



JERICO

Application for Transnational Access to Coastal Observatories





Description of the project (to be provided in pdf format)

Please contact the manager of the infrastructure/installation you wish to use before writing the proposal

PART 1: User group details

Indicate if the proposal is submitted by

- an individual
- a user group

Information about the applicants (PI and project partners)

Principal Investigator (user group leader)

Title Mr Name and Surname Alberto Ribotti

Gender Male Female

Institution Institute for Coastal Marine Environment of CNR, Unit in Oristano

Department / Research Group Operational Oceanography Group (GOO)

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Project partners

(repeat for each partner of the group)

Partner # 1

Title Name and Surname

Gender Male Female

Institution

Department / Research Group





Address _____

 Country _____
 email _____

PART 2: Additional information about the applicant(s) expertise

Expertise of the group in the domain of the application

The GOO's, of CNR Institute for Marine and Coastal Environment (IAMC) Unit in Oristano, main oceanographic activities are related to the monitoring, forecasting and assessment of the impact of human activities on marine and coastal ecosystems (<http://www.seaforecast.cnr.it>). The Group has a robust and recognized experience in the field of Ocean Forecast Modeling for both open ocean and coastal areas. The activity is particularly focused on the implementation and use of nested ocean forecasting models based on different numerical methods (finite differences or elements), which are applied at sub-regional (Sicily Strait, western Mediterranean) and coastal scales in order to provide an innovative approach to the management of the marine systems, and its resources. The research and scientific activities include the water current and wave field forecasting, the investigation of wind wave-water current interactions and the transport of pollutants and other objects for the management of emergencies at sea (oil spill and Safe And Rescue - SAR). Ocean data (CTD, current, sea level), from cruises or drifting buoys or deployed instruments, are used to study the characteristics of the general circulation, from seasonal to climatic time scale, and to validate numerical models.

Over 22 scientific papers have been published from 2006 to nowadays and the Group participates to national and European projects as main contractor or partner mainly devoted in the framework of operational oceanography activities. The Group is part of national and European associations for operational oceanography like the Gruppo Nazionale di Oceanografia Operativa (GNOO) and the Mediterranean Operational Oceanography Network (MOON) representing CNR in EuroGOOS.

Short CV of the PI

Alberto Ribotti, IAMC CNR research scientist in physical oceanography, key expert in physical oceanography and ocean monitoring, with the organization and/or participation at over 24 Mediterranean oceanographic cruises since 1995, particularly addressed to numerical ocean model validation and climatological studies. He works on projects mainly addressed to operational oceanography, ocean forecasting and capacity building activities in oceanography. Responsible of the oceanographic instrumentation at IAMC CNR in Oristano.

A list of 5 recent, relevant publications of the participant(s) in the field of the project

Sorgente R., A. Olita, P. Oddo, L. Fazioli, A. Ribotti, Numerical simulation and decomposition of kinetic energies in the Central Mediterranean: insight on mesoscale circulation and energy conversion, (2011), Ocean Science, Special Issue: ECOOP (European Coastal-shelf sea





Operational Observing and forecasting system Project), 7, 4, 503-519

Ribotti A., Sorgente R., Fazioli L., Olita A., Hendiarti N., Frederik M.C.G., Sadly M., Syamsudin F., Djajadihardja Y.S., Hanggono A., Adi T.R., Farhan A.R., Subki B.A., Manzella G.M.R., Rupolo V., Ruti P., Fusco L., An operational approach to the ocean management in the Indonesian Archipelago, (2010), Journal of Operational Oceanography, 3, 1, 27-35

Ribotti A, Borghini M., Sorgente R., ADCP Measurements in Protected Areas on Vessels of Opportunity. Sea Technology, (2010), 51, 3, 45-46

Schroeder K., Gasparini G.P., Borghini M., Ribotti A., Experimental evidences of the recent abrupt changes in the deep Western Mediterranean Sea, (2009), In: CIESM, 2009. Dynamics of Mediterranean deep waters. N° 38, Workshop Monographs [F. Briand, Ed.], 132 pages, Monaco , 51-56

Ribotti A., Puillat I., Sorgente R., Natale S., Mesoscale circulation in the surface layer off the southern and western Sardinia island in 2000-2002, (2004), Chemistry and Ecology, 20, 5, 345-363

PART 3: Detailed scientific description of the project

List the main objectives of the proposed research

(one page maximum)

The proposed research is drawn in the central part of the Algero-Provencal sub-basin that constitutes the central area of the Western Mediterranean Sea.

This part can be seen as a buffer area between the northern Provencal sub-basin and southern Algerian one and is mainly characterized by the presence and action of the Balearic Front.

So it has a great importance to understand exchanges through the two sub-basins and the complex interactions through eddies. The area of work covers a transect between Balearic islands and Oristano (Sardinia) that the Group in Oristano, in collaboration with the Institute of Marine Sciences of CNR in La Spezia, is annually repeated with CTD and current-meter casts for the last ten years during oceanographic cruises to study the inter-annual variability of physical and biochemical properties of water masses and understand the circulation, the exchanges through the sub-basins and the transport of salt and heat in the western Mediterranean.

Objectives: the proposed research wants to identify the physical properties of the surface and intermediate water masses between Balearics and Sardinia with the aim of:

- i) study the variability of the physical properties of surface and intermediate water masses between the Algerian and the Provencal sub-basins;
- ii) evaluate the transport of water, salt and heat through the area and verify if the interannual variability of the surface and intermediate water masses is due to climatic changes;
- iii) validate the operational hydrodynamic numerical model of the western Mediterranean (<http://www.seaforecast.cnr.it/en/fl/wmed.php>) through the use of in-situ and satellite data.



**Give a brief description of the scientific background and rationale of your project
(one page maximum)**

The southern part of the Algero-Provençal sub-basin, namely the Algerian sub-Basin (AB), is characterized at the surface by the Atlantic Water (AW) flowing into the Mediterranean Sea through the Gibraltar Strait (Millot et al., J. Mar. Syst., 1999). Along the Algerian coast, the AW is transported mainly by the Algerian current (AC Millot, J. Geoph. Res., 1985) from which the anticyclonic Algerian eddies (AEs, Puillat et al., J. Mar. Syst., 2002; Taupier-Letage et al., J. Geoph. Res., 2003), often involving surface and intermediate waters, are generated by baroclinic instabilities of the AC itself. The AEs generally remain more or less included in the main AC flow. Reached the Sardinia Channel (SaC) they can collapse or, strongly modified, can remain almost blocked in the SaC area for several months before collapsing (Puillat et al., J. Mar. Syst., 2002). In some cases (a few per year), the AEs can detach from the AC moving eastward and northward. In these cases the eddies can follow the Sardinian slope northward becoming open-sea eddies. These big “old” and highly energetic AEs can accomplish one or more cyclonic cycle in the AB not exceeding 40°N (Puillat et al., J. Mar. Syst., 2002). Studies focusing on the biological response of AEs (e.g. Taupier-Letage et al., J. Geoph. Res., 2003), depicted complicated relationships depending on the life history, path and size of such eddies, indicating that further investigations are needed.

The northern part of the sub-basin (Provençal sub-Basin) is also a highly dynamic region with strong mesoscale activity, especially studied because site of deep-water formation and for the seasonal bloom occurring in the so-called MEDOC area (MEDOC group, Nature, 1969; the area of Deep Water Formation in northwestern Mediterranean just offshore the Gulf of Lion) in spring are strictly related as in Jacques et al. (Mar. Biol., 1973). The deep water formation process involves substantially three phases (MEDOC group, Nature, 1969; Levy et al. 1998): preconditioning, violent mixing and sinking of the chimneys with the rapid re-stratification of the surface waters.

Northern and southern parts of the basin are divided by a strict area constituted by a north-south gradient between saltier and colder waters at north (LaViolette et al., J. Geoph. Res., 1990; López Garcíá et al., J. Geoph. Res., 1994) and fresher Atlantic Water (AW) at south. This third and central part (around 39.5-41°N) can be seen as a buffer area between the northern and southern ones, mainly characterized by the presence and action of the Balearic Front.

Nevertheless, this part is also characterized by the strongest coupling between chlorophyll *a* (Chl α ; a good and prompt proxy for phytoplanktonic biomass) and the displacement of isopycnae. In other words, effects on the phytoplanktonic abundance of nutrient injection in euphotic layer, generated by isopycnae displacements, is much more evident here than in northern and southern areas (Olita et al., Ocean Dyn., 2011). So, this area is for sure of great interest for the understanding of the coupling between mesoscale circulation and biological response, a field needing further investigation.

**Present the proposed experimental method and working plan
(one page maximum)**

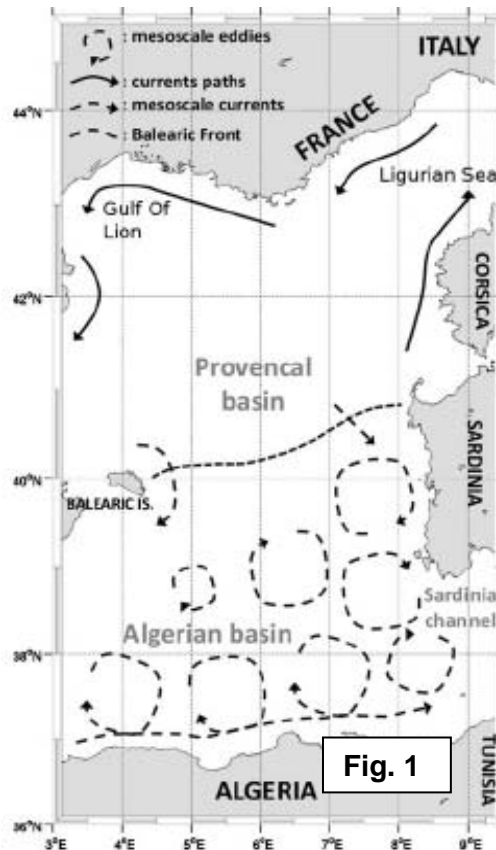


Fig. 1

In order to study the physical characteristics of surface and intermediate water masses in the area between 39.5° and 41°N of latitude in the western Mediterranean, a deep water sea glider (to 1000m depth) is proposed in two missions between Balearic islands and Sardinia (figure 1).

During the two missions the sea glider will leave from Balearic islands to Sardinia and back in order to verify the characteristic of an area still interested by mesoscale activity (AEs) and to compare the acquired data with CTD data from cruises in the area (2006, 2007, 2011, 2012).

This first mission will be planned in 2012 while the second in 2013 depending by sea glider availability and CNR cruises planning for 2012 and 2013.

Data will be used also to validate the numerical circulation model for the western Mediterranean that, if in agreement, after will be used to have a synoptic vision covering the whole area during the whole two missions.

Working plan (in figure 2 the area & the CTD transect):

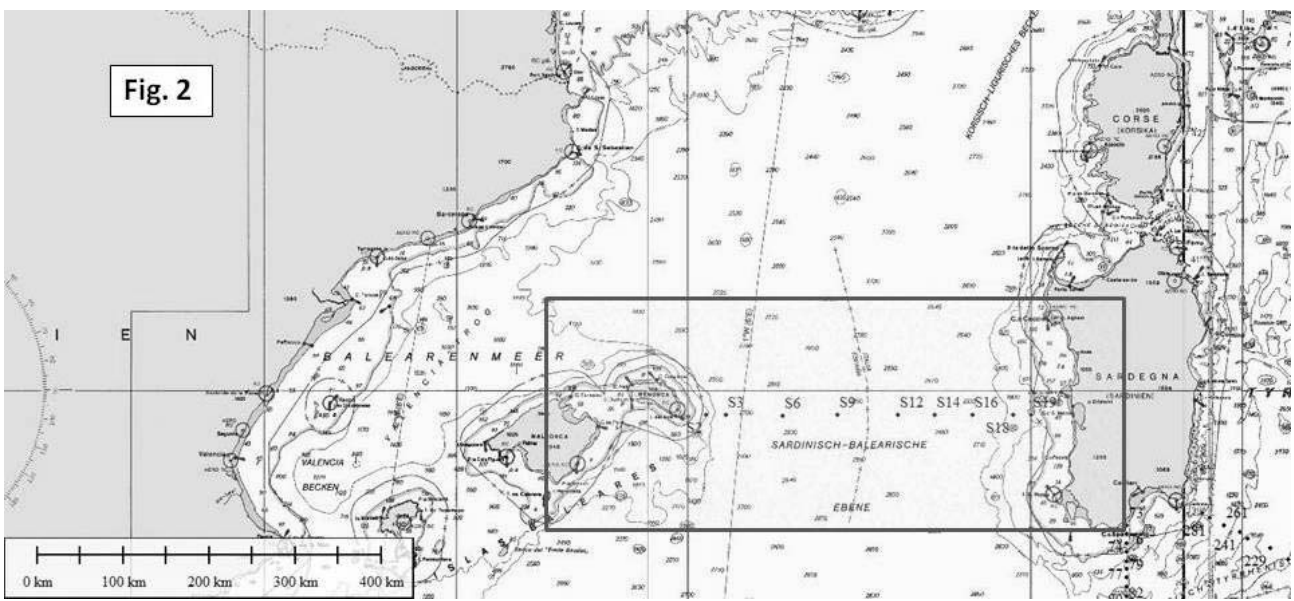
R1) For a period of a week at the beginning of each mission (in 2012 and in 2013), one researcher/technician from IAMC CNR in Oristano will train at CSIC-IMEDEA in

Esporles to manage gliders and acquire data.

R2) At the end of the each mission the same IAMC representative will join a second week in Esporles on glider recovery and data processing/analysis. So four weeks of training are planned during the whole project.

M1) The first mission will be in 2012, during the training week, from Balearic islands to Sardinia. The transect, between 39.5° and 41°N of latitude, is about 180-200 nm long with a depth reaching 2900 m for the most of it. The time the sea glider needs to cover it (go and back) is of about 70-80 days. IAMC CNR Oristano will acquire data supervised by CSIC-IMEDEA; The period will be decided due to sea glider and stage time availability by both institutes.

M2) The second mission will be in 2013 due to the same reasons as at point (R2). IAMC CNR Oristano will acquire data supervised by CSIC-IMEDEA;



Indicate the type of access applied for

- remote *(the measuring system is implemented by the operator of the installation and the presence of the user group is not required)*
- partially remote *(the presence of the user group is required at some stage e.g. installing and un-installing)*
- in person/hands on *(the presence of the user group is required/recommended during the whole access period)*

Indicate the proposed time schedule including expected duration of access time

(half a page maximum)

- 1) 2 weeks in 2012 with launch and recovery of the sea glider due to sea glider and stage time availability by both institutes.
 - 1.1) During the first week 1 researcher/technician from IAMC CNR in Oristano will train at CSIC-IMEDEA in Esporles to manage sea gliders (first half of the stage) and acquire data (second half of the stage). At half of the period of stage in 2012, the first mission will start with the launch of the sea glider from off Balearic islands to Sardinia. The transect will be about 180-200 nm long for one way with a depth reaching 2900 m for the most of it. The time the sea glider needs to cover the whole trip (go and back) is of about 70-80 days. Data will be acquired at CSIC-IMEDEA and delivered to IAMC CNR in Oristano. IAMC CNR Oristano will acquire data supervised by CSIC-IMEDEA;
 - 1.2) During the second week 1 researcher/technician from IAMC CNR in Oristano will train at CSIC-IMEDEA in Esporles to recover sea glider in the Balearic islands and for sea glider data processing/analysis.
- 2) The same as above for the second mission planned in 2013. The precise time will be decided due to sea glider and stage time availability by both institutes.



Host infrastructure

Indicate the type(s) of JERICO host facility(s) you are interested in
(Tick more than one if it is useful for your project)

- ferrybox
 fixed platform
 sea glider
 calibration laboratory

Indicate the specific JERICO host facility(ies) you wish to choose

Facility ID: CSIC-Glider in particular a sea glider for deep sea water

Explain briefly why you think your project will be best carried out at the specified host facility(ies)

The main advantage is given by the position of the CSIC-IMEDEA at Balearic islands, really close to the starting/ending points of the missions, so reducing their costs of implementation. Furthermore such a project could be the start for stronger future collaborations between the CSIC-IMEDEA in Esporles and IAMC CNR in Oristano, looking at their strategic positions in the western Mediterranean and their similar reciprocal areas and fields of interest (operational oceanography, ocean forecasting).

If possible, list other JERICO facility(ies) where you think your experiment could alternatively be carried out

Our main objective is the validation of numerical forecasting models implemented at IAMC CNR in Oristano. This in mind, other Jerico facilities of interest for us could be the gliders at CETMS in France or the mooring MPLS at ISMAR-CNR in La Spezia.

Additional information

Is there a facility similar to the one you wish to utilize in your country?

- Yes
 No

If yes, please indicate your reasons for requesting access to the JERICO facility you have chosen

Have you already submitted an Access Proposal to any of the participating facilities under this or previous EU Programs?





Yes No

If yes, please indicate the name of the institution, submission date and reference number for each such proposal

Is this a resubmission of a previously rejected proposal? (Select "yes" if this application is a revised version of a proposal submitted to JERICO before that was rejected by the Selection Panel)

Yes No

If yes, please give the exact reference number and submission date. Kindly describe briefly the changes made in comparison to the rejected version.

Is this a continuation of an earlier project funded under a previous call for Transnational Access in JERICO at the same facility?

Yes No

If yes, please give the exact reference number and submission date. Kindly indicate also what has been achieved in the previous experiment and the reasons why the objectives have not been fully met.

PART 4: Technical information

Wherever possible, please specify your requests regarding the use of your chosen facility's equipment/instruments/sensors, including any additional services, data or other requirements.

None

List all material/equipment you plan to bring to the JERICO facility (if any):

None

Please provide a detailed and realistic budget for the expenses you expect to incur for travel/boarding and the shipment of equipment, if applicable in your case (note that a maximum of two travel grants will be assigned to each user group, depending on the length of the requested period of stay).



Costs regards two travels and two weeks lodging for 1 CNR researcher/technician in Mallorca during the training for instrument preparation (starting experiment) and two travels and two weeks lodging during the training for sea glider recovery and data processing/analysis (ending experiment).

Travel (4): 2400 euro

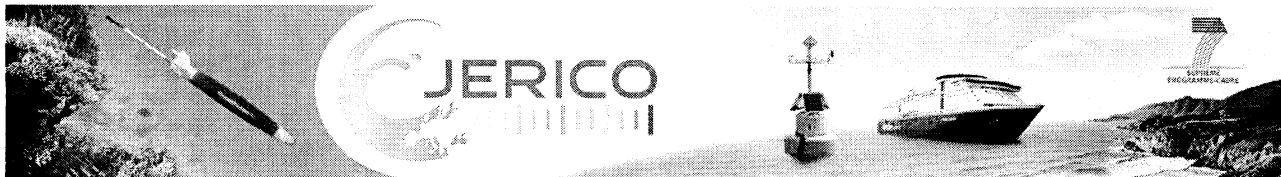
Hotel 28 nights (2*(7+7)): 2600 euro

Meals: 2000 euro

TOTAL 7000 euro

Please tick the appropriate boxes and give detailed information for the kind of risks associated with your proposed activity

- Chemical :
- Biological :
- Radiological :
- Other: sea and weather conditions



Date of compilation 30/03/2012

Signature of the PI *[Signature]*

Signature of an appropriate authorised person
(e.g. Head of Department, Research Office) *[Signature]*

Ist. Ambiente Marino Costiero - C.N.R.
Il Direttore
Dott. Salvatore Mazzola

This section reserved to the JERICO TNA Office

Date of proposal receipt by email _____

Assigned reference number _____

Signature of receiving officer _____