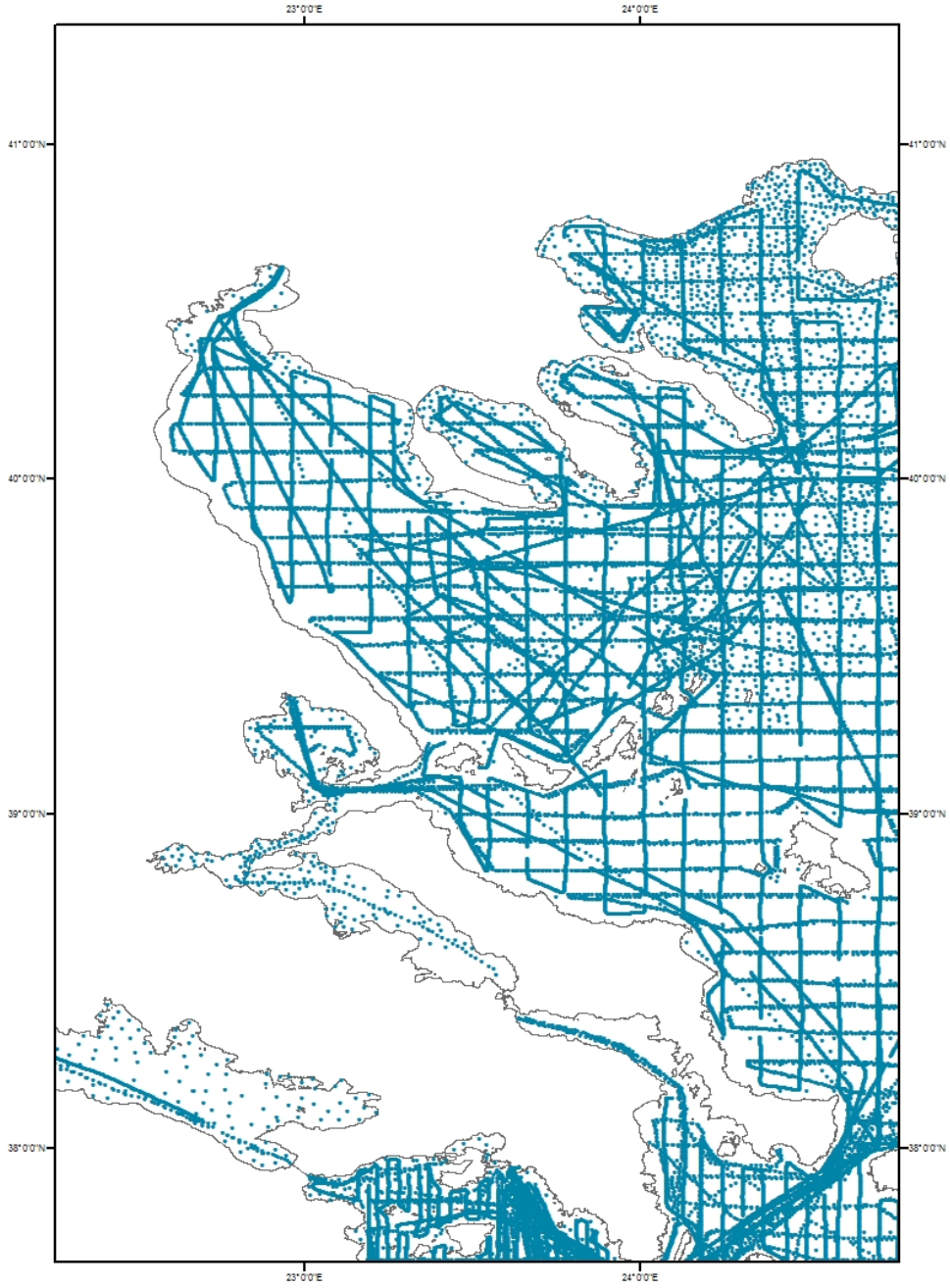


Image: Additional single beam surveys from HCMR which have not yet been included

- CNR-ISMAR has some new multibeam surveys for the Sicily Straits which will be combined by OGS-RIMA for generating a new release of a composite DTM for the area south of Sicily.

The next release of the regional DTM will be coordinated by HCMR, also following their participation in the CARAIBES Training Workshop which is planned by IFREMER in Brest - France in the week of 5th - 9th December 2011.

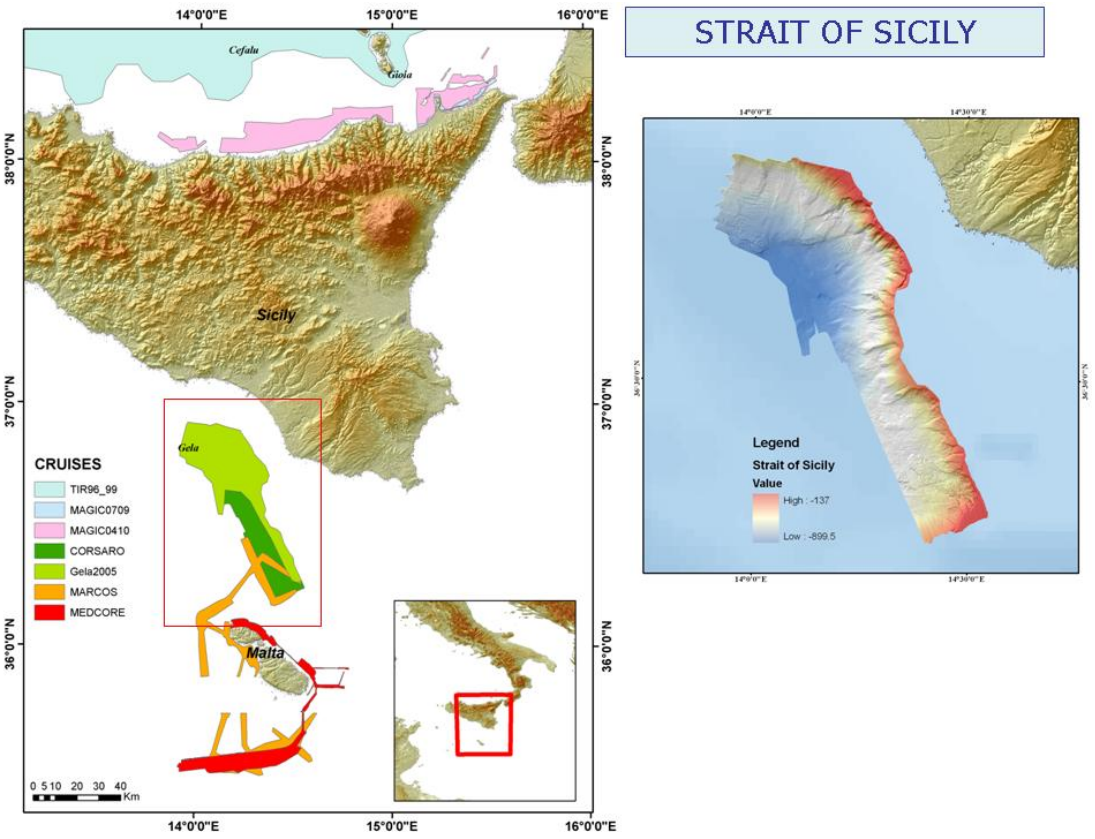


Image: Additional multi beam surveys from CNR-ISMAR which have not yet been included

4. WP2.2: QC/QA AND PRODUCING DIGITAL TERRAIN MODELS FOR THE 3 REGIONS

4.1 Objectives and approach of WP2.2

The objectives of WP2.2 are:

- To validate and to harmonise the quality of all hydrographic data sets
- To generate a Digital Terrain Model (DTMs) per region of the waterdepth with a width per grid cell of 500 m
- To generate accuracy and reliability indicators

In the first year this has been achieved for the 3 new regions by following the methodology for QC/QA and production of the DTM parts that earlier has been formulated and agreed in the Hydrography Lot. This is documented in a guideline titled “Guidelines for metadata, data and DTM QA/QC, Version 1.4, April 2010, produced by IFREMER, SHOM, NOC and ATLIS for EMODNET Hydrography” that is available from the public website.

Some partners made use of their in-house software packages configured according to the methodology and accuracy indicators as prescribed in the guideline. However most partners (HCMR, OGS-RIMA, CNR-ISMAR, and LNEG) agreed to make use of the CARAIBES software for which IFREMER provided a free licence and gave a Training Workshop in December 2010.

To improve the overall consistency and the quality further a number of activities have been undertaken in the reporting period and are planned:

- IFREMER organises another Training Workshop in Brest - France in the week of 5th December to 9th December 2011 for interested partners to give training in the use of the CARAIBES system, the online CMS for the new EMODNet Products Catalogue service and the EMODnet QA/QC methodology
- SHOM and IFREMER have evaluated the quality of the DTM so far produced for the Atlantic region around Spain and Portugal to explore whether the QA/QC methodology needs to be improved and if so, how. The results of this recent evaluation and proposed follow-up will be described in the next paragraphs.

4.2 Evaluation of Quality achieved for DTM of Bay of Biscay

The analysis focuses on the DTM produced for the Bay of Biscay area and describes the methodology of creation, the data source content, the characteristics of the resultant DTM and its limitations.

4.2.1 General data source characteristics

Source of data

Data are provided originating from survey data (singlebeam, lead line or multibeam). Data are preferably in the form of xyz soundings, however some data providers have provided composite DTM product. These will be used as alternative when no sounding exist. Elsewhere, GEBCO 30 arc-second gridded data is used to complete the coverage.

Horizontal datum

The resulting DTM will be generated in angular coordinates (latitude, longitude) within the WGS84 horizontal geodetic framework. Hence data are preferably provided respecting this datum.

Vertical datum

The Lowest Astronomical Tide (LAT) is the prefered vertical reference. The product DTMs are considered to be refered to the LAT as data sources are in LAT. Depth is considered positive.

CDI

Each of the dataset is referenced relative to its CDI identifier (Common Data Index). This identifier is particularly usefull to characterise the most important contributor for a grid node.

4.2.2 Gridding process

Grid resolution and geometry

The product DTM has a resolution of ¼ of arc-minute (which is approx 494m). The value of the grid parameters is cell centered. The origin of the grid referential the crossing of the Equator and the Greenwich Meridian. The corner of a cell located at the origin of this referential should be tangential to these axes as described in the image on the right.

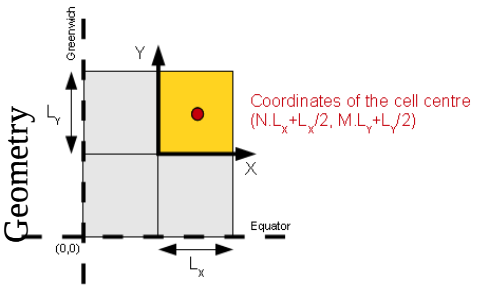


Image: Grid cell geometry

Grid parameters

For each of the cell the following attributes are given:

- Minimum cell depth
- Maximum cell depth
- Average cell depth, ie the average of the mean depths computed at each subcell (from 1/16th of arc-minute subcells).
- Standard deviation of the cell depth
- Number of depths used for interpolation of cell depth
- The number of subcells (1/16th of arc-minute subcell) used for the computation of the average cell depth
- The CDI of the most important contributor for the cell
- Smoothed depth, resulting of a spline function (applied on the average cell depths filled by the Gebco data)
- Residual difference between the average depth and the smoothed depth converted into percentage of the water depth

Gridding workflow

Gridding is a two-fold process. As illustrated below, data originating from individual providers are averaged at a resolution of 1/16th arc-minute (other grid parameters are also computed). Then, the average of the 16 cells (or less) for all the dataset is averaged, and corresponding grid parameters are also computed.

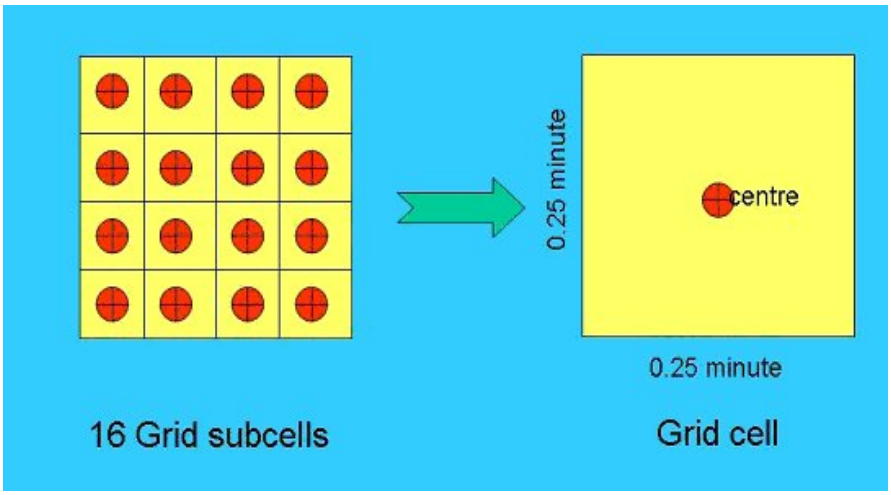


Image: Gridding workflow

4.2.3 Characteristics of the data sources relevant to the Bay of Biscay Grid

Data gathered from providers_name were not reprocessed. They are essentially composed of Multibeam data, single beam soundings and plummets soundings.

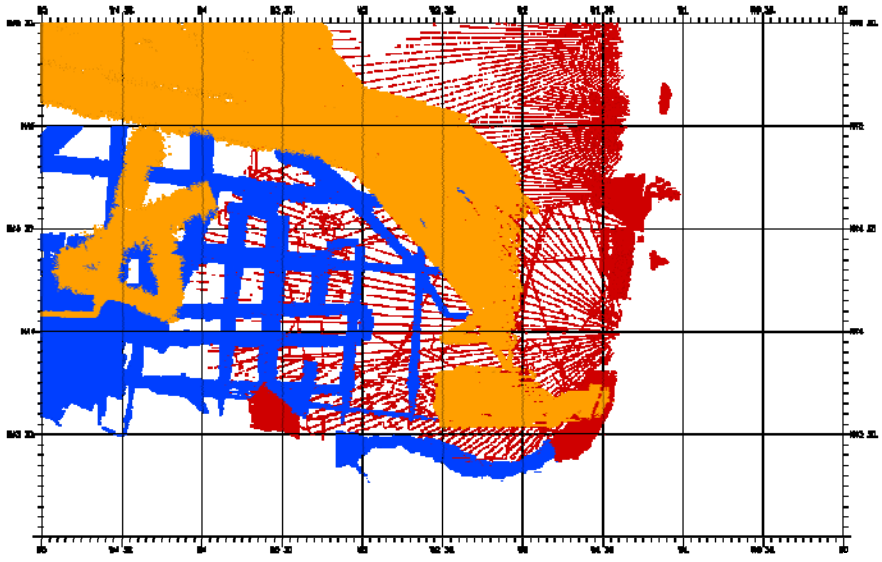


Image: Dataset distribution coded by distributor

The interested user is able to evaluate the distribution of source datasets composing an area of interest of the present DTM by going on the Pilot portal (http://portal.emodnet-hydrography.eu/EmodnetPortal/index.jsf), selecting survey tracks and polygons in the drop-down list superimposed on any of the other DTM layer.

If datasets are overlapping there is no temporal or geographical deconfliction of the datasets. All the data are considered whatever their age or quality. However the EMODNEt methodology report gives a series of rules (to be evaluated against the content of metadata of each dataset), used to filter out the lowest quality data, with respect to acquisition and processing levels.

Table 1 gives the list of the rules and provides also information related to the application of these rules. In some occasion, it was decided to override these rules in order to benefit from a wider coverage.

Rules	Datasets affected	Inclusion	Exclusion	Remarks
SR03	Ifremer datasets Edmo code : 486		X	No tide correction, data rejected on the continental shelf (above 200m depth)
SR07	540-S196700500-6 486-65593		X	Isolated data, source of artefacts when merging with regional DTM as Gebco
SR05		X		Constant sound velocity corrected by a local function applied on the water depth Zproc= 1.0005Zraw + 22

List of criteria/rules

SR01 : « Unknown geodesy »

SR02 : “Positioning accuracy”

SR03 : Sea level of reference

SR04 : Sounding system unknown

SR05 : Sound velocity

SR06 : Data processing traceability

SR07 : Isolated data

Selection Rules “SR” are fully described in the EMODNet methodology guideline.

4.2.4 Bay of Biscay Digital Elevation Model Product

The DTM created for the Bay of Biscay area has been computed using source data and the gridding methodology both described above. CARAIBES Software v3.6 has been used for the computation at IFREMER. The next image shows the gridding of all the data available in the area and compliant with Table 1 description.

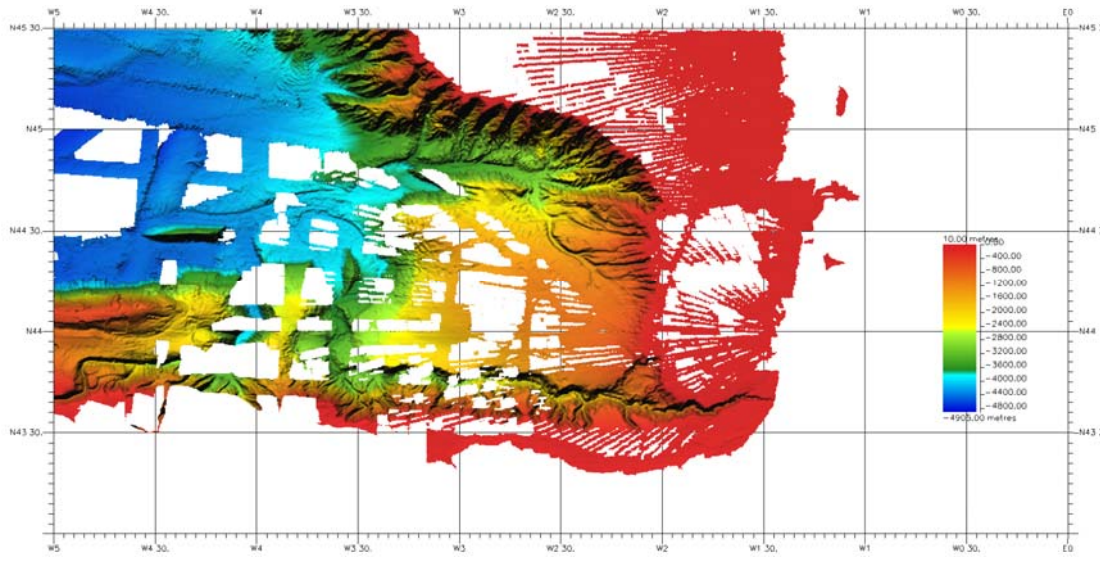


Image: Average depth for the dataset (1/4 of a minute

The next image has been built from the Data set distribution coded by distributor, with holes in the coverage being filled by GEBCO values.

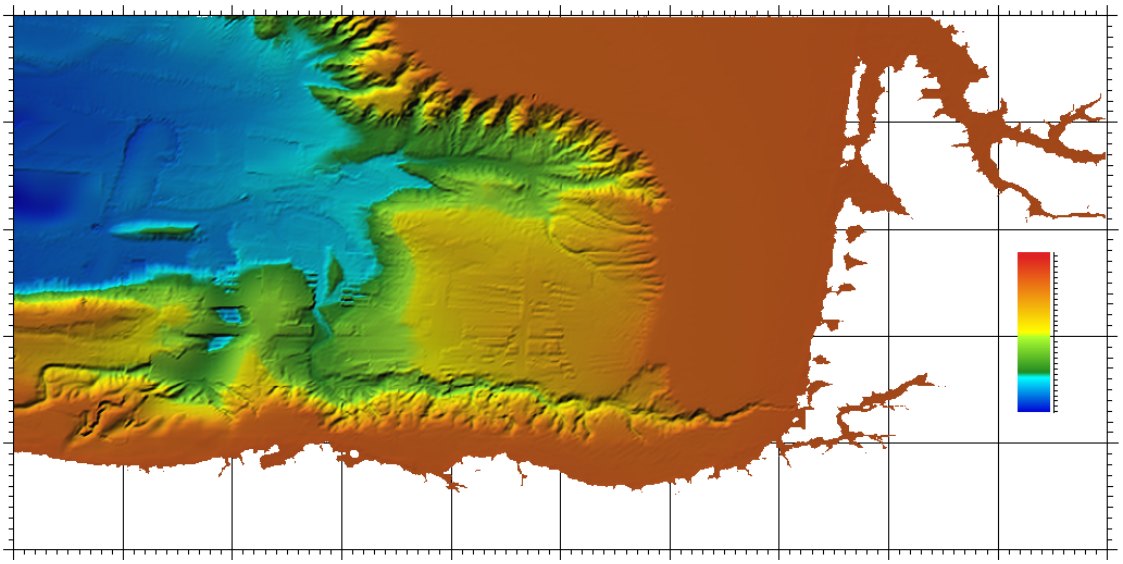


Image: Bathymetric depth filled by GEBCO data and smoothed through a spline function

4.2.5 Quality analysis

Along with the computation of the average water depth, other statistics have been computed and can be used to help assessing the quality of the grids.

- **Slope:** is calculated from the spline surface. This measurement can be used on top of describing the general morphology of the area.

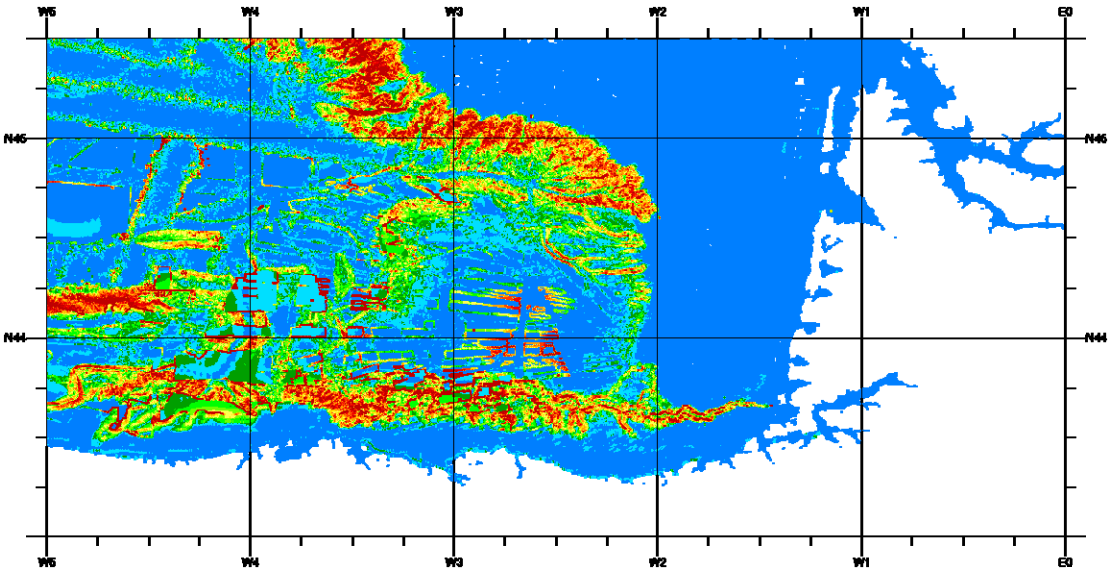


Image: Slope calculated from the resulting DTM (see previous image)

- **Standard deviation:** is computed on all the soundings contained in a cell of 1/4 of arc-minute. This statistic is driven either by the morphology or deviation to the mean value

of one dataset to another when datasets are overlapping.

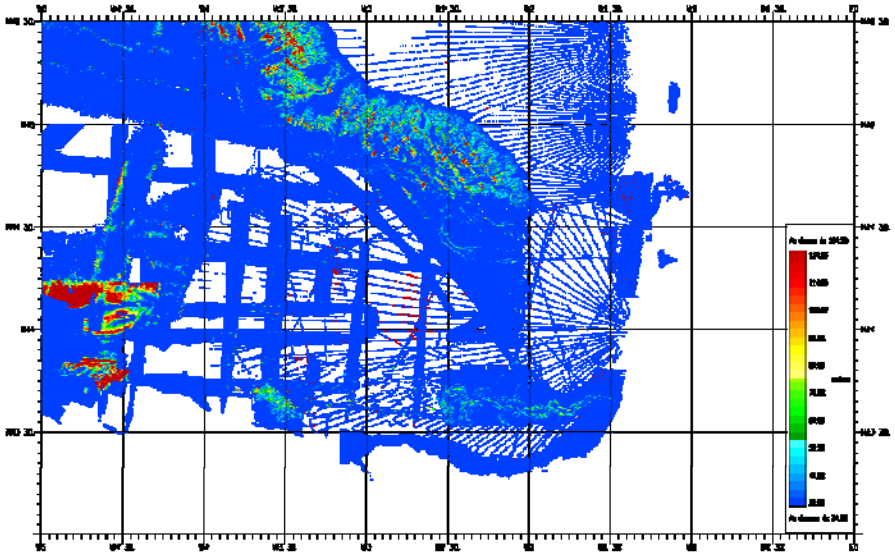


Image: Standard deviation calculated from the EMODNet dataset

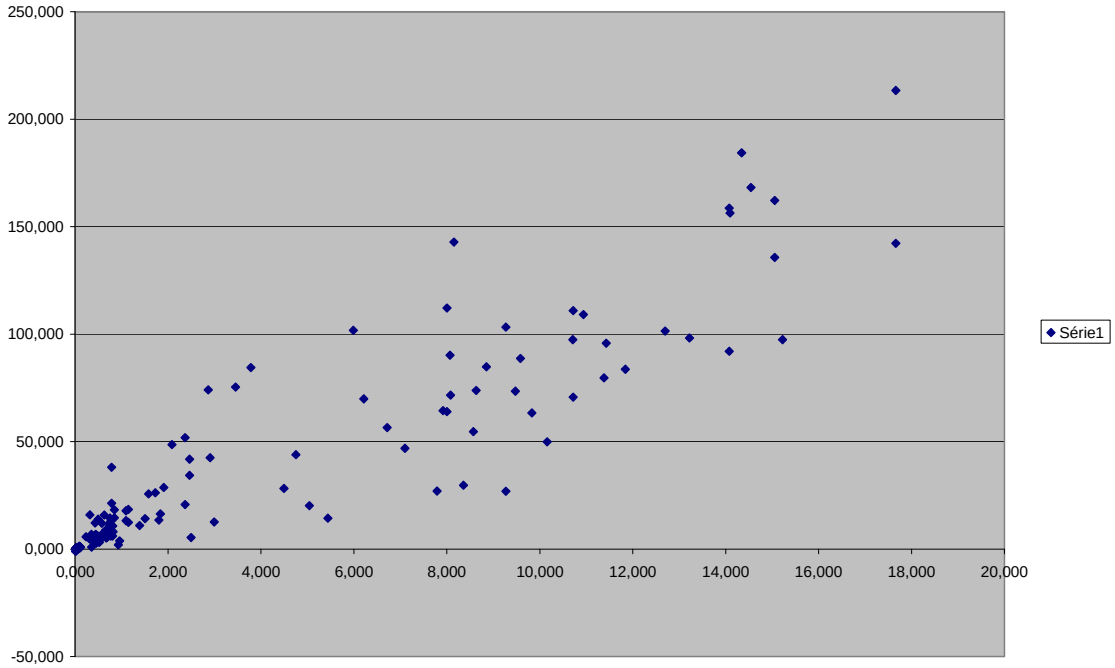


Image: Distribution of standard deviation with respect to the slope

Remark: High STD are mainly related to the highest slope.

- **Offset between smoothed water-depth (spline) and mean water-depth:** This statistic is also calculated and provided to the grid user. This offset is given as a percentage of water depth. This variable is less sensitive to the morphology than the standard deviation.

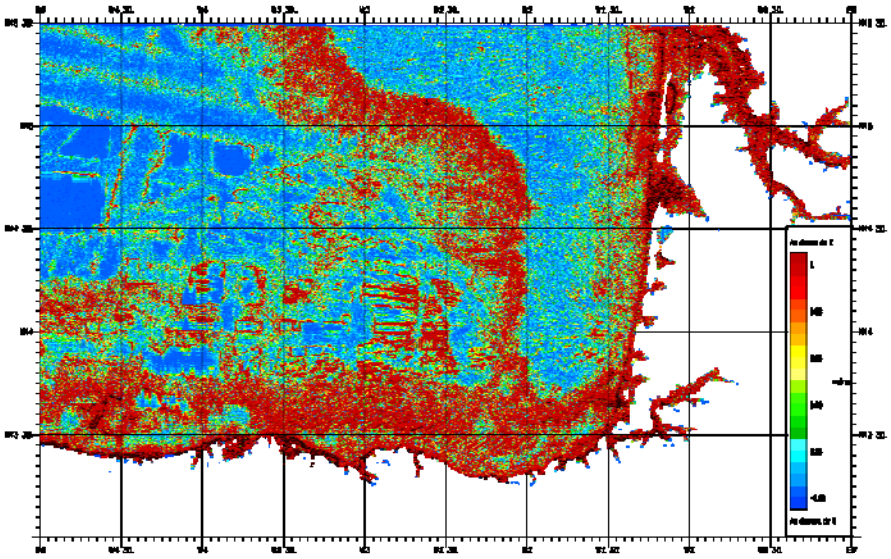


Image: Smoothed water depth to the average water depth reported as a percentage of water depth

- **Density of soundings per cell:** Number of sounding are counted per node of the product DTM for all the data sources satisfying the requisites. This value provides an estimate of the robustness of all the other statistics.

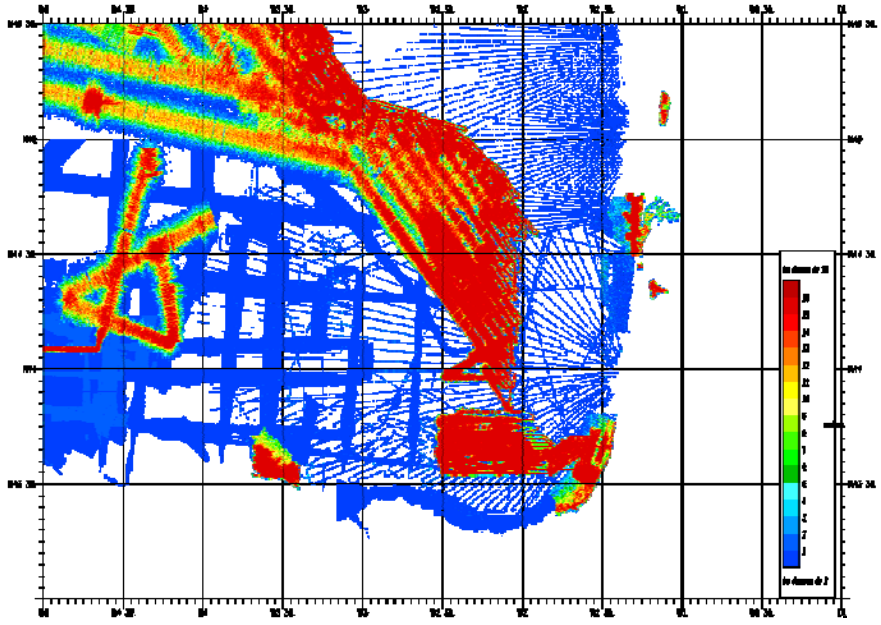


Image: Number of soundings per 1/4 of arc-minute nodes

4.2.6 Identified artifacts

An artifact commonly observed in the EMODNet DTM product is caused by the filling of gaps with GEBCO data. It appears that the depth as indicated by GEBCO and in many cases derived from satellite observations using the Smith and Sandwell algorithm is not in balance with the depths as observed from the in-situ bathymetric surveys. In those cases one can conclude that GEBCO is not accurate.

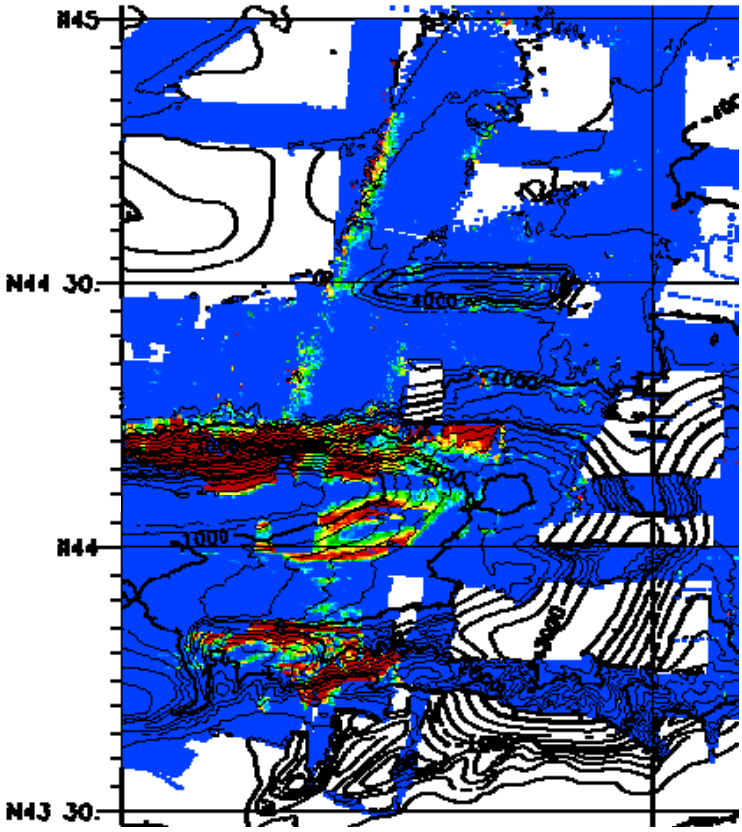


Image: DTM artifacts identified with standard deviation anomaly

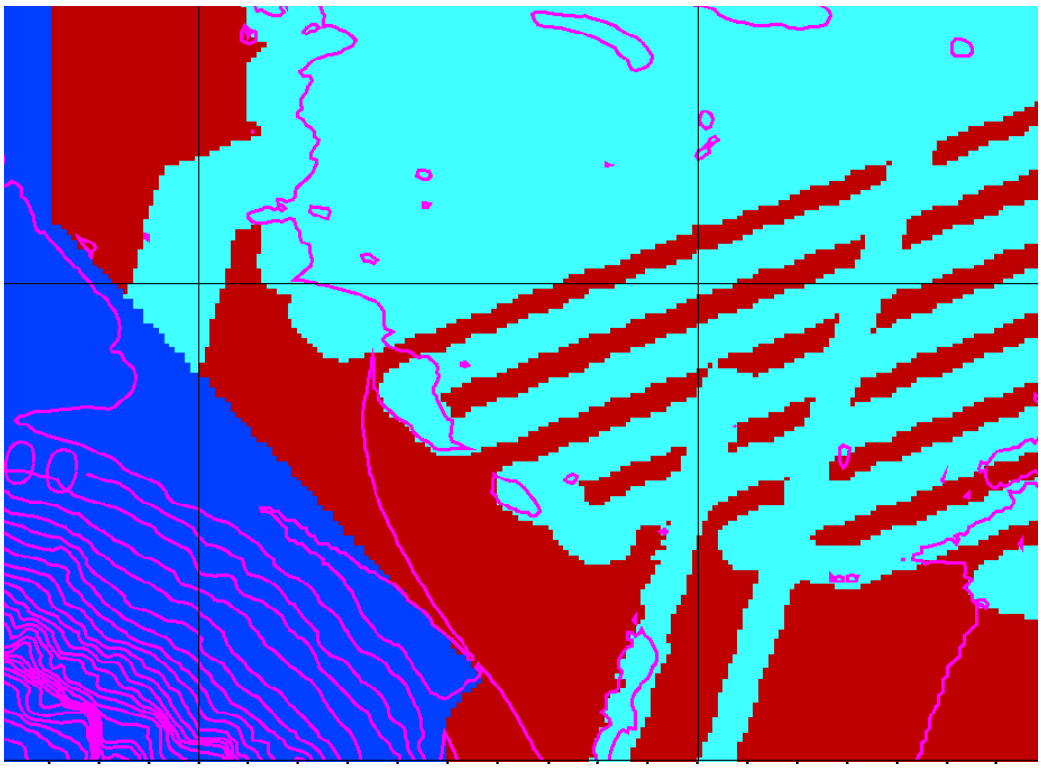


Image: Isobath anomaly explained by CDI ID change

The use of the CDI Id allows to explain some artifacts of the DTM: above a shift of bathymetry is identified with the isobath and is linked to the shift between adjacent datasets.

4.2.7 Conclusions and follow-up:

The QA example has analysed the DTM as generated for the Bay of Biscay applying the EMODNet-Hydrography methodology. It should be reminded that in EMODNet on purpose data have been gridded as they are without further smoothing to demonstrate areas of non-coverage and the effects of filling those with GEBCO data. In practice artifacts can be clearly identified.

There is a list of known issues. Some might be improved; others can not be improved considering the available data sources:

- **Inconsistencies between source data and product data**
- **DTM overlap between zones and merge with GEBCO to be improved.**
- **Some data inserted in the DTM do not fully comply with specifications (horizontal, vertical datum, positional accuracy, sounding systems, data processing history, …)**
- **Inconsistencies between EMODNet and GEBCO**

There are a number of options for minimising artifacts:

- improve the smoothing algorithm to deliver also a nicely smoothed DTM version next to the basic DTM
- try to get hold of the internal GEBCO 1/16 minute grid and use this in stead of the 30 sec grid
- study artifacts together with GEBCO which might lead to improving GEBCO and lower the number of remaining artifacts in the EMODNet DTM.
- evaluate the merging of neighbouring DTMs to prevent steps

Also the Quality Indicators might be improved by:

- **adding layers for age and estimation of the horizontal accuracy of the source dataset, derived from the CDI**
- **including a processing report as part of the DTM product description, thereby describing how data have been incorporated in the model or filtered out**
- **assessing coverage and quality of the source data**
- **visual evaluation of the depth layer (sun shaded, depth contours, 3D)**
- **analysis of the statistic layers (std, % difference with spline, number of soundings, …)**
- **cross reference of some variables (Depth vs CDI, ..)**
- **Evaluation of the gridding algorithm in selected areas: kriegging and/or other known algorithm/implementation: bootstrapping.**
- **test the DTM vs user applications (hydrodynamic modeling, geomorphometric analysis); report limitations**

A selection of measures are considered for the next DTM releases, but this may pose a large effort which is not feasible. Therefore it has been decided that SHOM and IFREMER will develop soon a template for a first level evaluation and improvement. This template will be tested in December 2011 by CNR-ISMAR for a pilot area in the Adriatic Sea. This feasibility pilot will indicate the efforts required and provide the basis for the consortium for deciding in January 2012 whether a wider application for all DTMs is feasible or a subset of measures should be applied.

5. WP2.3: INCLUSION OF THE 3 DTM's FOR THE NEW BASINS INTO THE EXISTING HYDROGRAPHIC EMODnet PORTAL

The objectives of WP2.3 are:

- To integrate the 3 DTM's in the EMODnet Hydrographic portal

The EMODnet Hydrographic portal is operational at http://www.emodnet-hydrography.eu . It provides access to the following services:

- The CDI data discovery and access service
- The Hydrography data products viewing service

A first release of the regional DTM's has been produced in the 1st year, delivered in May 2011 and integrated together with new releases of the 3 existing maritime regions from the Hydrography Lot into the central EMODnet DTM early June 2011.

Work is underway for generating a new version of the DTMs, incorporating more data sets and taking measures for minimising the number of artefacts. These will be integrated into the central portal and ready for public use by June 2012.

The planning for the generation of the new releases is as follows:

- On-going: gathering new data sets and populating these to the CDI service
- December 2011: Training Workshop organised by IFREMER in Brest - France for selected partners for training with CARAIBES software and online CMS for product description catalogue
- December 2011: SHOM and IFREMER deliver a template for first level quality evaluation and improvement.
- December 2011: CNR-ISMAR will test the quality template for a pilot area in the Adriatic Sea. This feasibility pilot will indicate the efforts required.
- January 2012: Consortium will decide whether a wider application of the first level QA and improvements is feasible for all DTMs or a subset of measures should be applied.
- From January 2012: Partners active with generating the new subDTM releases incorporating additional data sets, generating metadata for surveys and composite DTMs and applying refined methodology following the QA template decision
- 1 April 2012: Upgraded regional and subDTMs ready for all regions for integration
- Mid May 2012: Public release of upgraded DTM in the EMODNet portal

The present portal experienced some technical issues which are underway for solutions or already solved:

- The Hydrographic Viewing Service performs very well under FireFox and Google Chrome, but experienced some deficiencies with Internet Explorer 8. This has been recently solved by implementing a patch.
- The EMODNet DTM can be downloaded as geographic tiles in a number of formats. This includes NetCDF (CF), but it appears in practice that the used NetCDF format is not fully conform its target definition. Therefore IFREMER will give support to ATLIS in the coming weeks to solve this issue.

- As explained in detail in 3.3.2 progress is being made with configuring and populating the EMODNet Products Catalogue Service. The Service will be used in the EMODNet Hydrography portal to give references from DTM grid cells to composite DTM metadata factsheets. The Service will also be used to assist users of WMS services and other EMODNet pilots to chose and to add layers of EMODNet Products to their viewing clients. This implementation is underway and will be launched in the coming 2 months.

6. WP3.1: ADOPT OR DEVELOP A STANDARD FOR MULTIBEAM DATA

The objectives of WP3.1 are:

- To adopt or develop a metadata standard for multibeam data
- To adopt or develop a data standard for multibeam data

In the reporting period no further activities have taken place for this WP. However for good understanding, the conclusions from the first year report are repeated below.

For the **metadata standard** the SeaDataNet standard has been adopted consisting of the Common Data Index (CDI) metadata profile, based on ISO 19115, and documented in "Documentation: 5.00; Common Data Index (CDI); Version 1.6; Metadata Format; 10 June 2010 with XML Schema, XLS description of all XML tags and XML examples". This documentation can be retrieved from the SeaDataNet website in the section 'Standards & Software:
http://www.seadatanet.org/standards_software

As part of the SeaDataNet and Geo-Seas projects considerable work has been undertaken to define the CDI metadata format (xml) and XML schema (xsd) as an extended profile of the ISO 19115 standard for geographical data sets. The latest version (see above) makes use of standard mark-up terms, wherever possible, which are managed in the Common Vocabularies, while for Organisation information, standard references are included to the EDMO – European Directory of Marine Organisations. Furthermore tools and services have been developed for generating CDI XML records from the data management systems of data centres, a CDI XML validation Web service, parsing the CDI XML records against an extended CDI schema including vocabularies support, and tools for importing CDI records into a central CDI Directory. An analysis as part of the Geo-Seas project with geophysical and bathymetric experts has concluded that the present CDI metadata format and XML schema, especially with its recent extension with GML objects for tracks and polygons consistent with recommendations from ISO, and OGC, are sufficient for describing multibeam survey datasets.

The SeaDataNet common vocabularies are used to mark up the CDI metadata and to label data. These lists of standardised terms cover a broad spectrum of disciplines of relevance to the oceanographic and wider community. The common vocabularies comprise various lists, such as related to variables, but also other relevant topics, such as sea area names, platform classes, instrument types, and so on. While preparing CDI entries for hydrographic surveys as part of the EMODnet Hydrography and Seabed Mapping Lots the vocabularies have been validated for the hydrographic domain, and where needed, extended. In practice this is an ongoing process and done by proposing additions or modifications to the international SeaVox governance group. After acceptance, these terms are added to the operational vocabularies via the SeaDataNet moderator NERC (BODC).

The choice of a **data format** for multibeam echo sounder data must solve several issues:

- Data produced by echo sounders, especially multi beam echo sounders, are generally delivered in a format specific to the system manufacturer. The chosen format must be manufacturer independent and must rely on an international standard to be easily accessible to users,
- Multi beam echo sounders produce a large amount of data during a survey, that is very different for vertical echosounders. The format must be as compact as possible, that imposes a binary encoding, but in a computer independent way to be transportable and deliverable through networks,
- All ancillary data necessary to aggregate data from several surveys and to process them

to produce gridded bathymetry (Digital Terrain Model : DTM) must be included in the same file in order to ease data usage.

The NetCDF (CF) format appears to be a very good candidate for bathymetric data delivery since it is already widely used especially for gridded bathymetry (Digital Terrain Model) by most international programs like the General Bathymetric Chart of the Oceans (GEBCO), the InterRidge and Margins programmes. NetCDF has been adopted as well by large organisations like the National Geophysical Data Centre, Lamont-Doherty Earth Observatory of Columbia University, and others within the US-Marine Geoscience Data System. In France, most of data producers (SHOM, Ifremer, Insu) make also use of NetCDF format both for observed data and gridded bathymetry.

NetCDF is a well documented "de facto standard" governed by the UNIDATA Consortium (http://www.unidata.ucar.edu/software/netcdf/). Both OpenSource and Commercial tools are available to read and process it :

- non commercial sector : GMT (Generic Mapping Tool), Caraibes (Observation data processing)
- commercial sector : ESRI, Map Info, ...

NetCDF (CF) is also the standard as adopted by SeaDataNet and Geo-Seas for gridded data sets, such as multibeam survey datasets.

Therefore it is decided in the EMODnet Hydrography - Seabed Mapping project to adopt the NetCDF (CF) format as basis for multibeam surveys. Partners can manage their survey data sets in their own formats but the NetCDF (CF) format is adopted for exchanging data sets.

Furthermore it is decided to join an activity formulated in the new SeaDataNet II project which will formulate together with experts from UNIDATA a common SeaDataNet NetCDF (CF) format that will support the use of the SeaDataNet Common Vocabularies, SeaDataNet EDMO codes and a linkage to the CDI metadata in the metadata header in the NetCDF (CF) files. This activity is also joined by experts from the Geo-Seas and EuroFleets projects because it is a common interest to formulate and adopt a SeaDataNet NetCDF (CF) format.

The results of this activity are expected in 2012 and will also include tools for data providers to convert their existing NetCDF (CF) files to the new SeaDataNet NetCDF (CF) format efficiently.

7. WP3.2: MULTIBEAM METADATA COMPILATION FOR THE MARITIME BASINS

The Task 2 of the Seabed Mapping project aims at laying the foundations for a future higher resolution mapping of seabeds in the maritime basins of Europe by:

- adopting or developing standards (format and metadata) for multibeam mapping data (bathymetry and backscatter)
- using these standards, create a portal for high resolution multibeam mapping tiles that includes:
    - an overview of current holdings of data tiles and tracklines
    - a repository for publicly available data tiles and tracklines
    - mechanisms for downloading publicly available data
    - demonstrations of how data from different surveys can be seamlessly joined
    - on-line instructions
    - a mechanism for replying to e-mails from users.
- monitoring and reporting on the effectiveness of the portal in meeting the needs of users in terms of ease of use, quality of information and fitness for purpose of the products delivered;
- analysing what lessons have been learned for a future operational EMODnet
- estimating the effort required to provide a complete coverage of waters of EU Member States
- keeping the portal operational afterwards and being prepared to transfer to the Commission.

The standards definition is undertaken in WP3.1. The setting up of the multibeam portal is undertaken in WP3.3. Estimating the effort required to provide a complete coverage will be undertaken in WP3.4. The status of each of these WPs is reported in separate chapters. In this chapter the status of WP3.2 is reported.

The objectives of WP3.2 are:

- To compile an overview of multibeam and single beam surveys for Europe's maritime basins
- To derive from the overview an initial metadata directory and a number of sample data sets, that will be loaded into the multibeam portal

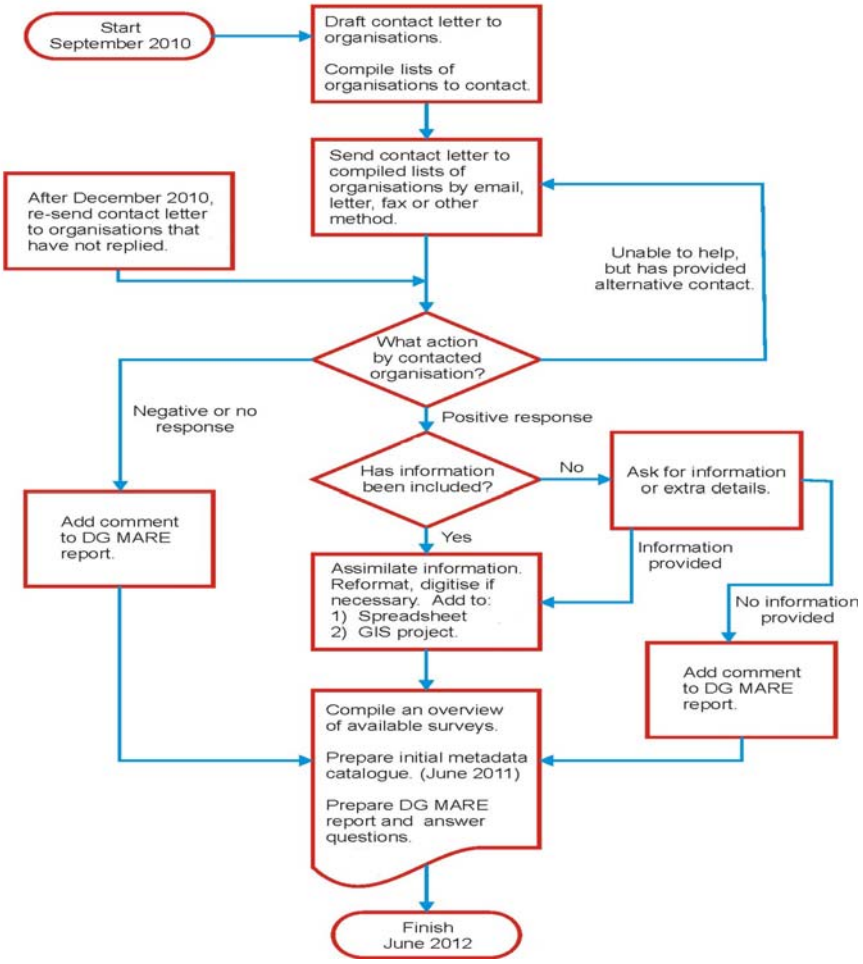
It is noted beforehand that the present CDI metadata overview and service already forms a very good start and basis for the requested overview. The gathering of entries for the CDI directory from existing and new data providers and establishing their engagement to contribute survey data sets continues with a focus on the 6 maritime regions and a focus on hydrographic offices, research institutes and harbour authorities.

The overview requested for Task 2 must be as complete as possible for all waters of European Member States and also include private sources. Thereby it is realised that a lot if not all data sets from private sources will be labelled as restricted data.

7.1 Approach

Partner NOCS has designed a procedure for gathering the required metadata on multibeam surveys and singlebeam surveys by using existing overviews and by questioning all possible data holders. This procedure is given in the next image. Moreover NOCS has prepared an introduction letter to approach potential data providers for their cooperation and contributions. Providers are asked for metadata. Thereby it is strived to get enough metadata

for compiling basic CDI metadata entries whereby it is important to get at least information on the originator, data holder, dates, survey method, and geographical coverage e.g by shapefiles or other digital files.



It has been discussed which parties should be involved in the survey by questionnaire because misunderstanding / crossing with the ongoing project activities should be avoided. Therefore it has been agreed that the survey will not address the existing data sources that already are involved in the project and for which full CDI references and data contributions are asked for existing maritime basins. The survey will focus in existing basins on complementary sources, such as industrial organisations. For not yet covered sea basins (Baltic, Black Sea, Norwegian sea and Arctic Waters) all possible sources will be addressed.

Organisations include:

- Data Centres
- Hydrographic Offices
- Oceanographic Institutes
- Geological Surveys
- Fishery Institutes
- Other Government Agencies
- University Departments

- Marine Survey Companies
- Oil & Gas and Mineral Extraction Companies

both inside and outside the European Union.

The survey activities are undertaken by NOCS and UNEP whereby UNEP is concentrating on North Africa and the Middle East.

7.2 Progress in the reporting period:

NOCS asked partners in the EMODnet Hydrography and Seabed Mapping projects for details of other surveys in their regions of responsibility that were not already represented in EMODnet. Their replies are paraphrased below and also resulting contacts and results if any.

France:

SHOM

Generally, industry data is represented by SHOM and IFREMER although there are a few companies not included in either. All the surveys that SHOM were aware of have been made available to EMODnet.

IFREMER

IFREMER don't use polygons or outlines of the data coverage for each survey. They work with the survey track lines or generate polygons of the DTM coverage (including all merged survey data). IFREMER can provide a list of all surveys they hold integrated together, and the global coverage, but it will not exactly fit the purpose that EMODNet Task 2 is pursuing. Therefore IFREMER will check to see what could be done from their database.

Greece

HCMR

No information yet.

Ireland

GSI

There is no formal archive of industry multibeam data in Ireland. A certain amount of surveying is done in conjunction with the Marine Institute and GSI's Petroleum Division (who issue permits for cables and site investigations etc). Interestingly they have been asked recently by the Irish Marine Renewable Industry Association to take on the role of archiving their site surveys and have loosely agreed but it is not formally set up yet. So essentially, it is easier for GSI to track down the data in Ireland than for NOC to try and do it by cold-contacting people.

Below is the internet link for the GSI's regularly updated coverage map, and as well as INFOMAR data, in the bottom key/box can be seen polygons from others' surveys, ADFISH etc. For some, such as JIBS, they have a copy of the data, metadata etc. For others they only have a polygon outlining the coverage and a contact name.

This chart can be found at:

http://www.infomar.ie/documents/Ireland_Coverage_Chart_12Apr11.pdf

Not on the chart, but obviously of real interest is the UKHO/Seazone listed datasets from the UK Royal Navy off the South Coast and a few other NIOZ and research cruises with MBES. It is possible that NOCS may be better placed to get more information about these cruises than the GSI.

If NOC can compile metadata on some of these surveys, the GSI are happy to try and track down some more data.

Italy

ISMAR, CNR

Below is a list of Italian companies and other contacts working offshore and collecting multibeam data:

GAS http://www.gas-survey.com/cms/

Enrico Sassi, Sales Director: *enrico.sassi@gas-survey.com*.

Federica Sanmarchi Sales Manager: *federica.sanmarchi@ gas-survey.com*

GAS has conducted several Multibeam surveys mainly for submarine cable laying purposes. They started to operate a Multibeam system in 1996 and have carried out thousands of kilometres of survey, including many trans-Atlantic cable systems surveys. They have been providing GIS files to our Customers since 2001 and have performed at least 2 or 3 cable surveys per year and that each cable survey could consist of many segments connecting different places. So what we are asking for is quite a huge archival research for them to carry out. They will enquire of their processing team and ask them if this is feasible considering the actual amount of work. They hope to give an answer soon and on the schedule of the work. If their technicians have time to work on it, is generally a shape file and not a georeferenced image. They work in CAD and usually export some data for our customers as shapefiles. The info regarding year of the survey and type of MBES will be separate.

GALSI http://www.galsi.it/ survey@galsi.it

James Nicholls: james.nicholls@flintgeo.com

Geoscience and survey, GALSI SpA, Milan.

They maintain details on multibeam coverage for several recent projects in the EMODnet area, specifically, for pipeline crossings in the Mediterranean, Tyrrhenian and southern Adriatic seas. They will look into providing a coverage shapefile and some detail on grid resolution and technique as requested in due course.

CCE Coastal Consulting Exploration

http://www.coastalexploration.com/

GEOTEAM

http://www.geoteam.biz/

Alessandro Piacitelli apiacitelli@geoteam.biz

Dipartimento di Scienze della Terra

Università degli Studi di Roma "La Sapienza", MAGIC project Coordinator

Prof. Francesco Latino Chiocci francesco.chiocci@uniroma1.it:

Portugal

IHPT

No information yet.

LNEG

There is a period of change in Portugal at this moment and there is uncertainty about the fate of the EMAM project data used by Portugal for it's UNCLOS submission to the UN as this group is closing down. The facilitator for EMAM has been Nuno Lourenço (nlourenco@am-em.org), probably he will continue to be one responsible for the EMAM data. He has already been working with the EMODnet Hydrography representative and has provided point values extracted at 500m x 500m from the survey. He has also agreed to provide the project with the shape file of the different survey boxes, ID and dates, he has included metadata too.

Spain

IEO

No information yet.

United Kingdom (also see image below)

NERC

A compilation of multibeam surveys in UK waters on the NERC's Maremap website http://www.bgs.ac.uk/maremap/index.cfm and compiled by workers at the British Geological Survey, Edinburgh is shown below. This includes a large amount of industry surveys. Single-beam coverage around the UK is represented by SeaZone's DSB digital compilation of UKHO fair sheets. There is also good metadata associated with the above compilations.

Other Countries

Norway

The MAREANO programme has collected a number of multibeam datasets off northwest Norway. All these and other bathymetric data, including single-beam surveys are held by the Norwegian Hydrographic Service in Stavanger (see Figure 4). A request for details of bathymetric coverage and metadata has been made. There has been an acknowledgment and the request has been forwarded on.

Russia

Searches for data from Russian research cruises at the US NGDC (National Geophysical Data Center) reveal that very little bathymetric data has been submitted to their geophysical database. Cruise reports can be found through searches on the Internet describing recent activity in the seas around Europe of programmes such as the TTR (Training through Research), but these have not generally released any data. Contact has been attempted with the operators of marine research vessels from Russia and others using the EU's list of research vessels. Although several were contacted by email no replies have been received.

The following were contacted:

Russian Academy of Sciences

State Enterprise "Polar Marine Geosurvey Expedition"

Sevmorneftegeofizika

State Unitary Hydrographic Department of Ministry of transport of Russia

Other datasets

OLEX

OLEX is expanding its user base and now has small multibeam systems in operation. Its focus is not just on data collection, but the visualisation of the seabed and seabed textures are also major selling points, OLEX is not a scientific organisation nor a scientific data repository. The company has had many requests for use of its bathymetry database (which in places has a 5m resolution grid), however it is not part of its business plan to deliver its commercial content at high resolution to anyone. OLEX has however made available to some academic users (GEBCO and IBCAO) a lower-resolution extraction of its soundings database for academic use, though it does not do so on a regular basis.

Cable companies

The soundings data from communications cables surveys is a more difficult problem. This is mostly because almost all cables are consortium owned and or consortium operated, and permission is required from all parties before any data can be released. Such data requests are usually placed at the end of the agenda for cable consortia meetings, and frequently are not considered due to time constraints. However the International Cable Protection Committee has agreed to recommend to its members at its next meeting that survey data are routinely released for scientific use once any commercial-in-confidence restrictions have expired. On top of this, the actual data often reside with third-party survey companies, and they are not always willing to invest their staff time in retrieving information that may not be commercially beneficial. When permission for use is granted, it may be possible to retrieve data from some of the survey companies, but this may require personal visits with storage media etc.

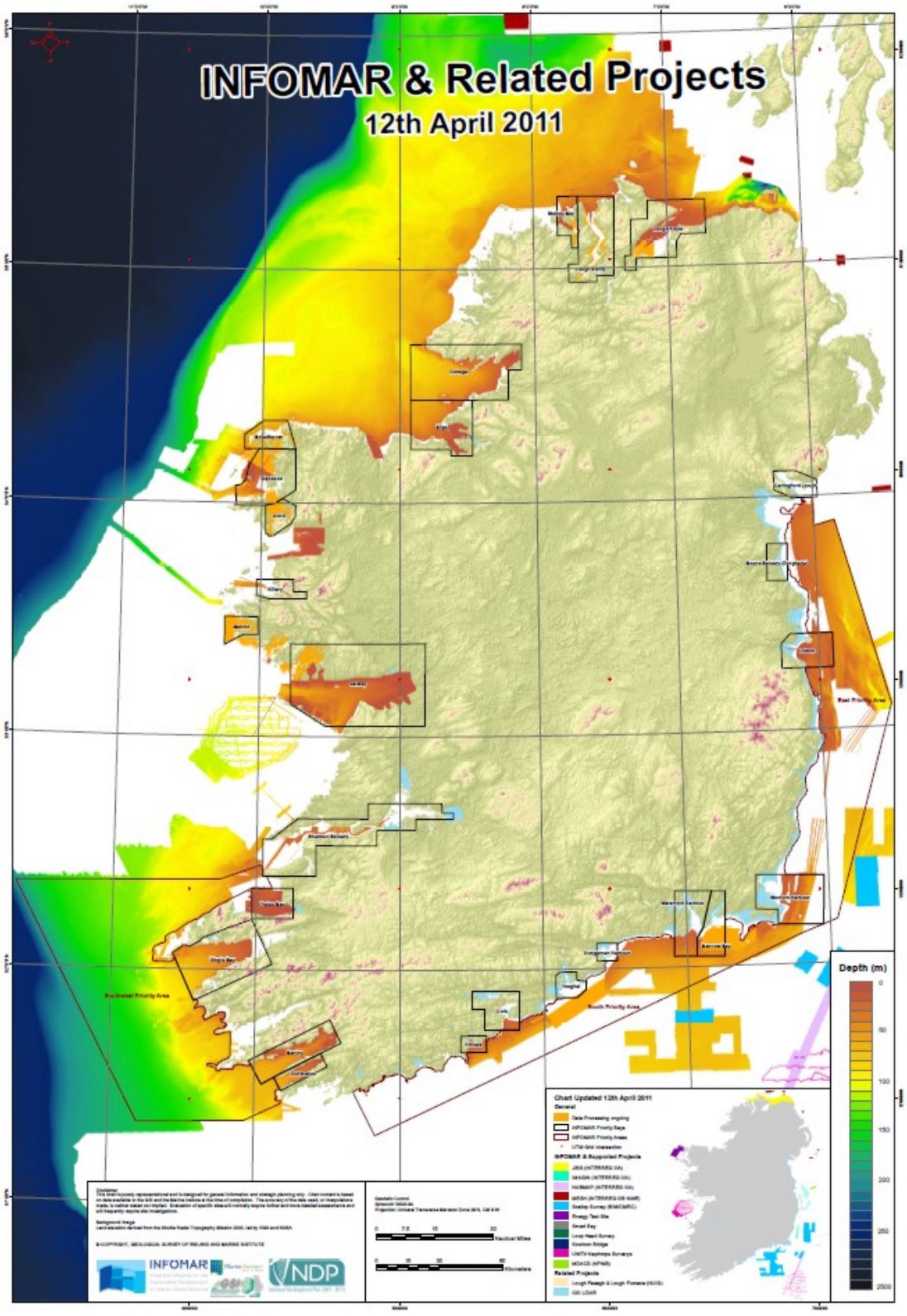


Image: Ireland, GSI's continually periodically updated coverage map.

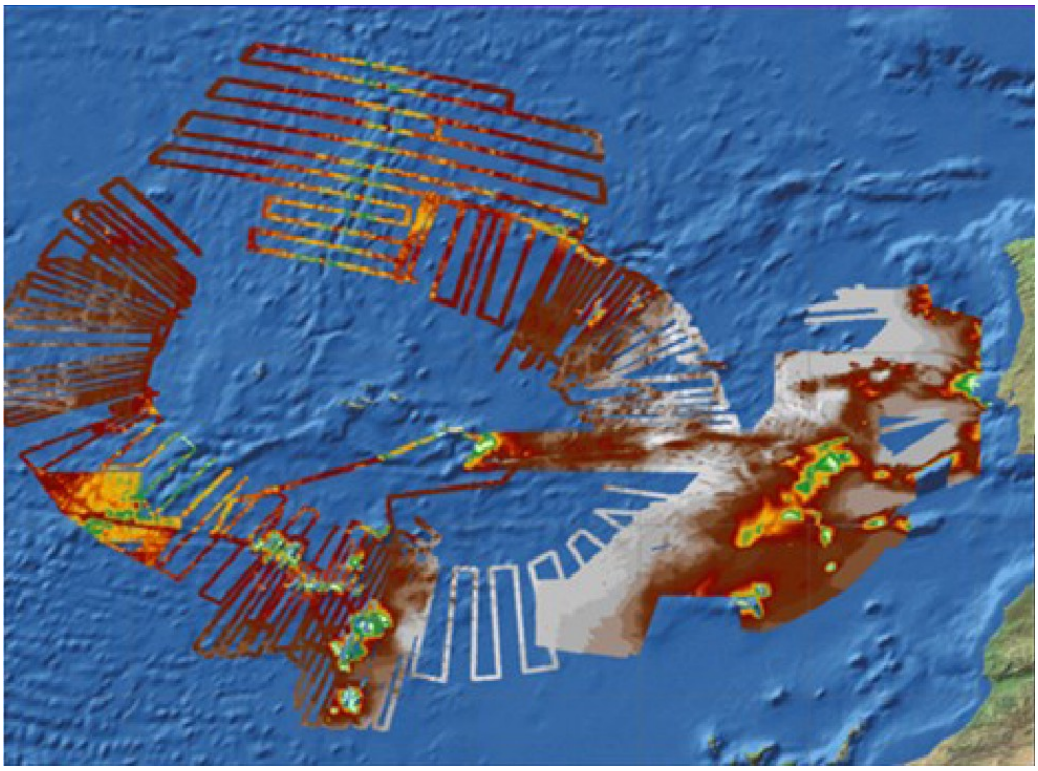


Image: Portugal UNCLOS multibeam coverage.

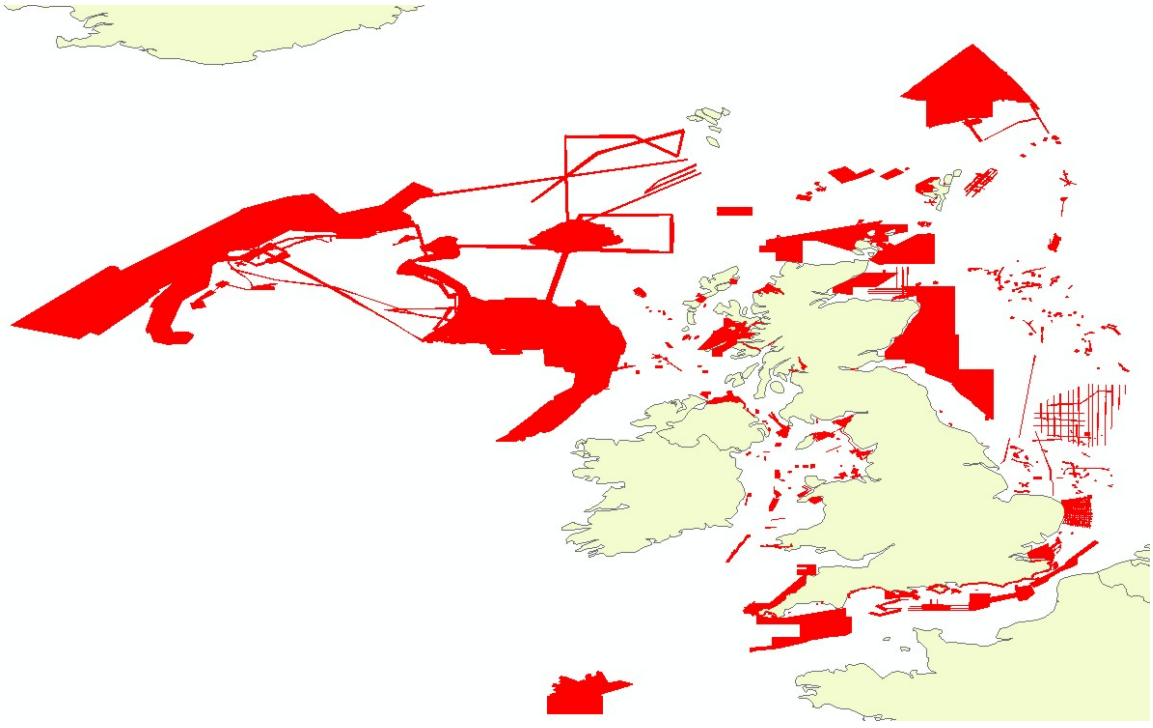


Image: United Kingdom multibeam coverage (red).

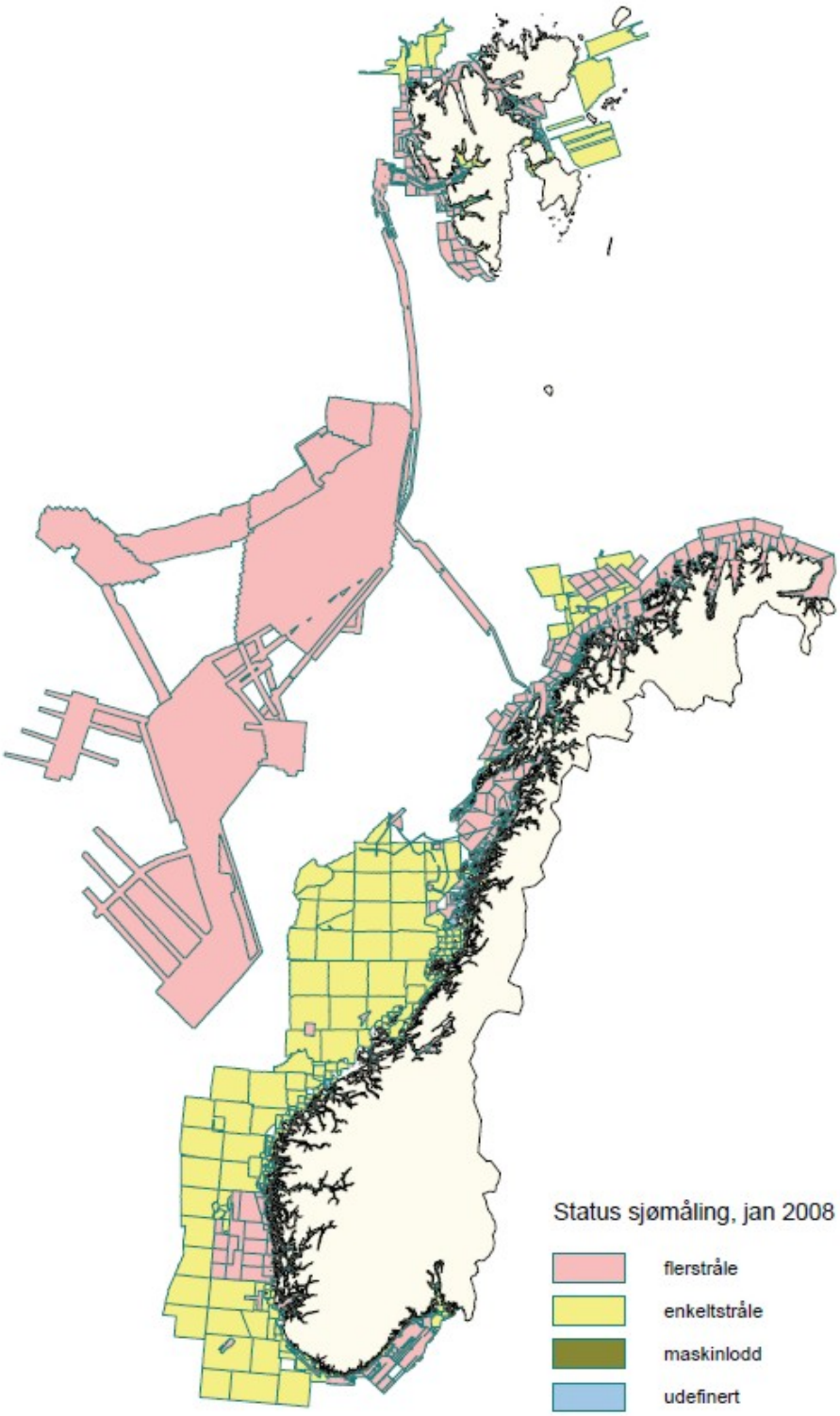


Image: Norway, multibeam (pink) and singlebeam (yellow) bathymetry coverage.

8. WP3.3: TECHNICAL DEVELOPMENT AND OPERATION OF PORTAL FOR MULTIBEAM DATA

The objectives of WP3.3 are:

- To develop and launch the EMODNET portal services for multibeam data;
- To demonstrate and to provide functionality for managing high resolution multi-beam and single beam survey data and seamlessly joining different surveys into one continous surface

In the reporting period no further activities have taken place for this WP. However for good understanding of the status, the conclusions from the first year report are repeated below.

As part of the EMODnet Hydrography Lot already very good progress has been made with the development of the Hydrography portal and its services. For WP3.3 especially the Hydrography data products viewing service is highly relevant. This is based on the SENS product line of partner ATLIS. The functionality has been so far restricted to the requirements for the EMODnet Hydrography Lot which is giving viewing, browsing and downloading services for the various hydrographic GIS data layers and providing traceability of used surveys through its connection with the CDI data discovery and access service.

For WP3.3 of the EMODnet Seabed Mapping project it has been proposed to integrate the specific multibeam and single beam portal into the same Hydrographic data products viewing service, powered by SENS. However this implicates adding additional functionalities, especially for retrieving individual surveys and analysis and processing tools for seamlessly joining different surveys.

Ultimately the SENS service will host the low resolution EMODnet bathymetry data products and associated metadata from this project (see WP2.1 and WP2.2) and from the EMODnet Hydrography project. Moreover it will host the high resolution multi-beam and single beam mapping data. In effect all bathymetry data will be integrated in the Oracle Spatial database.

The SENS product line is technically ready for this extension of functionality. Seamlessly joining different high resolution multi-beam and single beam surveys will be based on SENS Bathymetry. And SENS BathyWeb will provide extra functionality enabling viewing selecting and downloading bathymetric products from those managed survey data.

SENS Bathymetry is a thick client application for managing the individual surveys and one or more continuous de-conflicted surfaces in one system. Continuous surfaces can be generated for temporary use or can be stored and maintained in the bathymetric database. Construction of the continuous surface from individual surfaces, e.g. high resolution multi-beam or single beam surveys, is done using a rule based “cookie cutter” technique. The whole process is controlled by using configurable parameters for interpolation, gridding and filtering. SENS Bathymetry uses an optimized multi-level gridding technique for fast display generation while analysis and editing is performed on the high resolution data.

SENS BathyWeb is a scalable web-based solution for the distribution of bathymetric products (e.g. seafloor DTMs, contours and spotsoundings). It is based on a service oriented architecture providing OGC map services and product services and enabling the definition, ordering and download of products.

The extension for managing survey data sets themselves by data providers and turning these into seamless products will not be fully integrated into the same Hydrography data products viewing service interface, but a separate interface will be developed by ATLIS for this extra functionality. This interface will be included as extra service in the Hydrography website.

Also the Common Data Index (CDI) services will be integrated into the extra interface / service, whereby the new part will be considered as a connected data centre itself.

Note: SENS BathyWeb is based on modules used for the WAB*Info system of the Dutch Waterway Authorities and is further developed for the Norwegian Hydrographic Service (NHS). NHS will use SENS Bathymetry for managing the bathymetric data and building DTM's. SENS BathyWeb will be used by NHS for disseminating government bathymetric data to expert users outside NHS. The implementation is fully integrated in Digital Norway, the Norwegian Spatial Data Infrastructure and is fully INSPIRE compliant.

Concluding it can be stated that the technical modules are already available at partner ATLIS for deploying the extra functionality for managing and processing single beam and multibeam survey datasets and producing seamless products from these by an experienced operator. This deployment in practice is seen as developing an extra service and web interface which will be done in the coming months and be launched by M24 (June 2012). This will be done as a prototype development whereby also data providers will be asked to volonteer to contribute some multibeam surveys in the public domain as demonstrator input.

9. WP3.4: ESTIMATE OF COMPLETE COVERAGE

The objective of WP3.4 is:

- To assess the coverage of European seas by high resolution multibeam data

This activity is lead by partner NOCS, that already has wide experience with this kind of analysis activities. A major condition for this activity is of course provided by a successful implementation of the WP2.2 activity, that must provide a good overview of existing multibeam and single beam surveys which is beyond the already collected present CDI overview.

The surveyed parties will not provide full metadata to NOCS queries. So it is not feasible in the given time and budget frame to compile a complete catalogue of multibeam and single beam surveys in the required CDI metadata format. On the contrary, for most surveys only a limited set of metadata will be retrieved from parties, including the important geographical coverage, which most organizations can provide. To facilitate storage and display of the coverage information, an ArcGIS project has been created within NOCS. The information already available through the CDIs of the EMODnet Hydrography DTM are being incorporated and new coverages have been added. With respect to the existing surveys, the lists of coordinates attached to the XML files are used to create polygons or polylines and the metadata are used to provide attributes to the resulting shapefiles. A significant problem has been the large number of files that need to be converted. This is particularly evident with the French contribution.

Below one can find a table of "Statistics of Instrument / gear type types and Data holding centres derived from the EMODnet Hydrography Common Data Index (CDI)".

List: Statistics of Instrument / gear type types and Data holding centres derived from the EMODnet Hydrography Common Data Index (CDI).

The number in brackets after each name indicates the number of datasets held.

ALL DATA

SHOM (SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE) (6143)

IFREMER / IDM/SISMER (636)

IHPT, Hydrographic Institute (132)

Geological Survey of Ireland (63)

British Oceanographic Data Centre (47)

CNR, Istituto di Scienze Marine (Sezione di Bologna) (41)

Spanish Oceanographic Institute (35)

Hellenic Centre for Marine Research, Hellenic National Oceanographic Data Centre (HCMR/HNODC) (27)

NIOZ Royal Netherlands Institute for Sea Research (24)

Hydrographic Institute of the Navy (11)

OGS, National Institute of Oceanography and Experimental Geophysics, Department of Geophysics of the Lithosphere (5)

Ministry of the Environment and Rural and Marine Environs - General Secretariat of the Sea (5)

OGS, National Institute of Oceanography and Experimental Geophysics, Department of Oceanography (5)

Institute of Marine Sciences. Mediterranean Marine and Environmental Research Centre (CMIMA-ICM-CSIC). Department of Marine Geology (4)

OGS, National Institute of Oceanography and Experimental Geophysics, Department for the Development of Marine Technology and Research (4)

Marine Technology Unit. Mediterranean Marine and Environmental Research Centre (CMIMA-UTM-CSIC) (4)

Ministry of the Environment and Rural and Marine Environs / Secretary of State of Climatic Change / General Directorate of Sustainability of the Coast and the Sea (3)

Natural Environment Research Council (2)

Geological and miner Spanish Institute (IGME). Marine Geology Service (1)

Basque Country University. Department of Stratigraphy, Geodynamics and Paleontology (EHU) (1)

Institute of Marine Sciences. Mediterranean Marine and Environmental Research Centre (CMIMA-ICM-CSIC) (1)

LNEG - National Laboratory of Energy and Geology (1)

Geological and Miner Spanish Institute (IGME). Department Of Investigation And Futurology Geocientífic (1)

AZTI - Tecnalia, Headquarters Pasaia(Gipuzkoa) (1)

MULTIBEAM DATA

IFREMER / IDM/SISMER (577)

SHOM (SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE) (520)

Geological Survey of Ireland (42)

British Oceanographic Data Centre (31)

Hellenic Centre for Marine Research, Hellenic National Oceanographic Data Centre (HCMR/HNODC) (25)

IHPT, Hydrographic Institute (24)

NIOZ Royal Netherlands Institute for Sea Research (24)

CNR, Istituto di Scienze Marine (Sezione di Bologna) (23)

Spanish Oceanographic Institute (11)

Institute of Marine Sciences. Mediterranean Marine and Environmental Research Centre (CMIMA-ICM-CSIC). Department of Marine Geology (4)

OGS, National Institute of Oceanography and Experimental Geophysics, Department for the Development of Marine Technology and Research (4)

Marine Technology Unit. Mediterranean Marine and Environmental Research Centre (CMIMA-UTM-CSIC) (4)

Hydrographic Institute of the Navy (2)

Natural Environment Research Council (2)

AZTI - Tecnalia, Headquarters Pasaia(Gipuzkoa) (1)

Ministry of the Environment and Rural and Marine Environs - General Secretariat of the Sea (1)

LNEG - National Laboratory of Energy and Geology (1)

Institute of Marine Sciences. Mediterranean Marine and Environmental Research Centre (CMIMA-ICM-CSIC) (1)

Basque Country University. Department of Stratigraphy, Geodynamics and Paleontology (EHU) (1)

LIDAR DATA

Geological Survey of Ireland (24)

SINGLE-BEAM DATA

SHOM (SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE) (3952)

IHPT, Hydrographic Institute (107)

Spanish Oceanographic Institute (24)

CNR, Istituto di Scienze Marine (Sezione di Bologna) (18)

British Oceanographic Data Centre (16)

LEADLINE DATA

SHOM (SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE) (952)

UNKNOWN DATA

SHOM (SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE) (2429)

10. USER FEEDBACK

The EMODNet Hydrography website has a central contact form by which users can give feedback. Also a more prominent user feedback button has been made available which can be reached from every screen by means of a button on the side. When clicking, the response form slides over the existing screen.

Image: Feedback form as overlay of every screen page

All feedback provided by users is sent to the EMODnet Hydrography team for their evaluation. However not many people have given feedback. Once in a while feedback is received, mostly with technical questions about data formats. These are answered immediately which is appreciated.

Next to external users project team partners have been engaged in using and testing the portal and providing their feedback for improving the services. All services are also provided with a help function to explain the extensive functionality of the services and how to use these. Most functions are easy to understand but there are also more complex functions which requires some preparation by users reading the manual.

Statistics of usage are maintained for the EMODNet Hydrography portal and the CDI Data Discovery and Access Service, which are both hosted by MARIS and separately for the Hydrography Viewing Service, which is hosted by ATLIS. In the following more statistics will be given for the reporting period from 1 June 2011 till 30 November 2011.

User Statistics, registered for the EMODNet Hydrography website and CDI data discovery and access service, illustrate the effect of the promotional campaign that was started in June 2011. Since then the monthly number of users has increased from circa 300 users average per month to 500 users average per month. The number of pages visited by users is 20 - 30 which is a good measure that users really are experiencing the website and not immediately clicking away. The portal statistics are given in the table below.

Monthly history

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan 2011	293	422	5503	20644	392.74 MB
Feb 2011	305	523	7138	23349	748.67 MB
Mar 2011	428	756	10062	36132	1.38 GB
Apr 2011	343	509	4926	17939	352.32 MB
May 2011	369	585	7511	26912	367.10 MB
Jun 2011	580	1019	20090	60786	603.22 MB
Jul 2011	457	878	17018	39292	377.02 MB
Aug 2011	457	846	7640	21946	256.53 MB
Sep 2011	498	985	17015	43722	569.33 MB
Oct 2011	549	845	10676	33189	785.98 MB
Nov 2011	588	1014	15484	36022	1.95 GB
Dec 2011	146	191	1756	4922	57.08 MB
Total	5013	8573	124819	364855	7.74 GB

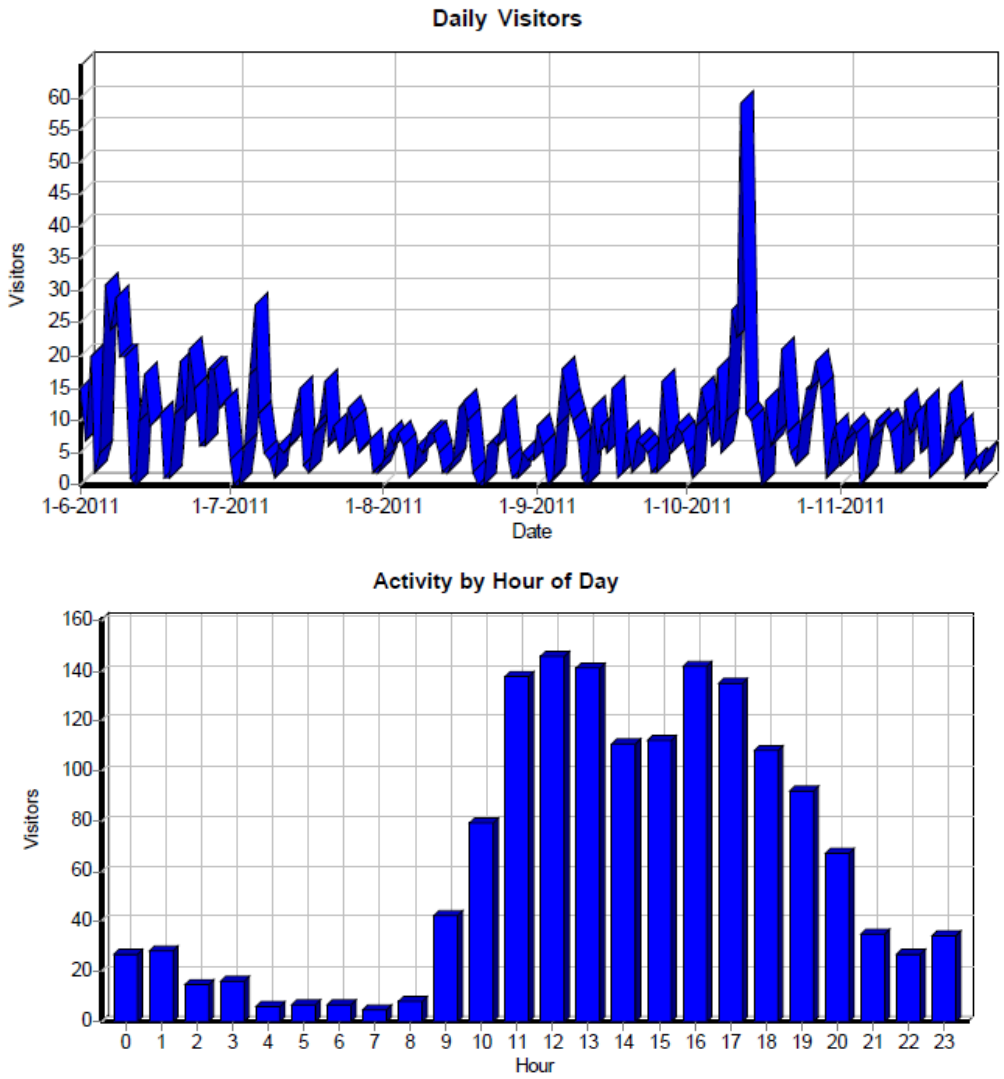
Table: user statistics for the EMODNet Hydrography portal site

Furthermore statistics are gathered for the use of the **Hydrography Viewing Service** for users visiting the digital bathymetry and downloading the bathymetry in tiles. This is illustrated with several more detailed tables and graphics.

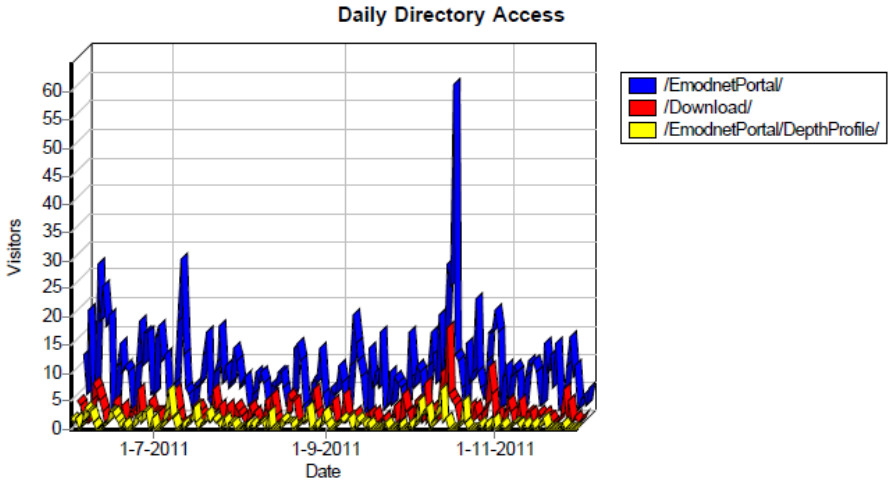
Activity by Month

Month	Hits	Page Views	Visitors	Bandwidth (KB)
Jun 2011	1,814	982	382	64,454,900
Jul 2011	1,152	474	228	38,558,064
Aug 2011	808	330	162	15,368,350
Sep 2011	824	302	200	13,933,310
Oct 2011	1,589	640	370	36,575,965
Nov 2011	848	291	186	13,351,510
Total	7,035	3,019	1,528	182,242,101

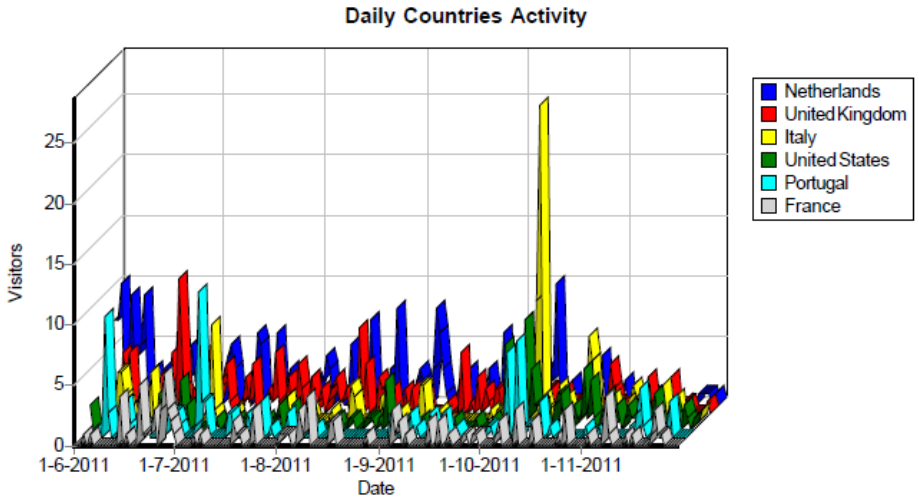
Table: user statistics for the EMODNet Hydrography Viewing Service



Graphics: statistics of visitors per day and over hours per day for the EMODNet Hydrography Viewing Service

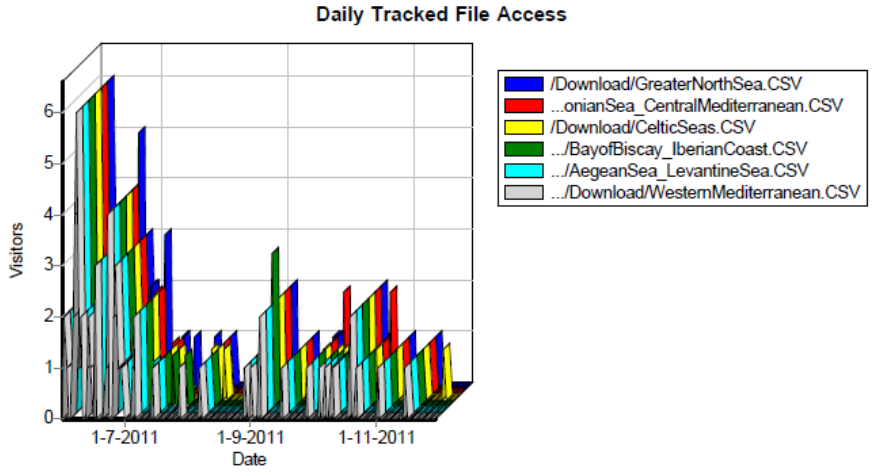


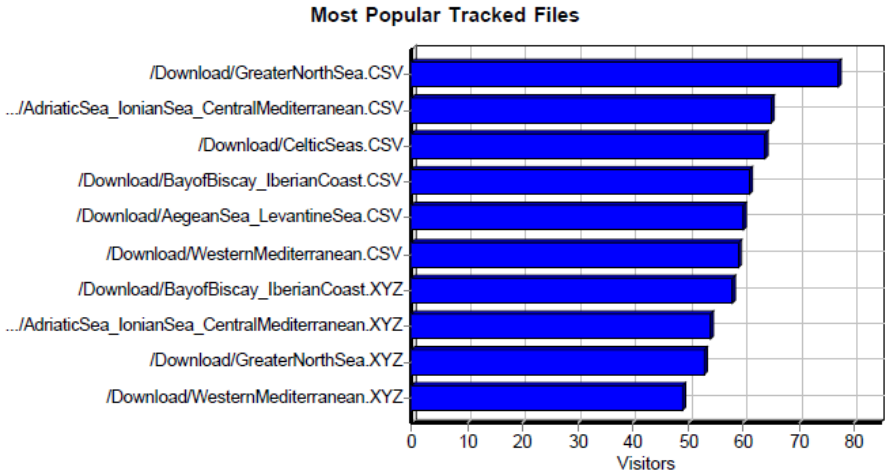
Graphics: statistics of visitors per day for the EMODNet Hydrography Viewing Service and the subdirectories for retrieving depth sections and downloading of DTM tiles



Graphics: statistics of visitors per country for the EMODNet Hydrography Viewing Service

Also more detail can be given of the downloading activity by users and which DTM tiles they are downloading





Graphics: statistics of downloading by users of the DTM tiles

Most Popular Tracked Files

	File	Hits	Visitors	Bandwidth (KB)
1	http://portal.emodnet-hydrography.eu/Download/GreaterNorthSea.CSV	175	77	15,769,988
2	http://portal.emodnet-hydrography.eu/Download/AdriaticSea_IonianSea_CentralMediterranean.CSV	154	65	16,392,785
3	http://portal.emodnet-hydrography.eu/Download/CelticSeas.CSV	142	64	38,414,294
4	http://portal.emodnet-hydrography.eu/Download/BayofBiscay_IberianCoast.CSV	178	61	21,408,047
5	http://portal.emodnet-hydrography.eu/Download/AegeanSea_LevantineSea.CSV	139	60	10,983,449
6	http://portal.emodnet-hydrography.eu/Download/WesternMediterranean.CSV	138	59	7,802,568
7	http://portal.emodnet-hydrography.eu/Download/BayofBiscay_IberianCoast.XYZ	116	58	6,471,772
8	http://portal.emodnet-hydrography.eu/Download/AdriaticSea_IonianSea_CentralMediterranean.XYZ	105	54	4,014,002
9	http://portal.emodnet-hydrography.eu/Download/GreaterNorthSea.XYZ	102	53	4,593,698
10	http://portal.emodnet-hydrography.eu/Download/WesternMediterranean.XYZ	97	49	2,400,710
11	http://portal.emodnet-hydrography.eu/Download/AegeanSea_LevantineSea.XYZ	106	49	3,514,174
12	http://portal.emodnet-hydrography.eu/Download/CelticSeas.XYZ	90	47	10,363,895
13	http://portal.emodnet-hydrography.eu/Download/GreaterNorthSea.GEOTIFF	38	27	439,024
14	http://portal.emodnet-hydrography.eu/Download/GreaterNorthSea.SD	38	27	613,306
15	http://portal.emodnet-hydrography.eu/Download/CelticSeas.NETCDF	41	26	8,102,972
16	http://portal.emodnet-hydrography.eu/Download/GreaterNorthSea.NETCDF	41	25	2,577,591
17	http://portal.emodnet-hydrography.eu/Download/AdriaticSea_IonianSea_CentralMediterranean.GEOTIFF	39	24	783,171
18	http://portal.emodnet-hydrography.eu/Download/WesternMediterranean.GEOTIFF	36	24	364,096
19	http://portal.emodnet-hydrography.eu/Download/BayofBiscay_IberianCoast.NETCDF	40	24	2,604,211
20	http://portal.emodnet-hydrography.eu/Download/CelticSeas.GEOTIFF	36	24	1,606,919
21	http://portal.emodnet-hydrography.eu/Download/AdriaticSea_IonianSea_CentralMediterranean.SD	33	22	759,368
22	http://portal.emodnet-hydrography.eu/Download/BayofBiscay_IberianCoast.GEOTIFF	33	21	729,678
23	http://portal.emodnet-hydrography.eu/Download/WesternMediterranean.NETCDF	36	21	1,155,588
24	http://portal.emodnet-hydrography.eu/Download/BayofBiscay_IberianCoast.SD	31	21	832,981
25	http://portal.emodnet-hydrography.eu/Download/AegeanSea_LevantineSea.NETCDF	34	20	1,537,694
26	http://portal.emodnet-hydrography.eu/Download/WesternMediterranean.SD	29	20	335,595
27	http://portal.emodnet-hydrography.eu/Download/AegeanSea_LevantineSea.SD	27	19	501,946
28	http://portal.emodnet-hydrography.eu/Download/CelticSeas.SD	31	19	1,909,520
29	http://portal.emodnet-hydrography.eu/Download/AdriaticSea_IonianSea_CentralMediterranean.NETCDF	34	19	2,051,741
30	http://portal.emodnet-hydrography.eu/Download/AegeanSea_LevantineSea.GEOTIFF	29	18	475,944
	Total	**2,168**	**N/A**	**169,510,740**

Table: statistics of downloading by users of the DTM tiles, including format types

From this table it appears that in total 2168 DTM files have been downloaded over the 6 months of reporting period. The CSV formated files are most popular. Considering the areas of interest, there is a no real preference.

11. PLANNED ACTIVITIES NEXT 6 MONTHS

For the next 6 months (M19 - M24) a number of activities are planned which are summarized below:

- Gather more data sets (surveys and composite data sets)
- Gather more metadata of both surveys and composite data sets
- Finetune the QA/QC methodology following the results of a pilot test
- Intensify cooperation with GEBCO
- Implement the EMODNet data product catalogue service and populate it with metadata of the composite DTMs and EMODNet DTM
- Integrate the EMODNet data product catalogue service into the EMODNet Hydrography Viewing Service and into the CDI Data Discovery and Access Service
- Improve the NetCDF (CF) output format for downloading DTM tiles
- Produce a new release of the regional DTM's and central EMODnet DTM in June 2012
- Undertake more promotional activities
- Collect user feedback
- Follow and harvest from the SeaDataNet NetCDF (CF) format developments
- Continue the identification and gathering of additional single beam and multibeam surveys from other organisations such as the private sector
- Develop a prototype for the extra service and interface for managing and processing single beam and multibeam survey data and for producing and delivering seamless products

12. REFERENCES:

- Documentation: 5.00; Common Data Index (CDI); Version 1.6; Metadata Format; 10 June 2010 with XML Schema, XLS description of all XML tags and XML examples (see http://www.seadatanet.org/standards_software)
- Guidelines for metadata, data and DTM QA/QC, Version 1.4, April 2010, produced by IFREMER, SHOM, NOC and ATLIS for EMODNET Hydrography
- Wessel,P. and Smith, W.H.F. (1996), 'A global self-consistent, hierarchical, high-resolution shoreline database', Journal of Geophysical Research, Vol.101, No B4, p8741-8743, April 10, 1996
- The General Bathymetric Chart of the Oceans (GEBCO) (see http://www.gebco.net)
- 1st Interim Report for the period June 2009 – May 2010, Version 1.0, Service Contract No. "MARE/2008/03 - Lot 1 Hydrography – SI2.531515"
- 2nd Interim Report for the period June 2010 – November 2010, Version 2.0, Service Contract No. "MARE/2008/03 - Lot 1 Hydrography – SI2.531515"
- 1st Interim Report for the period June 2010 – May 2011, Version 1.0, Service Contract No. "MARE/2009/07 - Lot Seabed Mapping – "SI2.563144"

ANNEX 1: Detailed Inventory of all gathered and used survey data sets for Seabed Mapping Lot regions

Status November 2011

All these surveys are already available as metadata records in the CDI data discovery and access service at the EMODnet Hydrography portal.
Note: Further work is ongoing for the metadata records for the used composite DTMs.

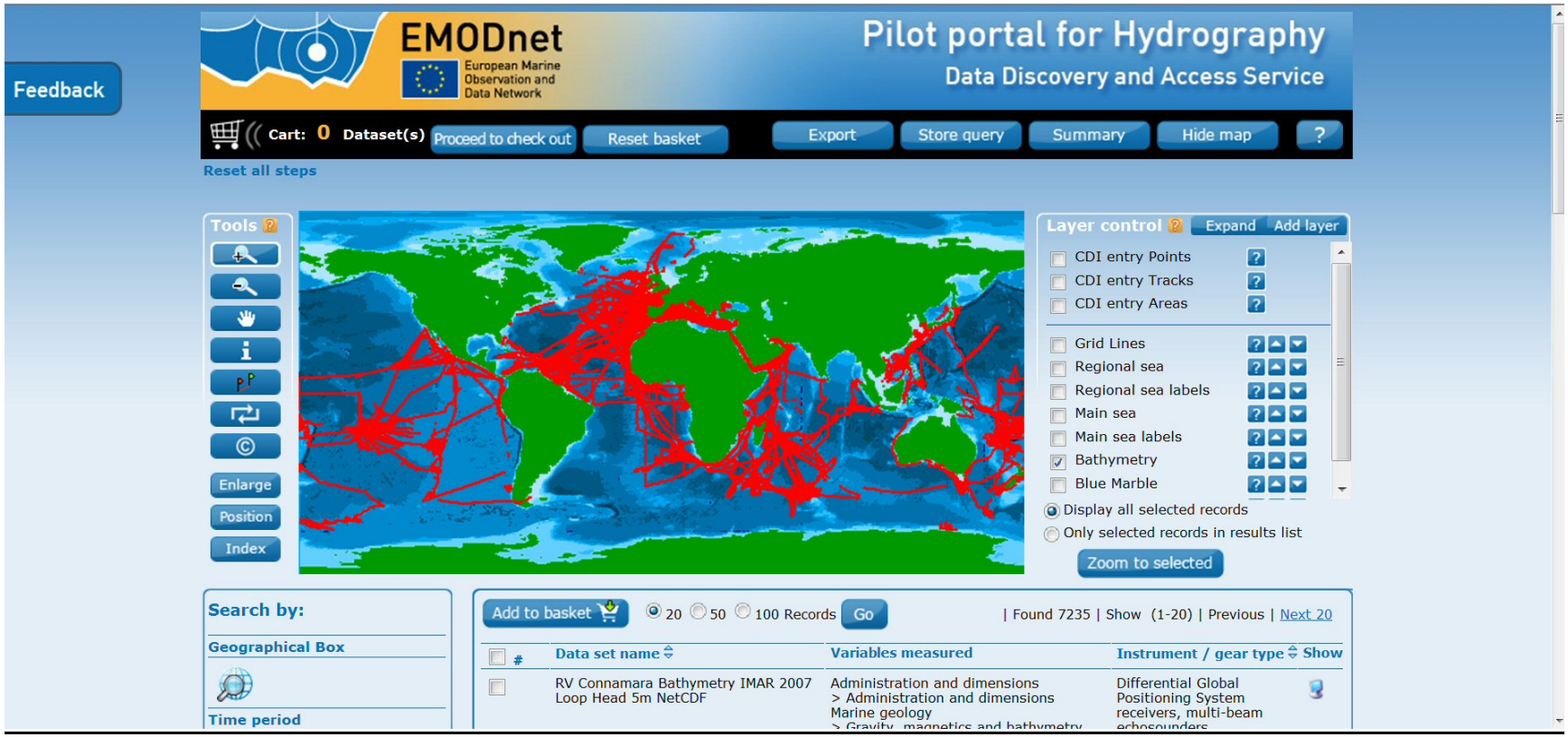


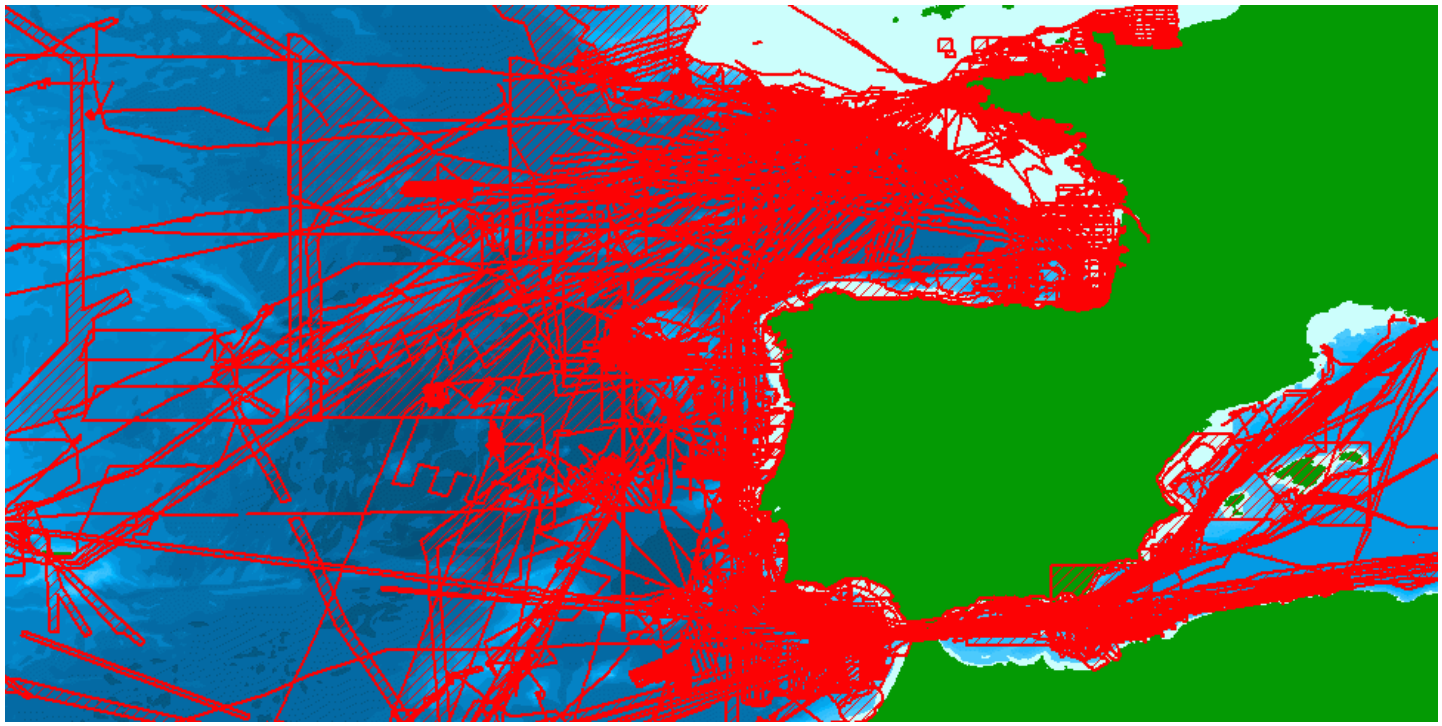
Image: Data Access at http://www.emodnet-hydrography.eu

Atlantic Ocean - Iberian coast and Bay of Biscay

The data gathering for this region is coordinated by IFREMER with support of MARIS. Survey data sets have been gathered from IFREMER (France), SHOM (France), IEO (Spain), IHPT (Portugal), LNEG (Portugal), NIOZ (Netherlands) and UTM-CSIC (Spain).

The following tables and images give the necessary details.

- **IFREMER - France**



Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
8414	France	19770912	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8417	France	19780701	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8427	France	19790318	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8428	France	19790627	Bathymetry and Elevation	Navy Navigation Satellite System receivers, Pulse8 receivers, multi-beam echosounders
8429	France	19790704	Bathymetry and Elevation	Navy Navigation Satellite System receivers, Pulse8 receivers, multi-beam echosounders
8430	France	19791001	Bathymetry and Elevation	Navy Navigation Satellite System receivers, Omega receivers, multi-beam echosounders
8431	France	19791020	Bathymetry and Elevation	Navy Navigation Satellite System receivers, Omega receivers, multi-beam echosounders
8435	France	19800224	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8455	France	19810808	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8457	France	19810925	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8460	France	19820122	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8461	France	19811221	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8462	France	19820109	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8468	France	19820522	Bathymetry and Elevation	Navy Navigation Satellite System receivers, Système leger de measure de distance receivers, multi-beam echosounders

8469	France	19820613	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8475	France	19830621	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8477	France	19830613	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8478	France	19830728	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8479	France	19830929	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8481	France	19831019	Bathymetry and Elevation	Navy Navigation Satellite System receivers, Système leger de measure de distance receivers, multi-beam echosounders
8482	France	19831024	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8543	France	19870718	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8544	France	19871030	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8551	France	19880611	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8554	France	19880323	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8556	France	19880803	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8557	France	19880817	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam

				echosounders
8558	France	19880915	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8559	France	19880929	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8566	France	19890301	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8567	France	19890401	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8568	France	19890612	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
8569	France	19890615	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
8571	France	19891015	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
8572	France	19891020	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
11800	France	19901102	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
11802	France	19901201	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
11828	France	19920725	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
11923	France	19920805	Bathymetry and Elevation	Long Range Navigation version C receivers, NAVSTAR Global Positioning System receivers, multi-beam echosounders
23098	France	19950406	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam

				echosounders
23408	France	19950609	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
23418	France	19950622	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
30464	France	19921005	Bathymetry and Elevation	Long Range Navigation version C receivers, NAVSTAR Global Positioning System receivers, multi-beam echosounders
30777	France	19911209	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
35491	France	19970613	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
37435	France	19970518	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
37436	France	19970518	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
42373	France	19980625	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
45695	France	19980613	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
60754	France	19911026	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
60759	France	19920926	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
60762	France	19921030	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
61493	France	20010809	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
61832	France	20010610	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders

61834	France	20010612	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
61835	France	20010615	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
61837	France	20010617	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
65014	France	20000607	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR Global Positioning System receivers, multi-beam echosounders
65313	France	20010203	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
65336	France	20010927	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR Global Positioning System receivers, multi-beam echosounders
65593	France	20020309	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
65595	France	20020311	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
65693	France	20020606	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
65695	France	20020608	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
66072	France	20020518	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
66492	France	20010915	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
68192	France	20000605	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
68252	France	19980614	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
70172	France	20020829	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam

				echosounders
72977	France	20030227	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
73053	France	20021202	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR Global Positioning System receivers, multi-beam echosounders
73152	France	20010821	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
78912	France	20030713	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
85600	France	20030703	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
85601	France	20030703	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
87759	France	19950611	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR Global Positioning System receivers, Système leger de measure de distance receivers, multi-beam echosounders
87765	France	20030807	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
87788	France	20030718	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
87789	France	20030723	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
95658	France	20040828	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR Global Positioning System receivers, multi-beam echosounders
95707	France	20040731	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
96528	France	20050408	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR Global Positioning System receivers, multi-beam echosounders
97848	France	20040928	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR

				Global Positioning System receivers, multi-beam echosounders
99102	France	20050721	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
99163	France	20051020	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
105310	France	20060719	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
109193	France	20070701	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR Global Positioning System receivers, multi-beam echosounders
109993	France	20000512	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
110287	France	19930218	Bathymetry and Elevation	Differential Global Positioning System receivers, Système leger de measure de distance receivers, multi-beam echosounders
111163	France	19980810	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
117172	France	20080408	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
117267	France	20080520	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
117268	France	20080520	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
118544	France	20080807	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
130296	France	20090510	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
130297	France	20090510	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135784	France	20090701	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders

135785	France	20090708	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135787	France	20090626	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135789	France	20090627	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135790	France	20090627	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135791	France	20090628	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135793	France	20090628	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135794	France	20090629	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135797	France	20090629	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135798	France	20090630	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135799	France	20090702	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135800	France	20090702	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
135801	France	20090701	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
141604	France	19950529	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR Global Positioning System receivers, Système leger de measure de distance receivers, multi-beam echosounders
141642	France	20090919	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders

141644	France	20090919	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142015	France	20090523	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142017	France	20090523	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142018	France	20090603	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142019	France	20090604	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142020	France	20090605	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142021	France	20090606	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142022	France	20090609	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142023	France	20090610	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142024	France	20090611	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142025	France	20090620	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142033	France	20090612	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142711	France	20091209	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142931	France	20091014	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142932	France	20091014	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam

				echosounders
142933	France	20091018	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142934	France	20091020	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142935	France	20091022	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142936	France	20091023	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142937	France	20091024	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142938	France	20091025	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142939	France	20091026	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
142940	France	20091027	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
144059	France	20090728	Bathymetry and Elevation	multi-beam echosounders
144060	France	20090728	Bathymetry and Elevation	multi-beam echosounders
144385	France	20091031	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
146145	France	19991130	Bathymetry and Elevation	
146245	France	20100621	Bathymetry and Elevation	
146302	France	20100531	Bathymetry and Elevation	
146314	France	19991130	Bathymetry and Elevation	
156205	France	20100706	Bathymetry and Elevation	
156208	France	20100706	Bathymetry and Elevation	

156209	France	20100714	Bathymetry and Elevation
156210	France	20100719	Bathymetry and Elevation
156211	France	20100723	Bathymetry and Elevation
156212	France	20100728	Bathymetry and Elevation
156213	France	20100729	Bathymetry and Elevation
156214	France	20100730	Bathymetry and Elevation
156215	France	20100801	Bathymetry and Elevation
156216	France	20100804	Bathymetry and Elevation
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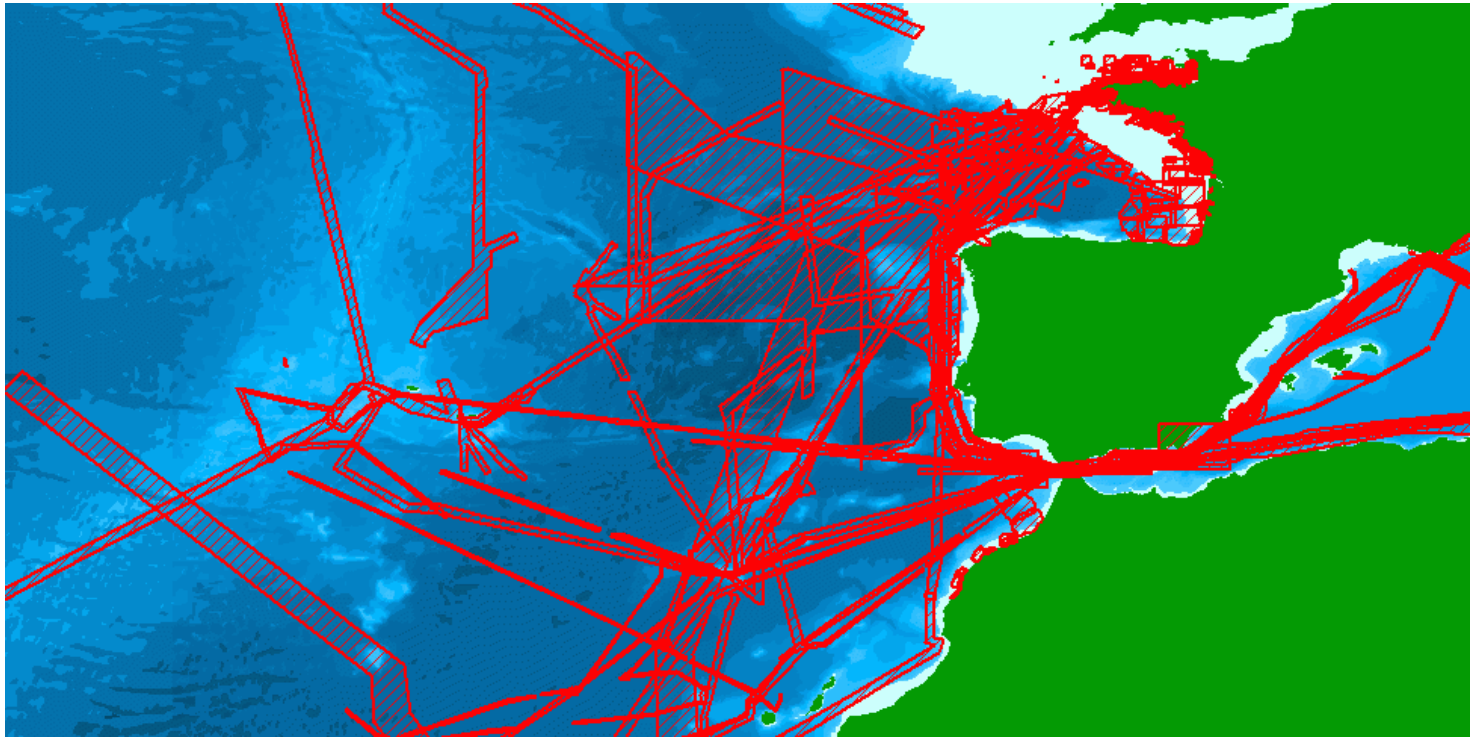
160615	France	20100711	Bathymetry and Elevation
160616	France	20100711	Bathymetry and Elevation
160628	France	20100712	Bathymetry and Elevation
160630	France	20100715	Bathymetry and Elevation
161452	France	20101018	Bathymetry and Elevation
161455	France	20101023	Bathymetry and Elevation
161460	France	20101110	Bathymetry and Elevation

- **SHOM (SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE) - France**



Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
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540-S181600100-003	France	18160101	Bathymetry and Elevation	plummets
540-S181600100-004	France	18160101	Bathymetry and Elevation	plummets

540-S181600100-005	France	18160101	Bathymetry and Elevation	plummets
540-S181600100-006	France	18160101	Bathymetry and Elevation	plummets
540-S181800100-001	France	18160101	Bathymetry and Elevation	plummets
540-S181800100-002	France	18160101	Bathymetry and Elevation	plummets
540-S181800200-5	France	18180101	Bathymetry and Elevation	unknown
540-S181800200-6	France	18180101	Bathymetry and Elevation	unknown
540-S181800300-001	France	18180101	Bathymetry and Elevation	plummets
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540-S181800300-003	France	18180101	Bathymetry and Elevation	plummets
540-S181800300-004	France	18180101	Bathymetry and Elevation	plummets
540-S181800300-005	France	18180101	Bathymetry and Elevation	plummets
540-S181800300-006	France	18180101	Bathymetry and Elevation	plummets
540-S181800300-007	France	18180101	Bathymetry and Elevation	plummets
540-S181800300-008	France	18180101	Bathymetry and Elevation	plummets
540-S181800300-009	France	18180101	Bathymetry and Elevation	plummets
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540-S181800300-011	France	18180101	Bathymetry and Elevation	plummets
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540-S181800400-001	France	18180101	Bathymetry and Elevation	plummets
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540-S181800400-003	France	18180101	Bathymetry and Elevation	plummets
540-S181800400-004	France	18180101	Bathymetry and Elevation	plummets
540-S181800400-005	France	18180101	Bathymetry and Elevation	plummets
540-S181900100-001	France	18190101	Bathymetry and Elevation	plummets

540-S181900100-002	France	18190101	Bathymetry and Elevation	plummets
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540-S181900100-004	France	18190101	Bathymetry and Elevation	plummets
540-S181900100-005	France	18190101	Bathymetry and Elevation	plummets
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540-S181900200-004	France	18190101	Bathymetry and Elevation	plummets
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540-S182000100-1	France	18200101	Bathymetry and Elevation	plummets
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540-S182000100-5	France	18200101	Bathymetry and Elevation	plummets
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540-S182000100-7	France	18200101	Bathymetry and Elevation	plummets
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540-S182000200-007	France	18200101	Bathymetry and Elevation	plummets
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540-S182100200-002	France	18210101	Bathymetry and Elevation	plummets

540-S182100200-003	France	18210101	Bathymetry and Elevation	plummets
540-S182100200-004	France	18210101	Bathymetry and Elevation	plummets
540-S182100200-005	France	18210101	Bathymetry and Elevation	plummets
540-S182100200-006	France	18210101	Bathymetry and Elevation	plummets
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540-S182100200-008	France	18210101	Bathymetry and Elevation	plummets
540-S182600100-061	France	18260101	Bathymetry and Elevation	plummets
540-S182600100-062	France	18260101	Bathymetry and Elevation	plummets
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540-S182900100-001	France	18290101	Bathymetry and Elevation	plummets
540-S182900200-001	France	18290101	Bathymetry and Elevation	plummets
540-S183000100-001	France	18300101	Bathymetry and Elevation	plummets
540-S183100100-1	France	18300101	Bathymetry and Elevation	plummets
540-S183700100-1	France	18370101	Bathymetry and Elevation	plummets
540-S183700100-2	France	18370101	Bathymetry and Elevation	plummets
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540-S183700200-10	France	18370101	Bathymetry and Elevation	unknown

540-S183700300-001	France	18370101	Bathymetry and Elevation	plummets
540-S183700400-001	France	18370101	Bathymetry and Elevation	plummets
540-S183800100-18	France	18380101	Bathymetry and Elevation	unknown
540-S183800100-19	France	18380101	Bathymetry and Elevation	unknown
540-S183800100-4	France	18380101	Bathymetry and Elevation	unknown
540-S183800100-5	France	18380101	Bathymetry and Elevation	unknown
540-S186500100-7	France	18650101	Bathymetry and Elevation	unknown
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540-S187300100-001	France	18730101	Bathymetry and Elevation	plummets
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540-S187700100-002	France	18770101	Bathymetry and Elevation	plummets
540-S187700100-003	France	18770101	Bathymetry and Elevation	plummets
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540-S188100100-003	France	18810101	Bathymetry and Elevation	plummets
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540-S188900100-002	France	18880101	Bathymetry and Elevation	plummets
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540-S188900100-004	France	18880101	Bathymetry and Elevation	plummets
540-S188900100-005	France	18880101	Bathymetry and Elevation	plummets
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540-S188900100-011	France	18880101	Bathymetry and Elevation	plummets
540-S188900100-012	France	18880101	Bathymetry and Elevation	plummets
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540-S189300100-002	France	18930101	Bathymetry and Elevation	plummets
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540-S189300100-009	France	18930101	Bathymetry and Elevation	plummets
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540-S189300100-011	France	18930101	Bathymetry and Elevation	plummets
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540-S189600300-001	France	18960101	Bathymetry and Elevation	plummets
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540-S189700100-010	France	18970101	Bathymetry and Elevation	plummets
540-S189800100-51	France	18960901	Bathymetry and Elevation	plummets
540-S189800100-52	France	18960901	Bathymetry and Elevation	plummets
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540-S189900200-11	France	19001231	Bathymetry and Elevation	unknown
540-S189900200-12	France	18990101	Bathymetry and Elevation	unknown
540-S189900200-13	France	19001231	Bathymetry and Elevation	unknown
540-S189900200-4	France	19001231	Bathymetry and Elevation	unknown
540-S189900200-5	France	18990101	Bathymetry and Elevation	unknown
540-S189900200-6	France	19001231	Bathymetry and Elevation	unknown
540-S189900200-7	France	18981231	Bathymetry and Elevation	unknown
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540-S190000100-007	France	19000101	Bathymetry and Elevation	plummets
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540-S190000100-015	France	19000101	Bathymetry and Elevation	plummets
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540-S190300100-005	France	19031231	Bathymetry and Elevation	plummets
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540-S190300200-002	France	19030101	Bathymetry and Elevation	plummets
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540-S190300200-006	France	19030101	Bathymetry and Elevation	plummets
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540-S190300200-008	France	19030101	Bathymetry and Elevation	plummets
540-S190400100-4	France	19040101	Bathymetry and Elevation	unknown
540-S190400100-5	France	19040101	Bathymetry and Elevation	unknown
540-S190400100-6	France	19040101	Bathymetry and Elevation	unknown
540-S190400100-7	France	19040101	Bathymetry and Elevation	unknown
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540-S190400200-002	France	19040101	Bathymetry and Elevation	plummets
540-S190400200-003	France	19040101	Bathymetry and Elevation	plummets
540-S190400200-004	France	19040101	Bathymetry and Elevation	plummets
540-S190400200-005	France	19040101	Bathymetry and Elevation	plummets
540-S190400200-006	France	19040101	Bathymetry and Elevation	plummets
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540-S190500200-002	France	19050101	Bathymetry and Elevation	plummets
540-S190500200-003	France	19050101	Bathymetry and Elevation	plummets
540-S190500200-004	France	19050101	Bathymetry and Elevation	plummets
540-S190500200-005	France	19050101	Bathymetry and Elevation	plummets
540-S190500200-006	France	19050101	Bathymetry and Elevation	plummets
540-S190500200-007	France	19050101	Bathymetry and Elevation	plummets
540-S190500200-008	France	19050101	Bathymetry and Elevation	plummets
540-S190500200-009	France	19050101	Bathymetry and Elevation	plummets

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540-S190600100-003	France	19060101	Bathymetry and Elevation	plummets
540-S190600100-004	France	19060101	Bathymetry and Elevation	plummets
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540-S190600100-006	France	19060101	Bathymetry and Elevation	plummets
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540-S190600100-010	France	19060101	Bathymetry and Elevation	plummets
540-S190800100-12	France	19080101	Bathymetry and Elevation	unknown
540-S190800100-13	France	19080101	Bathymetry and Elevation	unknown
540-S190800100-15	France	19080101	Bathymetry and Elevation	unknown
540-S190800200-001	France	19060101	Bathymetry and Elevation	plummets, unknown
540-S190800200-002	France	19060101	Bathymetry and Elevation	plummets, unknown
540-S190800200-7	France	19080131	Bathymetry and Elevation	plummets, unknown
540-S190800200-8	France	19080131	Bathymetry and Elevation	plummets, unknown
540-S190800200-81	France	19080131	Bathymetry and Elevation	plummets, unknown
540-S190800300-001	France	19080101	Bathymetry and Elevation	plummets
540-S190800300-002	France	19080101	Bathymetry and Elevation	plummets
540-S190800300-003	France	19080101	Bathymetry and Elevation	plummets
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540-S190800300-005	France	19080101	Bathymetry and Elevation	plummets
540-S190800300-006	France	19080101	Bathymetry and Elevation	plummets

540-S191000100-001	France	19100101	Bathymetry and Elevation	plummets
540-S191000100-002	France	19100101	Bathymetry and Elevation	plummets
540-S191000100-003	France	19100101	Bathymetry and Elevation	plummets
540-S191000100-004	France	19100101	Bathymetry and Elevation	plummets
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540-S191000200-002	France	19100101	Bathymetry and Elevation	plummets
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540-S191700100-001	France	19170101	Bathymetry and Elevation	plummets
540-S192000100-1	France	19200101	Bathymetry and Elevation	unknown
540-S192200200-001	France	19221001	Bathymetry and Elevation	plummets
540-S192300100-001	France	19230101	Bathymetry and Elevation	plummets
540-S192300100-002	France	19230101	Bathymetry and Elevation	plummets
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540-S192300100-011	France	19230101	Bathymetry and Elevation	plummets
540-S192300100-29	France	19230101	Bathymetry and Elevation	plummets
540-S192300100-31	France	19230101	Bathymetry and Elevation	plummets
540-S192300100-32	France	19230101	Bathymetry and Elevation	plummets

540-S192300100-37	France	19230101	Bathymetry and Elevation	plummets
540-S192300100-38	France	19230101	Bathymetry and Elevation	plummets
540-S192300200-001	France	19230101	Bathymetry and Elevation	plummets
540-S192300200-002	France	19230101	Bathymetry and Elevation	plummets
540-S192300200-003	France	19230101	Bathymetry and Elevation	plummets
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540-S192400100-001	France	19240101	Bathymetry and Elevation	plummets
540-S192400100-002	France	19240101	Bathymetry and Elevation	plummets
540-S192400100-003	France	19240101	Bathymetry and Elevation	plummets
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540-S192400100-005	France	19240101	Bathymetry and Elevation	plummets
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540-S192400100-012	France	19240101	Bathymetry and Elevation	plummets
540-S192400100-37	France	19240101	Bathymetry and Elevation	plummets
540-S192400100-38	France	19240101	Bathymetry and Elevation	plummets
540-S192400100-40	France	19240101	Bathymetry and Elevation	plummets
540-S192400100-41	France	19240101	Bathymetry and Elevation	plummets
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540-S192400200-001	France	19240101	Bathymetry and Elevation	plummets

540-S192400300-001	France	19240101	Bathymetry and Elevation	plummets
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540-S192400300-003	France	19240101	Bathymetry and Elevation	plummets
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540-S192500100-002	France	19250101	Bathymetry and Elevation	plummets
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540-S192600200-007	France	19260101	Bathymetry and Elevation	plummets
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540-S192600300-005	France	19260101	Bathymetry and Elevation	plummets
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540-S192800100-8	France	19281231	Bathymetry and Elevation	unknown
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540-S192800200-005	France	19280101	Bathymetry and Elevation	plummets
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540-S192800200-007	France	19280101	Bathymetry and Elevation	plummets
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540-S192800200-015	France	19280101	Bathymetry and Elevation	plummets
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540-S192900100-6	France	19291231	Bathymetry and Elevation	unknown
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540-S193100100-79	France	19290101	Bathymetry and Elevation	plummets
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540-S193100200-1	France	19290101	Bathymetry and Elevation	plummets
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540-S193100300-30	France	19311231	Bathymetry and Elevation	unknown
540-S193100400-2	France	19310101	Bathymetry and Elevation	unknown
540-S193100500-1	France	19310101	Bathymetry and Elevation	unknown
540-S193100500-6	France	19310101	Bathymetry and Elevation	unknown
540-S193100600-1	France	19310505	Bathymetry and Elevation	unknown
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540-S194600800-002	France	19460101	Bathymetry and Elevation	plummets
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540-S194801300-001	France	19480301	Bathymetry and Elevation	plummets
540-S195000400-1	France	19500101	Bathymetry and Elevation	unknown
540-S195001700-001	France	19500101	Bathymetry and Elevation	single-beam echosounders
540-S195001700-002	France	19500101	Bathymetry and Elevation	single-beam echosounders
540-S195001700-003	France	19500101	Bathymetry and Elevation	single-beam echosounders
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540-S195100500-2	France	19510101	Bathymetry and Elevation	unknown
540-S195100500-3	France	19510101	Bathymetry and Elevation	unknown
540-S195100500-4	France	19510101	Bathymetry and Elevation	unknown
540-S195100500-5	France	19510101	Bathymetry and Elevation	unknown
540-S195100500-6	France	19510101	Bathymetry and Elevation	unknown
540-S195101000-001	France	19510101	Bathymetry and Elevation	single-beam echosounders
540-S195101000-002	France	19510101	Bathymetry and Elevation	single-beam echosounders
540-S195101000-003	France	19510101	Bathymetry and Elevation	single-beam echosounders

540-S195201100-001	France	19520101	Bathymetry and Elevation	single-beam echosounders
540-S195201100-002	France	19520101	Bathymetry and Elevation	single-beam echosounders
540-S195201100-003	France	19520101	Bathymetry and Elevation	single-beam echosounders
540-S195201100-004	France	19520101	Bathymetry and Elevation	single-beam echosounders
540-S195300400-1	France	19530101	Bathymetry and Elevation	unknown
540-S195300500-1	France	19530101	Bathymetry and Elevation	unknown
540-S195300500-2	France	19530101	Bathymetry and Elevation	unknown
540-S195300700-001	France	19530610	Bathymetry and Elevation	single-beam echosounders, unknown
540-S195401800-001	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-002	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-004	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-005	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-006	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-007	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-008	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-009	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-010	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-011	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-012	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195401800-013	France	19540101	Bathymetry and Elevation	single-beam echosounders
540-S195500300-1	France	19550531	Bathymetry and Elevation	unknown
540-S195500300-2	France	19550531	Bathymetry and Elevation	unknown
540-S195500400-001	France	19550101	Bathymetry and Elevation	unknown
540-S195500500-1	France	19550101	Bathymetry and Elevation	unknown

540-S195502000-001	France	19550101	Bathymetry and Elevation	single-beam echosounders
540-S195502300-001	France	19550101	Bathymetry and Elevation	single-beam echosounders
540-S195502300-002	France	19550101	Bathymetry and Elevation	single-beam echosounders
540-S195600300-001	France	19560101	Bathymetry and Elevation	plummets
540-S195600300-002	France	19560101	Bathymetry and Elevation	plummets
540-S195600500-1	France	19560101	Bathymetry and Elevation	unknown
540-S195700200-1	France	19571130	Bathymetry and Elevation	unknown
540-S195700300-1	France	19570101	Bathymetry and Elevation	unknown
540-S195700400-001	France	19570831	Bathymetry and Elevation	unknown
540-S195700400-002	France	19570831	Bathymetry and Elevation	unknown
540-S195700400-3	France	19570831	Bathymetry and Elevation	unknown
540-S195700500-1	France	19570831	Bathymetry and Elevation	unknown
540-S195700500-2	France	19570831	Bathymetry and Elevation	unknown
540-S195800200-001	France	19580101	Bathymetry and Elevation	single-beam echosounders
540-S195800200-002	France	19580101	Bathymetry and Elevation	single-beam echosounders
540-S195900500-003	France	19600430	Bathymetry and Elevation	unknown
540-S195900500-1	France	19600430	Bathymetry and Elevation	unknown
540-S195900500-2	France	19600430	Bathymetry and Elevation	unknown
540-S195900500-4	France	19600430	Bathymetry and Elevation	unknown
540-S195900500-5	France	19600430	Bathymetry and Elevation	unknown
540-S195900500-6	France	19600430	Bathymetry and Elevation	unknown
540-S195900500-7	France	19600430	Bathymetry and Elevation	unknown
540-S195900500-8	France	19600430	Bathymetry and Elevation	unknown
540-S195900600-1	France	19590101	Bathymetry and Elevation	unknown

540-S195900600-2	France	19590101	Bathymetry and Elevation	unknown
540-S195900600-3	France	19590101	Bathymetry and Elevation	unknown
540-S195900600-4	France	19590101	Bathymetry and Elevation	unknown
540-S195900700-1	France	19590101	Bathymetry and Elevation	unknown
540-S196000300-2	France	19590101	Bathymetry and Elevation	unknown
540-S196000300-3	France	19590101	Bathymetry and Elevation	unknown
540-S196000400-1	France	19610101	Bathymetry and Elevation	unknown
540-S196000600-1	France	19600930	Bathymetry and Elevation	unknown
540-S196000600-2	France	19600930	Bathymetry and Elevation	unknown
540-S196000700-1	France	19600831	Bathymetry and Elevation	unknown
540-S196000700-2	France	19600831	Bathymetry and Elevation	unknown
540-S196000700-3	France	19600831	Bathymetry and Elevation	unknown
540-S196000700-4	France	19600831	Bathymetry and Elevation	unknown
540-S196000700-5	France	19600831	Bathymetry and Elevation	unknown
540-S196000700-6	France	19600831	Bathymetry and Elevation	unknown
540-S196000700-7	France	19600831	Bathymetry and Elevation	unknown
540-S196000700-8	France	19600831	Bathymetry and Elevation	unknown
540-S196000800-1	France	19600101	Bathymetry and Elevation	unknown
540-S196000900-001	France	19600101	Bathymetry and Elevation	single-beam echosounders
540-S196000900-002	France	19600101	Bathymetry and Elevation	single-beam echosounders
540-S196000900-003	France	19600101	Bathymetry and Elevation	single-beam echosounders
540-S196000900-004	France	19600101	Bathymetry and Elevation	single-beam echosounders
540-S196100300-1	France	19610101	Bathymetry and Elevation	unknown
540-S196100300-2	France	19610101	Bathymetry and Elevation	unknown

540-S196100400-005	France	19610101	Bathymetry and Elevation	unknown
540-S196100400-1	France	19610101	Bathymetry and Elevation	unknown
540-S196100400-2	France	19610101	Bathymetry and Elevation	unknown
540-S196100400-3	France	19610101	Bathymetry and Elevation	unknown
540-S196100500-1	France	19610101	Bathymetry and Elevation	unknown
540-S196100500-10	France	19610101	Bathymetry and Elevation	unknown
540-S196100500-2	France	19610101	Bathymetry and Elevation	unknown
540-S196100500-3	France	19610101	Bathymetry and Elevation	unknown
540-S196100500-4	France	19610101	Bathymetry and Elevation	unknown
540-S196100600-1	France	19610101	Bathymetry and Elevation	unknown
540-S196100700-1	France	19610101	Bathymetry and Elevation	unknown
540-S196100700-2	France	19610101	Bathymetry and Elevation	unknown
540-S196100700-3	France	19610101	Bathymetry and Elevation	unknown
540-S196100700-4	France	19620101	Bathymetry and Elevation	unknown
540-S196100700-5	France	19620101	Bathymetry and Elevation	unknown
540-S196100700-6	France	19620101	Bathymetry and Elevation	unknown
540-S196100700-7	France	19620101	Bathymetry and Elevation	unknown
540-S196100700-8	France	19620101	Bathymetry and Elevation	unknown
540-S196100900-1	France	19610101	Bathymetry and Elevation	unknown
540-S196200500-1	France	19620101	Bathymetry and Elevation	unknown
540-S196200500-2	France	19620101	Bathymetry and Elevation	unknown
540-S196200500-3	France	19620101	Bathymetry and Elevation	unknown
540-S196200500-4	France	19620101	Bathymetry and Elevation	unknown
540-S196200500-5	France	19620101	Bathymetry and Elevation	unknown

540-S196200500-6	France	19620101	Bathymetry and Elevation	unknown
540-S196200500-7	France	19620101	Bathymetry and Elevation	unknown
540-S196200600-001	France	19620101	Bathymetry and Elevation	unknown
540-S196200600-2	France	19620908	Bathymetry and Elevation	unknown
540-S196200700-1	France	19620101	Bathymetry and Elevation	unknown
540-S196200700-2	France	19620101	Bathymetry and Elevation	unknown
540-S196200800-1	France	19620101	Bathymetry and Elevation	unknown
540-S196200800-2	France	19610101	Bathymetry and Elevation	unknown
540-S196200800-3	France	19610101	Bathymetry and Elevation	unknown
540-S196200800-4	France	19620101	Bathymetry and Elevation	unknown
540-S196200800-5	France	19620101	Bathymetry and Elevation	unknown
540-S196200800-6	France	19610101	Bathymetry and Elevation	unknown
540-S196200800-7	France	19620101	Bathymetry and Elevation	unknown
540-S196200800-8	France	19610101	Bathymetry and Elevation	unknown
540-S196300500-1	France	19630630	Bathymetry and Elevation	unknown
540-S196300900-1	France	19630101	Bathymetry and Elevation	unknown
540-S196300900-2	France	19630101	Bathymetry and Elevation	unknown
540-S196300900-3	France	19630101	Bathymetry and Elevation	unknown
540-S196301000-1	France	19630101	Bathymetry and Elevation	unknown
540-S196301000-2	France	19630101	Bathymetry and Elevation	unknown
540-S196301000-4	France	19630101	Bathymetry and Elevation	unknown
540-S196301000-5	France	19630101	Bathymetry and Elevation	unknown
540-S196301000-6	France	19630101	Bathymetry and Elevation	unknown
540-S196301100-1	France	19630101	Bathymetry and Elevation	unknown

540-S196301100-2	France	19630101	Bathymetry and Elevation	unknown
540-S196301100-3	France	19630101	Bathymetry and Elevation	unknown
540-S196301100-4	France	19630101	Bathymetry and Elevation	unknown
540-S196301100-5	France	19630101	Bathymetry and Elevation	unknown
540-S196301100-6	France	19630101	Bathymetry and Elevation	unknown
540-S196301200-1	France	19630101	Bathymetry and Elevation	unknown
540-S196301200-2	France	19630101	Bathymetry and Elevation	unknown
540-S196301300-1	France	19630101	Bathymetry and Elevation	unknown
540-S196301300-2	France	19630101	Bathymetry and Elevation	unknown
540-S196301300-3	France	19630101	Bathymetry and Elevation	unknown
540-S196301300-4	France	19630101	Bathymetry and Elevation	unknown
540-S196301300-5	France	19630813	Bathymetry and Elevation	unknown
540-S196301300-6	France	19630813	Bathymetry and Elevation	unknown
540-S196301300-7	France	19630813	Bathymetry and Elevation	unknown
540-S196301300-8	France	19630813	Bathymetry and Elevation	unknown
540-S196301300-9	France	19630813	Bathymetry and Elevation	unknown
540-S196303900-001	France	19630101	Bathymetry and Elevation	unknown
540-S196400700-001	France	19640101	Bathymetry and Elevation	plummets
540-S196400800-1	France	19640101	Bathymetry and Elevation	single-beam echosounders
540-S196400800-2	France	19640101	Bathymetry and Elevation	single-beam echosounders
540-S196400800-3	France	19640101	Bathymetry and Elevation	single-beam echosounders
540-S196400800-4	France	19640101	Bathymetry and Elevation	single-beam echosounders
540-S196400800-5	France	19640101	Bathymetry and Elevation	single-beam echosounders
540-S196400900-1	France	19640101	Bathymetry and Elevation	unknown

540-S196400900-2	France	19640101	Bathymetry and Elevation	unknown
540-S196400900-3	France	19640101	Bathymetry and Elevation	unknown
540-S196400900-4	France	19640101	Bathymetry and Elevation	unknown
540-S196400900-5	France	19640101	Bathymetry and Elevation	unknown
540-S196400900-6	France	19640101	Bathymetry and Elevation	unknown
540-S196400900-7	France	19640101	Bathymetry and Elevation	unknown
540-S196400900-8	France	19640101	Bathymetry and Elevation	unknown
540-S196400900-9	France	19640101	Bathymetry and Elevation	unknown
540-S196401000-008	France	19640101	Bathymetry and Elevation	unknown
540-S196401000-1	France	19640101	Bathymetry and Elevation	unknown
540-S196401000-2	France	19640101	Bathymetry and Elevation	unknown
540-S196401000-3	France	19640101	Bathymetry and Elevation	unknown
540-S196401000-4	France	19640101	Bathymetry and Elevation	unknown
540-S196401000-5	France	19640101	Bathymetry and Elevation	unknown
540-S196401000-6	France	19640101	Bathymetry and Elevation	unknown
540-S196401000-7	France	19640101	Bathymetry and Elevation	unknown
540-S196500100-001	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500100-002	France	19660101	Bathymetry and Elevation	single-beam echosounders
540-S196500100-003	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500100-004	France	19660101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-1	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-10	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-11	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-12	France	19660101	Bathymetry and Elevation	single-beam echosounders

540-S196500300-13	France	19660101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-2	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-3	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-4	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-5	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-6	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-7	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-8	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500300-9	France	19650101	Bathymetry and Elevation	single-beam echosounders
540-S196500400-1	France	19650101	Bathymetry and Elevation	unknown
540-S196600300-1	France	19660101	Bathymetry and Elevation	unknown
540-S196600300-2	France	19660101	Bathymetry and Elevation	unknown
540-S196600300-3	France	19660101	Bathymetry and Elevation	unknown
540-S196700300-001	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-002	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-003	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-2	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-3	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-4	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-5	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-6	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-7	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-8	France	19670101	Bathymetry and Elevation	plummets, unknown
540-S196700300-9	France	19670101	Bathymetry and Elevation	plummets, unknown

540-S196700400-1	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-10	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-11	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-12	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-13	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-2	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-3	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-4	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-5	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-6	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-7	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-8	France	19670101	Bathymetry and Elevation	unknown
540-S196700400-9	France	19670101	Bathymetry and Elevation	unknown
540-S196700500-1	France	19670101	Bathymetry and Elevation	unknown
540-S196700500-2	France	19670101	Bathymetry and Elevation	unknown
540-S196700500-3	France	19670101	Bathymetry and Elevation	unknown
540-S196700500-4	France	19670101	Bathymetry and Elevation	unknown
540-S196700500-5	France	19670101	Bathymetry and Elevation	unknown
540-S196700500-6	France	19670101	Bathymetry and Elevation	unknown
540-S196700700-001	France	19670101	Bathymetry and Elevation	unknown
540-S196700700-002	France	19670101	Bathymetry and Elevation	unknown
540-S196700700-003	France	19670101	Bathymetry and Elevation	unknown
540-S196700700-004	France	19670101	Bathymetry and Elevation	unknown
540-S196700700-005	France	19670101	Bathymetry and Elevation	unknown

540-S196700700-006	France	19670101	Bathymetry and Elevation	unknown
540-S196700700-007	France	19680101	Bathymetry and Elevation	unknown
540-S196700700-008	France	19680101	Bathymetry and Elevation	unknown
540-S196700700-009	France	19680101	Bathymetry and Elevation	unknown
540-S196700700-010	France	19680101	Bathymetry and Elevation	unknown
540-S196900200-001	France	19690101	Bathymetry and Elevation	unknown
540-S196900200-002	France	19690101	Bathymetry and Elevation	unknown
540-S196900200-003	France	19690101	Bathymetry and Elevation	unknown
540-S196900600-1	France	19690101	Bathymetry and Elevation	unknown
540-S197000500-1	France	19700101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197000600-1	France	19700101	Bathymetry and Elevation	unknown
540-S197000600-6	France	19710101	Bathymetry and Elevation	unknown
540-S197001600-1	France	19700101	Bathymetry and Elevation	unknown
540-S197001600-2	France	19700101	Bathymetry and Elevation	unknown
540-S197001600-3	France	19700101	Bathymetry and Elevation	unknown
540-S197001600-4	France	19700101	Bathymetry and Elevation	unknown
540-S197001600-5	France	19700101	Bathymetry and Elevation	unknown
540-S197001800-1	France	19700101	Bathymetry and Elevation	unknown
540-S197001800-2	France	19700101	Bathymetry and Elevation	unknown
540-S197100300-1	France	19710101	Bathymetry and Elevation	single-beam echosounders
540-S197100300-18	France	19710101	Bathymetry and Elevation	single-beam echosounders
540-S197100300-2	France	19710101	Bathymetry and Elevation	single-beam echosounders
540-S197100300-3	France	19710101	Bathymetry and Elevation	single-beam echosounders
540-S197100300-4	France	19710101	Bathymetry and Elevation	single-beam echosounders

540-S197100300-5	France	19710101	Bathymetry and Elevation	single-beam echosounders
540-S197100500-1	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-1	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-10	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-11	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-12	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-2	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-3	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-4	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-5	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-6	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-7	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-8	France	19710101	Bathymetry and Elevation	unknown
540-S197101000-9	France	19710101	Bathymetry and Elevation	unknown
540-S197101800-1	France	19700101	Bathymetry and Elevation	unknown
540-S197101800-10	France	19710101	Bathymetry and Elevation	unknown
540-S197101800-11	France	19720101	Bathymetry and Elevation	unknown
540-S197101800-2	France	19700101	Bathymetry and Elevation	unknown
540-S197101800-3	France	19710101	Bathymetry and Elevation	unknown
540-S197101800-9	France	19710101	Bathymetry and Elevation	unknown
540-S197101900-1	France	19710101	Bathymetry and Elevation	single-beam echosounders
540-S197101900-2	France	19700101	Bathymetry and Elevation	single-beam echosounders
540-S197101900-3	France	19710101	Bathymetry and Elevation	single-beam echosounders
540-S197300900-1	France	19730314	Bathymetry and Elevation	single-beam echosounders

540-S197302000-1	France	19711112	Bathymetry and Elevation	single-beam echosounders
540-S197400700-1	France	19720101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197400700-13	France	19720101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197400700-14	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197400700-15	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197400700-16	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197400700-2	France	19720101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197400700-3	France	19720101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197400700-4	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197400700-5	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197400700-6	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-1	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-10	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-11	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-12	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-13	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-14	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-15	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-16	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-17	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-18	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-19	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-2	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-20	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown

540-S197401000-3	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-4	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-5	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-6	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-7	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-8	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401000-9	France	19730101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197401300-1	France	19730101	Bathymetry and Elevation	unknown
540-S197401300-2	France	19730101	Bathymetry and Elevation	unknown
540-S197401300-21	France	19730101	Bathymetry and Elevation	unknown
540-S197401300-3	France	19730101	Bathymetry and Elevation	unknown
540-S197401300-4	France	19730101	Bathymetry and Elevation	unknown
540-S197401300-5	France	19730101	Bathymetry and Elevation	unknown
540-S197401300-6	France	19730101	Bathymetry and Elevation	unknown
540-S197401300-7	France	19730101	Bathymetry and Elevation	unknown
540-S197401300-8	France	19730101	Bathymetry and Elevation	unknown
540-S197500900-1	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197500900-2	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197500900-3	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197500900-4	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197500900-5	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197500900-6	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-1	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-10	France	19740101	Bathymetry and Elevation	single-beam echosounders

540-S197501100-11	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-12	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-13	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-14	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-2	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-3	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-4	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-5	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-6	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-7	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-8	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501100-9	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197501400-1	France	19750514	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197501500-1	France	19750509	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197501500-2	France	19750509	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197601000-4	France	19740101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197601000-7	France	19740101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197601000-9	France	19751231	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197601200-1	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197601200-2	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197601400-1	France	19720101	Bathymetry and Elevation	unknown
540-S197601400-2	France	19720101	Bathymetry and Elevation	unknown
540-S197601400-3	France	19720101	Bathymetry and Elevation	unknown
540-S197700200-1	France	19760101	Bathymetry and Elevation	single-beam echosounders, unknown

540-S197700200-2	France	19760101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197700600-1	France	19740101	Bathymetry and Elevation	single-beam echosounders
540-S197700700-1	France	19750101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197700700-2	France	19760101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197701200-3	France	19770324	Bathymetry and Elevation	single-beam echosounders
540-S197701200-4	France	19770324	Bathymetry and Elevation	single-beam echosounders
540-S197701200-5	France	19770324	Bathymetry and Elevation	single-beam echosounders
540-S197701400-1	France	19770101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197800700-1	France	19780101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197801100-1	France	19780101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197801300-1	France	19750101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197801300-2	France	19750101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197801300-3	France	19750101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197801300-4	France	19750101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197801300-5	France	19750101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197802100-1	France	19760101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197802100-3	France	19760101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S197901000-2	France	19790101	Bathymetry and Elevation	single-beam echosounders
540-S197901000-3	France	19790101	Bathymetry and Elevation	single-beam echosounders
540-S197901000-4	France	19790101	Bathymetry and Elevation	single-beam echosounders
540-S198001400-1	France	19800101	Bathymetry and Elevation	single-beam echosounders
540-S198001400-2	France	19800101	Bathymetry and Elevation	single-beam echosounders
540-S198001400-3	France	19800101	Bathymetry and Elevation	single-beam echosounders
540-S198100100-1	France	19790101	Bathymetry and Elevation	unknown

540-S198101000-1	France	19810101	Bathymetry and Elevation	single-beam echosounders
540-S198101000-2	France	19810101	Bathymetry and Elevation	single-beam echosounders
540-S198202400-1	France	19810101	Bathymetry and Elevation	single-beam echosounders
540-S198202400-2	France	19810101	Bathymetry and Elevation	single-beam echosounders
540-S198202400-3	France	19810101	Bathymetry and Elevation	single-beam echosounders
540-S198202400-4	France	19810101	Bathymetry and Elevation	single-beam echosounders
540-S198202400-5	France	19810101	Bathymetry and Elevation	single-beam echosounders
540-S198202400-6	France	19810101	Bathymetry and Elevation	single-beam echosounders
540-S198202400-7	France	19810101	Bathymetry and Elevation	single-beam echosounders
540-S198300100-1	France	19820101	Bathymetry and Elevation	unknown
540-S198300100-2	France	19820101	Bathymetry and Elevation	unknown
540-S198300100-3	France	19820101	Bathymetry and Elevation	unknown
540-S198300100-4	France	19820101	Bathymetry and Elevation	unknown
540-S198300100-5	France	19820101	Bathymetry and Elevation	unknown
540-S198300100-6	France	19820101	Bathymetry and Elevation	unknown
540-S198300100-7	France	19820101	Bathymetry and Elevation	unknown
540-S198300100-8	France	19820101	Bathymetry and Elevation	unknown
540-S198301000-1	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198301000-2	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198301000-3	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198301000-4	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198301700-1	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198301700-2	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198302700-1	France	19820101	Bathymetry and Elevation	single-beam echosounders, unknown

540-S198302700-2	France	19820101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198400800-1	France	19840322	Bathymetry and Elevation	single-beam echosounders
540-S198401600-10	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-11	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-12	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-13	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-14	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-2	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-3	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-4	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-5	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-6	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-7	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-8	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198401600-9	France	19830101	Bathymetry and Elevation	single-beam echosounders
540-S198402500-1	France	19840101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198402500-2	France	19840101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198500300-1	France	19840101	Bathymetry and Elevation	single-beam echosounders
540-S198500300-21	France	19840323	Bathymetry and Elevation	single-beam echosounders
540-S198500300-22	France	19840323	Bathymetry and Elevation	single-beam echosounders
540-S198500300-23	France	19840323	Bathymetry and Elevation	single-beam echosounders
540-S198600400-1	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198600400-10	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198600400-11	France	19850101	Bathymetry and Elevation	single-beam echosounders

540-S198600400-12	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198600400-2	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198600400-3	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198600400-5	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198600400-6	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198600400-7	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198600400-8	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198600400-9	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198601800-1	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198601800-2	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198601800-3	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198601800-4	France	19850101	Bathymetry and Elevation	single-beam echosounders
540-S198601900-1	France	19851009	Bathymetry and Elevation	single-beam echosounders
540-S198602300-1	France	19860101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198602600-1	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198602600-2	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198602600-3	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198703800-1	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S198703800-2	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S198703800-3	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S198703800-4	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S1987E5300-1	France	19870108	Bathymetry and Elevation	unknown
540-S1987F5300-1	France	19870108	Bathymetry and Elevation	unknown
540-S198801000-1	France	19870101	Bathymetry and Elevation	single-beam echosounders

540-S198803400-1	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-10	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-11	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-12	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-13	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-14	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-15	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-16	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-17	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-18	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-19	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-2	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-20	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-21	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-22	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-23	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-24	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-25	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-26	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-27	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-28	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-29	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-3	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-30	France	19860101	Bathymetry and Elevation	single-beam echosounders

540-S198803400-31	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-32	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-33	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-34	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-35	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-36	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-37	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-38	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-39	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-4	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-40	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-41	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-42	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-43	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-44	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-45	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-46	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-47	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-48	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-49	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-5	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-50	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-51	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-52	France	19860101	Bathymetry and Elevation	single-beam echosounders

540-S198803400-53	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-54	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-55	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-56	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-57	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-58	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-59	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-6	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-60	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-61	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-62	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-63	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-64	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-65	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-66	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-67	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-68	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-69	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-7	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-70	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-71	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-72	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-73	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-74	France	19860101	Bathymetry and Elevation	single-beam echosounders

540-S198803400-75	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-76	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-77	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-78	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-79	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-8	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-80	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-81	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-82	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-83	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803400-9	France	19860101	Bathymetry and Elevation	single-beam echosounders
540-S198803600-1	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S198900800-1	France	19880101	Bathymetry and Elevation	single-beam echosounders
540-S198901800-1	France	19880101	Bathymetry and Elevation	single-beam echosounders
540-S198901900-001	France	19880101	Bathymetry and Elevation	unknown
540-S198901900-002	France	19880101	Bathymetry and Elevation	unknown
540-S198901900-003	France	19880101	Bathymetry and Elevation	unknown
540-S198901900-004	France	19880101	Bathymetry and Elevation	unknown
540-S198901900-005	France	19880101	Bathymetry and Elevation	unknown
540-S198901900-006	France	19880101	Bathymetry and Elevation	unknown
540-S198901900-007	France	19880101	Bathymetry and Elevation	unknown
540-S198902700-1	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198902700-10	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198902700-11	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown

540-S198902700-2	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198902700-3	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198902700-4	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198902700-5	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198902700-6	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198902700-7	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198902700-8	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S198902700-9	France	19880101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199000800-1	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199000800-2	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199000800-3	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199000800-4	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199000800-5	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199000800-6	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199000800-7	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-10	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-11	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-12	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-18	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-19	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-20	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-21	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-22	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-23	France	19870101	Bathymetry and Elevation	single-beam echosounders

540-S199002000-24	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-6	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-7	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-8	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199002000-9	France	19870101	Bathymetry and Elevation	single-beam echosounders
540-S199101800-001	France	19900101	Bathymetry and Elevation	unknown
540-S199101800-002	France	19900101	Bathymetry and Elevation	unknown
540-S199101800-003	France	19900101	Bathymetry and Elevation	unknown
540-S199101800-004	France	19900101	Bathymetry and Elevation	unknown
540-S199101800-005	France	19900101	Bathymetry and Elevation	unknown
540-S199101800-006	France	19900101	Bathymetry and Elevation	unknown
540-S199103529-1	France	19900901	Bathymetry and Elevation	unknown
540-S199103530-1	France	19900901	Bathymetry and Elevation	unknown
540-S199103531-1	France	19900901	Bathymetry and Elevation	unknown
540-S199103533-1	France	19900901	Bathymetry and Elevation	unknown
540-S199103543-1	France	19900901	Bathymetry and Elevation	unknown
540-S199104500-1	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-1	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-10	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-11	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-12	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-13	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-14	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-15	France	19890101	Bathymetry and Elevation	single-beam echosounders

540-S199106900-16	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-17	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-18	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-19	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-2	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-20	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-21	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-22	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-23	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-24	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-25	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-26	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-27	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-28	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-29	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-3	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-30	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-31	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-32	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-33	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-34	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-35	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-36	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-37	France	19890101	Bathymetry and Elevation	single-beam echosounders

540-S199106900-38	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-39	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-4	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-40	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-41	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-42	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-43	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-44	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-45	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-46	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-47	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-48	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-49	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-5	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-50	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-51	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-52	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-53	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-54	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-55	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-56	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-57	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-58	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-59	France	19890101	Bathymetry and Elevation	single-beam echosounders

540-S199106900-6	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-60	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-61	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-62	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-63	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-64	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-65	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-66	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-67	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-68	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-69	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-7	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-8	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199106900-9	France	19890101	Bathymetry and Elevation	single-beam echosounders
540-S199107100-1	France	19900101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199107100-3	France	19900101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199107200-001	France	19900101	Bathymetry and Elevation	unknown
540-S199107300-1	France	19900101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199107300-2	France	19900101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199107300-3	France	19900101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199107300-4	France	19900101	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199204000-1	France	19911004	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199205600-1	France	19911219	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199205600-2	France	19911219	Bathymetry and Elevation	single-beam echosounders, unknown

540-S199206700-1	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-10	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-11	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-12	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-13	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-14	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-15	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-16	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-17	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-18	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-19	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-2	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-20	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-21	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-22	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-23	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-24	France	19900101	Bathymetry and Elevation	single-beam echosounders
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540-S199206700-26	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-27	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-28	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-29	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-3	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-30	France	19900101	Bathymetry and Elevation	single-beam echosounders

540-S199206700-31	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-32	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-33	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-34	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-35	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-36	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-37	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-38	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-39	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-4	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-40	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-41	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-42	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-43	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-44	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-45	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-46	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-47	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-48	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-49	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-5	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-50	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-51	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-52	France	19900101	Bathymetry and Elevation	single-beam echosounders

540-S199206700-53	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-54	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-55	France	19910531	Bathymetry and Elevation	single-beam echosounders
540-S199206700-56	France	19910531	Bathymetry and Elevation	single-beam echosounders
540-S199206700-57	France	19910531	Bathymetry and Elevation	single-beam echosounders
540-S199206700-58	France	19910531	Bathymetry and Elevation	single-beam echosounders
540-S199206700-59	France	19910531	Bathymetry and Elevation	single-beam echosounders
540-S199206700-6	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-60	France	19910531	Bathymetry and Elevation	single-beam echosounders
540-S199206700-61	France	19910531	Bathymetry and Elevation	single-beam echosounders
540-S199206700-62	France	19910531	Bathymetry and Elevation	single-beam echosounders
540-S199206700-7	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-8	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199206700-9	France	19900101	Bathymetry and Elevation	single-beam echosounders
540-S199302000-1	France	19900911	Bathymetry and Elevation	single-beam echosounders
540-S199302100-1	France	19910902	Bathymetry and Elevation	single-beam echosounders
540-S199400100-1	France	19930602	Bathymetry and Elevation	single-beam echosounders
540-S199400100-2	France	19930602	Bathymetry and Elevation	single-beam echosounders
540-S199401100-1	France	19920113	Bathymetry and Elevation	single-beam echosounders
540-S199402900-1	France	19910101	Bathymetry and Elevation	single-beam echosounders
540-S199403100-1	France	19930901	Bathymetry and Elevation	single-beam echosounders
540-S199403500-2	France	19910906	Bathymetry and Elevation	single-beam echosounders
540-S199403500-3	France	19910909	Bathymetry and Elevation	single-beam echosounders
540-S199404900-1	France	19881030	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders

540-S199404900-2	France	19881001	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S199404900-3	France	19880901	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S199503400-1	France	19941213	Bathymetry and Elevation	single-beam echosounders
540-S199503400-2	France	19941213	Bathymetry and Elevation	single-beam echosounders
540-S199505500-1	France	19950201	Bathymetry and Elevation	single-beam echosounders
540-S199505700-1	France	19911201	Bathymetry and Elevation	single-beam echosounders
540-S199505900-1	France	19941214	Bathymetry and Elevation	single-beam echosounders
540-S199505900-2	France	19941214	Bathymetry and Elevation	single-beam echosounders
540-S199601400-1	France	19941023	Bathymetry and Elevation	single-beam echosounders
540-S199601400-2	France	19941023	Bathymetry and Elevation	single-beam echosounders
540-S199601500-1	France	19951012	Bathymetry and Elevation	single-beam echosounders
540-S199602600-1	France	19940618	Bathymetry and Elevation	single-beam echosounders
540-S199602600-2	France	19940618	Bathymetry and Elevation	single-beam echosounders
540-S199602700-1	France	19950503	Bathymetry and Elevation	single-beam echosounders
540-S199602900-1	France	19941106	Bathymetry and Elevation	single-beam echosounders
540-S199602900-2	France	19941106	Bathymetry and Elevation	single-beam echosounders
540-S199603700-002	France	19960925	Bathymetry and Elevation	single-beam echosounders
540-S199604800-001	France	19960220	Bathymetry and Elevation	single-beam echosounders
540-S199604900-1	France	19960607	Bathymetry and Elevation	single-beam echosounders
540-S199605000-1	France	19941017	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S199605000-2	France	19941017	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S199605200-1	France	19950523	Bathymetry and Elevation	single-beam echosounders

540-S199605300-001	France	19911126	Bathymetry and Elevation	single-beam echosounders
540-S199605300-002	France	19911126	Bathymetry and Elevation	single-beam echosounders
540-S199605300-003	France	19911126	Bathymetry and Elevation	single-beam echosounders
540-S199605500-001	France	19951120	Bathymetry and Elevation	single-beam echosounders
540-S199605500-002	France	19951120	Bathymetry and Elevation	single-beam echosounders
540-S199605500-003	France	19951120	Bathymetry and Elevation	single-beam echosounders
540-S199605500-004	France	19951120	Bathymetry and Elevation	single-beam echosounders
540-S199606000-1	France	19911101	Bathymetry and Elevation	single-beam echosounders
540-S199606000-2	France	19911101	Bathymetry and Elevation	single-beam echosounders
540-S199700200-1	France	19940816	Bathymetry and Elevation	single-beam echosounders
540-S199703000-1	France	19960201	Bathymetry and Elevation	single-beam echosounders
540-S199703000-2	France	19960201	Bathymetry and Elevation	single-beam echosounders
540-S199704500-1	France	19961001	Bathymetry and Elevation	multi-beam echosounders
540-S199704500-2	France	19961001	Bathymetry and Elevation	multi-beam echosounders
540-S199704600-1	France	19960326	Bathymetry and Elevation	single-beam echosounders
540-S199800300-1	France	19970717	Bathymetry and Elevation	single-beam echosounders
540-S199800400-1	France	19970718	Bathymetry and Elevation	single-beam echosounders
540-S199801000-1	France	19961204	Bathymetry and Elevation	single-beam echosounders
540-S199801000-2	France	19961204	Bathymetry and Elevation	single-beam echosounders
540-S199801300-1	France	19970402	Bathymetry and Elevation	single-beam echosounders
540-S199801500-1	France	19970924	Bathymetry and Elevation	single-beam echosounders
540-S199801600-1	France	19970319	Bathymetry and Elevation	single-beam echosounders
540-S199801700-1	France	19970405	Bathymetry and Elevation	single-beam echosounders
540-S199802000-1	France	19970403	Bathymetry and Elevation	single-beam echosounders

540-S199802100-1	France	19970108	Bathymetry and Elevation	single-beam echosounders
540-S199802100-2	France	19970108	Bathymetry and Elevation	single-beam echosounders
540-S199802100-3	France	19970108	Bathymetry and Elevation	single-beam echosounders
540-S199802100-4	France	19970108	Bathymetry and Elevation	single-beam echosounders
540-S199802300-1	France	19970324	Bathymetry and Elevation	single-beam echosounders, unknown
540-S199802400-1	France	19970319	Bathymetry and Elevation	single-beam echosounders
540-S199802500-1	France	19970719	Bathymetry and Elevation	single-beam echosounders
540-S199803500-1	France	19960911	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S199803500-2	France	19960911	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S199803500-3	France	19960911	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S199803600-1	France	19970923	Bathymetry and Elevation	multi-beam echosounders
540-S199803600-2	France	19970923	Bathymetry and Elevation	multi-beam echosounders
540-S199806200-1	France	19971112	Bathymetry and Elevation	single-beam echosounders
540-S199900600-010	France	19970320	Bathymetry and Elevation	single-beam echosounders
540-S199900600-1	France	19970320	Bathymetry and Elevation	single-beam echosounders
540-S199902100-2	France	19980504	Bathymetry and Elevation	single-beam echosounders
540-S199902200-1	France	19960221	Bathymetry and Elevation	single-beam echosounders
540-S199903100-1	France	19980101	Bathymetry and Elevation	single-beam echosounders
540-S199903300-1	France	19980509	Bathymetry and Elevation	single-beam echosounders
540-S199903300-2	France	19980509	Bathymetry and Elevation	single-beam echosounders
540-S199903300-3	France	19980509	Bathymetry and Elevation	single-beam echosounders
540-S200002800-1	France	19990101	Bathymetry and Elevation	single-beam echosounders

540-S200003700-1	France	20000509	Bathymetry and Elevation	unknown
540-S200004400-1	France	19980428	Bathymetry and Elevation	multi-beam echosounders
540-S200004400-2	France	19980428	Bathymetry and Elevation	multi-beam echosounders
540-S200004400-3	France	19980428	Bathymetry and Elevation	multi-beam echosounders
540-S200005400-1	France	19990428	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200005400-2	France	19981013	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200005800-1	France	20000308	Bathymetry and Elevation	multi-beam echosounders
540-S200102100-1	France	19970723	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200102100-2	France	19970723	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200103100-1	France	20000421	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200103100-2	France	20000421	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200103700-1	France	19980427	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200103700-2	France	19980427	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200103800-1	France	19980226	Bathymetry and Elevation	single-beam echosounders
540-S200103800-2	France	19980226	Bathymetry and Elevation	single-beam echosounders
540-S200105200-1	France	19991006	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200105200-2	France	19991006	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200105400-1	France	20010124	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200105400-2	France	20010124	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200105500-1	France	19990323	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders

540-S200105500-2	France	19990323	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
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540-S200105700-2	France	19990719	Bathymetry and Elevation	single-beam echosounders
540-S200105700-3	France	19990719	Bathymetry and Elevation	single-beam echosounders
540-S200107400-1	France	20010314	Bathymetry and Elevation	unknown
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540-S200201400-3	France	20000517	Bathymetry and Elevation	multi-beam echosounders, unknown
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540-S200201400-5	France	20010318	Bathymetry and Elevation	multi-beam echosounders, unknown
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540-S200201600-4	France	20010615	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200204500-1	France	20000928	Bathymetry and Elevation	multi-beam echosounders
540-S200204800-1	France	20000223	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200204800-2	France	20010510	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200301300-1	France	20010502	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200301300-2	France	20010528	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200304600-1	France	20010905	Bathymetry and Elevation	multi-beam echosounders
540-S200304700-1	France	20010701	Bathymetry and Elevation	multi-beam echosounders
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540-S200305000-2	France	20020319	Bathymetry and Elevation	single-beam echosounders, unknown
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540-S200305000-4	France	20020319	Bathymetry and Elevation	single-beam echosounders, unknown
540-S200305100-1	France	20010710	Bathymetry and Elevation	multi-beam echosounders
540-S200305100-2	France	20010710	Bathymetry and Elevation	multi-beam echosounders
540-S200400900-1	France	20030204	Bathymetry and Elevation	multi-beam echosounders
540-S200400900-2	France	20030204	Bathymetry and Elevation	multi-beam echosounders
540-S200500300-1	France	20040601	Bathymetry and Elevation	multi-beam echosounders
540-S200500300-2	France	20040601	Bathymetry and Elevation	multi-beam echosounders
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540-S200501000-1	France	20040413	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200501000-2	France	20040413	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200501000-3	France	20040413	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200501000-4	France	20040413	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
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540-S200501000-6	France	20040413	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
540-S200501000-7	France	20040413	Bathymetry and Elevation	multi-beam echosounders, single-beam echosounders
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540-S200502700-1	France	20041124	Bathymetry and Elevation	multi-beam echosounders, unknown

540-S200502700-2	France	20041124	Bathymetry and Elevation	multi-beam echosounders, unknown
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540-S200504500-1	France	20030409	Bathymetry and Elevation	multi-beam echosounders
540-S200504500-6	France	20030409	Bathymetry and Elevation	multi-beam echosounders
540-S200504800-1	France	20050401	Bathymetry and Elevation	multi-beam echosounders
540-S200506700-1	France	20050907	Bathymetry and Elevation	multi-beam echosounders
540-S200506800-1	France	20050120	Bathymetry and Elevation	multi-beam echosounders
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540-S200507600-1	France	20050810	Bathymetry and Elevation	multi-beam echosounders
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540-S200507700-2	France	20050930	Bathymetry and Elevation	multi-beam echosounders
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540-S200508600-2	France	20050713	Bathymetry and Elevation	multi-beam echosounders
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540-S200600100-2	France	20050708	Bathymetry and Elevation	multi-beam echosounders
540-S200600100-3	France	20050708	Bathymetry and Elevation	multi-beam echosounders
540-S200600100-4	France	20050708	Bathymetry and Elevation	multi-beam echosounders
540-S200600400-1	France	20050928	Bathymetry and Elevation	multi-beam echosounders
540-S200600400-2	France	20050928	Bathymetry and Elevation	multi-beam echosounders
540-S200600400-3	France	20051003	Bathymetry and Elevation	multi-beam echosounders
540-S200601900-1	France	20060325	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200601900-2	France	20060325	Bathymetry and Elevation	multi-beam echosounders, unknown

540-S200602000-1	France	20060325	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200602000-2	France	20060330	Bathymetry and Elevation	multi-beam echosounders, unknown
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540-S200602200-3	France	20050228	Bathymetry and Elevation	multi-beam echosounders, unknown
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540-S200602500-2	France	20060320	Bathymetry and Elevation	multi-beam echosounders
540-S200602500-3	France	20060322	Bathymetry and Elevation	multi-beam echosounders
540-S200603700-1	France	20050514	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200603700-2	France	20050514	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200603700-3	France	20050514	Bathymetry and Elevation	multi-beam echosounders, unknown
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540-S200701300-2	France	20060622	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200701300-3	France	20060309	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200701300-4	France	20060622	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200701400-1	France	20060404	Bathymetry and Elevation	multi-beam echosounders
540-S200701400-2	France	20060404	Bathymetry and Elevation	multi-beam echosounders
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540-S200701700-2	France	20051121	Bathymetry and Elevation	multi-beam echosounders
540-S200701700-3	France	20051121	Bathymetry and Elevation	multi-beam echosounders
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540-S200705900-1	France	20070628	Bathymetry and Elevation	multi-beam echosounders
540-S200706000-1	France	20070718	Bathymetry and Elevation	multi-beam echosounders
540-S200706200-1	France	20070707	Bathymetry and Elevation	multi-beam echosounders
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540-S200709300-1	France	20070902	Bathymetry and Elevation	multi-beam echosounders
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540-S200802600-2	France	20050712	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200803500-1	France	20080213	Bathymetry and Elevation	multi-beam echosounders
540-S200803500-2	France	20080404	Bathymetry and Elevation	multi-beam echosounders
540-S200804100-1	France	20080402	Bathymetry and Elevation	multi-beam echosounders
540-S200804100-2	France	20080402	Bathymetry and Elevation	multi-beam echosounders
540-S200806700-1	France	20080701	Bathymetry and Elevation	multi-beam echosounders
540-S200807100-1	France	20080915	Bathymetry and Elevation	unknown
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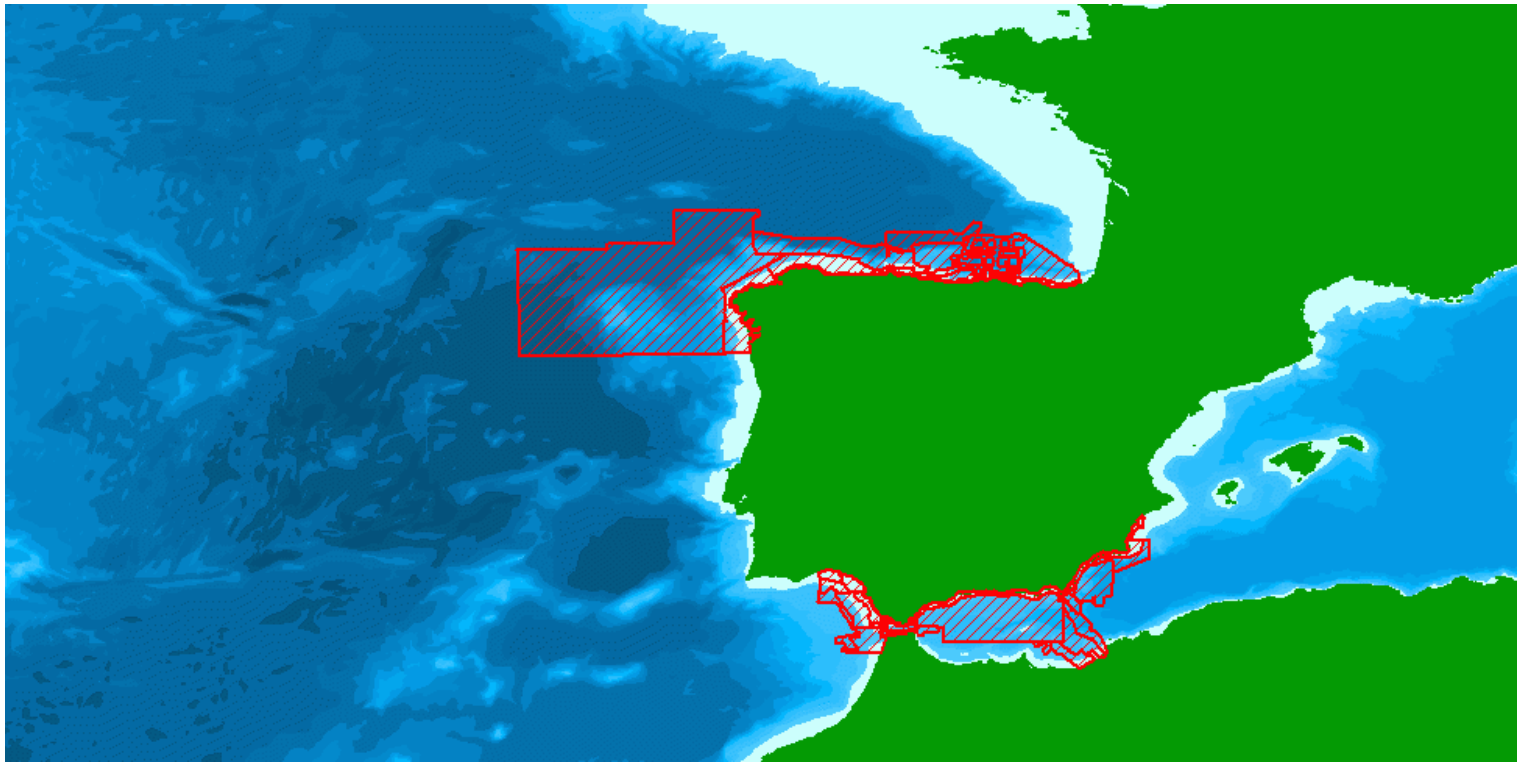
540-S200807100-5	France	20080915	Bathymetry and Elevation	unknown
540-S200807300-1	France	20071108	Bathymetry and Elevation	multi-beam echosounders
540-S200807300-2	France	20071108	Bathymetry and Elevation	multi-beam echosounders

540-S200900900-1	France	20081211	Bathymetry and Elevation	multi-beam echosounders
540-S200900900-2	France	20081211	Bathymetry and Elevation	multi-beam echosounders
540-S200901000-1	France	20090113	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200901000-2	France	20090113	Bathymetry and Elevation	multi-beam echosounders, unknown
540-S200901200-1	France	20071011	Bathymetry and Elevation	multi-beam echosounders
540-S200901200-2	France	20071011	Bathymetry and Elevation	multi-beam echosounders
540-S200901200-3	France	20071011	Bathymetry and Elevation	multi-beam echosounders
540-S200901200-4	France	20071011	Bathymetry and Elevation	multi-beam echosounders
540-S200901200-5	France	20071019	Bathymetry and Elevation	multi-beam echosounders
540-S200907000-1	France	20061006	Bathymetry and Elevation	multi-beam echosounders
S199902100-1	France	19980504	Bathymetry and Elevation	single-beam echosounders
S200002800-1	France	19990101	Bathymetry and Elevation	single-beam echosounders
S200608000-1	France	20050204	Bathymetry and Elevation	multi-beam echosounders

- **SPANISH OCEANOGRAPHIC INSTITUTE (IEO) - Spain**

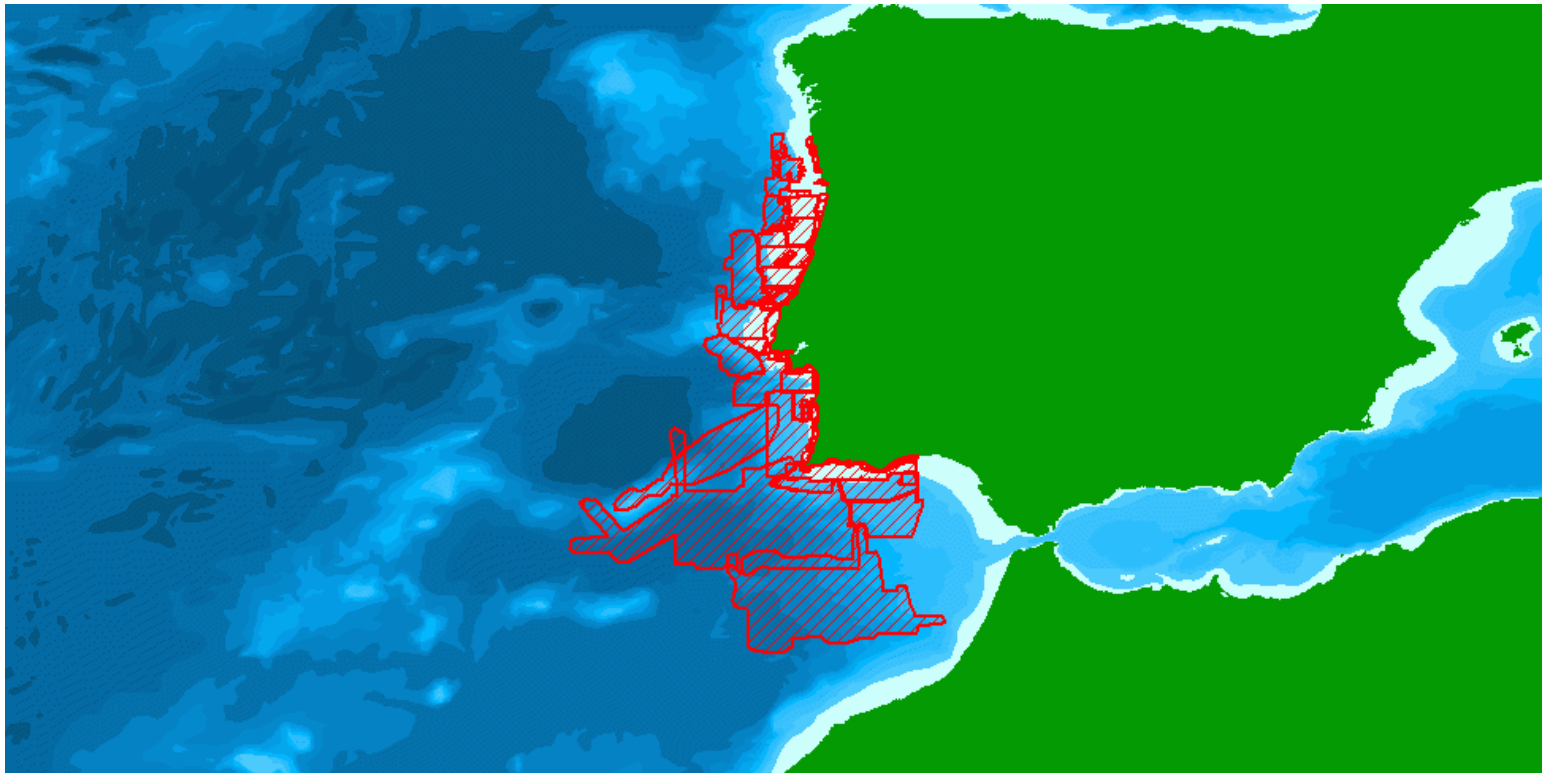


Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
ECOMARG	Spain	20030101	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
EZA GIBRALTAR	Spain	20000101	Bathymetry and Elevation	Differential Global Positioning System

				receivers, multi-beam echosounders, sound velocity sensors
GR_CADIZ_0041	Spain	19800101	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
GR_CADIZ_0041	Spain	19910101	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
GR_CADIZ_0041	Spain	19950101	Bathymetry and Elevation	single-beam echosounders
GR_CADIZ_0041	Spain	20030101	Bathymetry and Elevation	single-beam echosounders
GR_CADIZ_0041	Spain	20040101	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
GR_CADIZ_0041	Spain	20040101	Bathymetry and Elevation	single-beam echosounders
GR_CADIZ_0041	Spain	20060101	Bathymetry and Elevation	single-beam echosounders
GR_CANTABRICO	Spain	19740101	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
GR_CANTABRICO	Spain	19740101	Bathymetry and Elevation	single-beam echosounders
GR_CANTABRICO	Spain	19890101	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
GR_CANTABRICO	Spain	19900101	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
GR_CANTABRICO	Spain	19950101	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
HERCULES-83 SURVEY	Spain	19830101	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders, sound velocity sensors
IHM-NAUTICAL CHART 445A GRIBRALTAR STRAIT	Spain	19860101	Bathymetry and Elevation	single-beam echosounders
MARCONI	Spain	20030101	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound

				velocity sensors
MARGUAL-06	Spain	20060101	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
PAIS_VASCO	Spain	20050101	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
TARIK SURVEY	Spain	19800101	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders, sound velocity sensors
ZEEE_GALICIA	Spain	20050101	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors

- **HYDROGRAPHIC INSTITUTE (IHPT) - Portugal**



Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
cascais2007	Portugal	20070101	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi0004_1982	Portugal	19820315	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders

hi0016_1974	Portugal	19741024	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders
hi001_1970	Portugal	19701101	Bathymetry and Elevation	single-beam echosounders
hi001_1975	Portugal	19751117	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders
hi001_2003nautila	Portugal	20030629	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi002_2000	Portugal	20000207	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi003_1982	Portugal	19820319	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders
hi005_2003	Portugal	20031118	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi006_1983	Portugal	19830627	Bathymetry and Elevation	single-beam echosounders
hi007_1982	Portugal	19820430	Bathymetry and Elevation	single-beam echosounders
hi008_1983_1	Portugal	19830520	Bathymetry and Elevation	single-beam echosounders
hi0101_1984	Portugal	19821118	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders
hi0101_1984_1	Portugal	19840621	Bathymetry and Elevation	Hyperfix receivers, single-beam echosounders
hi010_1977	Portugal	19770101	Bathymetry and Elevation	single-beam echosounders
hi011_1977	Portugal	19771116	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders
hi011_1982	Portugal	19820708	Bathymetry and Elevation	single-beam echosounders
hi012_1993	Portugal	19921116	Bathymetry and Elevation	single-beam echosounders
hi0132_1988	Portugal	19880806	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi013_1972	Portugal	19721001	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders

hi013_1978	Portugal	19780101	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi014_1979	Portugal	19791024	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders
hi014_1981	Portugal	19810614	Bathymetry and Elevation	single-beam echosounders
hi015_1974	Portugal	19740901	Bathymetry and Elevation	single-beam echosounders
hi015_1977	Portugal	19770101	Bathymetry and Elevation	single-beam echosounders
hi015_1978	Portugal	19780807	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders
hi015_1979	Portugal	19790101	Bathymetry and Elevation	single-beam echosounders
hi015_1980	Portugal	19800101	Bathymetry and Elevation	single-beam echosounders
hi015_2004matespro	Portugal	20040615	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
hi017_1999	Portugal	19990101	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi0201_1984	Portugal	19840531	Bathymetry and Elevation	single-beam echosounders
hi0201_1984_1	Portugal	19840628	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi0201_1986	Portugal	19851206	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi025_1979	Portugal	19790401	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi025_2004delila	Portugal	20040928	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
hi026_2003	Portugal	20030311	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi0301_1988	Portugal	19880328	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders

hi0302_1986	Portugal	19850605	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi0304_1987	Portugal	19870512	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi0400_1985	Portugal	19840320	Bathymetry and Elevation	single-beam echosounders
hi0401_1985	Portugal	19850417	Bathymetry and Elevation	single-beam echosounders
hi0401_1989	Portugal	19890720	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi0403_1987	Portugal	19870407	Bathymetry and Elevation	single-beam echosounders
hi0405_1978	Portugal	19791024	Bathymetry and Elevation	Hyperfix receivers, single-beam echosounders
hi0405_1979	Portugal	19791024	Bathymetry and Elevation	Hyperfix receivers, single-beam echosounders
hi041_2009	Portugal	20090209	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
hi048_1982	Portugal	19820504	Bathymetry and Elevation	single-beam echosounders
hi0501_1986	Portugal	19860410	Bathymetry and Elevation	single-beam echosounders
hi053_1978	Portugal	19780501	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi064_1978	Portugal	19780601	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi06_1983	Portugal	19830101	Bathymetry and Elevation	single-beam echosounders
hi071_2000	Portugal	20000403	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi0803_1991	Portugal	19910115	Bathymetry and Elevation	single-beam echosounders
hi083_1977	Portugal	19770101	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi0901_1986	Portugal	19860801	Bathymetry and Elevation	single-beam echosounders
hi0907_1986	Portugal	19860619	Bathymetry and Elevation	single-beam echosounders

hi090_1998	Portugal	19980526	Bathymetry and Elevation	Hyperfix receivers, single-beam echosounders
hi090_2000	Portugal	20000613	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi090_2001	Portugal	20010405	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi091_2007accineti	Portugal	20070910	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
hi092_2004	Portugal	20040928	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi115_2002	Portugal	20020513	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi117_1981	Portugal	19810528	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi117_1998	Portugal	19980825	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi1204_1997	Portugal	19971015	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi128_2002	Portugal	20020613	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi136_2001	Portugal	20011109	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi144_2001	Portugal	20010925	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi1512_1982	Portugal	19821201	Bathymetry and Elevation	single-beam echosounders
hi152_2003	Portugal	20030708	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi156_2001	Portugal	20011023	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi180_2003	Portugal	20030917	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-

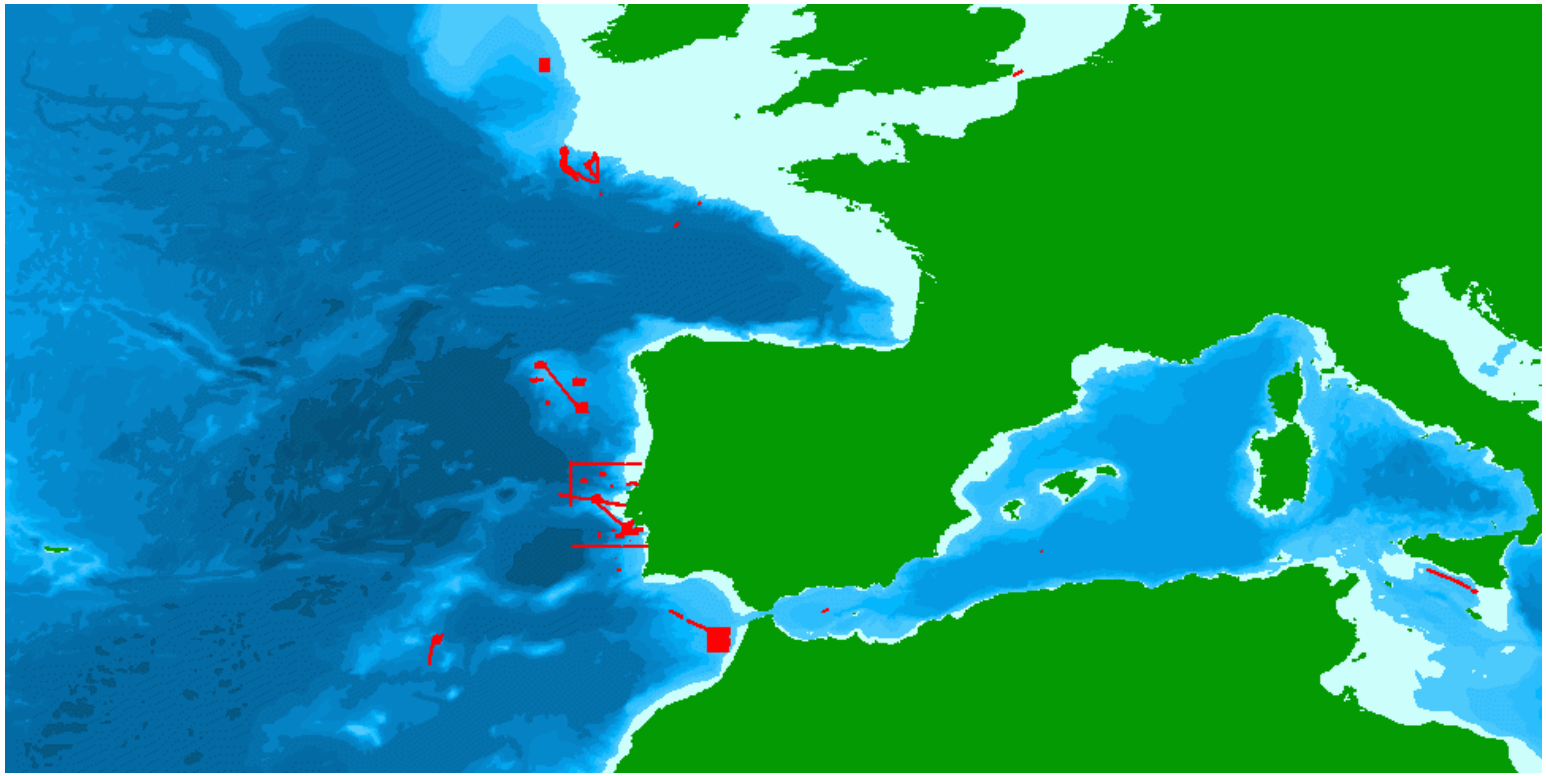
				beam echosounders
hi2101_1993	Portugal	19930715	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2101_1995	Portugal	19950323	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2101_1998	Portugal	19980227	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2101_2005_1	Portugal	20050314	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2102_1990	Portugal	19901001	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2102_2006	Portugal	20060404	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2102_2009	Portugal	20090514	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
hi2102_2009_1	Portugal	20090108	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2103_1995	Portugal	19950724	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2103_2004_1	Portugal	20040310	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2103_2005	Portugal	20051128	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2103_2006	Portugal	20060401	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2104_1995	Portugal	19951116	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2107_1997	Portugal	19970416	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders

hi2108_1991	Portugal	19911203	Bathymetry and Elevation	single-beam echosounders
hi2108_2007	Portugal	20070510	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi2201_1993	Portugal	19930619	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2201_1994	Portugal	19940601	Bathymetry and Elevation	single-beam echosounders
hi2202_1994	Portugal	19940506	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2204_1994	Portugal	19940606	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2206_1995	Portugal	19950628	Bathymetry and Elevation	single-beam echosounders
hi224_1987	Portugal	19880407	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi224_1988	Portugal	19880407	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2301_1994	Portugal	19940328	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2306_1994	Portugal	19940715	Bathymetry and Elevation	Hyperfix receivers, single-beam echosounders
hi2306_1996	Portugal	19960514	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi2307_1993	Portugal	19931108	Bathymetry and Elevation	single-beam echosounders
hi2307_1994	Portugal	19940721	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2319_1995	Portugal	19951018	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi249_1990	Portugal	19900308	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi2511_1980	Portugal	19800901	Bathymetry and Elevation	Trisponder navigation systems, single-beam

				echosounders
hi277_1989	Portugal	19890520	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi3201_2007	Portugal	20070712	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
hi3201_2008deepco	Portugal	20080520	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
hi3202_2007deepco	Portugal	20071211	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders, sound velocity sensors
hi3401_2006	Portugal	20041118	Bathymetry and Elevation	Differential Global Positioning System receivers
hi4103_1997	Portugal	19970106	Bathymetry and Elevation	Hyperfix receivers, single-beam echosounders
hi4108_1997	Portugal	19971013	Bathymetry and Elevation	Hyperfix receivers, single-beam echosounders
hi4201_1994	Portugal	19940823	Bathymetry and Elevation	Hyperfix receivers, single-beam echosounders
hi4201_1999	Portugal	19990525	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi4202_1996	Portugal	19960613	Bathymetry and Elevation	single-beam echosounders
hi4206_2004	Portugal	20040219	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi4210_2004	Portugal	20040907	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi4251_2004	Portugal	20040525	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi5201_2006	Portugal	20060419	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi5201_2006_2	Portugal	20060503	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi5202_2006	Portugal	20060517	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders

hi5301_2009	Portugal	20090608	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi5301_2009_1	Portugal	20090929	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi5302_2007	Portugal	20071018	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
hi5302_2009	Portugal	20091214	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi5303_2008	Portugal	20080825	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi5304_2007	Portugal	20070410	Bathymetry and Elevation	Differential Global Positioning System receivers, single-beam echosounders
hi7274_1967	Portugal	19670101	Bathymetry and Elevation	single-beam echosounders
hi78_1980	Portugal	19801010	Bathymetry and Elevation	Système leger de measure de distance receivers, single-beam echosounders
hi79_1978	Portugal	19781001	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi8306_1980	Portugal	19800601	Bathymetry and Elevation	single-beam echosounders
hi8310_1980	Portugal	19801001	Bathymetry and Elevation	Trisponder navigation systems, single-beam echosounders
hi8409_1972	Portugal	19720901	Bathymetry and Elevation	single-beam echosounders

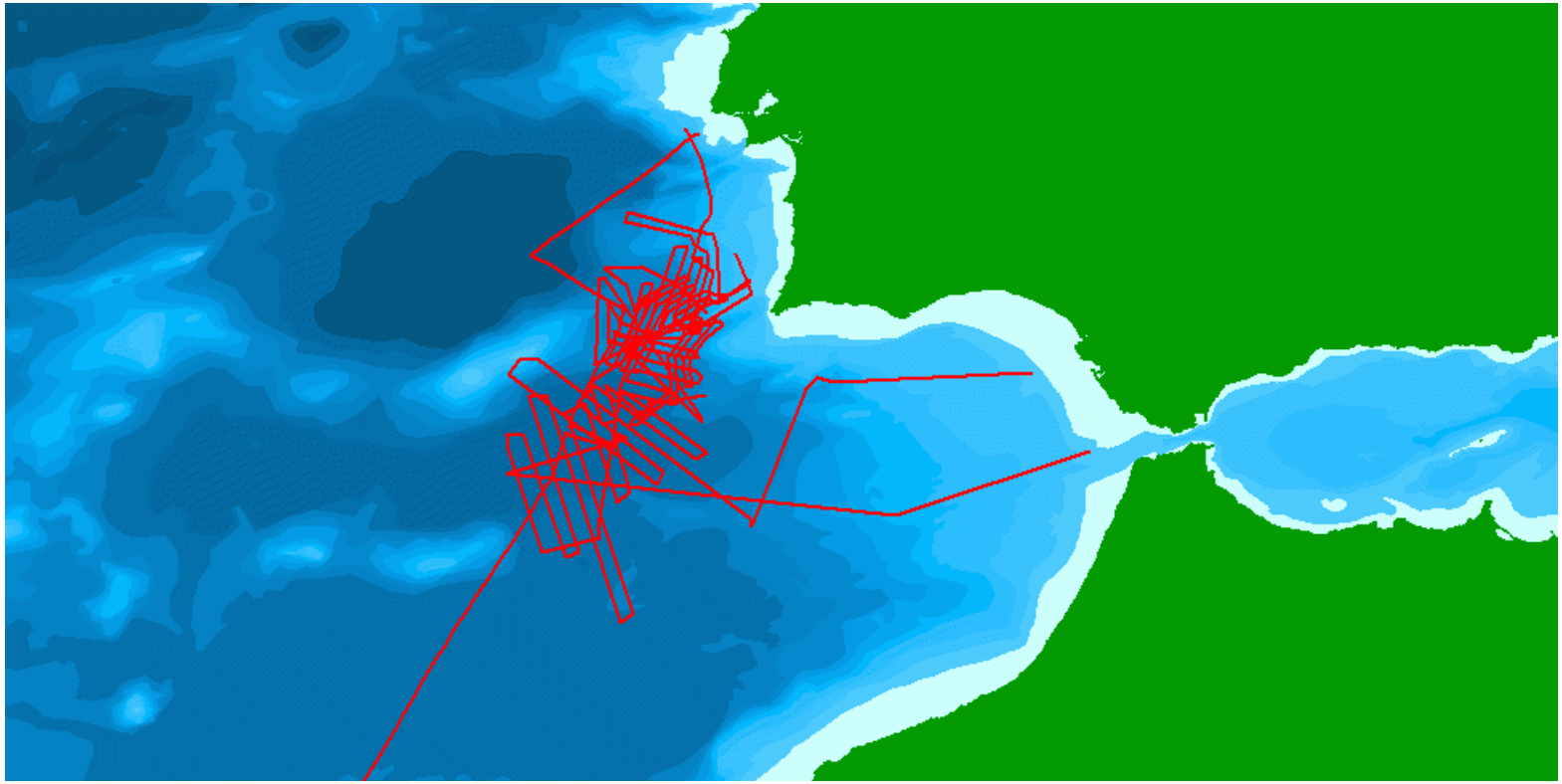
- **NIOZ ROYAL NETHERLANDS INSTITUTE FOR SEA RESEARCH (NIOZ) - The Netherlands**



Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
NIOZ multibeam collection	Netherlands	20060512	Bathymetry and Elevation	multi-beam echosounders
NIOZ multibeam collection	Netherlands	20060831	Bathymetry and Elevation	multi-beam echosounders
NIOZ multibeam collection	Netherlands	20060928	Bathymetry and Elevation	multi-beam echosounders

NIOZ multibeam collection	Netherlands	20061021	Bathymetry and Elevation	multi-beam echosounders
NIOZ multibeam collection	Netherlands	20070429	Bathymetry and Elevation	multi-beam echosounders
NIOZ multibeam collection	Netherlands	20070520	Bathymetry and Elevation	multi-beam echosounders
NIOZ multibeam collection	Netherlands	20070601	Bathymetry and Elevation	multi-beam echosounders
NIOZ multibeam collection	Netherlands	20080920	Bathymetry and Elevation	multi-beam echosounders

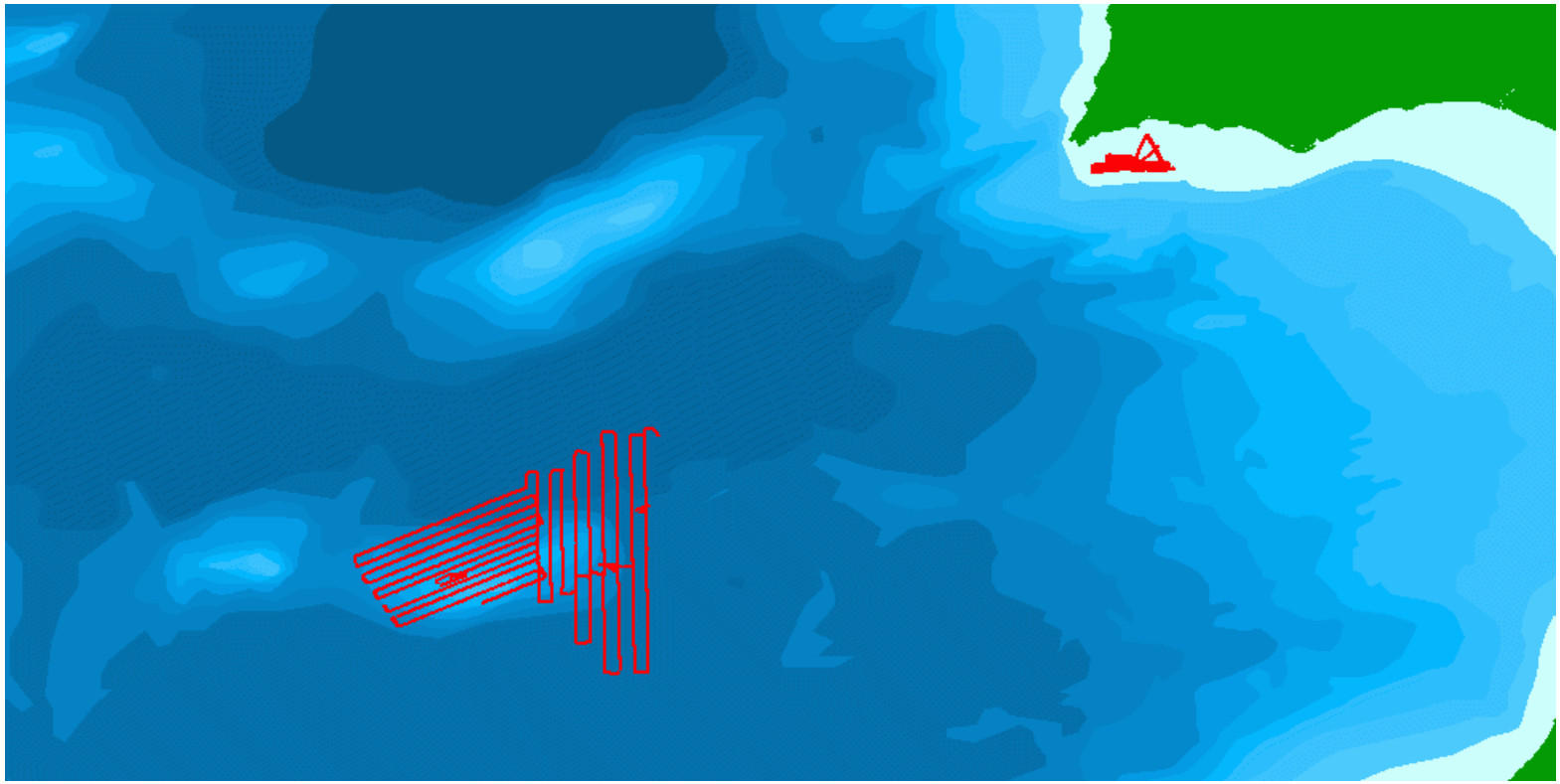
- **MARINE TECHNOLOGY UNIT. MEDITERRANEAN MARINE AND ENVIRONMENTAL RESEARCH CENTRE (CMIMA-UTM-CSIC) - Spain**



Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
HITS2001	Spain	20010910	Bathymetry and Elevation,Gravity,Side-scan sonar,Sound velocity and travel time in the water column	>2000 Hz top-bandwidth sub-bottom penetrator and mud profiler systems, gravimeters, multi-beam echosounders, sidescan sonars, sound velocity sensors

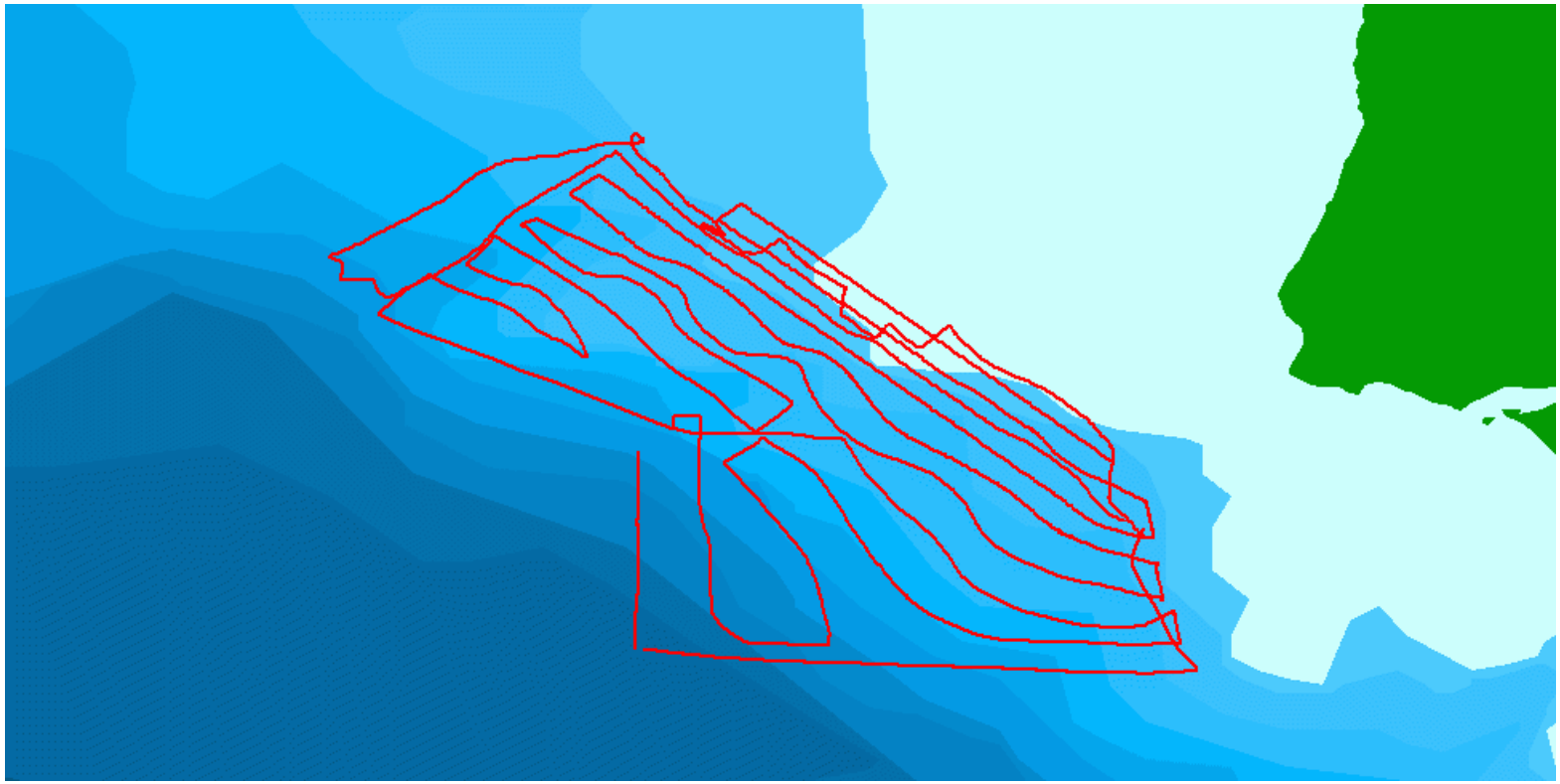
PARSIFAL2000	Spain	20000518	Active seismic refraction,Bathymetry and Elevation,Gravity,Magnetics,Sound velocity and travel time in the water column	>2000 Hz top-bandwidth sub-bottom penetrator and mud profiler systems, gravimeters, magnetometers, multi-beam echosounders, seismic refraction systems, sound velocity sensors
PICABIA2003	Spain	20030722	Bathymetry and Elevation,Seismic reflection,Sound velocity and travel time in the water column	>2000 Hz top-bandwidth sub-bottom penetrator and mud profiler systems, multi-beam echosounders, sound velocity sensors
SWIM2006	Spain	20060531	Bathymetry and Elevation,Gravity,Magnetics,Seismic reflection,Sound velocity and travel time in the water column	>2000 Hz top-bandwidth sub-bottom penetrator and mud profiler systems, gravimeters, magnetometers, multi-beam echosounders, multi-channel seismic reflection systems, sound velocity sensors

- **CNR, ISTITUTO DI SCIENZE MARINE (Sezione di Bologna) (CNR-ISMAR) - Italy**



Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
SOUTH_OF_PORTIMAO	Italy	20080801	Bathymetry and Elevation	Global Navigation Satellite System receivers, multi-beam echosounders
SVICENTE_LAGOS_CANYONS	Italy	20051002	Bathymetry and Elevation	Global Navigation Satellite System receivers, multi-beam echosounders

- **LNEG - NATIONAL LABORATORY OF ENERGY AND GEOLOGY (LNEG) - Portugal**



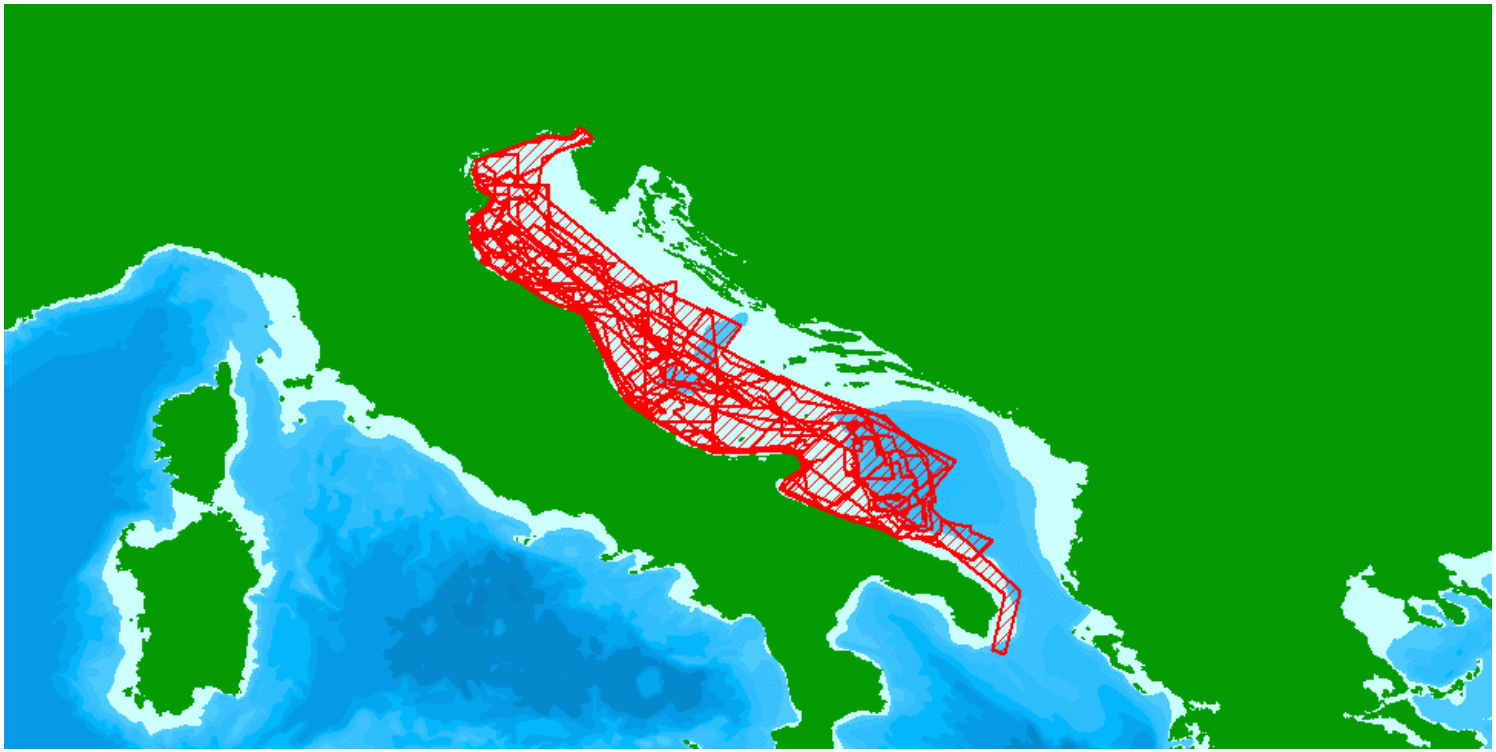
Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
ESTREMADURA_SPUR	Portugal	20070910	Bathymetry and Elevation	Global Navigation Satellite System receivers, multi-beam echosounders

Adriatic Sea

The data gathering for this region is coordinated by CNR-ISMAR with support of OGS. Survey data sets have been gathered from CNR-ISMAR (Italy), OGS (Italy), and SHOM (France).

The following tables and images give the necessary details.

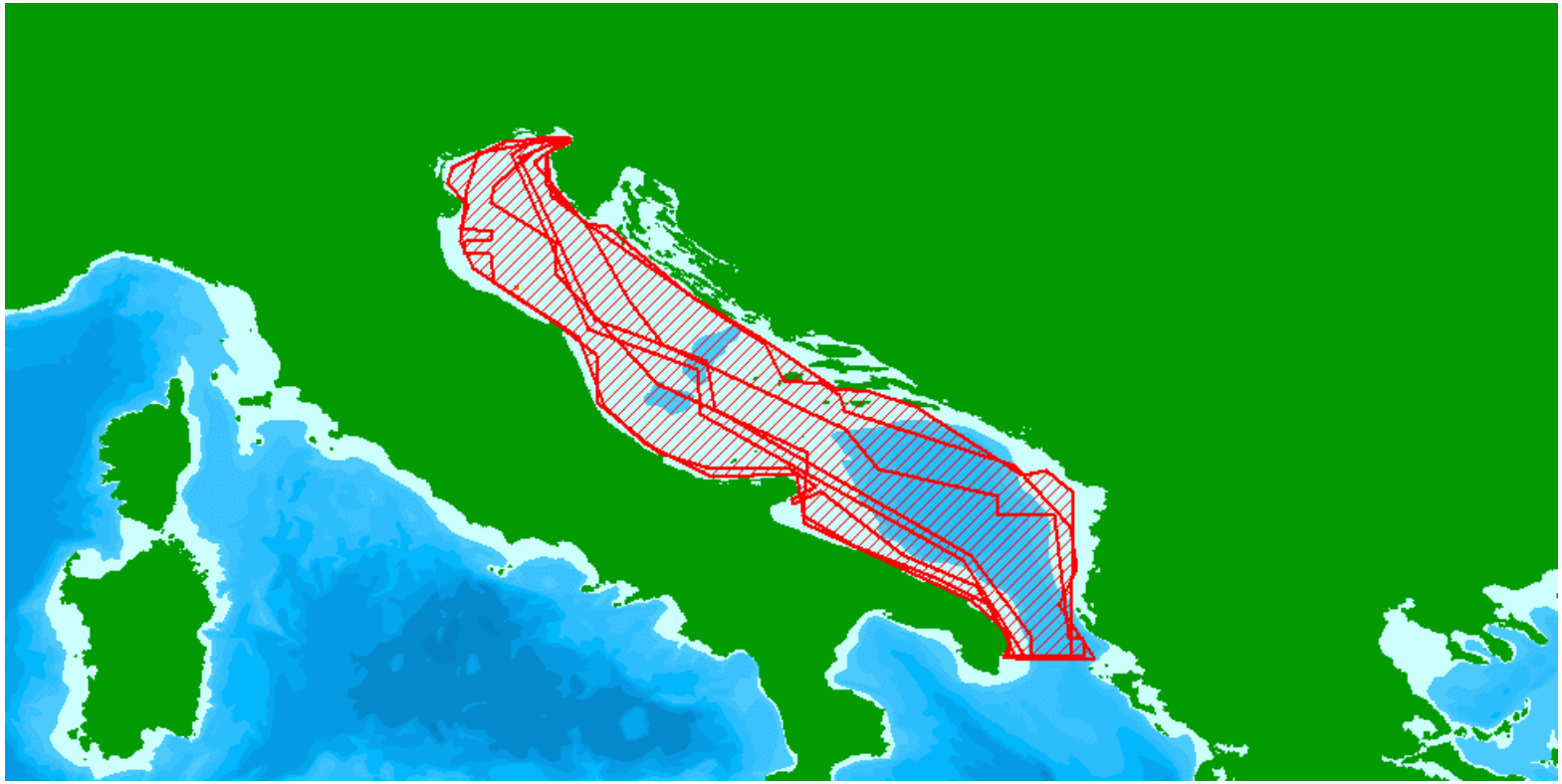
- **CNR, ISTITUTO DI SCIENZE MARINE (Sezione di Bologna) (CNR-ISMAR) - Italy**



Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
AMICI99	Italy	19990903	Bathymetry and Elevation	single-beam echosounders
AN97	Italy	19970521	Bathymetry and Elevation	single-beam echosounders
ARCADIA	Italy	20100313	Bathymetry and Elevation	multi-beam echosounders
BARCA2007	Italy	20070327	Bathymetry and Elevation	multi-beam echosounders
CM91	Italy	19910518	Bathymetry and Elevation	single-beam echosounders
CM92	Italy	19920521	Bathymetry and Elevation	single-beam echosounders
CM95	Italy	19950823	Bathymetry and Elevation	single-beam echosounders
CNR003	Italy	20030109	Bathymetry and Elevation	multi-beam echosounders
COSTA2000	Italy	20000428	Bathymetry and Elevation	single-beam echosounders
COSTA2001	Italy	20010504	Bathymetry and Elevation	single-beam echosounders
COSTA2002	Italy	20020412	Bathymetry and Elevation	single-beam echosounders
ERB01	Italy	20030227	Bathymetry and Elevation	single-beam echosounders
IMPACT09	Italy	20090316	Bathymetry and Elevation	multi-beam echosounders
MAGIC0409	Italy	20090401	Bathymetry and Elevation	multi-beam echosounders
RER96	Italy	19960627	Bathymetry and Elevation	single-beam echosounders
RER97	Italy	19970520	Bathymetry and Elevation	single-beam echosounders
RF93	Italy	19930728	Bathymetry and Elevation	single-beam echosounders
RF95	Italy	19950905	Bathymetry and Elevation	single-beam echosounders
SAGA03	Italy	20030613	Bathymetry and Elevation	single-beam echosounders
SASSI08	Italy	20080616	Bathymetry and Elevation	multi-beam echosounders
SETE06	Italy	20060506	Bathymetry and Elevation	multi-beam echosounders
STRATA04	Italy	20040721	Bathymetry and Elevation	single-beam echosounders
STRATA2005	Italy	20050327	Bathymetry and Elevation	multi-beam echosounders

VENICE2004	Italy	20040712	Bathymetry and Elevation	single-beam echosounders
VENICE2005	Italy	20050317	Bathymetry and Elevation	single-beam echosounders
YD97	Italy	19970912	Bathymetry and Elevation	single-beam echosounders

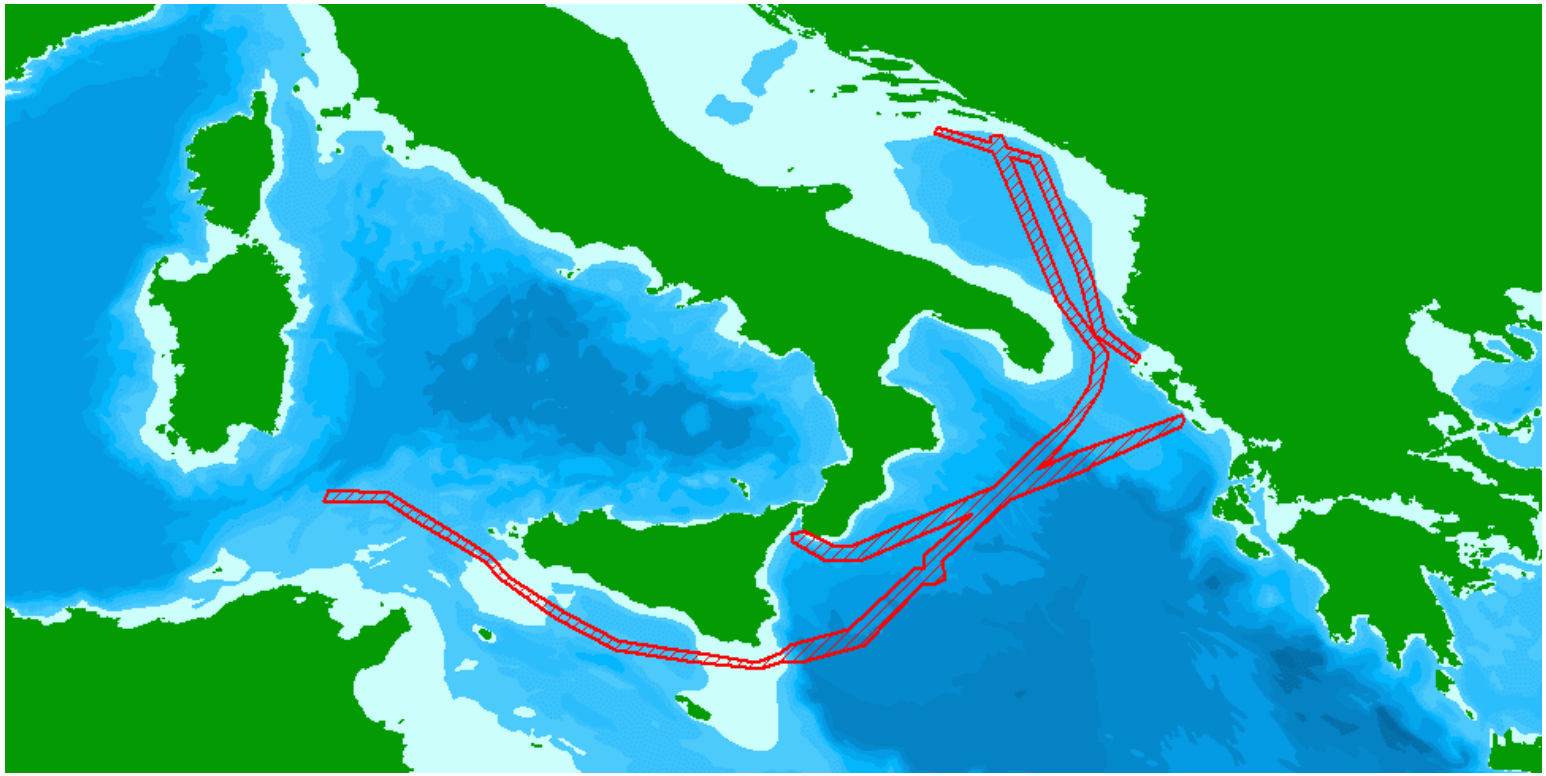
- **OGS, NATIONAL INSTITUTE OF OCEANOGRAPHY AND EXPERIMENTAL GEOPHYSICS, DEPARTMENT OF OCEANOGRAPHY (OGS) - Italy**



Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
MTPII-MATER/MAI2 AUG97	Italy	19970828	Air pressure,Air temperature,Atmospheric humidity,Bathymetry and Elevation,Date and	

			time,Electrical conductivity of the water column,Platform or instrument orientation,Visible waveband radiance and irradiance measurements in the atmosphere,Wind speed and direction	
MTPII-MATER/MAI3 DEC97	Italy	19971228	Air pressure,Air temperature,Atmospheric humidity,Bathymetry and Elevation,Date and time,Electrical conductivity of the water column,Platform or instrument orientation,Visible waveband radiance and irradiance measurements in the atmosphere,Wind speed and direction	
MTPII-MATER/MAI4 JAN98	Italy	19980109	Air pressure,Air temperature,Atmospheric humidity,Bathymetry and Elevation,Date and time,Electrical conductivity of the water column,Platform or instrument orientation,Visible waveband radiance and irradiance measurements in the atmosphere,Wind speed and direction	
MTPII-MATER/MAI5 MAR98	Italy	19980310	Air pressure,Air temperature,Atmospheric humidity,Bathymetry and Elevation,Date and time,Electrical conductivity of the water column,Platform or instrument orientation,Visible waveband radiance and irradiance measurements in the atmosphere,Wind speed and direction	
OGS - Single-beam (1965)	Italy	19650101	Bathymetry and Elevation	single-beam echosounders
OGS - Single-beam (1966)	Italy	19660101	Bathymetry and Elevation	single-beam echosounders
OGS - Single-beam (1967)	Italy	19670101	Bathymetry and Elevation	single-beam echosounders
OGS - Single-beam (1968)	Italy	19680101	Bathymetry and Elevation	single-beam echosounders
OGS - Single-beam (1972)	Italy	19720101	Bathymetry and Elevation	single-beam echosounders

- **SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE (SHOM) - France**



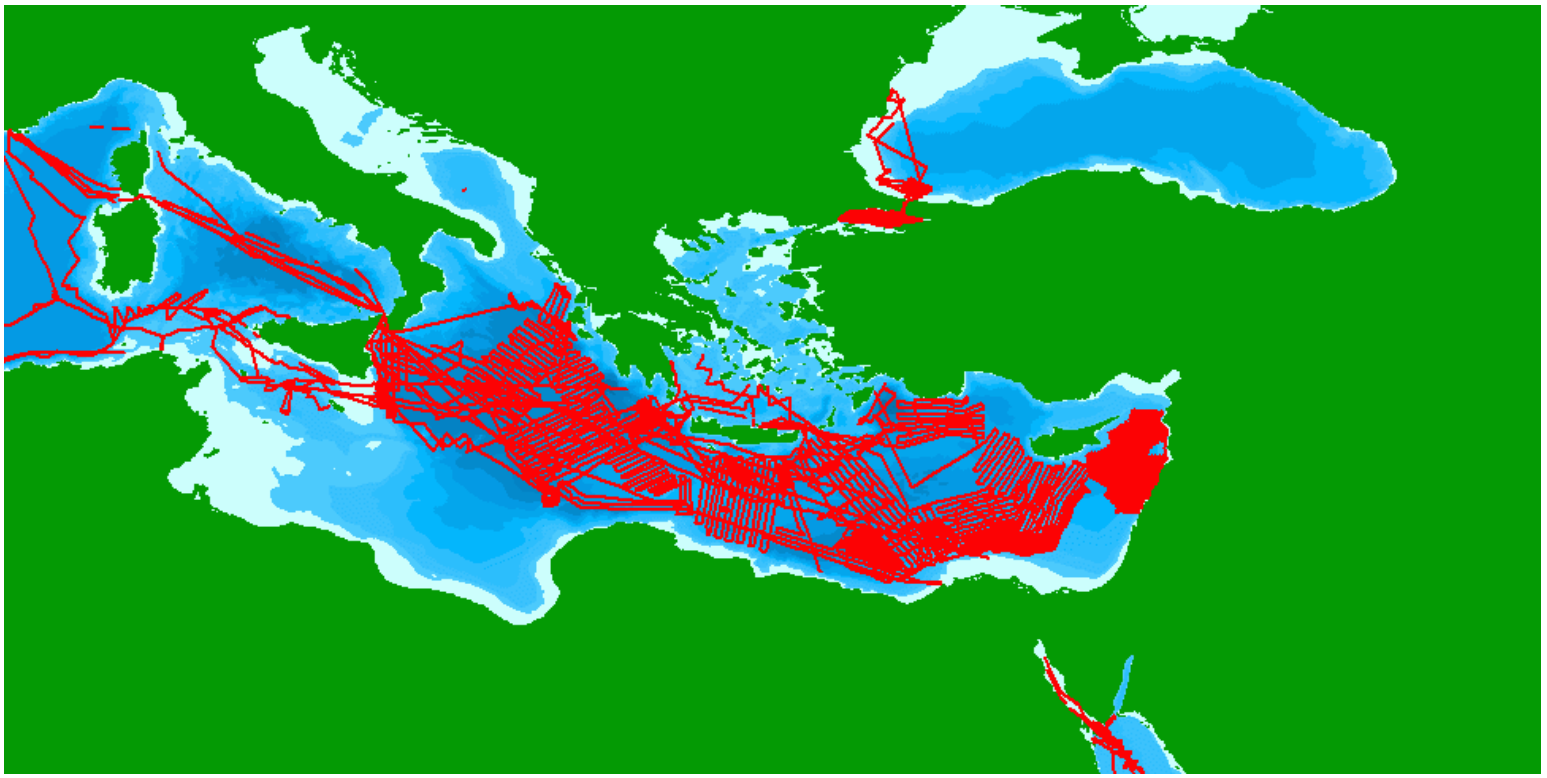
Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
540-S200709300-6	France	20070902	Bathymetry and Elevation	multi-beam echosounders

EASTERN MEDITERRANEAN - AEGEAN - LEVANTINE SEA

The data gathering for this region is coordinated by HCMR with support of IFREMER. Survey data sets have been gathered from IFREMER (France), SHOM (France), HCMR (Spain), NIOZ (Netherlands) and OGS-RIMA (Italy).

The following tables and images give the necessary details.

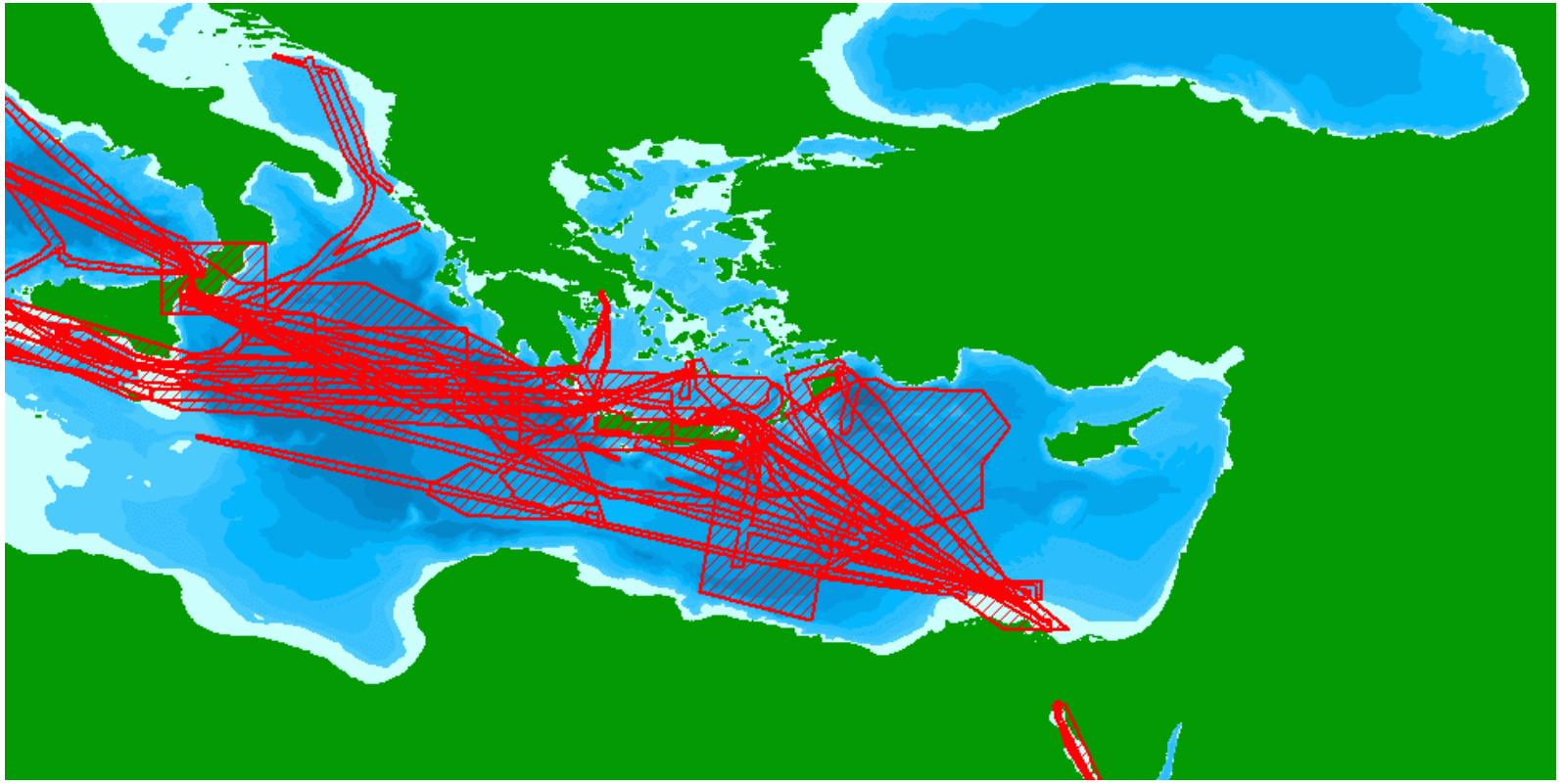
- **IFREMER - France**



Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
8419	France	19780928	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8420	France	19780826	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8421	France	19780905	Bathymetry and Elevation	Long Range Navigation version C receivers, Navy Navigation Satellite System receivers, Omega receivers, multi-beam echosounders
8422	France	19780919	Bathymetry and Elevation	Long Range Navigation version C receivers, Navy Navigation Satellite System receivers, Omega receivers, multi-beam echosounders
8423	France	19781015	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8433	France	19800122	Bathymetry and Elevation	Long Range Navigation version C receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
8483	France	19831120	Bathymetry and Elevation	Navy Navigation Satellite System receivers, multi-beam echosounders
8563	France	19881128	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, Navy Navigation Satellite System receivers, multi-beam echosounders
11824	France	19920710	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
11828	France	19920725	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
23355	France	19950703	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
30412	France	19950804	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
38466	France	19980128	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders

38467	France	19980213	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
64714	France	20001009	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
70560	France	20021019	Bathymetry and Elevation	Differential Global Positioning System receivers, NAVSTAR Global Positioning System receivers, multi-beam echosounders
82552	France	20030928	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
82776	France	20031029	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
84352	France	20030902	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
84377	France	20031118	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
84463	France	20030906	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
84477	France	20031004	Bathymetry and Elevation	Differential Global Positioning System receivers, multi-beam echosounders
145305	France	20030810	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders

- **SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE (SHOM) - France**

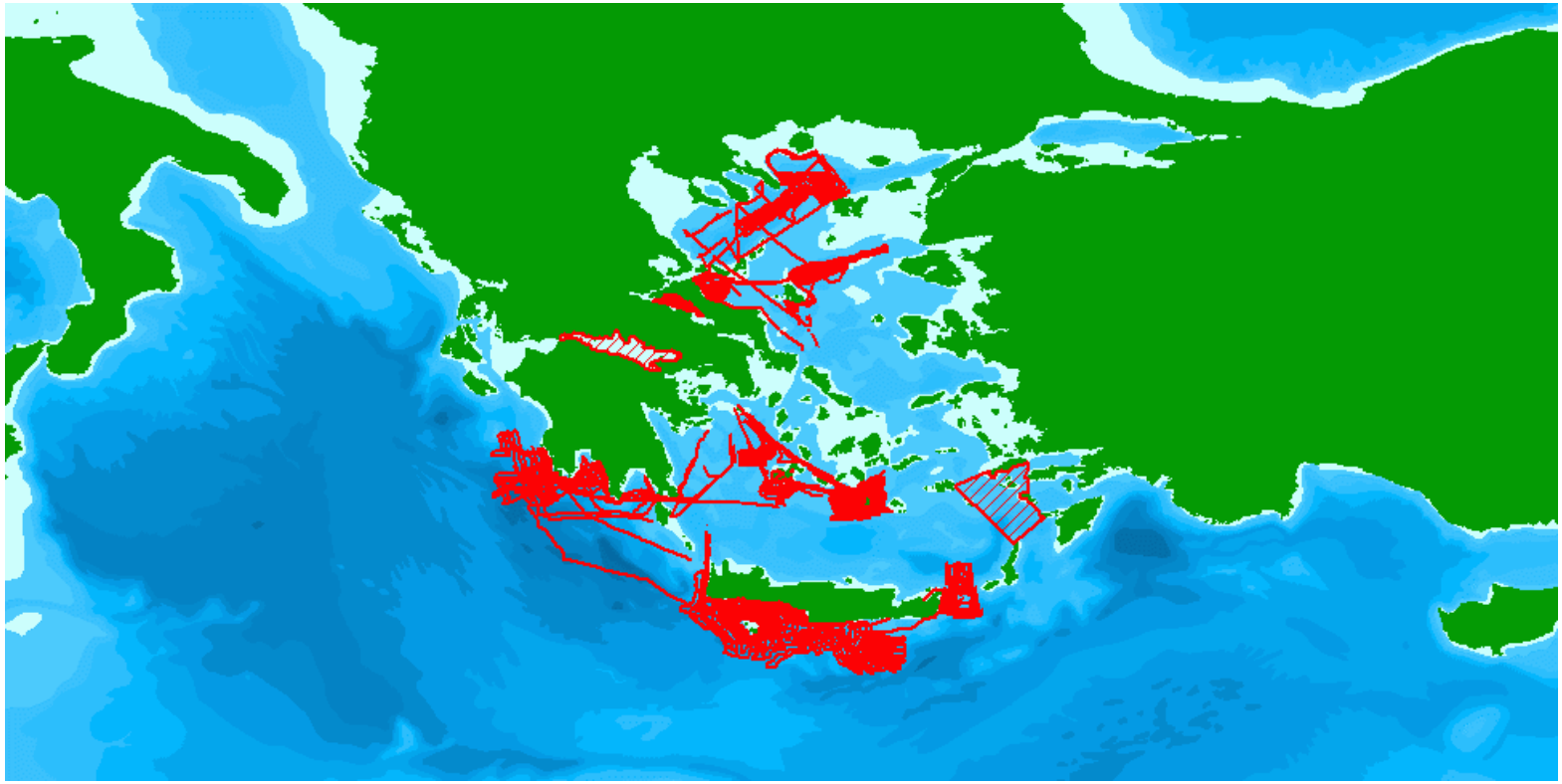


Data set name	"Country"	"Start date"	"Parameters measured"	"instrument / gear type"
540-S199103559-1	France	19910101	Bathymetry and Elevation	unknown
540-S199103568-1	France	19910101	Bathymetry and Elevation	unknown
540-S199103569-1	France	19910101	Bathymetry and Elevation	unknown

540-S199103571-1	France	19910101	Bathymetry and Elevation	unknown
540-S199103572-1	France	19910101	Bathymetry and Elevation	unknown
540-S199103573-1	France	19910101	Bathymetry and Elevation	unknown
540-S199103574-1	France	19910101	Bathymetry and Elevation	unknown
540-S199103575-1	France	19910101	Bathymetry and Elevation	unknown
540-S199103576-1	France	19910101	Bathymetry and Elevation	unknown
540-S199103578-1	France	19910101	Bathymetry and Elevation	unknown
540-S199700300-1	France	19940814	Bathymetry and Elevation	single-beam echosounders
540-S199801300-1	France	19970402	Bathymetry and Elevation	single-beam echosounders
540-S200002800-1	France	19990101	Bathymetry and Elevation	single-beam echosounders
540-S200302200-1	France	20020103	Bathymetry and Elevation	single-beam echosounders
540-S200502500-1	France	20041009	Bathymetry and Elevation	multi-beam echosounders
540-S200502500-2	France	20041009	Bathymetry and Elevation	multi-beam echosounders
540-S200504500-6	France	20030409	Bathymetry and Elevation	multi-beam echosounders
540-S200606100-1	France	20060410	Bathymetry and Elevation	multi-beam echosounders
540-S200607500-2	France	20061021	Bathymetry and Elevation	multi-beam echosounders
540-S200704900-10	France	20070223	Bathymetry and Elevation	multi-beam echosounders
540-S200704900-3	France	20070208	Bathymetry and Elevation	multi-beam echosounders
540-S200704900-4	France	20070202	Bathymetry and Elevation	multi-beam echosounders
540-S200704900-5	France	20070131	Bathymetry and Elevation	multi-beam echosounders
540-S200704900-6	France	20070130	Bathymetry and Elevation	multi-beam echosounders
540-S200709300-6	France	20070902	Bathymetry and Elevation	multi-beam echosounders
540-S200710900-1	France	20070405	Bathymetry and Elevation	multi-beam echosounders
540-S200710900-3	France	20070504	Bathymetry and Elevation	multi-beam echosounders

540-S200801600-1	France	20080103	Bathymetry and Elevation	multi-beam echosounders
540-S200801600-6	France	20080118	Bathymetry and Elevation	multi-beam echosounders
S200002800-1	France	19990101	Bathymetry and Elevation	single-beam echosounders

- **HELLENIC CENTRE FOR MARINE RESEARCH, INSTITUTE OF OCEANOGRAPHY (HCMR/IO) - Greece**



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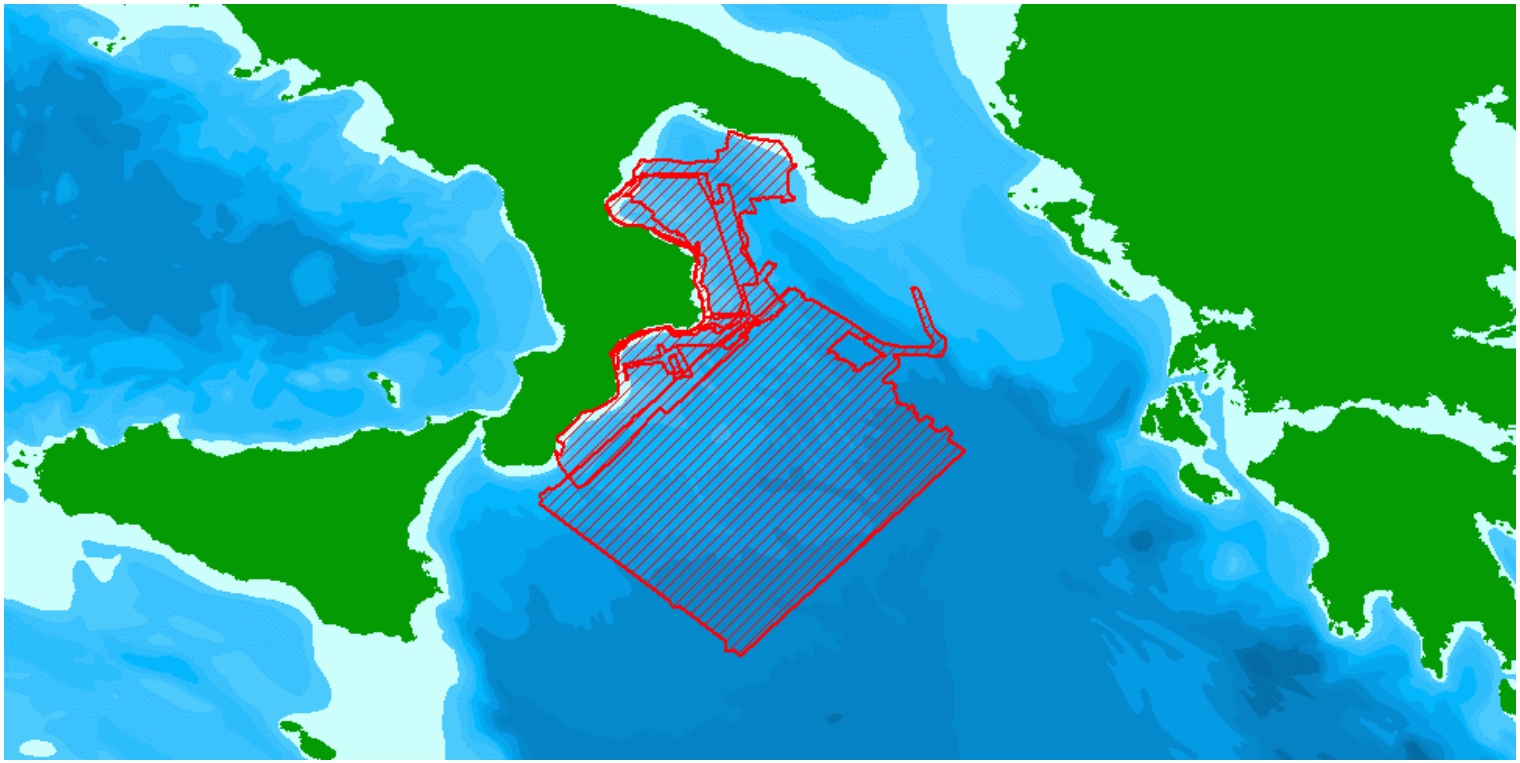
danaus200706	Greece	20070621	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
danaus200905	Greece	20090524	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders

falkonera200406	Greece	20040614	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
geowarn2000	Greece	20000101	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
Hermes200509	Greece	20050928	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
Hermes200605	Greece	20060519	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
km3net200602	Greece	20060215	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
km3net20060506	Greece	20060531	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
km3net200610	Greece	20061018	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
km3net200612	Greece	20061209	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
km3net200711	Greece	20071106	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
km3net2007b05	Greece	20070526	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
korinth	Greece	20010101	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
milos200111	Greece	20011115	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
milos200604	Greece	20060426	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
milos200705	Greece	20070529	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
milos200706	Greece	20070620	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-

				beam echosounders
milos200805	Greece	20080512	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
myrtoo200011	Greece	20001103	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
n_evia200401	Greece	20040121	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
naig200011	Greece	20001120	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
phaedra200606	Greece	20060626	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
santorini200111	Greece	20011108	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
skiros200204	Greece	20020406	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
skiros200309	Greece	20030922	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, multi-beam echosounders
Tsigrado200907	Greece	20090708	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, single-beam echosounders
Voudia200907	Greece	20090708	Bathymetry and Elevation	NAVSTAR Global Positioning System receivers, single-beam echosounders

- **OGS, NATIONAL INSTITUTE OF OCEANOGRAPHY AND EXPERIMENTAL GEOPHYSICS, DEPARTMENT FOR THE DEVELOPMENT OF MARINE TECHNOLOGY AND RESEARCH (OGS-RIMA) - Italy**



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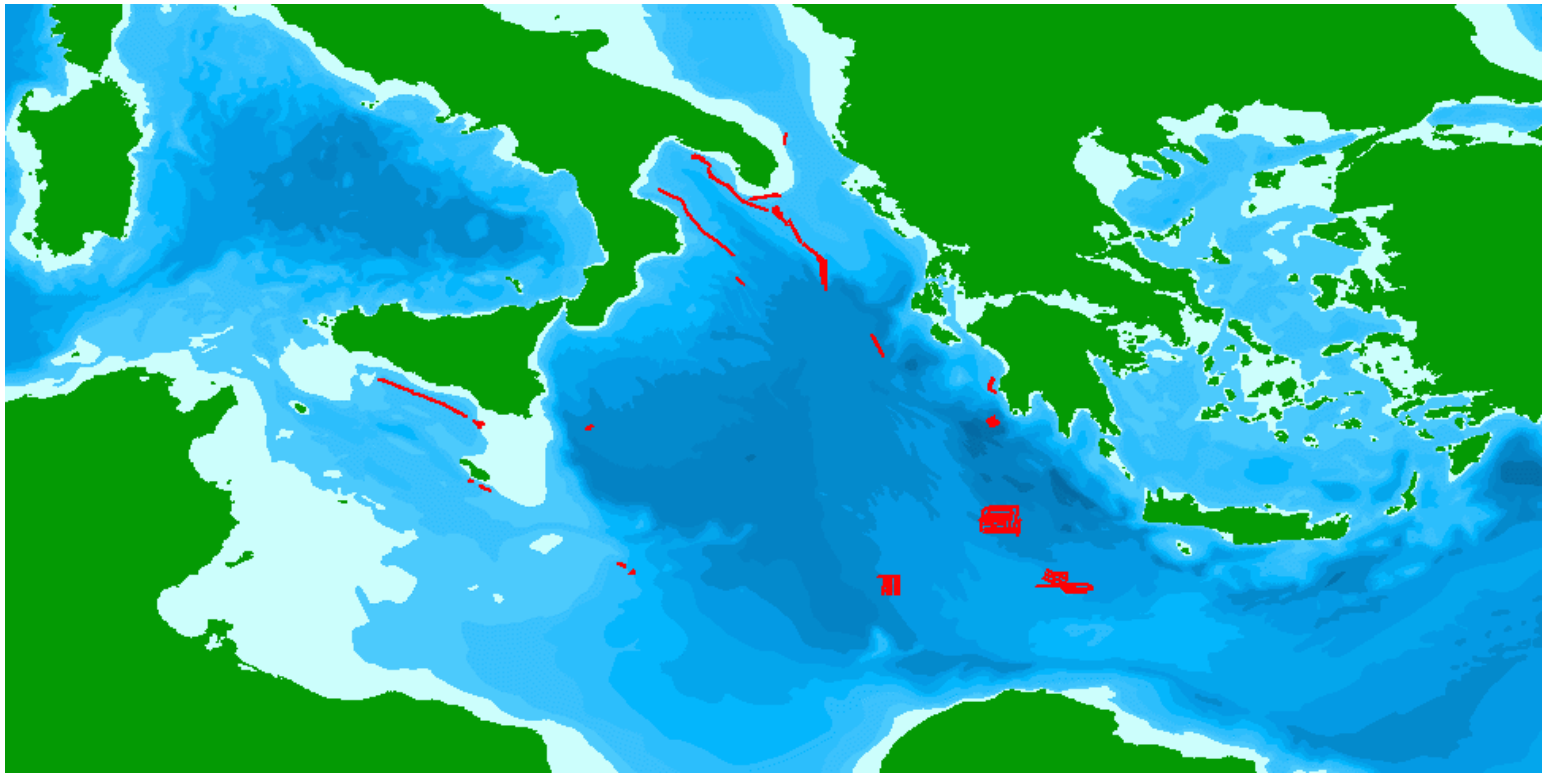
HERMES	Italy	20050701	Bathymetry and Elevation	multi-beam echosounders
MAGICOGS	Italy	20090331	Bathymetry and Elevation	multi-beam echosounders
MESC	Italy	20050902	Bathymetry and Elevation	multi-beam echosounders
WGDT	Italy	20050820	Bathymetry and Elevation	multi-beam echosounders

- **NIOZ ROYAL NETHERLANDS INSTITUTE FOR SEA RESEARCH (NIOZ) - The Netherlands**



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NIOZ multibeam collection	Netherlands	20081019	Bathymetry and Elevation	multi-beam echosounders
NIOZ multibeam collection	Netherlands	20091126	Bathymetry and Elevation	multi-beam echosounders
NIOZ multibeam collection	Netherlands	20091214	Bathymetry and Elevation	multi-beam echosounders