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**SUBDIRECCIÓN GENERAL
DE PROYECTOS DE
INVESTIGACIÓN**

DOCUMENTO DE PLAN DE CAMPAÑA BUQUE OCEANOGRÁFICO

1.- DATOS DEL INVESTIGADOR PRINCIPAL:

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2.- DATOS DEL PROYECTO:

Título del Proyecto: Physical-biological coupling at the mesoscale range around South Shetland Islands (Antarctica)- COUPLING-

Coordinador del Proyecto: Pablo Sangrà Inciarte

3.- PLAN DE CAMPAÑA.

Documento de formato libre, en el que se describirá con suficiente detalle el plan de campaña, adjuntando uno o varios mapas detallados así como todas las coordenadas de aquellos lugares en que se desarrolle la labor.

Cruise planning of survey COUPLING

Requested Ship Time: 25 survey time+6 days transit Ushuaia-Bransfield-Ushuaia = 31 days

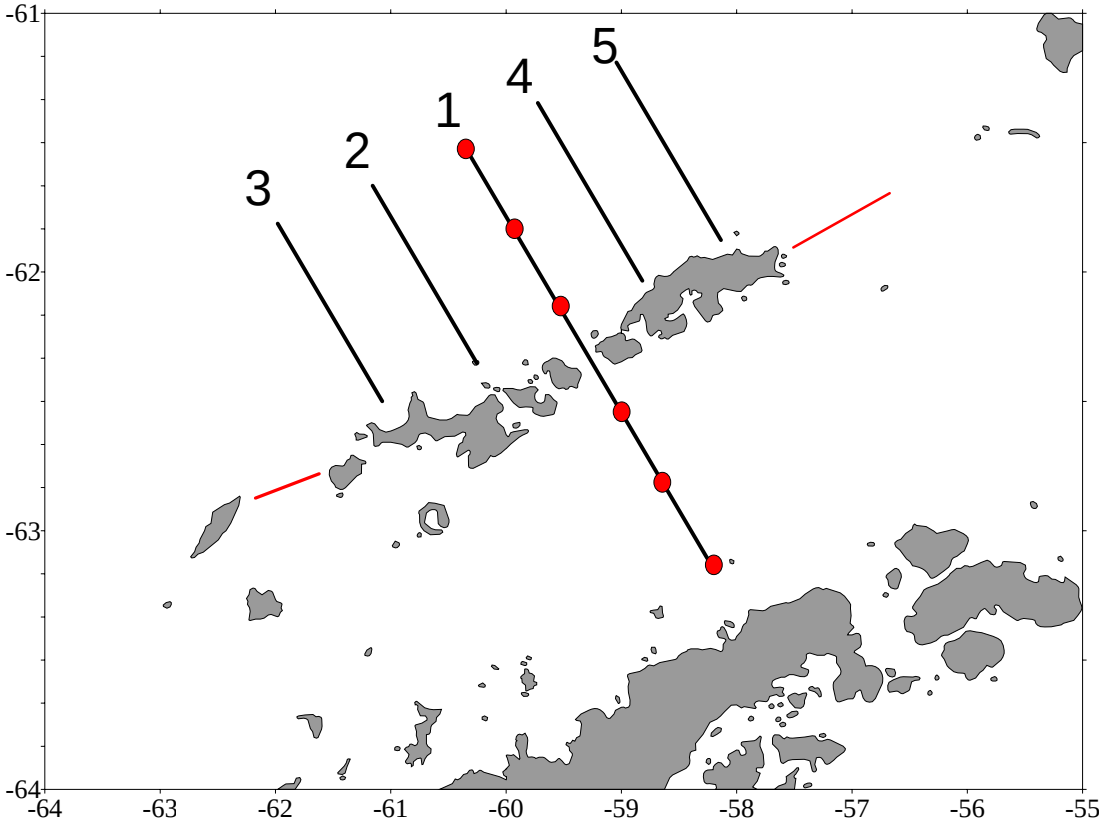

Figure 1. Survey planning around South Shetlands Islands (Antarctica). Five interdisciplinary transect of 50 mn (T1, 100nm) with a resolution of five nm (bold lines). Transect 1 will be sampled with CTD-Rosette-BIONESS-LHPR, 20 XCP will be also launched. Transects 3, 5 will be sampled with CTD-Rosette and BIONESS. Transects 2, 4 with CTD-Rosette and LHPR. In transect 1, 6 circadian (red points) stations will be performed (CTD-Rosette-High resolution profiler-BIONESS-LHPRR). Red transects will be done only with CTD.

Observational strategy

In the first part of the cruise we plan to sample five interdisciplinary transects 50 mn long from South Shetlands Islands toward Drake Passage. In each transect 10 interdisciplinary stations will be sampled (5 mn spacing between stations) (see figure below). Transect 1 (the central one) will be also extended through channel between Robert Island and Nelson Island towards Bransfield Strait so 10 more interdisciplinary stations will be sampled.. Based in our previous experience each transect will be sampled twice, one for sampling odd stations and other for sampling even stations (see details in the cruise planning). This will allow us to have enough time to fix and process biological samples maintaining a 5 nm resolution. At each station we will sample hydrography (CTD), phytoplankton (community structure and metabolism (Rosette) and photosynthetic efficiency (FRRF), and, zooplankton (BIONESS: transects 1, 3 and 5; and LHPR: transects 1, 2 and 4). In the transect 1 along both sides of

the archipelago we will also launch 20 XCP (eXpandable Current Profiler, 5 mn resolution) to obtain the velocity shear and the fine structure. This will allow us to calculate the degree of turbulence (dynamical stability and mixing). We will also sample (only CTD) two short zonal transects and the ends of the archipelago in order to reveal the circulation connection between both sides. This will be completed by launching 4 Argos buoys.

In a second part of the survey, six circadian stations in different physical environments (high turbulent waters (fronts), well stratified waters and homogenous waters) along transect 1 will be sampled using CTD-Rossete, FRRF, BIONESS and LHPR. This will allow us to obtain the semidiurnal variability of phytoplankton biological properties and zooplankton vertical migrations. We will also measure directly the degree of turbulence and fine structure with a high resolution profiler (TurboMAP).

Sampling

• Interdisciplinary stations: CTD-Rosetta + (BIONESS or LHPR)

- CTD fluorimeter-transmisometer of the whole water column
- Phytoplankton samples (0-10-25-50-75-100 m and DCM)
- Nutrients (0-10-25-50-75-100-150-200-300-500-1000 m).
- BIONESS. Alter the CTD profiles meroplankton will be sampled with BIONESS net. The sampled will be done at 2 knots and samples will be taken at regular depths until 500 m in order to sample *Metridia gerlachier.*.
- LHPR. Zooplankton will be sampled with high vertical resolution with Longhurst-Hardy Plankton Recorder (LHPR)

• Turbulence stations

- In the central transect (Transect 1) 20 XCP will be launched in order to get the vertical velocity shear and then to calculate Richardson numbers (dynamical stability and diapicnal mixing) with a resolution of 5 nm.
- At the circadian stations direct measurement of turbulence and fine structure will be done by doing 1 cast every 6 hours with a high resolution vertical profiler.

• Circadian stations:

Six circadian stations will be performed in three different physical environments (highly turbulent, stratified, homogeneous). Each 6 hours CTD-Rosette-BIONESS-LHPR- will be launched. Also, turbulence profiler cast will be done.

• Transect timing

CTD-Rosette cast will take one hour and BIONESS or LHPR fishing will take 2 hours. Therefore in each inrterdisciplinary station we will spend 3 hours (except in central transect T1, 5 hours). First we will sample the even station and then we will come back sampling odd station (50+50 nm) being the distance between same sign station 10 nm. Time between CTD-Rosette casts, and LHPR/BIONESS fishing will be 3 hours at five knots speed. This will imply that each quarter group (four hours) will sample one CTD-Rosette and one BIONESS/LHPR fishing which is a rather sustainable rhythm. Transect 2, 3, 4, 5 will take 53 hours each (11 sta.x3 h= 33h, 100 nm/5 kn=20 h) and a total of 9 days (c.a. 53x4=212 h). Central transect T1 will take five days (20 sta x 5 h= 100 h, 200 nm/5 kn= 40 h). End transect for close circulation will take 1 day and the six circadian

station 6 days. Assuming 300 nm transits (c.a. 3 days) the total estimate time of the survey will be 25 days (9+5+1+6+2=23 days +2 days margin)

4.- RESUMEN DEL PLAN DE CAMPAÑA.

Realizar un resumen del Plan de Campaña en un máximo de 10 líneas.

We plan to sample six interdisciplinary transects 50 mn long a 5mn spacing between stations, around South Shetland Isalnds (Antarctica). Five transect will be sampled at the north side of South Shetland Islands (Drake Passage) and one on the south side (Bransfield Strait). Each transect will be sampled two times, one for sampling odd stations and other for sampling even stations. In the stations we will sample, hidrography (CTD), phytoplankton (Rosette), meroplankton (BIONESS, 3 transects) and zooplankton (3 transects). In the central transect along both sides of the archipelago we will launch 20 XCP (5 mn resolution). We will also sample only with CTD two short zonal transects and the ends of the archipelago. We will also launch 4 Argos buoys. Finally we plan to perform 6 circadian stations. The total estimate survey time will be 25 days