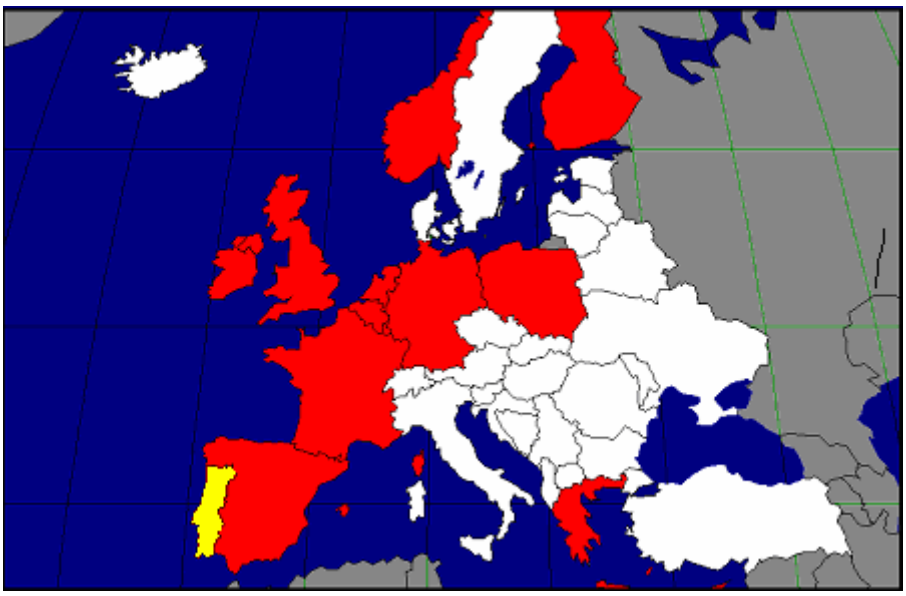
FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Compendium of Specialist Marine Research Infrastructures



Portugal

Under the Framework of the **MarinERA** project
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Compendium of Specialist Marine Research Infrastructures

PORTUGAL

1. Vessels (>30m) and related infrastructure

1.1 RV Noruega

The 47.5 m, **Noruega** is a former fishing vessel offered by Norway to Portugal and equipped to perform Oceanographic research in national coastal and high sea areas.

Construction year: 1978
Main areas of activity: Bioceanography and Fisheries
Operator: IPIMAR
Website: http://ipimar-iniap.ipimar.pt/navios/noruega.html

1.2. RV Capricórnio

The 46,55m **Capricórnio** is an Oceanographic research vessel in national coastal and high sea areas.

Construction year: 1968
Main areas of activity: Bioceanography and Fisheries
Operator: IPIMAR
Website: http://ipimar-iniap.ipimar.pt/navios/capricornio.html

1.3. RV D. Carlos I

The 68,2m **D. Carlos I** is a Hydrographic and Oceanographic research vessel in national coastal and high sea areas.

Construction year: 1989
Main areas of activity: Oceanography and other activities of support to the Scientific Community
Operator: IH – Hydrographic Institute.
Contact: navios@hidrografico.pt
Website: http://www.hidrografico.pt/hidrografico/navios/Navios_individualmnt/dcarlos.htm

1.4. RV Almirante Gago Coutinho

The 68,2m **Almirante Gago Coutinho** is Hydrographic and Oceanographic research vessel in national coastal and high sea areas.

Construction year: 1985
Main areas of activity: Oceanography, Seismology and other activities of support to the Scientific Community
Operator: IH – Hydrographic Institute.
Contact: navios@hidrografico.pt
Website: Almirante Gago Coutinho

1.5. RV Auriga

The 31,5m **Auriga** is a Coastal and Estuaries research vessel.

Construction year: 1987
Main areas of activity: Coastal and Estuarine research
Operator: IH – Hydrographic Institute.
Contact: navios@hidrografico.pt
Website: RV Auriga

1.6. RV Andrómeda

The 31,5m **Andrómeda** is a Coastal and Estuaries research vessel.

Construction year: 1985
Main areas of activity: Coastal and Estuarine research
Operator: IH – Hydrographic Institute.
Contact: navios@hidrografico.pt
Website: RV Andrómeda

1.7. RV Arquipélago

The 27m **Arquipélag***o* is a Oceanographic and fisheries research vessel, based in the Azores Islands.

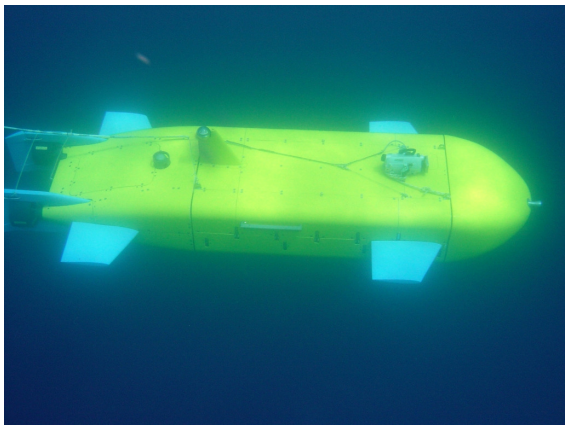
Construction year: 1993
Main areas of activity: Oceanography and fisheries
Operator: DOP/Uaç - Department of Oceanography and Fisheries of the University of the Azores.
Contact: marlene@notes.horta.uac.pt
Website: Arquipélago

1.8. Submersible **Lula**

Lula is an autonomous manned submersible vehicle, based in the Azores islands.

Construction year: 2000
Operator: Foundation Rebikoff-Niggeler
Contact: info@rebikoff.org
Website: http://www.rebikoff.org/lula_e.php

1.9. AUV **INFANTE**– IST/ISR



INFANTE is an autonomous underwater vehicle (AUV), designed and built in Portugal by IST/ISR. The AUV is an experimental testbed for the development of technologies for ocean exploration. It is also a versatile platform capable of carrying advanced sensor suites for the acquisition of ocean data in a purely automatic mode.

Construction year: 2002
Operator: Instituto Superior Técnico (IST), through its Institute for Systems and Robotics (ISR)
Contact: António Pascoal (antonio@isr.ist.utl.pt)
Website: http://www.isr.ist.utl.pt

1.10. ASV **DELFIM** – IST/ISR

DELFIM is an autonomous surface vessel (ASV) for automatic acquisition of ocean data. The ASV is routinely used for bathymetric operations in coastal areas.

Construction year: 1999
Operator: Instituto Superior Técnico (IST), through its Institute for Systems and Robotics (ISR)
Contact: António Pascoal (antonio@isr.ist.utl.pt)
Website: http://www.isr.ist.utl.pt

1.11. ASV **DELFIM$_X$** – IST/ISR

DELFIM$_X$ is the successor of the DELFIM autonomous surface vessel (ASV), designed for increased autonomy and improved hydrodynamic characteristics.

Construction year: 2004
Operator: Instituto Superior Técnico (IST), through its Institute for Systems and Robotics (ISR)
Contact: António Pascoal (antonio@isr.ist.utl.pt)
Website: http://www.isr.ist.utl.pt

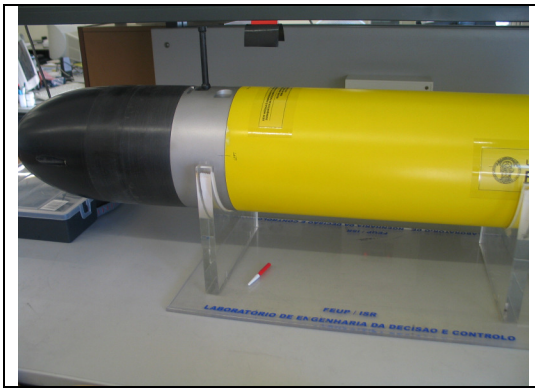
1.12. ASV **CARAVELA** 2000 – Consortium Caravela

SCALED MODEL

CARAVELA is a long-range autonomous surface vessel (ASV) for automatic acquisition of ocean data. The vessel is capable of navigating without constant human supervision for extended periods of time. It carries a large submerged body for the installation of acoustic sensor suites.

Construction year: 2001
Operator: CARAVELA consortium – IMAR/DOP/UAzores, RINAVE. IST, CONAFI.
Contact: Ricardo Santos (IMAR/DOP, ricardo@notes.horta.uac.pt) and António Pascoal (IST/ISR, antonio@isr.ist.utl.pt)
Website: http://www.horta.uac.pt/ and http://www.isr.ist.utl.pt

1.13. AUV ISR U. Porto



Construction year: 2005
Operator: Faculdade de Eng. da Universidade do Porto
Contact: João Tasso F. Borges de Sousa (jtasso@fe.up.pt)
Website:
http://paginas.fe.up.pt/lsts/lsts_www/English/index.html

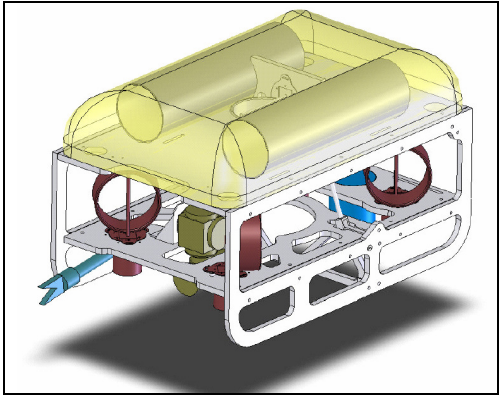
1.14. AUV **Isurus** U. Porto

Construction year: 1998
Operator: Faculdade de Eng. da Universidade do Porto
Contact: Fernando Lobo Pereira (flp@fe.up.pt)
Website:
http://paginas.fe.up.pt/lsts/lsts_www/English/auv.html

1.15. ROV I U. Porto

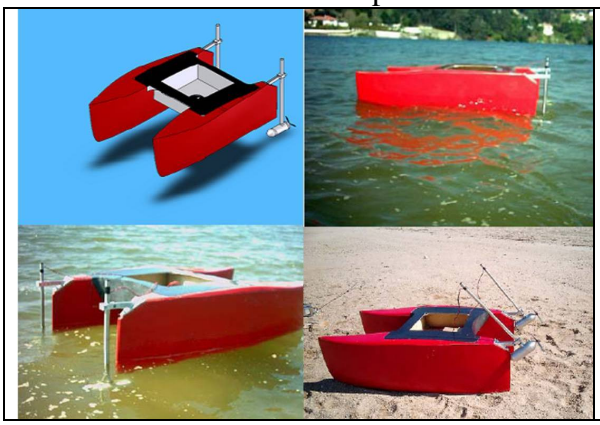
Construction year: 2002
Operator: Faculdade de Eng. da Universidade do Porto
Contact: Fernando Lobo Pereira (flp@fe.up.pt)
Website: http://paginas.fe.up.pt/lsts/

1.16. ROV II U. Porto



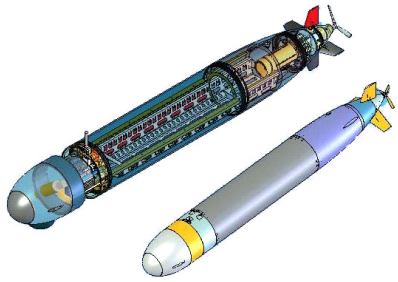
Construction year: 2006
Operator: Faculdade de Eng. da Universidade do Porto
Contact: João Tasso F. Borges de Sousa (jtasso@fe.up.pt)
Website: http://paginas.fe.up.pt/lsts/

1.17. ASV **Roaz** Isep



Construction year: 2006
Operator: Instituto Superior de Engenharia do Porto
Contact: Eduardo Pereira da Silva (eaps@lsa.isep.ipp.pt)
Website: http://lsa.isep.ipp.pt/

1.18. AUV Light U. Porto



Construction year: 2006
Operator: Faculdade de Eng. da Universidade do Porto
Contact: João Tasso F. Borges de Sousa (jtasso@fe.up.pt)
Website: http://paginas.fe.up.pt/lsts/

1.19. ROSETTE SAMPLER (12l bottles)

Rosette is a water sampler. It's a metallic structure with 12 Niskin bottles (12l each), depth sensor (6000m) and 6 thermometers of inversion (3 protected and 3 not protected). Attached to the Rosette exists a CTD (Conductivity, Temperature, Depth), that permits the assessment of temperature and salinity variations according to the depth.

Operator: Department of Marine Geology - INETI
Contact: Fátima Abrantes (fabrantes@pro.softhome.net)
Website: http://www.ineti.pt/UO/UO/?UO=145&subUO=0

1.20. BOX-CORER

This sampler is a standard version of the Oktopus GmbH, with a square section of 50 by 50 cm (0.25m2). Allows a sampling with a maximum volume of 0.125 m3 of superficial sediments (up to 50 cm deep) with a good preservation of the sediment-water interface. Contains a removable lateral panel, which permits the visualization of the sedimentary structure.

Operator: Department of Marine Geology - INETI
Contact: Fátima Abrantes (fabrantes@pro.softhome.net)
Website: http://www.ineti.pt/UO/UO/?UO=145&subUO=0

1.21. MULTI-CORER

This equipment permits the simultaneous collection (up to 6 tubes) of non-disturbed sedimentary sequence (up to 60 cm de deep) and of the respective sediment-water interfaces. It is mostly used in areas of thin sediments for high-resolution studies.

Operator: Department of Marine Geology - INETI
Contact: Fátima Abrantes (fabrantes@pro.softhome.net)
Website: http://www.ineti.pt/UO/UO/?UO=145&subUO=0

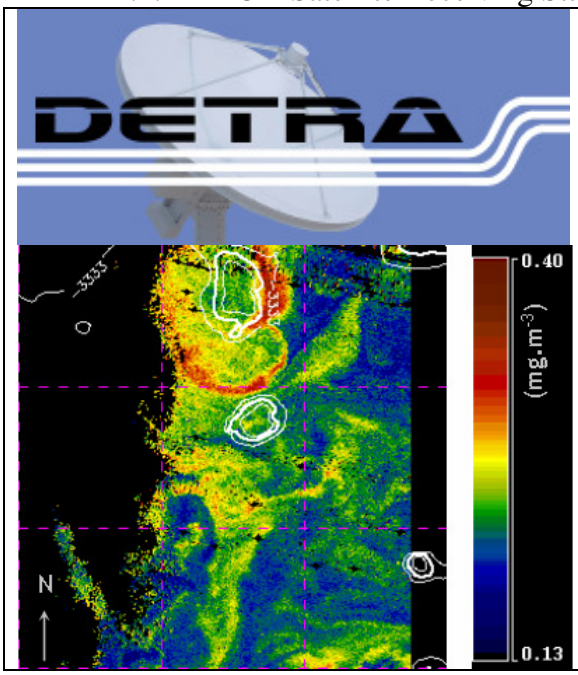
2. Observing and monitoring system

2.1. CPR – Continuous Plankton Recorder

CPR Iberian line is being monthly sampled. Database is available since 1946.

Construction year: Supported by IPIMAR from 2002 until 2006
Operator: SAHFOS, UK
Contact: Teresa Moita (tmoita@ipimar.pt)
Website: http://192.171.163.165/

2.2. HAZO – Satellite Receiving Station



High Resolution Picture Transmission (HRPT) receiving and processing station for Advanced Very High Resolution Radiometer (AVHRR) and Sea-viewing Wide Field-of-view Sensor (SeaWiFS) satellite sensors installed in the Azores (HAZO station) is a key tool to study the variability and trends of Sea Surface Temperature (SST) and Ocean Colour (OC) in the NE Atlantic.
The HAZO station is installed in Horta (Faial, Azores). Since 2001, the HAZO station daily receives SeaWiFS and AVHRR images from SeaStar, NOAA-12, -14 and -16, respectively. NOAA-17 is recorded since 2002. Image processing routines from the reception to the delivery of geophysical data is automated. Sea Surface Temperatures (SST) and chlorophyll a concentrations (chl a). Remnant cloudiness present in NOAA imagery is cleaned.

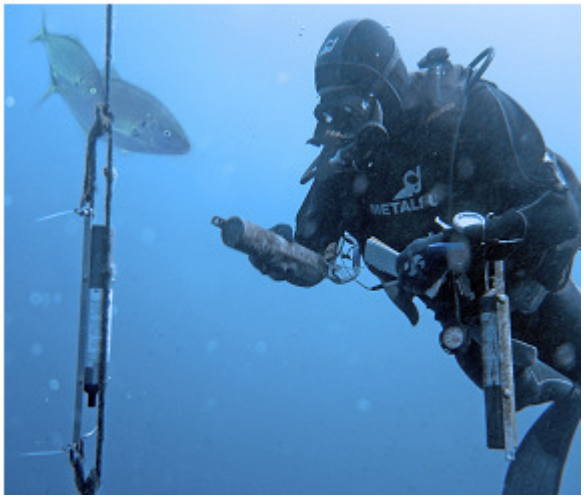
Contact: anamartins@notes.horta.uac.pt
Website: www.horta.uac.pt

2.3. MONICAP

MONICAP is a monitoring system developed by the Institute of Systems and Computer Engineering, for the inspection of fishing activities using GPS (Global Positioning System) for the geographical positioning and Inmarsat-C for satellite communications between the vessels and a control center. The MONICAP system was industrialised and is installed presently (or in installation phase) in more than 800 fishing ships that operate under control of Portugal, Spain, France, Ireland and Angola. For each one of these countries was also developed and supplied a Control Centre, which allows the geographical visualisation of the ships and control of its movements and activities.

Website:
http://www.inov.pt/eng/systems/system/e_monicap1.html
Contact: inov@inov.pt

2.4. Acoustic Underwater Telemetry Array



A network of moored submersed stations equipped with acoustic receivers for long-term monitoring studies of organisms tagged with acoustic transmitters. The network is of extreme usefulness for studies of habitat use, migrations and physiology of aquatic organisms, with subsequent relevant applications such as design of marine reserves, assessment of climatic changes and new findings of organismal adaptations to the environment. The network comprises 24 VR2 (VEMCO, Ltd., Hallifax, Canada) receivers with 15 month deployment, but its capacity is under expansion to include several new generation VR3 receivers with capacity for over five year permanent deployment and remote data download by acoustic link. This will significatively augment the network's capacity to cover deeper habitats (down to 300 metres).

Website: www.horta.uac.pt
Contact: ricardo@notes.horta.uac.pt

2.5. Mobile Lab

Mobile lab for monitoring contaminants along Portuguese continental coast.

Construction year: 2002
Operator: IPIMAR
Contact: Miguel Caetano (mcaetano@ipimar.pt)
Website: http://ipimar-iniap.ipimar.pt/

2.6. IOFCUL satellite receiving station

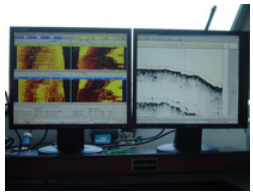
Data from the AVHRR sensor aboard the NOAA satellites are acquired and processed in this facility. A database with over 15 years of Sea Surface Temperature of the Iberian coastal region is available for studies on the dynamics of the Coastal Zone and for climate-related studies.

Construction year: 1991
Contact: Isabel Ambar (iambar@fc.ul.pt)
Website: www.io.fc.ul.pt/fisica

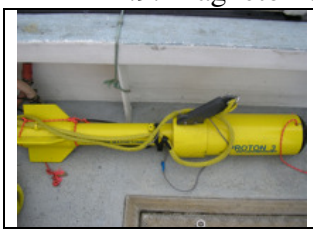
2.7. QTC VIEW Series IV

	**QTC VIEW Series IV**: Acoustic ground discrimination system. Consists of hardware and acquisition software designed to operate with a simple or double frequency single beam echo-sounder. Seabed classification is accomplished through software analysis of the acquired echoes, in real time or post-processing. **Operator**: CESAM and Department of Biology – University of Aveiro **Contact**: Victor Quintino (vquintino@bio.ua.pt)

2.8. Edgetech 512i

 	**Edgetech 512i**: Combined sidescan sonar (double frequency: 100/400kHz) and sub-bottom chirp profiler (0.5 to 12KHz). Tow cable of 100 m. J-Star and SonarWeb acquisition and processing software. **Operator**: CESAM and Department of Geosciences, University of Aveiro **Contact**: Luís Menezes Pinheiro (lmp@geo.ua.pt)

2.9. Magnetometer - Proton 3

	**Magnetometer - Fishers Proton 3**: Proton Magnetometer. Resolution: 1nT. Tow cable: 30 m. **Operator**: CESAM – University of Aveiro **Contact**: Luís Menezes Pinheiro (lmp@geo.ua.pt)

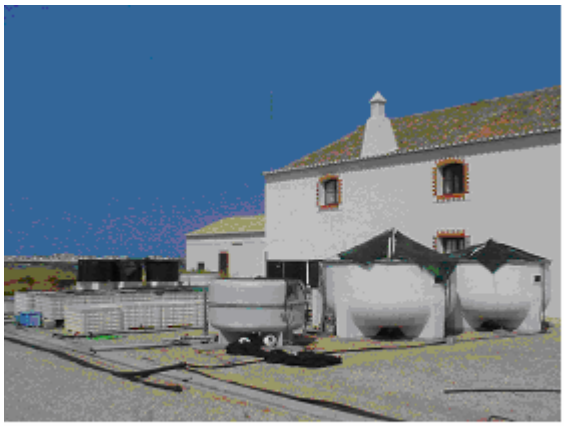
3. Fixed large scale facilities

3.1. LabHorta

LabHorta is a laboratory to conduct experiments with organisms of deep-sea hydrothermal vents (namely mollusks), which are kept under controlled conditions, including hyperbaric chambers. It was created to support and expand the capacity of research cruises and the experimental studies of the biology, physiology and behaviour of deep-sea hydrothermal vent fauna and taxa from other deep-sea environments. The Genetics and Histology Laboratory and the Ecotoxicology Laboratory are part of the LabHorta facility. The main equipments in the Genetics and Histology Laboratory include refrigerated ultra-centrifuge, ultra-freezer, PCR mini-cycler and other protein and DNA electrophoresis equipment. The Eco-toxicology Laboratory is equipped with a HPLC, molecular absorption spectrophotometer, atomic absorption spectrophotometer, spectrofluorometer and diverse auxiliary equipment (e.g. precision balances, conductivimeters).

Website: www.horta.uac.pt
Contact: acolaco@notes.horta.uac.pt

3.2. Marine Stations / Aquaculture facilities



Ramalhete Marine Station, Faro, Portugal

The Ramalhete Marine Station is located adjacent to one of the main channels of Ria Formosa, next to Faro international airport, 8km from the city and 4 km from the University if Algarve, Campus de Gambelas, with good access. It consists of 4 hectares of a salt pan system and a recovered warehouse which provided support to the artisan tuna fishery. The ground floor houses 500 m2 of tank facilities and includes installations for phyto- and zooplankton culture, 4 rooms for special needs, including behavioral studies and environmental control, a wet laboratory. The top floor houses a 100m2 header tank that stores seawater pumped directly from a settlement tank that receives tidal water directly from the Ria Formosa. Well water is used to regulate salinity. The top floor houses dry labs, meeting room, office space, a kitchenette, clock room and bathroom. An outdoor area of 900 m2 provides space for larger volume tanks and other needs. The station has been used mostly for projects related to fish, cephalopods and algae, but is able to accommodate most organisms from the biogeographic area. Among the species that have been grown indoors are the algae Fucus vesiculosus, the fishes Sparus aurata, Dicentrarchus labrax, Salaria pavo, Fundulus heteroclitus, Oreochromis mossambicus, Solea senegalensis, Epinephelus marginatus, Epinephelus aeneus and Pagrus pagrus larvae, the cephalopod mollusc Sepia officinalis, the phytoplankton Isochrysis galbana clone tahitiana, Tetraselimis chuii, Tetraselmis suecica, Platymonas spp., the zooplankton copepods Euterpina acutiflans, Acartia tonsa, Tisbe furcata and rotifers Brachionus plicatilis e B. rotundiformis. In the outside ponds a range of organisms grow and they function as large mesochosms for experimental studies.

Website: www.ualg.pt/ccmar
Contact: ramalhete@ualg.pt

3.3. European Wave Pilot Plant at the island of Pico

The European pilot plant at the island of Pico (Azores) is a grid-connected wave energy shoreline device with a rated power of 400 kW. It was designed, as well, to be used an experimental facility at full scale. The power plant is equipped with a horizontal-axis Wells turbine-generator set and with a generator of the wound rotor, induction type, capable of operating over a relatively wide range of speeds. The plant is equipped with two different valves: a fast-acting valve for the start and stop procedures or emergency situations and a sluice gate to isolate the turbine and duct system for maintenance operations or in very stormy situations. In order to prevent the flow rate through the turbine from becoming excessive, a controlled by-pass valve is located on the roof of the chamber.
The Wave Energy Centre, a private non-profit association located in Lisbon, Portugal, manages the European Wave Pilot Plant.

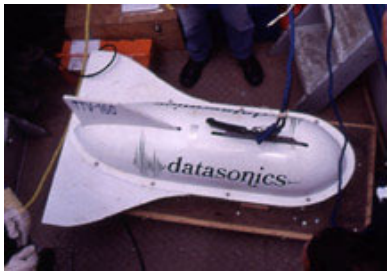
Website: www.wave-energy-centre.org
Contact: mail@wave-energy-centre.org

3.4. Laboratory of Marine Geology –DGM-INETI

The Laboratory of Marine Geology of the National Institute of Engineering, Technology and Innovation (INETI), is specially equipped for work in the fields of sediments and micropaleontology. Performs element analysis and detailed sediment grain-size determinations (Coulter, Sedigraf).

Operator: Department of Marine Geology - INETI
Contact: Fátima Abrantes (fabrantes@pro.softhome.net)
Website: http://www.ineti.pt/UO/UO/?UO=145&subUO=0

3.5. Laboratory of Marine Geophysics –DGM-INETI



The Laboratory of Marine Geophysics of the National Institute of Engineering, Technology and Innovation (INETI), is specially equipped for work in the fields of software development (e.g. BoomDirec system for acquisition and digitalisation of seismic data, and Geophysics campaigns.

Operator: Department of Marine Geology - INETI
Contact: Fátima Abrantes (fabrantes@pro.softhome.net)
Website: http://www.ineti.pt/UO/UO/?UO=145&subUO=0

3.6. Maritime Hydraulics Laboratory - LNEC

A Wave Flume for 2-D tests, with active wave absorption.

A Wave Basin for 3-D tests.

SAM Control & Acquisition Software

The Hydraulics and Environment Department of LNEC owns a testing hall for maritime hydraulic tests with an area of 6,500 square metres, which is mostly occupied with testing flumes and basins for hydraulic model.

Basins are used for three-dimensional studies of structure stability and wave penetration and flumes are used for 2-D stability and overtopping tests of maritime structures.

The main testing facilities at the Maritime Hydraulics Laboratory managed by the Division of Ports and Maritime Infrastructures are:

- Wave basin, 16.2 x 6.8 m²;
- Wave basin, 38.1 x 15.7 m²;
- Wave basin, 44.0 x 23.0 m²;
- Wave basin, 30.0 x 19.6 m²;
- Four mobile, 6.0 m long, irregular wave generators for use in the wave basins (maximum water depth: 50 cm);
- Two mobile, 6.0 m long, irregular wave generators for use in the wave basins (maximum water depth: 80 cm);
- Regular wave flume, 60 cm wide, 38.0 m long
- Irregular wave flume, 1.6 m wide, 49.4 m long, that may be fitted with a wind-generating system;
- Irregular wave flume, 3.0 m wide, 73.0 m long, with an enlarged 11.0 x 3.0 m² section in which three-dimensional stability tests may be performed. This flume is equipped with a rolling platform crane and it can be divided in three sections;
- Large 3-movement rolling platform, which serves 30% of the testing hall;

There exist three motor pump groups for the basin irregular wave generators, which make it possible to perform three simultaneous three-dimensional tests.

In the testing hall there is a Control Room where a centralised control of the entire irregular wave flumes and basins resides. This Control Room also receives all electric signals that convey information from models (resistive probes, force and movement sensors, video, intercoms).

All flumes and basins are controlled by the SAM computer software package which is also used for the characterization and numerical and physical simulation of sea waves. This integrated software package was recently upgraded with an active wave absorption system (AWASYS, University of Ghent, Belgium) that was embedded into an already existing SAM module. This new module enables real-time paddle compensation of unwanted reflected waves produced by either the model being tested or the paddle itself.

Website: http://www.lnec.pt;
http://www.dha.lnec.pt/npe/english/equipment.html

Contact: acovas@lnec.pt; jasantos@lnec.pt;rcapitao@lnec.pt

3.7. Experimental Facility for Cohesive Sediment Studies - LNEC

Annular Flume

Set-up for consolidation tests,
settling column

Laser diffractometer

Cohesive sediments are mixtures of clay, silt and organic matter, widely found in estuarine environments. In order to study the physical processes that control cohesive sediment dynamics, an experimental facility has been developed by the Hydraulics and Environment Department of LNEC.

The experimental facility includes:

- An **annular flume** to simulate cohesive sediment transport and to evaluate critical bed shear stresses for erosion and deposition;
- A **set-up for consolidation tests** to study the sediment properties during the consolidation process and to evaluate the effective stress and the permeability through time;
- A laboratory **settling column** to study the sedimentation process of suspended particles and to evaluate the mean settling velocity of a suspension;
- A **laboratory** for cohesive and non-cohesive sediment characterization.

The annular flume consists of a rotating circular channel with a lid at the surface. Both elements rotate independently in opposite directions in order to avoid secondary flows. The flume has a mean external diameter of 3.7 m, a width of 0.30 m and a variable water depth between 0.39 and 0.47 m. The flume simulates different hydrodynamic conditions, including steady and periodic flows. During the experiments, the suspended sediment concentration is measured by an optical probe (OSLIM).

The set-up for consolidation tests consists of 5 columns with a height of 3 m and an external diameter of 0.20 m, installed in a dark, temperature controlled chamber (T<10ºC). The columns are filled with water-sediment mixtures. Density profiles in each column are obtained through a gama-densimeter, with a 137Cs source, mounted in a moving frame. Pore pressure profiles are obtained through differential pressure transducers installed at different levels.

The laboratory settling column has a height of 2.5 m and an external diameter of 0.12 m. It is equipped with 10 sampling outlets, at different levels, simultaneously operated by electromagnetic valves. During the tests, samples are collected, at defined time steps, into small containers installed in a rotating supporting device. The concentration of each sample is evaluated by a gravimetric method. Concentration profiles allow the calculation of settling velocities.

This laboratory includes equipment to perform several sedimentological analyses, such as: Determination of silt-clay content; Determination of suspended sediment concentration by a gravimetric method; Grain size analysis of sandy sediments by dry sieving; Particle size analysis of fine sediments by laser diffraction.

Websites: http://www.lnec.pt
http://www.dha.lnec.pt/nec/english/equipment.html

Contact:
afortunato@lnec.pt;lportela@lnec.pt;pfreire@lnec.pt

3.8. IOFCUL Geophysical Fluid Dynamics rotating tables

Two rotating platforms are being equipped with, respectively, a 1-m diameter and a 0.3-m diameter tanks, including measurement and visualization capabilities. The facility will enable studies of the effects of rotation and stratification on geophysical fluid dynamics.

Construction year: 2002/03 (ongoing)
Contact: Nuno Serra (nserra@fc.ul.pt)
Website: www.io.fc.ul.pt/fisica

4. Airborne infrastructure

4.1. Unnamed Air Vehicle

This Advanced Ceramics Research UAV is a vehicle for environmental missions specially dedicated to monitoring marine life and oil spills

General features:Up to 24h autonomy (in 2004); Digital camera ; Radio communication

Construction year: 2003
Operator: Faculdade de Eng. da Universidade do Porto
Contact: lsts@fe.up.pt
Website:
http://paginas.fe.up.pt/lsts/lsts_www/English/uav.html

4.2. **Antex M**-Vehicle

The Antex M-Vehicle designed for environmental missions specially dedicated to surveillance and monitoring missions

Construction year: 2004
Operator: Faculdade de Eng. da Universidade do Porto
Contact: lsts@fe.up.pt
Website:
http://paginas.fe.up.pt/lsts/lsts_www/English/antex.html

5. Archiving / Data management facilities

5.1. Core Repository - DGM-INETI

Core repository containing sea bottom sediment samples, sediment cores from the coastal to deep-sea areas, and core samples and data from the hydrocarbon exploration program.

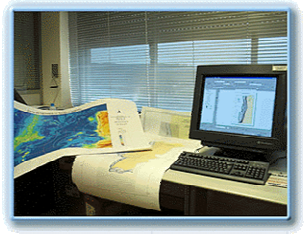
Operator: Department of Marine Geology - INETI
Contact: Fátima Abrantes (fabrantes@pro.softhome.net)
Website: http://www.ineti.pt/UO/UO/?UO=145&subUO=0

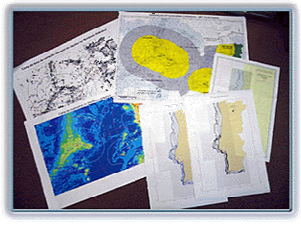
5.2. Cold Core Repository - DGM-INETI

Cold core repository (4ºC) for sea bottom and sediment core samples.

Operator: Department of Marine Geology - INETI
Contact: Fátima Abrantes (fabrantes@pro.softhome.net)
Website: http://www.ineti.pt/UO/UO/?UO=145&subUO=0

5.3. GIS Laboratory - DGM-INETI

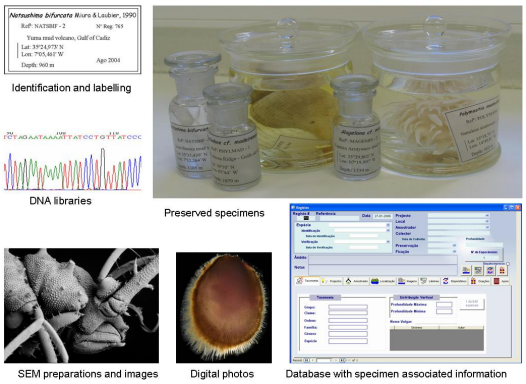




The G.I.S. Laboratory of the Marine Geology Department (INETI), uses the programs ArcView3.2 e o ArcGis8.3, the same as the Environmental Research Institute (ESRI), to support all research projects involving this department.

Operator: Department of Marine Geology - INETI
Contact: Fátima Abrantes (fabrantes@pro.softhome.net)
Website: http://www.ineti.pt/UO/UO/?UO=145&subUO=0

5.4. Biological Research Collection (Marine Invertebrates) - CESAM - DBUA



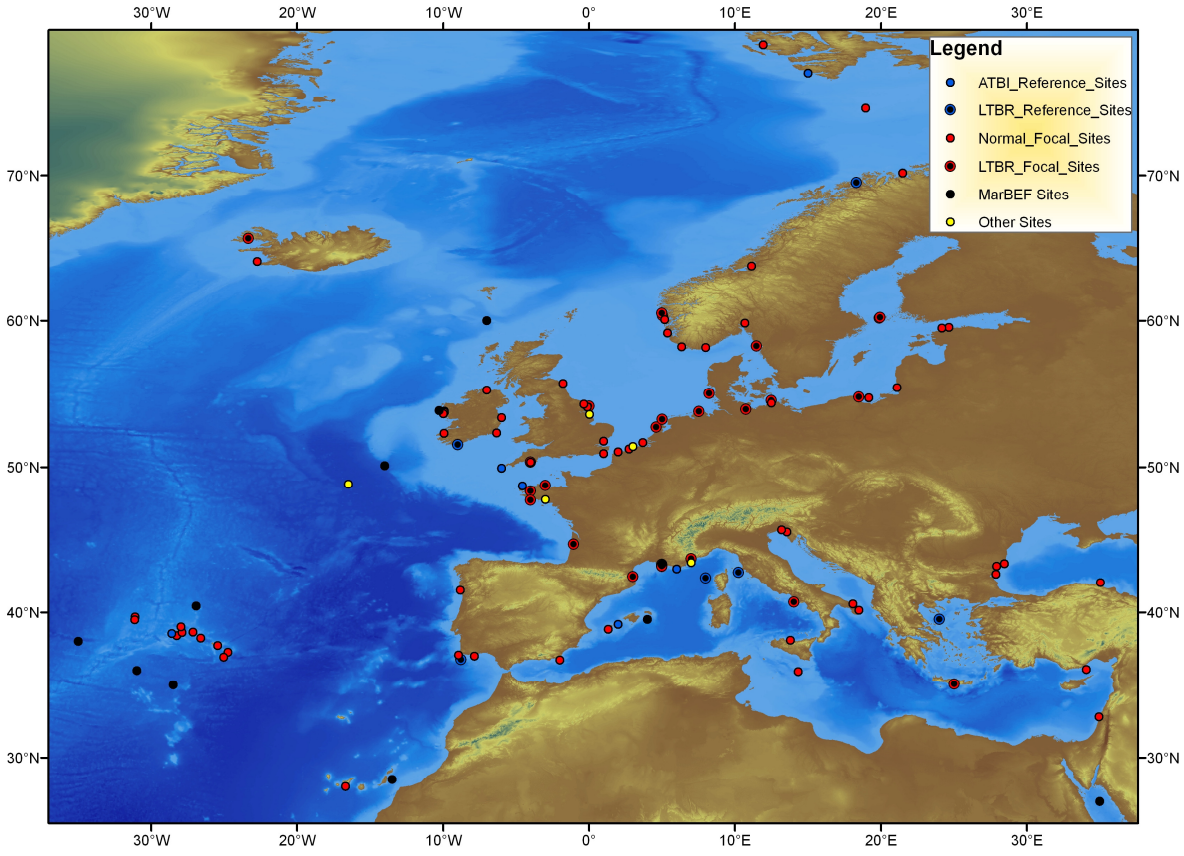
BRC-MI: The Biological Research Collection is a repository of natural history specimens and jointly curated collections such as frozen tissues and other physical samples, e.g. DNA libraries and digital images. The collection contains specimens from coastal to deep-sea environments. Specimen-associated information is managed through archiving and GIS databases.

Operator: CESAM and Department of Biology – University of Aveiro

Contact: Marina Cunha (marina.cunha@ua.pt)

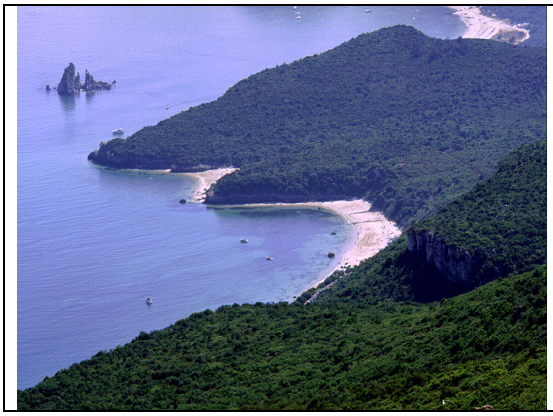
6. Other

6.1. Marine Biodiversity Research Sites



ImagDOP (based on www.pml.ac.uk/biomare/ and www.marbef.org)

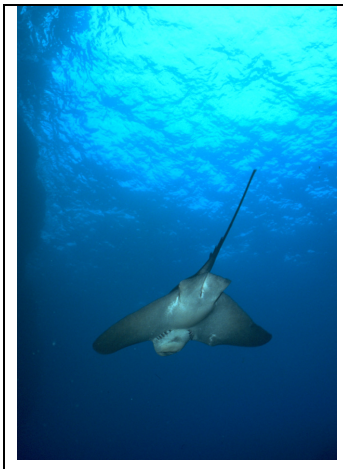
6.1.2 ARRÁBIDA MARINE PARK



The Arrábida Marine Park is a 25 Km stretch of coastline (55 km2) located on the Portuguese western shore. All habitats typical of the region are present, except for intertidal mud flats. The strategic position of the Arrábida Marine Park makes it an ideal laboratory for studies on marine biodiversity and climate change. The shore north and south from the site is mainly composed of sandy bottoms, which gives this site the characteristics of a "continental island".

Website:
http://www.pml.ac.uk/biomare/sites/arrabida.htm

6.1.3 CABRAS AND FRADINHOS, TERCEIRA ISLAND, AZORES



These are a group of islets on the South coast of Terceira island, 1 to 5 km away from the shore. Reef habitats support typical semi-offshore marine biodiversity. The site includes reefs, caves, boulder fields and sandy bottoms down to 120 m.

The area is important for the conservation of birds and presents shallow bottoms that still hold communities subject to low fishing pressure. The University station in Terceira island houses a small marine biology team which has conducted research on fish communities and marine ecology in general. A few papers and reports dealing mainly with fish and seabirds have been published, resulting from the University research. Other papers deal with exploitation and conservation aspects.

Website: http://www.pml.ac.uk/biomare/sites/Cabras and Fradinhos.htm

6.1.4 CORVO ISLAND, AZORES

Corvo is the smallest island of the archipelago (17km2) and it holds only 400 inhabitants. It represents the best opportunity for Integrated Management at the community level. Coastal habitats and resources are considered to be the least altered and exploited by anthropogenic activities in the archipelago. The seabed around the island drops steeply to around 50-100m and then more gradually down to 500m approximately one nautical mile from the shore. Littoral and sublittoral rocky and sandy habitats are very diverse, including vast irregular lava flows, caves and small pinnacles close to shore.

Website:
http://www.pml.ac.uk/biomare/sites/corvo.htm

6.1.5 LITORAL NORTE

Litoral Norte is a 60 km streach of coast and adjacent sea that has been a Natura 2000 site since May of 2000. This coast includes three main estuaries (Minho, Lima and Cávado rivers), and has mostly a rocky bottom, with some sandy and muddy areas.

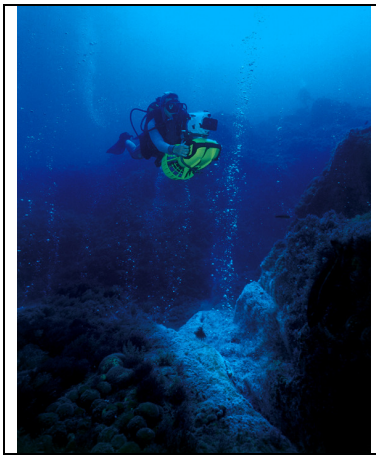
Website:
http://www.pml.ac.uk/biomare/sites/Costa%20Norte.htm

6.1.6 COSTA VICENTINA

The Costa Vicentina marks the SW-part of the European mainland; it consists of steep rocky cliffs on a tidal coast with sandy beaches at more remote sites. Due to its marginal position and its status of protection, human impact on the fauna and flora is limited to fishing and shellfish collection on the shore; sporadically touristic activity may have some impact (diving, beaches used for recreation and water sports) or possible oil spills from passing ships.
The Costa Vicentina is integrated into a Natural Park whose administration constitutes part of the Instituto da Conservação da Natureza (ICN).

Website:
http://www.pml.ac.uk/biomare/sites/Costa Vicentina.htm

6.1.7 D. JOÃO DE CASTRO BANK, AZORES



This is one of the few known shallow-water hydrothermal vent fields in the world; an underwater volcano located 40 miles off the two main islands of the Azores (S. Miguel and Terceira). Sublittoral offshore rocky habitats include unique shallow (-13 and -40 m) and mid-water (-200 m) hydrothermal vents with bacterial mats. Sediment and boulders occur inside the crater (around 45 m) and around the volcanic apparatus. The slope and base of the bank includes deepwater habitats to depths below 1000 m.

Website: http://www.pml.ac.uk/biomare/sites/D. Joao de Castro Bank.htm

6.1.8 FAIAL-PICO CHANNEL, AZORES

This site is located in between the Faial and Pico islands (Central Azores). It is the most diverse and representative complex of habitats in the archipelago. It constitutes a 5 km-wide shelf between the islands and the adjacent coasts. The channel is subject to strong tidal currents and its depths vary from 500 meters at both entrances to an average of 45 meters in the middle. The habitats in the channel are very diverse, including littoral and sublittoral rocky and sandy habitats representing the full gradient of hydrodynamic conditions in the Azores, including sandy sheltered bays and beaches, tidal current-swept areas, stretches of exposed rocky coast, shallow mid-channel reefs/pinnacles, islets, steep plunges, caves, boulder fields, volcanic bedrocks, boulder beaches and small shallow hydrothermal fields (mainly gas leaks).

Website: http://www.pml.ac.uk/biomare/sites/Faial-Pico Channel.htm

6.1.9 FORMIGAS BANK, AZORES

This is an offshore seamount rising from abyssal depths to the surface, including a small set of islets. The shallow area (<200m deep) covers 3627.5 ha. And is located between Santa Maria and São Miguel islands, approx. 20 miles off the nearest one. There are littoral and sublittoral offshore rocky habitats with unique Cystoseira beds in shallow highly irregular volcanic bedrock at the top of the bank. At around 60 meters there is the only registered laminarian occurrence in the Azores. The slope and base of the bank includes deepwater habitats to depths below 1700 m.

Website:
http://www.pml.ac.uk/biomare/sites/formigas.htm

6.1.10 LAGES, PICO ISLAND, AZORES

Located in Pico Island from the westernmost part of "Baía das Lajes do Pico" to "Ponta da Queimada, this is a flat sheltered platform closely linked to the deepwater environment, supporting a unique set of intertidal and subtidal habitats. The area contains a variety of intertidal and sublittoral rocky and sandy habitats including marshland, a large system of intertidal pools and gullies, large stretches of basaltic bedrock, boulder areas, and sandy bottoms. Algae species include Enteromorpha linza, Ulva rigida, Chondracanthus acicularis, Chaetomorpha linum and Asparagopsis armata. It is considered as one of the sites in the archipelago with a higher number of marine species.

Website: http://www.pml.ac.uk/biomare/sites/Lages Pico Island.htm

6.1.11 NE COAST OF FLORES ISLAND, AZORES

This area is located in the western-most island of the Azores archipelago. The coastal area is defined from Santa Cruz to Ilhéu da Gadelha (approx.: 39º30'N, 31º10'W). It is a sinuous rocky coast (approximately 19 Km-long) fringed by a large system of near-shore islets. The site comprises a set of intertidal and sublittoral rocky habitats known to support high marine biodiversity, including intertidal pools and a large number of enclosed bays, submerged caves and islets. Conspicuous species include large specimens of Epinephelus marginatus. The bottom is covered by algae but in the steeper areas it is possible to observe phoronids and other less common species. Occasionally, during the night, it is possible to observe Loligo forbesi. It is an important area for the reproduction of several protected marine birds, such as Calonectris diomedea borealis, Sterna hirundo and Sterna dougallii.

Website: http://www.pml.ac.uk/biomare/sites/NE Coast Flores Island.htm

6.1.12 NE COAST OF SÃO JORGE ISLAND, AZORES

The site is located in the coastal area of São Jorge Island from 38º38'N, 27º58'W to 38º33'N, 27º46'W, and comprises a complex of unique brackish lagoons and marine rocky habitats highly exposed to prevailing swells, within a 23 km wide stretch of coast. It comprises intertidal and sublittoral rocky habitats, including the 2 single brackish lagoons in the archipelago, located on shallow platforms originating from cliff landslides. The lagoons vary in their species and habitat composition, but in both there is an intermediate salinity that results in unique environments in the Azorean context. For example, Tapes decussatus is present in the southern lagoon, and Ruppia maritima in the northern lagoon. At the shelf edge there are strong currents and the a mixture of coastal and open-ocean species such as Corypahena hippurus. The surrounding cliffs are important nesting habitats for marine birds.

Website: http://www.pml.ac.uk/biomare/sites/NE Coast S Jorge Island.htm

6.1.13 RIA FORMOSA LAGOON

The Ria Formosa is a mesotidal lagoon, separated from the ocean by a system of five sand barrier islands and six inlets, which extend for about 55 km along the south coast of Portugal. The barrier island system consists of mainland, barrier islands, back barrier lagoons, inlet deltas, barrier platforms and shoreface with extensive mud flats, sand banks, dune systems, saltmarshes and substantial Zostera beds. It is a natural park protected by national legislation and nature conservation regulations and most of it is of international importance, under the protection of the Habitats and Birds Directives (Community Directive 79/409/EEC) and designated as a Ramsar site for the protection of wetlands. The average water depth is less than 2 m and the tidal height varies from a maximum of 3.7 m in spring tides to a minimum of 0.4 m in neap tides. Bare sediment communities and meadows of the seagrass Zostera noltii occupy the lower intertidal ats. The shallow subtidal is dominated by the seagrass Cymodocea nodosa. Ria Formosa is a highly productive coastal lagoon, supporting an intense mollusc shery and is an important nursery for coastal communities. Salinity ranges between 35‰ and 37‰, except during short periods following heavy rainfall when surface water salinity may be as low as 15‰. Water temperature varies between 12ºC in winter and 27ºC in the summer.

Website: http://www.pml.ac.uk/biomare/sites/Ria Formosa.htm

6.1.14 S. COAST AND REEFS OF SANTA MARIA ISLAND, AZORES

Located in the coastal area of Santa Maria Island within a square from 36º55,7'N, 25º10,5'W to 36º55,2'N, 25º'01'W, this stretch of coast 30 km long displays the typical environment of the islands' sheltered southern coasts. It comprises very diverse intertidal and sublittoral sandy and rocky habitats along a stretch of shallow coast dominated by soft bottoms, including large sandy beaches, sheltered bays, small reefs and one islet. The islet has several caves and in its interior it is possible to see less common species for the Azores, such as Tylodina perversa.

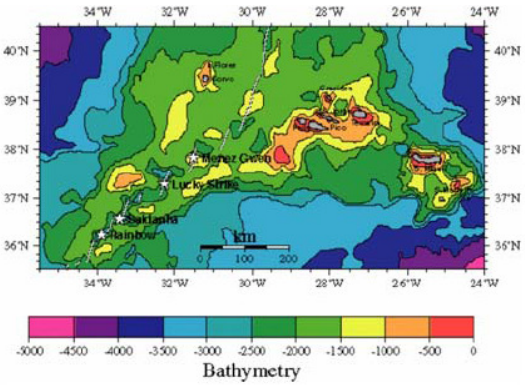
Website:
http://www.pml.ac.uk/biomare/sites/Santa Maria Island.htm

6.1.15 VILA FRANCA ISLET, SÃO MIGUEL, AZORES

The area is an ancient submerged volcanic crater 1.2km south of Vila Franca village. The islet comprises a shallow inner lagoon with a diameter of 150 m. It has one main water entrance and several fissures (locally named "Golas"). The fissures are scattered around the islet and play a important role in the water circulation. There is a strong zonation of bottom species according to depth. From the splash zone to the subtidal it is possible to observe different dominances of Melaraphe neritoides, Bangia cf. fuscopurporea, Littorina striata, Chthamalus stellatus, Rivolaria atra, Fucus spiralis, Stramonita haemastoma, Mitra nigra, Enteromorpha compressa, Patella aspera, erect Corallinaceae, Paracentrotus lividus, Ophidiaster ophidianus and Gymnogongrus tenuis (Morton, 1990). It is the only place in the Azores where maerl beds have been recorded.

Website:
http://www.pml.ac.uk/biomare/sites/Vila Franca S Miguel.htm

6.1.16 The MoMAR area

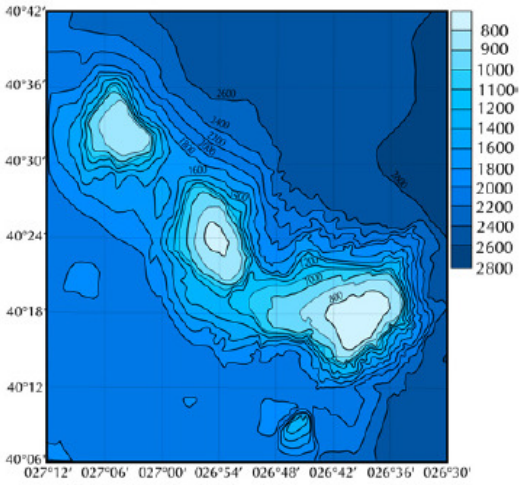


MoMAR area.

The MoMAR area, includes the Menez Gwen, Lucky Strike, Saldanha, Menez Hom and Rainbow vent fields, and their respective segments: the AMAR, FAMOUS, Lucky Strike and Menez Gwen segments. These segments trend subperpendicular to the direction of plate separation and are offset by axial discontinuities. These discontinuities may be transform faults, or so-called nontransform offsets. Tectonic and volcanic processes vary within each individual segment: segments centers have a thicker crust, indicative of a larger supply of magma and enhanced volcanism,
while segments ends have a deeper axial valley, indicative of more pronounced tectonic activity. Menez Gwen and Lucky Strike vent fields are on a basaltic environment at the center of the segment, while Saldanha and Rainbow are in a Peridotite environment at the end of the segment. It is a Long Term Monitoring Site an a proposed sea-floor observatory.

Website: www.marbef.org / www.momar.org

6.1.17 The SEDLO Seamount



The Sedlo Seamount, about 180 km north of the Azores, Sedlo has an elongated shape with three summits rising from nearly 3000m to a little more than 700m below sea level. It is thought to be little, if ever, affected by human activities. summit of Sedlo shows large areas of bare rock, sometimes with a thin layer of sediment, and also bolders and stones of different size.
On the rock we find a variety of attached-living animals, for example sponges, black corals, stony corals, sea lilies, and sea anemones, as well as moving animals such as seastars and crabs. Shrimps and fish, particularly sharks and deep-sea eels, swim close to the seabed. Only a few colonies of coral have been seen on Sedlo, the largest about the size of a frying pan. Seagulls, shearwaters, and storm petrels were observed, as well as sea turtles and dolphins.

Website: www.marbef.org

Updated: April 2007