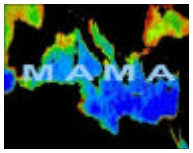
Questionnaire on marine monitoring activities in the Mediterranean

A survey for

MAMA - The Mediterranean network to Assess and upgrade the Monitoring and forecasting Activity in the region



in cooperation with

EDIOS - The European Directory of the Initial Ocean-observing System

General Information

and

Help Document

Questionnaire prepared by the MedGOOS Secretariat, IOI-Malta Operational Centre, University of Malta

Funded under the EC Programme, Environment and Sustainable Development, Vth Framework Programme

The MAMA WP1 inventory on operational ocean/coastal monitoring activities includes moored buoys, coastal installations, seabed stations, drifting buoys, repeated sections and sampling stations, ships of opportunity and airborne repeated tracks, as well as other platforms where routine, repeated, and consistent long-term observations of the marine environmental conditions are conducted. These kind of platforms make the data available for use in real-time, near-real-time or in delayed mode at regular intervals.

The inventory aims to also include routine observing programmes that use non-automised tools. It intends to mainly cover ongoing activities, including however programmes that may have temporarily stopped operation or that are planned to become operative in the near future.

Main Components of the Questionnaire
The questionnaire is structured in two parts:

1. The first part of the questionnaire aims to identify, on a country by country basis, the current demand, requirements and practice for applications or routine marine observations. The requested information will enable an assessment on the type and extent of current operational activities in ocean/coastal monitoring that address the needs of existing or candidate customers, including research. It will also furnish a picture on the extended potential benefits that can be derived and developed from the activities, and provide the elements on which the initial ocean observing system in the region can be built. The information includes details on:
   - the main recipients;
   - the key requested deliverables including descriptions of products and services provided;
   - the monitoring activities including the main parameters measured, type of analysis and assessments made to adapt measurements to user needs.

2. The second part focuses on the technical details of marine monitoring and observing sites, platforms and devices. It aims to identify the current practices in the observation and monitoring of the marine environment, including details on platforms, instruments, sensors, maintenance, telecom systems, data storage, exchange codes and formats, etc. already in use.

Observations targeted by the survey
<u>The following observations should be included in the MAMA WP1 inventory. Please note that some of the definitions are overlapping.</u>

a) All marine observations made on an operational basis by laboratories, institutions, or agencies in the Mediterranean Sea within the EEZ of bordering states or in the open sea.
b) Relevant monitoring activities are those which are conducted with an aim of observing an area of sea on a routine basis and must be an ongoing activity in the Mediterranean with some concrete commitment to continue in the future. Routine observations are those which are conducted repeatedly at a site, or along a track at regular periods of time on a daily (or less), weekly, monthly, seasonal or yearly basis.

c) Routine observing programmes that are currently non-active, but are planned to be repeated or start in the near future should also be included.
d) Routine marine observations on shores, beaches and coasts, measuring marine parameters and variables that are part of a long term observing programme.
e) Routine observations include not only those obtained by automatised tools but also by other methods used efficiently such as by manual sampling, laboratory analysis and other similar methods.
f) Marine meteorological observation stations (such as for sea level, wind speed, barometric pressure, waves, sea surface temperature, and sea-ice data) obtained from ships and buoys should be included.
g) Tidal and sea level stations, HF radar stations measuring offshore wind, waves and currents, should be included.
h) Where observations are repeated seasonally or annually in a broadly defined sea are, but not at exactly repeated identical stations, the stations should be reported as existing within a box (with co-ordinates) or in a named sea area. This should also apply to long-term programmes of drifting floats or profiling floats.
i) Repeated tracks or sections should be listed with the co-ordinates of the start and end of the track, or a long narrow box, if the track is subject to considerable lateral variability.

The following observations should not be included

a) Stations or sections which are not repeated on a regular basis.
b) Stations where the resulting data are confidential and cannot be obtained for use by others, even after reference to the originator.
c) Stations in closed lagoons or lakes separated from the sea by beach or sand bars.
d) Routine observing programmes that are still in planning phase and have not yet started the implementation phase.

How many questionnaires should be submitted?

The questionnaire is designed to request information on the basis of applications (for part I) and observing programmes (for part II). This means that for part I a marine institution/centre is asked to submit a separate entry form for each application, service or product that it delivers based on routine marine observations. Similarly for part II a separate entry form is requested for each observation programme conducted by the same institute/centre.

How is the information collected?

The survey is being conducted by means of a questionnaire on a national scale by each MAMA focal point. The information is collected by means of a dedicated electronic inventory form, developed by the MedGOOS Secretariat. The entry form has the support of hypertext help to facilitate a streamlined compilation of the entry form. A hard copy entry form is also available for submission of data by non-electronic means.

To access the questionnaire, first login to the website at the address: http://www.capemalta.net/medgoos/questionnaire

You can choose to submit information by using the hardcopy version of the questionnaire that is downloadable from the site. If you opt to compile the questionnaire online select the appropriate name/flag. In the screen that follows choose the entry form required. Once the questionnaire is chosen and the entry form appears on the browser, the user can start filling in the questionnaire. It may be useful to prepare the answers on paper prior to compiling them on screen; one can use the hard copy version to print a copy of the entry form.

Since the compilation of the questionnaire may take some time to complete, one can opt to fill up the entry form offline (i.e. disconnect temporarily from the Internet). To send the form, one has to re-connect to the Internet, and submit the form by pointing on the send button. It is however probably safer (especially if you have ADSL/Cable connection) to stay online while compiling the questionnaire.

Once the Send button is clicked various actions are initiated (through an online cgi script). These are:

1) An e-mail is sent to the MedGOOS Secretariat (Malta). The results of the questionnaire will be contained in the body of this email message and will contain answers to each question on a separate line. These can be subsequently transferred to a normal text file.
2) A copy of this Email (step 1) is also sent to the MAMA designated partner in the respective country.
3) A copy of this Email (step 1) is sent to the email address used in section A of the questionnaire (backup copy).
4) Upon submission, a screen with the results will appear. Users are encouraged to print this screen. This will save a lot of time if the form fails to arrive to its destination and would require to be recompiled again. Please note that the compiled entry form CANNOT be saved or printed. This is a technical restriction of HTML files. Only the empty form can be saved. On the other hand the results screen (that comes up after pressing the send button) CAN be saved.

Collaboration with EDIOS

This questionnaire is being conducted in close cooperation with EDIOS – the European Directory of the Initial Ocean-observing System. EDIOS is an EU-funded project under the Vth Framework Programme (Environment and Sustainable Development) and it is an initiative of EuroGOOS (European Global Ocean Observing System). It aims to build a searchable marine Directory of the ocean observing, measuring, and monitoring systems operating in Europe. With the inputs from the MAMA WP1 inventory the Directory will be extended to cover the Mediterranean region. The MAMA/EDIOS initiative constitutes a prerequisite for the full implementation of a Euro-Mediterranean ocean observing system by allowing for the first time an analysis of the continuously available data for operational models, and hence the ability to optimise the development and maintenance of instruments, and the design of sampling strategy. The collected information will enable the identification of the gaps in the monitoring systems in the region and in the capacity to measure, model and forecast the ecosystem.

What is Operational Oceanography?

As described in the EuroGOOS strategy, Operational Oceanograpghy can be defined as the activity of systematic and long-term routine measurements of the seas and oceans and atmosphere, and their rapid interpretation and dissemination. Important products derived from operational oceanography are:

- now casts: provide the most usefully accurate description of the present state of the sea including living resources
- forecasts: provide continuous forecasts of the future condition of the sea for as far ahead as possible
- hind casts: assemble long term data sets which will provide data for description of past states, and time series showing trends and changes

Operational Oceanography proceeds usually, but not always, by the rapid transmission of observational data to data assimilation centres. There, powerful computers use processing software and numerical forecasting models to extract added value information from the data. The outputs are used to generate data products, applications and services often through intermediary value-adding organisations. Examples of final products include warnings (of coastal floods, ice and storm damage, harmful algal blooms and contaminants, etc.), electronic charts, optimum routes for ships, prediction of seasonal or annual primary productivity, ocean currents, ocean climate variability etc. The final products and forecasts must be distributed rapidly to industrial users, government agencies and regulatory authorities.

Legal Waiver

The MAMA inventory covers a wide range of information compiled from many sources. The agencies are individuals responsible for compiling and distributing this information do not accept or imply any responsibility or liability for losses or damage incurred for whatever reason by people obtaining and using the information from MAMA.

This waiver includes all the Member Agencies and Partners of the MAMA project, the Members of MedGOOS collectively and separately, the sponsoring and funding organisations such as the Commission of the European Union, and individuals working in the MAMA project.

No information or geographical data or co-ordinates or place names used by MAMA should be interpreted as implying political jurisdiction or the boundaries of states either on land or in the offshore zone or territorial waters.

In order to show the type of data measured at each location, the types of equipment and sensors deployed there are described as fully as possible. In some cases the information provided by MAMA includes the commercial brand name of devices, and there may be a reference to the URL of the manufacturer or sales organisation providing the equipment. This information must not be interpreted as endorsement by MAMA or its partner Agencies. The information is provided purely as the most factual way of describing the equipment and its characteristics. The manufacturers or suppliers are solely responsible for the information which they provide on the equipment.

Any statement of accuracy or resolution of instruments included in the MAMA inventory is based on factual information provided by the operator, manufacturer, or supplier of the equipment. Users of MAMA inventory should be strongly aware that accuracy, resolution, and reliability of equipment depends critically upon the environmental exposure, prior- and post-calibration, and maintenance procedures used. Figures implying accuracy, resolution, percentage data recovery, and reliability, should therefore be regarded as ideal standards, achievable only provided that calibration and maintenance have been fully carried out. MAMA cannot guarantee that this is the case, and accuracy, resolution, and data recovery may be less than indicated.

Help Document

General note on questionnaire compilation – In most sections it is possible to enter more than one selection. Make your choice by using the check boxes where available. In cases where only one answer is necessary this is either stated specifically or indicated in the help document. For free-format fields please enter answers either on separate lines or separately by a semicolon ';'. Free-format fields have fixed lengths and do not allow entries longer than the maximum number of allowed characters.

Annexes – A number of annexes accompany the entry form to facilitate a uniform compilation of fields where a selection of items from the list is required. For those compiling the questionnaire annexes can be accessed online directly from the entry form by clicking on the indicated annex; otherwise a hardcopy can be downloaded or printed directly from the website.

Optional/non-optional fields – While submitters are encouraged to fill all the requested information and answer the questionnaire completely. It should be noted that there are some subsections and fields which are optional. These optional parts of the questionnaire are indicated by the icon  . Optional fields can be left unanswered at your discretion. Leaving empty fields will however greatly reduce the value of the questionnaire. Unmarked sections and fields are mandatory and should be answered completely.

Inventory on Marine Monitoring Activities in the Mediterranean
Part I – National Requirements for the Monitoring of the Marine Environment

Part I, Section A, Entry Identifier
The Entry Form Signature is necessary to identify each completed questionnaire. The identification is made by means of an Entry Identifier. Part I of the questionnaire is designed such that a separate entry form is necessary for each application, service or product based on routine marine observations. For this reason the identifier is composed of two parts; the first part is a name preferably the acronym of the institute/centre/agency providing the product, and the second part is an integer number (start from 1) to indicate the number of separate questionnaires submitted by the same institute/centre/agency (i.e. different applications).

Part I, Section A, Compilation Date
Indicate the date when the entry form was first compiled.

Part I, Section A, Currency Date
Indicate the date when the entries were last revised.

Part I, Section B1, Type of Requirement/s Addressed by the Application
The objective of Section B of the questionnaire is to identify existing types of operational (routine or repeated regularly) oceanographic products, applications or services which are distributed routinely, or are routinely available to end users, or to value added companies

or contractors. It is not concerned with the large volumes of research data which may be available from research institutions on request, or which are held in oceanographic archives for consultation. The application, service or product must directly relay on routine. In B1 indicate the obligations, commitment or requirement which the product, application or service described in B3 is addressing. You can choose more than one item from the list or describe a new item.

Part I, Section B1, Value-added industry and consultants

Technically advanced data services are often used by intermediaries, companies or consultants which add value to the data. Please tick here if you have such arrangements to supply data or services to this sector, or if you use such intermediaries to provide the product.

Part I, Section B2, Responsible Body (Product Recipient) Making the Request

Indicate the user groups, companies, or applications sector making the request for the product application or service. If there are more specific or narrower groups of end-users, please list under *other*.

Part I, Section B2.1, Nature of Application

List the main category of use which best fits the product, application or service. You can choose more than one item from the list or describe a new item.

Part I, Section B2.2, Benefits

This is a free format field in which the main benefits emerging from the application can be described. Benefits can be summarized by one or more broad topic listed in separate lines. Example of benefits can be the monitoring of trends in coastal waters, wave and sea state forecasts, fish stock assessments, warning of eutrophication and pollution, safety of navigation, forces on offshore structures, etc.

Part I, Section B2.3, Duration of Commitment

Choose from the following:

- short term for commitments less than 5 years,
- long term for commitments longer than 5 years, and
- open-ended if there is no foreseeable termination of the commitment.

Part I, Section B2.4, Level of Funding Committed

Please indicate the total amount of funding per year received from the recipient for the provision of the service/product. Note that the indicated amount <u>does not</u> refer to the cost necessary to produce the service, but to the actual contribution received from the recipient.

Part I, Section B3.1, Name of Application, Product or Service

Section B3 requests some details on the application, product or service described in the questionnaire. To be eligible for this inventory the application, product or service must be one that depends directly on the availability of routine marine observations.

Part I, Section B3.2.1, Output Data Processing, Analysis, Interpretation and Procedures

This is a free-format field in which the key processes for data enhancements and for extraction of added-value information is described. Please use a separate paragraph for each process. Processes can include numerical models, gridding, electronic charting, merging of data sets, statistical analysis, etc. Do not include quality control or data management here.

Part I, Section B3.2.2, Interface Tools Used

This is a free-format field in which you can list tools and software used to aid added-value extraction from data.

Part I, Section B3.2.3, Observation Time Lag

Time difference in days or fraction of a day between observations and product delivery.

Part I, Section B4.2, Estimated Product Volume

Indicate the size for each product update.

Part I, Section B4.3, Update Frequency of Products

Please indicate the frequency with which the product is updated with fresh information. If the product is linked to some special event (such as an oil spill, extreme weather/sea condition or marine pollution incident) and therefore furnished in coincidence with such events, you can choose the "Event Based" option. For regular updates of products choose the closest frequency in the provided options (e.g. for updates more than once daily choose "Daily"; for updates more than once weekly choose "Weekly"; etc.).

Part I Section B5, Brief Profile of the Observing Programme Supporting Product Provision

Operational oceanographic products, applications or services rely on the use of routine marine data that is processed to extract information useful for end-users. Section B5 requests brief information on the observing programme/s supplying data to enable the product described in the previous subsections. If more than one observation programme is involved in the product delivery, please merge the details from the separate programmes into one set.

Part I, Section B5.1, Name of Observing Programme

Write the name of the observing programme supporting the product, application or service provision. For more than one programme list on separate lines

Part I, Section B5.2, Overall mission and objectives of the Observing Programme

If more than one observation programme is involved in the product delivery, please merge the overall mission and objectives of these programmes.

Part I, Section B5.4, Frequency of Observations

This does not refer to the sampling frequency of the sensors, but to the period of records used for the product. For example, ocean currents may be collected every 10 minutes, but only hourly averaged values are used, in which case the frequency is 24/day. In the case of products which refer to less frequent sampling (such as in the case of regular surveys

by research vessels) the frequency of observations should refer to the frequency of surveys (e.g. once per month).

Part I, Section B5.6, Sea Area

In B5.6.1 give the most representative geographical sea area in which the observations are made. Select from the list of main Mediterranean sub-basins, straits and gulfs in Annex 2; B5.6.2 is a free-format field in which you are requested to enter the more specific name of the area where the measurements are collected. This could be the name of a bay, lagoon or other coastal area (e.g. choose Eastern Mediterranean in B5.6.1 and Matruh Bay in B5.6.2 for a typical bay on the Egyptian coast).

Part I, Section B6, Organisation Responsible for the Observing Programme and Product Delivery

This section requests details on responsible institutions and key contacts involved in the full chain of operations ranging from data collection, to data processing and management, to data enhancement and product delivery. Separate subsections (B6.1 "Overall Management"; B6.2 "Maintenance Operations on Land and at Sea"; B6.3 "Data Processing and Management"; B6.4 "Data Enhancement and Product Development") are provided since a different responsible may be involved in the different stages of the activity. If the same responsible covers more than one operation, please repeat the contact and information for each of the relevant subsections.

Part 1, Section B6.5, Staff Deployment

Please indicate the overall human workforce required to undertake the activity including staff engaged in all components, ranging from the underlying data of the observing program to elaboration and subsequent delivery of the product, application or service. Please indicate the staff involvement **specific** to the product, application or service for which this entry form is being compiled. Include staff engaged both on permanent or temporary basis. Give values in human-months per year (e.g. 18 human-months for 3 persons engaged 50% on the activity) indicating level of male/female participation.

Part I, Section B7, General Information Sources

List the key publications/reports that describe or relate to the product, application or service. Please give also the internet site where this activity or information on the activity can be found.

Part I, Section B8, Additional By-Products

This section requests information on potential additional applications and benefits which can be derived from the current product described in the previous sections. The intention is to identify:

(i) the additional products that can be derived from the current set of observations and data
(ii) list of additional measurements required to improve or extend products and applications or furnish new ones
(iii) other potential end-users that can in the near future possibly need a service
(iv) additional benefits that can in the future be offered.

Inventory on Marine Monitoring Activities in the Mediterranean
Part II – Description and Pratices of the Marine Monitoring Activities

Part II, Section A, Entry Identifier
The Entry Form Signature is necessary to identify each completed questionnaire. The identification is made by means of an Entry Identifier. Part II of the questionnaire is designed such that a separate entry form is necessary for each marine observation programme. For this reason the identifier is composed of two parts; the first part is a name preferably the acronym of the institute/centre/agency providing the product, and the second part is an integer number (start from 1) to indicate the number of separate questionnaires submitted by the same institute/centre/agency (i.e. different observation programmes).
An observation programme is here defined to consist of routine marine monitoring activities composed of one or more platforms carrying instruments to make measurements in the sea. Platforms can be ships, small vessels, buoys, moorings, drifters, trawled systems, etc. (see annex 5) and can be utilized in the combination for a given observation programme.

Part II, Section A, Compilation Date
Indicate the date when the entry form was first compiled.

Part II, Section A, Currency Date
Indicate the date when the entries were last revised.

Part II, Section C1, Name of Observing Progamme
The same observation programme may have already been referenced in Part I B5.1. In that case please make sure to refer to the observation programme with the same name or acronym as that used in B5.1.

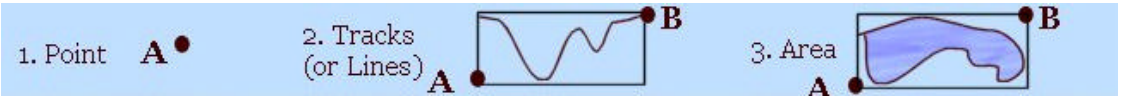
Part II, Section C2.1, Overall Zone of Application
Tick the zone where the measurements are effectively made. You can tick more than one item.

Part II, Section C2.2.1, Type
This refers to the horizontal spatial configuration of the observations. Please indicate whether the collections are made from single point stations (e.g. fixed monitoring stations, CTD stations, etc.) or from measurements along transects/tracks (e.g. towed instruments, floats shipborne ADCP, trawls, ships of opportunity, etc.). Indicate the overall number of stations or tracks for the respective type of observations.

Part II, Section C2.3, Sea Area
In C2.3.1 give the most representative geographical sea area in which the observations are made. Select from the list of main Mediterranean sub-basins, straits and gulfs in Annex 2; C2.3.2 is a free-format field in which you are requested to enter the more specific name of the area where the measurements are collected. This could be the name of a bay, lagoon or other coastal area (e.g. choose Eastern Mediterranean in C2.3.1 and Matruh Bay in C2.3.2 for a typical bay on the Egyptian coast).

Part II, Section C2.4, Overall Position Information

If the observations are made from a single point station (example 1 below) enter the lat./long. for point A. If the observations are collected over a range of latitudes (example 2 and 3), enter the lat./long. for both points A and B to delimit the are of observations. The position information could be for example a series of CTD stations collected along a section, moored buoy positions, continuous plankton recorder tows, or the area covered by a fisheries survey cruise.



The "Measurements depth" indicates the position of the observation in the water columns taken from the water surface. For a profile, the minimum is the depth of the first correct observation closest to the water surface, and the maximum is the depth of the deepest correct measurement in the profile.

For "Sea Floor depth", the maximum depth is the case of a number of stations in the depth of this station with the deepest water columns; the minimum depth is that of the station in shallowest waters. In the case of a single station or buoy the minimum and maximum depth are identical.

Part II, Section C2.5, Position Fixing of Observations

For platforms or carriers other than ships, small vessels or air craft, please provide information on the navigation and positioning information where relevant.

Part II, Section C2.6, Programme Status

Please indicate the future commitment to the observing programme, adding dates where appropriate.

Part II, Section C2.7, Staff Deployment

Please indicate the overall staff engagement for the observing programme. Include staff employed both on a permanent or temporary contracts. Give values in human-months per year (e.g. 18 human-months for 3 persons engaged 50% on the activity) indicating level of male/female participation. For staff involved in other programmes please estimate human hours contribution on the basis of the proportional time dedicated to the monitoring activity for which this entry form is being compiled. Include Laboratory work under the category of work done by technicians.

Part II, Section C2.8, Parameter Information

List the parameters measured (e.g. temperature, salinity, chlorphyll-a, phytoplankton, dissolved oxygen, ph, particulate carbon, silicate, etc.), including, where possible, an estimate of their accurancy. Indicate whether real-time or delayed mode validation is made, preferably indicating any schemes used. Under sampling period indicate the time between successive measurements (e.g. 10 minute, hourly, daily, annually, 3 hours before high water, etc.).

Part II, Section C2.9, Equipment Used
If the observations are collected at one platform, then put "1" under Number and enter the details below. If there are several platforms please repeat for each platform separately; give a separate number (1,2,3, etc) for each platform. Where a repeated cruise is undertaken by different ships or vessels these should be counted as one platform provided that their equipment and sub-systems are broadly comparable. If the ships or vessels are very differently equipped, please complete separate forms.

In the case of measurements made by means of an operator handling directly an instrument (such as manual lowering into the sea, bottle measurements, operation by a winch, etc.) indicate kind of handling in the space allocated for description.

Part II, Section C2.9.1, Mooring System
Please tick if the mooring system is one of the following (tick more than one if relevant).

Part II, Section C2.9.2, Instruments
Please supply information on the instruments attached to the platform/s. If many instruments are in use copy the table as necessary.

Part II, Section C2.9.3, Sensors
Please supply information on the sensors used to make the measurements. If many sensors are in use copy the table as necessary.

Part II, Section C2.9.4, Energy Supply
Many platforms such as buoys, towed vehicles, etc., require an on-board power supply, or power to be transmitted from the support ship or from shore by cable. For platforms other than ships, vessels, air craft, please indicate the usual method of power provision for this platform or carriers.

Part II, Section C2.9.6, Telecoms Systems, Hardware and Software
This subsection is concerned with the hardware and software of telemetry of observational data from instruments and sensors to platforms or to shore, and the transfer of data from there to Data Assembly Centres, modeling centres or data archives.

Part II, Section C2.9.6, Operational Data Transmission System
This concerns the transfer of data inherent to the observing platform. Please tick one or more of the following which fits the platform being described.

Part II, Section C2.9.6, Transmission Medium Used
This concerns the transfer of data between the observing platform and the processing centres. Please tick one or more of the following methods.

Part II, Section C2.10, Data Management
Please choose from the lists the standard data formats and codes used, and add any others that are relevant to the observing programme.

Part II, Section C2.11.4, Special Q.C. for Automatic Recording Stations
Note that this subsection should only be compiled for automated platforms.

Part II, Section C2.11.5, Laboratory Practices
This is a free-format field for the description of methods used for laboratory analysis. It is sufficient to give references to technical manuals such as the IAEA-MEL standard methods described in Annex 3.

Part II, Section C2.12, Data Access
This section requests information relating to the condition and protocols for access to the measurements made by the observing programme.

Inventory on Marine Monitoring Activities in the Mediterranean
Part II – Maintenance Practice

Part II, Section D, Maintenance Practise
This section requests information on the maintenance of measurements in the sea. The information comprises platforms, equipment and sensors used for making details on maintenance practices, facilities required, human power involved and costs. Level 1 refers to maintenance of components including sensors and parts of equipment. Level 2 refers to maintenance of the platform or carrier. Maintenance is here meant to include not only routine checks but also repairs.

Part II, Section D1.1, Sensors/Equipment Maintained
For each sensor or equipment please list details on the kind of maintenance performed (i.e. calibration, repair, fouling, power replanishment/check, system check, etc.). For each maintenance type give frequency of the maintenance operation (choose from the following list:

a) 1 month or less;
b) 1-2 months;
c) quarterly;
d) 4-6 months;
e) 7-12 months;
f) >12 months.

For repairs give an estimate of the frequency of repairs on the basis of past experience. Where a calibration is performed please mention the method of calibration used and whether this is carried out on site at sea or requires translocation to the laboratory.

Part II, Section D1.2, Means Needed
Please indicate the kind of main facilities needed to perform the maintenance (e.g. ship, small craft, special laboratory facilities). Use a semicolon to separate operations.

Part II, Section D1.3, Duration of Operations

Please indicate the overall time in days (on average) to perform the full level 1 maintenance of the platform. Do not include ship trawl.

Part II, Section D1.5, Type of Operations
Please list the main type of operations used in the level 1 maintenance process (e.g. cleaning, antifoul painting, replacement, etc.). Use a semicolon to separate operations.

Part II, Section D2.1, List of Operations
Please list the main operations required for level 2 maintenance (e.g. mooring inspections; general platform overhaul; solar panel cleaning/replacement; etc.). List operations separately indicating the average frequency required for each.

Part II, Section D2.2, Means Needed
Please indicate the kind of facilities needed to perform the level 2 maintenance (e.g. kind of ship or vessel, special ship equipment like crane or winch, etc.). Use a semicolon to separate entries.

Part II, Section D2.3, Duration of Operations
Please indicate the overall time in days (on average) to perform the full level 2 maintenance. Please include ship time.

Part II, Section D2.4, Number of Persons Involved
Please indicate the minimum number of people (including scientists, technicians and crew) needed for normal maintenance operation.