

Ministerio de Ciencia e Innovación



APPLICATION FOR THE AUTHORIZATION OF SCIENTIFIC RESEARCH ACTIVITIES ON BOARD OF THE RESEARCH VESSEL HESPÉRIDES

Notification of research cruise: R/V "Hespérides"

Cruise MALASPINA 2010, BIO Hespérides 2010

Part A GENERAL INFORMATION

1. Vessel name:	BIO Hespérides			
2. Period of work (planned):	June 2011			
3. Research organisation:	CSIC, Spain			
4. Operator and owner:	Operator: Spanish Ministry of Science and Innovation (Ministerio de Ciencia e Innovación (MICINN)) España; Owner: Spanish Navy			
5. Characteristics of vessel:	 Flag: Spain Type of vessel: Oceanographic Resea Vessel Year built and country: 1991, Spain. Refit 2004. Length / width: 82.5 m / 14.3 m Draft: 4.42 m Tonnage: Gross = 2,665.6 T Maximum Speed: 14.7 knots Fuel: 528 m³ Propulsion: Two AEG engines Register port: Cartagena Classification society: Lloyds"100 A1 Class1C". Call code: EBBW Phone: INMARSAT + 00871 (00874) 322 4 			

110 Fax: INMARSAT + 00871 (00874) 322 443 111 Communications: radio MF-HF-VHF, télex, SATCOM E-mail:<u>info-</u> <u>hesperides@hesperides.cmima.csic.es</u>

6. Crew: Name of master: Juan Antonio Aguilar Cavanillas, Spanish Navy

Number of crew people: 56 marine crew (Spanish Navy) See list in appendix 1

Number of marine survey technicians and scientists: 37

7. Researchers:

Principal Researcher in Spain:

Carlos M. Duarte Quesada IMEDEA-CSIC, Miquel Marqués 21 07190 Esporles, Islas Baleares, Spain Telephone: +34 971 611725 Fax: +34 971 611761 E-mail: carlosduarte@imedea.uib-csic.es 8. Geographical zone where the vessel will work:



General map of the Malaspina cruise.

The Malaspina Expedition is a Spanish Circunnavigation Scientific Cruise.

Relation of the points to be sampled in British waters:

* This margin of dates is due to uncertainties on the departure date. Once this is set, the exact dates will be communicated to the contact point indicated for this matter

June 2011 (19-30 June 2011)

Lat: 16° 10.600' S Long: 62° 51.800' W- Montserrat

9. Short description of the purpose of the cruise:

This project aims at conducting a circumnavigation scientific cruise, MALASPINA 2010, with the aims of providing a high-resolution coherent inventory on the impact of global change on the ocean <u>ecosystem at the global scale</u>.

The project also seaks to train a new generation of young scientists with a global outlook to ocean ecosystems; celebrate, the 200th anniversary of the birth of Charles Darwin (1809, 2009 named International Year of Biodiversity) and the death of Alessandro Malaspina (1810), who lead the first Spanish scientific circunnavigation and raise awareness on his expedition and the role of Spain in the exploration of the planet's natural resources.

10. Dates and names of planned call ports (before and after work):

June- JulyEmbarking port:19th June 2011, Cartagena de Indias (Colombia)Debarking port:14th July 201, Cartagena (Spain)

* These dates can vary depending on the departure date. Once this is set, the exact dates will be communicated to the contact point indicated for this matter.

11. Logistic requirements in call ports:

Food, water and fuel provision.

Part B DETAILED INFORMATION

1. Vessel name: BIO Hespérides

2. Period of work (planned): Two periods, estimated dates:

June: 19-30 June 2011

3. Goals of cruise and general methodology to be used (explain):

The Malaspina 2010 project will contribute to the Exploration of Marine Biodiversity in the ocean through following activities:

- Assess the changes in the physical properties of the main waters masses across different oceans.
- Determine changes in mass, heat and freshwater fluxes relative to baselines developed under the WOCE program.
- Identify the locations along the cruise where the strongest thermohaline transformations occur.
- Evaluate the inventory of anthropogenic CO2 in different ocean basins.
- Determine the depths of saturation of calcite and aragonite as related to the current acidification of the oceans.
- Assess concentrations and emission fluxes of the cloud-seeding biogenic trace gases DMS, isoprene and CH3I, and their relationship to biological variables.
- Assess inputs of organic carbon from the atmosphere to the ocean, a process ignored in previous assessment of the global carbon cycle.
- Estimate the increase in the inputs of nitrogen from the atmosphere to the ocean relative to historical estimates.
- First global-scale assessment of the diffusive fluxes of N (as ammonia) to the ocean.
- First global assessment ever of persistent organic pollutants in the ocean, including estimates the oceanic inventory, the routes of entry in planktonic food webs, and their sources and sinks.
- A global assessment of the penetration and lethal doses of UV radiation in the ocean, and the effect of temperature increase and UVR on primary production, phytoplankton physiology, growth rates and losses by cell death.
- A global assessment of the community metabolism and its response to temperature increase and increasing UV radiation.
- Formulation and validation of models of the response of the global ocean ecosystem to temperature and UV increase.

General methodology:

Changes in the physical properties:

Tracer fluxes will be calculated directly (from bottles and CTD data), as well as by inverse modelling. For mesoscale studies, XBT will be launched between stations to increase the resolution.

Ocean Biogeochemistry

Most samples will be collected with the rosette of the CTD. Nutrients: autoanalizer and spectrofluorometry on board. Dissolved and particulate N and P: wet digestion and autoanalysis on board. Urea: FIA on board. TOC and POC: samples collected, sealed or frozen, respectively, and analyzed by catalytic combustion upon return. CDOM and FDOM: spectrophotometry and spectrofluorometry on board. C, N, O, and S isotopic ratios: mass spectrometry connected to either a TOC or an elemental analyzer, upon return. Samples for nutrient analyses will be frozen and analyse at the lab back in Spain.

Ocean optics, Plankton, production and metabolism.

Quantification on the variability in the inherent and apparent optical properties of water, including those corresponding to PAR and UVR bands will be done using radiometers equipped with radiations sensors (spectral) and pressure sensors. It will be identified the presence of peaks in the UV band in the spectral absorption of natural plankton from the presence of UV-protecting pigments. Measurements of the light absorption by de CDOM (Chromophoric dissolved organic matter) will be done by spectrophotometry. Chlorophyll a will be determined by fluorometry. Coccolithophorids will be sampled. The community respiration (R), net community production (NCP) and gross production (GP) of the pelagic communities across the different geographical areas will be calculate by Winkler Method. Plankton samples wil be collected using Niksin botteles and nets (WP2 and Multinet). Plankton samples will be frozen and analyse at the lab back in Spain.

4. Add one map at an appropriate scale showing the geographical working zone where the work is planned, the locations of sampling stations (if any), the tracks of survey lines (if any), the location of moored equipment (if any), and any other relevant information:



Station to be sampled in British waters (19-30 June, 2011)

5. Type of samples, if any (i.e., geological / water / plankton / radioactive isotopes):

Water samples. Plankton samples.

- 6. Details on moored equipment, if any: NONE
- 7. Explosives, if any: NONE
- 8. Details and references on:
 - a) Previous / future related cruises:
- NONE

b) Previously published data related to the planned cruise (add additional page if needed):

References:

- Aristegui, J., Gasol, J. M., Duarte, C.M. & Herndl, G. J. 2009. Microbial oceanography of the dark ocean's pelagic realm. Limnology and Oceanography, 54 (5): 1501-1529.

- Duarte, C. M. & Regaudie-De-Gioux, A. 2009. Thresholds of gross primary production for the metabolic balance of marine planktonic communities. Limnology and Oceanography. 54 (3): 1015- 1022.

- Hendriks, I.E., Duarte, C.M. & Alvarez, M. 2010. Vulnerability of marine biodiversity to ocean acidification: A meta-analysis. Estuarine, Coastal and Shelf Science 86: 157-164.

- Peralta Ruiz, V. 2009. La frontera Amazónica en el Perú del siglo XVIII. Una representación desde la ilustración. Illapa 4: 7-30.

9. Name and address of researchers from the coastal state(s) in which waters the cruise will take place, and with whom previous contacts have been established:

- Harry L. Bryden School of Ocean and Earth Science, University of Southampton Empress Dock Southampton SO14 3ZH United Kingdom E-mail: <u>H.Bryden@noc.soton.ac.uk</u>

Kevin Jones
Department of Environmental Science,
Lancaster Environment Centre, Lancaster University,
Lancaster, LA1 4YQ, UK United Kingdom
Phone (44)-1524-593972
e-mail: k.c.jones@lancaster.ac.uk

10. Say:

a) Are researchers from the coastal state going to be invited to visit the vessel once at port?

YES

b) Will an observer from the coastal state be accepted on board during the research cruise and, if of application, which will be the dates and embarking / debarking ports?

NO, since the research vessel will not touch Port in British territory, and it will be impossible to embark and debark an observer.

c) When the data collected during the requested cruise will be made available to the coastal state and by which means?

YES, data will be sent in electronic format, along with metadata, to the designated oceanographic data center at the coastal state.

			Distance to shore		
Provide a list of the main scientific equipment that is going to be used, saying the waters where it will be used / installed	Fisheries research within the establish ed fishing limits	Research related to the continental shelf beyond the limits of the coastal state	Within 12 nautical miles	Within 12 and 50 nautical miles	Within 50 and 200 nautical miles
Water sampling (CTD-Rosette) In all sampling stations	NO	NO	NO	NO	YES
Radiometer SATLANTIC In all sampling stations	NO	NO	NO	NO	YES
Plankton sampling nets In all sampling stations	NO	NO	NO	NO	YES
Current-meter (ADCP) (continuous record)	NO	NO	NO	NO	YES
Multinet	NO	NO	NO	NO	YES

11. Research equipment / Coastal state. Complete the table below – one copy per coastal state (by answering "yes" or "no")

Appendix 1. (a) List of crew members.

EMPLEO	APELLIDOS	NOMBRE	DNI	F. NACIM.
CF	AGUILAR CAVANILLLAS	JUAN ANTONIO	00.684.538-N	21/01/60
CC	BARÓN TOURIÑO	JOSE LUIS	51.384.460-E	30/04/65
TN	CORDERO ROS	JOSE MARIA	52.988.441-Y	25/02/75
TN	LOPEZ MOR	SERGIO	33.466.349-S	11/09/79
AN	VILLAR ÁLVAREZ	ELENA	44.039.582-X	23/12/75
AN	ABRAHAM FERNÁNDEZ	JESÚS	33.471.814-Y	16/10/82
TTE.	FERNÁNDEZ FORTES	CARLOS ALBERTO	34.993.577-C	18/02/78
AN	LÓPEZ DE SABANDO	JAVIER ALONSO	48.322.749-W	17/03/80
ALF SAN	GARCÍA AVILÉS	ANTONIO	77.521.349-W	26/11/73
AF	COLOM FERNANDEZ	JESUS	48.904.909-D	25/04/83
BGDA MQS	BENZAL CERVANTES	MATIAS A.	22.943.264-M	13/06/62
BGDA ELS	GARCIA BARCELONA	JOSE LUIS	22.964.489-R	18/07/66
SGT1 ELS	MILA FONTCUBERTA	ENRIQUE	44.031.427-C	05/04/72
SGT1 MNS	BECEIRO GOMEZ	GERMAN	32.656.523-L	13/10/67
SGT1 MQS	SAN JUAN BENITO	EMILIO	11./91.6/3-X	21.12.1962
SGT1 MQS	AMOR COVIAN	SERGIO	36.083.722-B	28.06.1970
SGT1 ADS	MOLERO CARPINTERO	JUAN	52.735.795-5	12.11.1972
SGT1 EKS	GARCIA CALVO	RAUL	52.093.612-5	18.02.1970
			71.132.816-A	09.09.1979
CRIEIM			32.689.938-5	24.07.1962
CB1 MOM	TOMÁS HERNÁNDEZ		32.033.447-B	24.07.1962
CB1 COM	MOYA MESA	IOSÉ	30 828 635-Y	10.08.1974
CB1 MNM	CORBALÁN RIVAS	JORGE	32.666 332-F	01.10 1972
CB1 FLM	Ρυςμάρες γιαριανά	AMADEO	20 156 094-K	29.06.1971
CB1 HAM		FRANCISCO	77.516.362-7	15.10.1972
CB1 MOM	ESCALONA RIVERA	DAVID	23.007.447-H	29.07.1975
CB1 MNM	QUINSTANS BARRANCO	SALVADOR	31.265.857-W	15.09.1972
CB1 ADM	SAURA CARDOSO	JESÚS	23.006.132-Z	09.12.1976
CB1 MQM	CERVIÑO AFONSO	FERNANDO	76.719.206-S	02.03.1974
CB1 MNM	MARTÍNEZ CAMPILLO	LUIS ANGEL	46.918.392-W	19.11.1979
CB1 MNM	ARNAO NOGUERA	FERNANDO	22.997.110-P	10.08.1974
CBO MNM	CABARCOS GARCIA	JESÚS	11.431.854-A	25.12.1977
CBO MQM	FIGUEIRAS VEIGA	FRANCISCO ALADINO	32.712.579-R	13.07.1978
CBO MQM	NUÑEZ ESTEBAN	IAGO	72.397.980-Y	31.08.1980
CBO MNM	GARCÍA GOMEZ	ANDRÉS	39.722.421-D	18.08.1977
CBO HAM	PÉREZ FERNÁNDEZ	GINÉS	23.043.983-F	29.09.1986
CBO HAM	CANTOS GALINDO	JOSÉ MANUEL	74.864.224-Y	19.03.1979
CBO HAM	SINESIO ROHNKE	ALEXANDER	73.577.859-P	09.03.1985
CBO ADM	COSTA PEREZ	CARMEN PILAR	73.999.485-K	16.06.1981
MRO HAM	PÉREZ BRETAL	JOSE JORGE	52.936.139-Y	25.09.1978
MRO HAM	HIDALGO BRAVO	SANTIAGO	02.532.375-Y	05.02.1980
MRO HAM	SEGURA VALENCIA	FRANKLIN PAUL	X7.049.293-T	12.04.1983
MRO HAM	MANZANARES MULA	CÉSAR	23.293.193-N	27.09.1989
MRO ADM	MAÑAS ROMERO	LUIS	44.589.811-X	24.07.1981
MRO MNM	ESPINOSA HERNÁNDEZ	JONATHAN	78.858.183-S	27.01.1989
MRO MQM	MEDINA GARRIDO	JUAN JOSE	48.582.481-H	16.10.1985
MRO MNM	GONZALEZ RODRIGUEZ	CESAR	54.064.467-T	23.01.1989
MRO ELM	ALVAREZ MONTEIRO	IVAN	76.962.450-B	02.07.1987
MRO HAM	BERNARDOS RAMOS	PABLO	76.089.230-D	16.05.1988
MRO HAM	AKAGONES SASTRE		43.187.459-Z	21.07.1986
MRO MNM	LABRADA OLOMI		47.650.876-M	15.03.1984
	GARCÍA RAMÍREZ		/8./11.847-H	15.01.1981
MRO ELIVI		ALEXIS	40.080.472-H	15.12.1990
	CAPARROS PINAR		52 020 127 0	21.04.1092
MRO ADM			23.058.600.1	04.02.1985
MRO MOM	MADRID NAVARRO	ENRIQUE	48 702 1/1-D	23 02 1001
MRO HAM	IIMÉNEZ GONZALEZ	RAFAFI	46.702.141-D	19.07.1983
MRO FRM	JARABO FERNÁNDEZ	ALBERTO BORIA	48.572 860-B	12.09.1987
MRO HAM	NAVAJAS BAUTISTA	ANGEL	47.085 583-V	16.10.1989
MRO MOM	JUAREZ ABRELI	JORGE	70.821 617-V	23.05 1991
MRO FLM	GOMEZ PINILLA	FRANCISCO JAVIER	48.938 573-R	30.07.1990
MRO HAM	EKOBO FERNÁNDEZ	JOHNSON KIEV	77.820 645-F	10.11 1990
MRO MNM	HERNÁNDEZ RUBIO	JOSE RAMÓN	48.336.522-K	19.07 1988
MRO MOM	BRAVO HERNÁNDEZ	ANTONIO	06.576.075-F	05.05 1981
MRO ELM	ABADÍA PINILLOS	MIKEL	44.642.520-A	11.08.1987
MRO ELM	JUAN AZORÍN	ANTONIO JOSÉ	48.627.905-V	06.11.1989
MRO ERM	CANO PALACIOS	CARLOS FRANCISCO	74.725.749-7	09.05.1984