

CAML - South American Projects

The South American Projects of CAML are coordinated across seven countries (Argentina, Brazil, Chile, Ecuador, Peru, Uruguay and Venezuela) by the LA-CAML consortium, under the leadership of Lúcia Campos (Brazil).

These Antarctic biodiversity projects are recognised as essential to the success of CAML.

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Ministerio de Relaciones Exteriores

Instituto Antártico Peruano

PROYECTOS DE INVESTIGACIÓN A REALIZARSE EN EL VERANO DEL 2008 Y QUE PODRÍAN ESTAR EN EL MARCO DEL CAML

1. Caracterización de la biodiversidad en la Ensenada Mackellar y la parte profunda de la Bahía Almirantazgo

Determinar la estructura especiológica y comunitaria del bentos en la Ensenada MacKellar y las partes profundas de la Bahía Almirantazgo y su relación con la naturaleza de los fondos y las condiciones ambientales imperantes y las características físico químicas de los fondos marinos.

Este proyecto será conducido por el INANPE con la participación del Instituto del Mar del Perú y la Universidad Nacional Mayor de San Marcos. Asimismo, se espera trabajará en cooperación con otros Programas Antárticos Nacionales como el de Brasil.

2. Caracterización de la biodiversidad bentónica del Estrecho de Bransfield

Durante el verano del 2008 se espera ampliar las observaciones que tradicionalmente se hacen en el ambiente pelágico de la Ensenada Mackellar. Esto se haría con el BIC Humboldt para tener una visión integral de este importante escenario. Los muestreos se harían con redes de arrastre de fondo (Granton) y draga Van Veen. Este sería un muestreo preliminar para determinar la biodiversidad y su distribución espacial en el estrecho, para luego plantear un diseño de muestreo estratificado al azar con el objeto de evaluar los recursos biológicos existentes en este ambiente.

La idea es determinar población y biomasa de lo existente en el estrecho de Bransfield, de tal manera que se puedan establecer las relaciones y comparaciones entre el ambiente pelágico y bentónico al mismo nivel. Todo esto está supeditado a la disponibilidad de los recursos económicos que se destinen a nuestra expedición. Si existe cooperación externa sería ideal. Asimismo, estamos tratando de intensificar cooperantes para llevara adelante esta propuesta. En principio se ejecutará con el IMARPE y la Universidad Nacional Mayor de San Marcos.

3. Depredación, tiempo atmosférico, microclima y elección del sitio de anidación de la colonia del gaviotín antártico *Sterna Vittata Gemlin 1789* en Punta Crepín, Isla Rey Jorge.

El proyecto tiene como objetivo cuantificar las variaciones microclimáticas del área de reproducción del gaviotín antártico (*Sterna vittata*) y su dinámica poblacional costera. En tal sentido, evaluará algunos factores biológicos y físicos que inciden en la reproducción del gaviotín antártico durante la etapa de puesta e incubación de huevos, para ello considera algunas características reproductivas de la colonia de *S. Vittata*, tales como: tamaño y estado actual de la colonia, densidad de nidos, éxito de eclosión, tiempo de atención de los padres en el nido; los cuales se relacionarán con factores tales como: la depredación por skuas, tiempo atmosférico durante el día y micro meteorología del área de anidación. Además se registrarán y analizarán las posibles diferencias micro meteorológicas entre áreas de anidación y áreas sin aves en reproducción.

Este proyecto será ejecutado por la Asociación Peruana para la Conservación de la Naturaleza (APECO).

4. Proyecto COPEPOD II, Biología y Ecología de las principales comunidades pelágicas del estrecho de Bransfield y alrededores de la Isla Elefante, desarrollado en Convenio con el Instituto del Mar del Perú – IMARPE

Tiene como objetivo analizar, describir y conceptuar el comportamiento nictimeral y/o distribución de las principales especies de la comunidad pelágica del ecosistema de la sub-área antártica CCAMLR 48.1 en relación con la producción primaria, presencia de depredadores y las condiciones físicas y químicas en la columna de agua.

El proyecto propone realizar prospecciones sobre ecología del comportamiento de las principales comunidades pelágicas, a fin de estudiar su ocupación tridimensional del espacio, lo que incluye diferentes niveles tróficos, en función a sus condiciones ambientales. Para ello se han definido cuatro áreas de investigación: Detección y Comportamiento, Biología y Ecología, Oceanografía Química y Física y Predadores Superiores, estas se especializan en las actividades de recolección de datos, pero interactúan proactivamente en el análisis de las muestras, en la validación estadística, en el intercambio de información con la comunidad científica nacional e internacional y en la publicación de los resultados de los estudios.

Lidera este proyecto el Instituto del Mar del Perú y participan en el mismo la Universidad Nacional Mayor de San Marcos, el British Antarctic Survey, la Universidad de Washington y el IRD-Francia (Instituto de Investigaciones para el Desarrollo).

**External Relations Ministry
Peruvian Antarctic Institute**

**INVESTIGATION PROJECTS FOR THE 2007/08 AUSTRAL SUMMER THAT
COULD CONTRIBUTE TO THE CENSUS OF ANTARCTIC MARINE LIFE**

1. Biodiversity characterization of Mackellar Inlet and the deep portion of Admiralty Bay

Determine the benthic communities' structures of Mackellar Inlet and the deep portion of Admiralty Bay (the latter in cooperation with the Brazilian IPY MABIREH project) and their relationship with the sea floor nature and physical-chemical characteristics and general environmental conditions.

This project shall be conducted by INANPE with the participation of the Instituto del Mar del Perú, the Universidad Nacional Mayor de San Marcos in cooperation with the Federal University of Rio de Janeiro and other National Antarctic Programmes.

2. Characterization of the Bransfield Strait benthic biodiversity

Increase observations on the pelagic and benthic observations that have been carried out in Mackellar inlet and Admiralty Bay in general to the Bransfield Strait during the 2008 Austral summer. This would be done using the R/V Humboldt to gather integrated oceanographic information in those areas. Sampling shall be done using a variety of equipment (e.g. Granton trawl, van Veen, box corer) to assess biodiversity, communities' spatial distribution in those study areas. The information generated through this cruise shall be used to design a wider plan to evaluate the existing biological resources: determine populations and biomass existing especially at the Bransfield Strait in order to establish pelagic-benthic couplings.

All this shall be dependant on the economic resources available for the expedition to take place. If there is external / international collaboration that would be ideal, and an effort towards that purpose has been made. Initially this project shall be carried out by IMARPE (Peruvian Marine Institute) and the Universidad Nacional Mayor de San Marcos and strong potential for collaboration with the Federal University of Rio de Janeiro.

3. Degradation, weather, microclimate and selection of nest forming site of the Sterna Vittata Gemlin 1789 Antarctic colony at Crepin Point, King George Island.

This project has the objective of quantifying microclimate variation of the reproductive area of the Antarctic *Sterna Vittata* Gemlin 1789, and its coastal population dynamics. Biological and physical factors that may influence their reproduction will be evaluated during the **laying eggs phase** and the eggs' incubation taking into account the following *S. Vittata* reproductive factors: size and colony state, density of nests hatching success, nursing period. All these aspects will be compared in relation to: predation by skuas, meteorology and microclimate in the nesting area. A register and analysis of possible microclimate differences between nesting areas without birds in reproductive stage will be carried out.

This project will be carried out by the Asociación Peruana for the Conservación de la Naturaleza (APECO).

4. Project COPEPOD II, Biology and Ecology of the main pelagic communities from the Bransfield Strait and surroundings of the Elephant Island, developed in cooperation with the Instituto del Mar del Perú – IMARPE

The main objective of this project is to analyse, describe and evaluate the “nictimeral” behaviour and the distribution of the main pelagic communities from the Antarctic sub-area CCAMLR 48.1 in relation to the primary production, presence of predators, and the physical- chemical water column conditions.

This project proposes to make an investigation on the behavioural ecology of the main pelagic communities in order to study their tridimensional space use, which includes different trophic levels in relation to environmental parameters. In order to carry out this project 4 areas of investigation have been established: 1) Behaviour, Biology and Ecology Assessment; 2) Chemical and Physical Oceanography, and top predators. Data has been collected in an integrated manner in collaboration through national and international cooperation, including for publication of the studies results.

This project is lead by the Instituto del Mar del Perú and participate in collaboration the Universidad Nacional Mayor de San Marcos, the British Antarctic Survey, the Univeristy of Washington and the IRD-France.

LA CAML 3

Pacific-Antarctic influence on the Atlantic side of the Magellan Strait: Long term monitoring of Patagonian microbial communities at ca. 52°S.

Dr. Viviana A. Alder/ Dr. Sergio Marensi
Instituto Antártico Argentino (IAA)
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)
Universidad de Buenos Aires (UBA)

Multidisciplinary, international efforts have led to a fair knowledge of microbial communities (pico-, nano- and microplankton) as to their structure, abundance, and processes involved in the global carbon cycle. Advanced, exhaustive studies on this field have been encouraged in many different sectors of the World Ocean, including those of difficult access such as the Antarctic. Curiously, for a few geographic areas adjacent to the latter region and under its strong, direct influence, studies of this kind are only in their initial stages. Such is the case of the Argentine shelf, which is characterized both by being one of the widest in the world and by its high diversity of marine ecosystems. In terms of dynamic processes (removal of CO₂ from the atmosphere through photosynthesis, nutrient recycling, coupling of phytoplanktonic and bacterioplanktonic production, food web interactions, transport of species by currents), this lack of knowledge prevents from establishing links and comparisons with adjacent oceanic regions (e.g., Southern Ocean, SE Pacific), as well as from constructing ecosystem models aimed to predict the patterns of carbon flux, among other limitations. Previous results from latitudinal transects extending from the Argentine shelf to the Southern Ocean during austral summer revealed that South Patagonian waters (mainly those along the coast of the Santa Cruz Province) favour the development of an extremely rich pseudo-estuarine ecosystem hosting high microbial and heterotrophic biomasses. These waters are under the influence of (1) nutrient-enriched Circumpolar waters, (2) a tongue of low-salinity, subantarctic waters proceeding from the Strait of Magellan (the most important choke point between the Atlantic and Pacific) and the Cape Horn Current, and extending northward up to 47°S, (3) frontal processes, and (4) human impact due to exploitation of living and non-living resources. Moreover, while the Atlantic side of the Magellan Strait exhibits the world's second largest tidal ranges, the Pacific end receives the direct effect from glacial continental ice melting during summer. Given the implications of this particular sector in local carbon fluxes, marine fisheries and Global Change, further critical questions arise: Is the Pacific-Atlantic link a potential catalyst of microbial activity on the Atlantic side of the Magellan Strait? Which are the environmental factors causing and regulating such high productivity levels? Is this phenomenon permanent, occasional or seasonal? To what degree do these unexpectedly high heterotrophic biomasses contribute to the local carbon flux and to Global Change? Which are the relationships between food-web structure, organic matter fluxes and climatic variability (e.g., ENSO)? What is the magnitude and fate of primary and secondary production in this area and how will it change as global temperature increases and atmospheric ozone becomes further depleted? These important questions need to be answered in the forthcoming years in order to understand both the dynamics of this

unique environment and the connections between Polar and mid-latitude ecosystems (for instance, how and to what extent “open-ocean” Drake Passage waters impact on this environment, and how this impact compares with that caused by the “protected” chokepoint of the Magellan Strait, directly influenced by the ENSO cycles). As a starting point for this ample research field, the present project intends to initiate a long-term monitoring of microscopic communities and their role in biogeochemical cycles through a Time Series Station in neritic Patagonian waters (ca. 52°S). Such a station will be the core of in situ and experimental studies on seasonal and interannual variability of the local microbial community structure, cell size and abundance, key species and functional groups, red tides, alternation between bacterioplankton and net phytoplankton dominance, etc. Data will be analyzed in relation to the main physico-chemical and geological constraints of the sector (temperature and salinity fluctuations, wind, turbulence, local tidal ranges, re-suspension processes, land-coast and plankton-benthos-sediment interactions, quality, origin and concentration of DOM and POM, organic and inorganic nutrients, DO, pH, chlorophyll, among others) as well as to meso-scale phenomena such as ENSO (actual and past conditions). This approach is expected to help in the understanding of coastal ecosystem responses to natural and anthropogenic changes and to promote the development of disciplines such as Aquatic Microbial Ecology and Marine Biogeochemistry in the young generation of scientists.

LA CAML 1

SEASonality of the DRAKE Passage pelagic ecosystem: BIODiversity, food webs, environmental change and human impact. Present and Past (DRAKE BIOSEAS)

Dr. Viviana A. Alder/ Dr. Enrique Marschoff
Instituto Antártico Argentino (IAA), Argentina

The Southern Ocean exerts a strong influence on global climate through the circulation of the Circumpolar Current and the seasonal shift of the sea-ice cover. While currently there are many different ways of assessing the intensity of phenomena associated with Climatic Change (ozone depletion, increase of temperature, CO₂ and UV radiation), there is no single tool for measuring the indirect effects of these alterations, most of which are critical to the functioning of ecosystems. In the marine environment, changes in thermal gradients modify the global oceanic circulation pattern, thus bringing unpredictable consequences to the structure of communities, trophic relationships and biogeochemical cycling. The geographic distribution and abundance of plankton stem from a combination of factors that include the interaction between the life cycle of species, oceanic circulation, formation of eddies, the behaviour of frontal systems (e.g., advance and retreat of the sea-ice cover), and the abundance of vertebrate predators (fish, birds and marine mammals). Any alteration, natural and/or anthropogenic (e.g., fisheries), in the intensity of predation leads to a change in the structure of trophic webs, thus affecting biodiversity, concentration of key Antarctic species, nutrient loading and carbon fluxes to the deep-sea, often resulting in the general unbalance of the ecosystem. In order to examine within an integral framework this conjunction of factors, the present project will focus on the seasonality of one of the most peculiar areas of the Southern Ocean: the Drake Passage, a key open-ocean choke point for the Antarctic Circumpolar Current. The pronounced continental constriction between South America and the Antarctic Peninsula causes the northern deflection of the ACC and, jointly with the ENSO cycles, influences directly the Southwestern Atlantic in terms of oceanographic-atmospheric and biological processes. Drake Bioseas is intended to achieve a first step towards the understanding of these processes by covering aspects that range from the assessment of air-sea interactions to geochronological surveys of the sea bottom, and from organisms living in the pelagic realm to benthic communities and micro-paleontological indicators, emphasising in the Magellan-Antarctic regions and the Atlantic-Pacific connections. Specific richness, population density, biomass and geographic distribution, shifts in community structure and biogeography, oxidative stress biomarkers and antioxidant defenses will be examined for bacteria, protozoa, planktonic algae, meso- and macrozooplankton, sea birds and marine mammals. Antarctic and subantarctic fishes will be examined only as to their systematic (morphological and molecular) and oxidative stress; this will allow elucidating the patterns of distribution of key species, migration processes and physiological responses to environmental changes. Special attention will be paid to dormant stages of microscopic organisms (non active bacteria, auxospore formation, cysts, resting propagules) as well as to factors controlling the timing of activation. The role of species within the trophic web will be evaluated, taking into consideration a wide spectrum of topics, including fluctuations in the nutritional mode of unicellular organisms, diet

composition, energy content, interspecific food overlapping in top predators, etc. Previous information from land, coastal and open ocean communities, provided from scientists involved in the project and by official and private institutions dedicated to fisheries, will constitute the tools for comparisons of past and current conditions. Such objectives make Drake Bioseas directly link to CCAMLR, EBA SCAR and CAML projects. This will be the first time in which a multidisciplinary and integrated approach is made on waters of the Drake Passage and its surroundings, emphasizing on the seasonal and inter-annual dynamics (2007-2008) of marine communities in natural boundaries such as Subantarctic vs. Antarctic, neritic vs. oceanic, Pacific vs. Atlantic, summer vs. winter, low- vs. mid-latitude environments, and on trophic relationships (areas/seasons/years of dominance of net phytoplanktonic cells vs. DOM-based microbial food web, and of crustacean vs. gelatinous zooplankton) and the magnitude of ecosystem fluctuations due to frontal behaviour (Subantarctic Front, Polar Front, Ice-Edge, winter conjunction of Polar and Ice fronts). Manipulative experimental work (productivity, grazing, physiological responses) on board will be carried out to complement in situ studies. Besides its scientific goals, the priorities of this endeavour embrace the legacy of an Experimental Research Centre for multidisciplinary studies on cold-water organisms, and an Argentine icebreaker reconditioned for scientific purposes. These legacies are expected to significantly contribute to the formation of a new generation of “bio-seas” scientists.

LA CAML 64

Reproductive biology and behavioral ecology of Skuas (*Catharacta lonnbergi* and *C. maccormicki*) in Keller Peninsula, Admiralty Bay, King George Island, Antarctic.

Dr. Maria Alice S. Alves

Erli Schneider Costa

Universidade Estadual do Rio de Janeiro (UERJ), Brazil

The main objective of this project is understands the reproductive biology and behavioral ecology of two species of Skuas that breeding in Keller Peninsula, near Brazilian Antarctic Station Comandante Ferraz. The project will have a duration of two years (starting in April 2007 to March 2009) and the collection of data will occur during two expeditions of 30 days each (dez/2007-jan/2008; dez/2008-jan/2009). This exploratory study will involve: capturing, marking and taking morphometric measurements of adults and chicks; monitoring reproduction and chicks to determine survival and growth rate; morphometry of eggs; blood sampling to estimate genetic variability and extra-pair fertilization; determining sex ratio of broods; estimating male/female parental investment; establishing whether and how brood reduction occurs. The observations in field will be associated with genetic studies.

LA CAML 9

Impact of Climate induced Glacial Melting on Marine and Terrestrial Coastal Communities on a Gradient along the Western Antarctic Peninsula (ClicOPEN) – Brazil

Dr. Jorge Arigony

Universidade Federal do Rio Grande do Sul (UFRGS), Brazil

The Southern Ocean exerts a strong influence on global climate through the circulation of the Circumpolar Current and the seasonal shift of the sea-ice cover. While currently there are many different ways of assessing the intensity of phenomena associated with Climatic Change (ozone depletion, increase of temperature, CO₂ and UV radiation), there is no single tool for measuring the indirect effects of these alterations, most of which are critical to the functioning of ecosystems. In the marine environment, changes in thermal gradients modify the global oceanic circulation pattern, thus bringing unpredictable consequences to the structure of communities, trophic relationships and biogeochemical cycling. The geographic distribution and abundance of plankton stem from a combination of factors that include the interaction between the life cycle of species, oceanic circulation, formation of eddies, the behaviour of frontal systems (e.g., advance and retreat of the sea-ice cover), and the abundance of vertebrate predators (fish, birds and marine mammals). Any alteration, natural and/or anthropogenic (e.g., fisheries), in the intensity of predation leads to a change in the structure of trophic webs, thus affecting biodiversity, concentration of key Antarctic species, nutrient loading and carbon fluxes to the deep-sea, often resulting in the general unbalance of the ecosystem. In order to examine within an integral framework this conjunction of factors, the present project will focus on the seasonality of one of the most peculiar areas of the Southern Ocean: the Drake Passage, a key open-ocean choke point for the Antarctic Circumpolar Current. The pronounced continental constriction between South America and the Antarctic Peninsula causes the northern deflection of the ACC and, jointly with the ENSO cycles, influences directly the Southwestern Atlantic in terms of oceanographic-atmospheric and biological processes. Drake Bioseas is intended to achieve a first step towards the understanding of these processes by covering aspects that range from the assessment of air-sea interactions to geochronological surveys of the sea bottom, and from organisms living in the pelagic realm to benthic communities and micro-paleontological indicators, emphasising in the Magellan-Antarctic regions and the Atlantic-Pacific connections. Specific richness, population density, biomass and geographic distribution, shifts in community structure and biogeography, oxidative stress biomarkers and antioxidant defenses will be examined for bacteria, protozoa, planktonic algae, meso- and macrozooplankton, sea birds and marine mammals. Antarctic and subantarctic fishes will be examined only as to their systematic (morphological and molecular) and oxidative stress; this will allow elucidating the patterns of distribution of key species, migration processes and physiological responses to environmental changes. Special attention will be paid to dormant stages of microscopic organisms (non active bacteria, auxospore formation, cysts, resting propagules) as well as to factors controlling the timing of activation. The role of species within the trophic web will be evaluated, taking into consideration a wide spectrum of

topics, including fluctuations in the nutritional mode of unicellular organisms, diet composition, energy content, interspecific food overlapping in top predators, etc. Previous information from land, coastal and open ocean communities, provided from scientists involved in the project and by official and private institutions dedicated to fisheries, will constitute the tools for comparisons of past and current conditions. Such objectives make Drake Bioseas directly link to CCAMLR, EBA SCAR and CAML projects. This will be the first time in which a multidisciplinary and integrated approach is made on waters of the Drake Passage and its surroundings, emphasizing on the seasonal and inter-annual dynamics (2007-2008) of marine communities in natural boundaries such as Subantarctic vs. Antarctic, neritic vs. oceanic, Pacific vs. Atlantic, summer vs. winter, low- vs. mid-latitude environments, and on trophic relationships (areas/seasons/years of dominance of net phytoplanktonic cells vs. DOM-based microbial food web, and of crustacean vs. gelatinous zooplankton) and the magnitude of ecosystem fluctuations due to frontal behaviour (Subantarctic Front, Polar Front, Ice-Edge, winter conjunction of Polar and Ice fronts). Manipulative experimental work (productivity, grazing, physiological responses) on board will be carried out to complement in situ studies. Besides its scientific goals, the priorities of this endeavour embrace the legacy of an Experimental Research Centre for multidisciplinary studies on cold-water organisms, and an Argentine icebreaker reconditioned for scientific purposes. These legacies are expected to significantly contribute to the formation of a new generation of “bio-seas” scientists.

LA CAML 23

Marine Antarctic Biodiversity in Relation to Environmental Heterogeneity at Admiralty Bay, King George Island, and adjacent areas in the Bransfield Strait (MABIREH)

Dr. Lúcia de Siqueira Campos
Universidade Federal do Rio de Janeiro (UFRJ), Brazil

Refine and calibrate the taxonomy of Antarctic organisms from Admiralty Bay sampled through the Brazilian Antarctic Programme with the Polish and Peruvian data. Admiralty Bay is within an Antarctic Specially Managed Area (ASMA) that has been studied over more than 30 years by different countries and where Brazil has studied the bay for over 20 years. The Polish and Brazilian programmes have had the most comprehensive studies in that area, the Polish with greater focus on Ezcurra Inlet, and the Brazilian with greater focus on Martel and Mackellar Inlets. However, there is still much scattered unpublished information, and over time marine data has been sampled in the bay using different methodologies by researchers from different programmes, including Perú. Admiralty Bay is going to be used as a case study for SCARMarBIN (The Antarctic Marine Biodiversity Information System) gathering as much benthic information as possible through a programme led by Poland called Admiralty Bay Benthic Database (ABBED). Within the framework of the Scientific Committee on Antarctic Research (SCAR) strategic plan during the International Polar Year countries have been stimulated to optimize efforts and collaborate as much as possible towards a better comprehension of the Antarctic Region in Relation to the rest of the Planet. Considering the context set by SCARMarBIN and ABBED, taking into account the strong benthic experience within the Brazilian Antarctic Programme, this project aims to include the Brazilian metadata into ABBED. Also, it has an exploratory component in collaboration with Poland and Perú for investigating and characterizing as much as possible all different marine benthic habitats within bay from shallow to deep using standard protocols established in conjunction with the Census of Antarctic Marine Life (CAML). This would allow the Brazilian work to be comparable to others within the Bay and to that from other areas of Antarctica. Relevant information on the Brazilian Antarctic Programme shall be posted in SCARMarBIN. This would provide higher visibility to the Brazilian Antarctic Sciences along with the Polish and Peruvian. As a joint effort with the Polish, Peruvian and Belgium colleagues, during the exploratory phase the Brazilian scientists shall provide an integrated view of the marine benthos through a multidisciplinary approach. The main aim here is to analyse how biodiversity and composition of benthic communities at Admiralty Bay and adjacent areas at the Bransfield Strait are affected by environmental heterogeneity. This is to be achieved through joint multidisciplinary studies of the biodiversity and ecosystems functioning at this (ASMA), including the use of high technology for bottom photography and sampling (e.g., ROV, Box corers, others).

**International Collaborative Expedition to collect and study FISH
indigenous to Sub-antarctic Habitats (ICEFISH) - Brazil**

Dr. Lucélia Donatti
Universidade Federal do Paraná (UFPR)

In a world experiencing climate global changes, loss of biodiversity and depletion of fisheries, the biotas of the Antarctic and the Sub-Antarctic offer compelling natural laboratories for understanding the evolutionary impact of these processes. Since the IGY (1957-58), biologists have made impressive progress in understanding the Antarctic ichthyofauna. However, research integration into the broader marine context has been limited, largely due to lack of access to Sub-Antarctic fishes. These fishes, in particular those of the dominant suborder Notothenioidei, are critical for a complete understanding of the evolution, population dynamics, eco-physiology and eco-biochemistry of their Antarctic relatives. The ICEFISH programme is designed to fill these critical gaps in our knowledge. Cruises, encompassing the South Atlantic, South Pacific and South Indian Ocean sectors constitute the ICEFISH programme, the first comprehensive international survey of the Sub-Antarctic marine habitat. The first, ICEFISH-2004 (17 May –17 July 2004) was a resounding success. Extensive fishing was performed in the South Atlantic sector: Burwood Banks, Falkland Islands/Islands Malvinas, Shag Rock, South Georgia, South Sandwich Islands, Bouvetoya, and Tristan de Cunha, at depths ranging from tidepools to the abyss (for information on the cruise, participants, and detailed science projects, see www.icefish.neu.edu). Although autonomous, ICEFISH-2007 builds on the important legacy of ICEFISH-2004. It will sample the Sub-Antarctic Pacific sector, including Campbell and Scott Islands, Antipodes, Auckland, Macquarie, and Balleny Islands. Fishing will be multi-modal, using Otter, mid-water, Blake and MOCNESS trawls, plankton nets, beach seining, tide pooling, and traps. We will charter a suitable ice-strengthened ship/icebreaker, equipped with aquaria with running seawater to maintain live specimens, and with high-quality research laboratories. Twenty-four to 28 scientists will participate, largely those of the 2004 cruise, ensuring continuity of the scientific focus of the ICEFISH programme. The scientific activity will cover a wide range of topics, many of which will develop work carried out in ICEFISH-2004.

Marine benthonic biodiversity of Bransfield Strait

Marco Espino
Instituto Antártico Peruano (INANPE), Peru

Throughout the 2007/2008 summer season it is expected to improve the Peruvian research studies of the pelagic ecosystem at the Mackellar Cove. The logistics to reach this aim involves the Peruvian Vessel BIC Humboldt. The sampling of the study area will employ dragnets (Granton) and vanVeen. This might be a preliminary sampling to verify the benthic diversity and spatial distribution in the Strait in order to construct an effective sampling design, and then evaluating the biological resources of the study area. The main goal is to assess the benthic biomass and population at the Bransfield Strait, so as to understand its relationship with the pelagic environment. However, this project depends on the resources available for the next Antarctic Expedition. International cooperation support is very welcome. Therefore, international support has been contacting to assist our project. The project will be conducted by the INANPE with the contributions of the *Instituto del Mar del Perú* (Sea Institute of Peru) and *Universidad Nacional Mayor de San Marcos* (Mayor de San Marcos National University).

Title in Spanish: Caracterización de la biodiversidad bentónica del Estrecho de Bransfield.

LA CAML 53

Marine biodiversity of Mackellar Cove and deep waters of Admiralty Bay

Marco Espino
Instituto Antártico Peruano (INANPE), Peru

This project aims to investigate the benthonic marine biodiversity at the Mackellar Cove and the deep waters of Admiralty Bay, in addition to the relationships between the benthic abundance and distribution, and the environmental parameters of the marine sediment.

The project will be conducted by the INANPE with the contributions of the *Instituto del Mar del Perú* (Sea Institute of Peru) and *Universidad Nacional Mayor de San Marcos* (Mayor de San Marcos National University). Moreover it is expected to cooperate with other Latinamerican Antarctic Programmes as the Brazilian Antarctic Program (PROANTAR).

Title in Spanish: Caracterización de la biodiversidad en la Ensenada Mackellar y la parte profunda de la Bahía Almirantazgo

LA CAML 10

Sea-Ice-Atmospheric Signals of Mid latitudes-Antarctic Linkages (SIAS)

Dr. Heitor Evangelista

Universidade Estadual do Rio de Janeiro (UERJ), Brazil

Within the framework of the scientific SCAR Programme AGCS (Antarctica and the Global Climate System), it was identified the need to increase our knowledge with respect to the coupling between the Sub-tropics and Antarctica. It has been recognised that South America imprints environmental changes in the Antarctic ice-sheet through the atmospheric transport of water vapour, heat, organic and mineral microparticles. On the other hand, the Antarctic continent exerts significant influence over the South American climate and on the tropical marine productivity. The total extent of this relation has yet to be uncovered and a joint effort towards a consistent answer is necessary. Herein we will focused this question on the geochemical-meteorological approach. Within the Brazilian Antarctic Programme and the possibility of including other countries, a joint project is proposed to investigate two integrated research lines in the above area: (1) the ocean-sea-ice-atmosphere interactions; (2) the ice-record of man-made activity and proxies of environmental changes. The specific objectives of this proposal are outlined below: A. Monitor elemental composition of fine and gross aerosol modes from the tropical region to the Antarctic Peninsula (XRF, EPMA and MEV+EDS) owing to identify its crustal, marine and anthropogenic components; B. Monitor minor gases (eg.: N₂O, NH₃, O₃ and CH₄) pointed out in the IPCC 2002 report; C. Monitor the effective optical thickness of the atmosphere due to the calibration of satellite images of the sea and transport mechanisms; D. Integrate simultaneous numerical transport models and back trajectories analysis with gases and aerosols database; E. Use the ²²²Rn atmospheric tracer to validate numeric models; F. Monitor the MSA aerosol and marine productivity of the sea; G. Monitor CO₂, N₂O (nitrous oxide) and NH₃ (ammonium) in seawater and the above atmosphere in order to estimate their fluxes at the ocean-atmosphere interface; In the atmosphere, nitrous oxide is a greenhouse gas and contributes to the consumption of O₃ in the stratosphere. In the lower atmosphere, ammonia forms fine particles of ammonium sulphate and nitrate and can be transported to long distances; H. Monitor the aerosol black carbon together with PAHs and total aerosol composition due to the extension of the atmospheric impact attributed to the industrial activity and the large-scale biomass burning of South America; I. Monitor stable isotopes of sulphur as a tracer of industrial activity and the large-scale biomass burning of South America; J. Develop ice-coring at the Antarctic Peninsula and at the Ross Ice-shelf in order to investigate the air-ice exchange, stable isotopes and microparticle elemental composition; use the MSA and Chlorine content on dated snow and firn as proxies of ocean primary production and sea-ice extent variability; K. Investigate the atmospheric microbiological apportionment to the Antarctic ice.

LA CAML 29

Evolution and Biodiversity in the Antarctic: the Response of Life to Change (EBA) – Brazil

Dr. Edith Fanta

Universidade Federal do Paraná (UFPR), Brazil

The SCAR Programme EBA (so far, 22 nations, over 70 researchers) will explore the evolutionary history of selected modern Antarctic biota, examine how biological diversity in the Antarctic influences the way present-day ecosystems function, and thereby predict how the biota may respond to future environmental change. For the first time it will integrate understanding across the major realms of Antarctic biology (marine, terrestrial, freshwater) into the cohesive picture which is a pre-requisite of Earth-System Science. EBA will advance evolutionary and ecological theory using model systems and organisms from the Antarctic.

The Antarctic environment offers a unique opportunity to address these globally significant questions in an interdisciplinary and multidisciplinary (molecular biology, ecophysiology, microbiology, taxonomy, organism biology, etc) approach, essential for understanding the structure and functioning of the earth system. EBA will involve fieldwork and labwork, in Antarctica and home institutions. There are clear synergies with other projects, e.g. CAML and ICEFISH-2007 (an international and multidisciplinary programme centered on a Sub-Antarctic cruise). Exploration of some areas will require new technology (e.g. benthic landers or ROV for the deep-sea, AUV for work beneath ice shelves).

EBA will liaise with the relevant physical and historical disciplines to ensure use of the most recent data and insights in interpreting the biological results. Combining these approaches with our increasing understanding of the tectonic, climatic and glacial evolution of Gondwana offers a uniquely powerful opportunity to advance our understanding of how evolutionary processes are related to the physical setting. The EBA science plan clearly shows that it will make a significant contribution to IPY by undertaking a focused initiative elucidating the evolutionary response of organisms, populations and communities to environmental change. EBA will leave a legacy of evolutionary and biodiversity information, which is the hallmark of IPY.

**Study of the Separation between Antarctica and South America:
its geological and biological implications (SEASOAM)**

Dr. Luiz Antônio Gambôa
Universidade Federal Fluminense (UFF), Brazil

A detailed knowledge of Antarctica's past and present status is globally significant for predicting how its future may affect the Earth's System. Comparisons between Antarctica and other fragments of Gondwana, the study of climate change, and anthropogenic influences to the Antarctic environment are critical for understanding the evolution and present biological community structures in Antarctica, and their connexions with the biota outside the polar front. The ultimate separation of Antarctica from South America happened during the Oligocene, and was responsible for the Antarctic isolation, northward flow of the AABW, formation of the Southern Ocean, and existence of numerous unique geological processes observed along the northern end of the Antarctic Peninsula (e.g. an active spreading centre in the Bransfield Strait, ridge trench collision and gas hydrates on modern sediments). The combination of isolation and climate change has led to an Antarctic biota rich in endemic taxa, and a strong contrast between marine, terrestrial, and limnetic biotas. In cooperation with other countries, the Brazilian Antarctic Programme proposes to act in two phases: 1) allowing the continuity of relevant research that investigate signals of global and regional changes in Antarctica, also gathering all available metadata collected through the programme into a format that can be linked to major world databases; and 2) an exploring phase integrating geophysics, geosciences and life sciences. The latter shall contribute to the following: A. Study the timing of separation between South America and Antarctica and the creation of the AABW; opening of the Drake Passage, and implications for faunal distribution across continents (past and present). Sediment deposited along the South American margin will be used in this study, and the impact of the AABW will be investigated through microfossils present in the sediments. B. Study the timing of the opening of the Bransfield Basin using stratigraphy observed in some of the islands, seismic profiles, and other geophysical tools. The precise time of opening may bear direct correlation with the final separation of Antarctica. C. Study the consequences for marine, terrestrial and limnetic ecosystems function of the Antarctic separation and the impact of past, current and predicted environmental change on biodiversity. Study the nature and extent to which interactions between changing abiotic conditions change biotic responses. D. Sample across the Bransfield Strait spreading axis, which is tectonically active and has an expressive bathymetric range, and explore patterns of gene flow along its bathymetric range.

LA CAML 12

Southern Ocean Studies for Understanding Global-CLIMATE Issues (SOS-Climate)

Dr. Carlos Aberto Eiras Garcia
Fundação Universidade Federal do Rio Grande (FURG), Brazil

This research initiative was formed with the objective to conduct long-term studies in the Southern Ocean (SO) which are associated with many global-climate changes issues. It is well known that the SO connects the major ocean basins permitting a global scale thermohaline circulation, therefore Antarctic bottom water formation and its variability as well as its pathways towards lower latitudes is relevant information. Interocean connection is a route for heat and freshwater (climate) anomalies, as well as anthropogenic tracers. The SO also plays a major role in the global climate change due to its key role in the global geochemical cycle, particularly carbon. The proposed activities during the IPY (2007-2008) are related to the actual work which is actually carried out in the SO (lat>30oS) by the Brazilian High Latitude Oceanography Group (GOAL), sponsored and funded by the Brazilian Antarctic Programme (PROANTAR). The main research topics of GOAL focuses in the understanding of (1) the formation and variability of dense bottom water close to the tip of Antarctic Peninsula; (2) the variability of Bransfield and Gerlache Straits ecosystems. (3) the role played by the SO in the global carbon cycle using in situ and satellite ocean color data; (4) the upper layer circulation and 3D structure eddies shedded by the Brazil-Malvinas Confluence. We also expect to undertake some transects, radiating outwards across the Antarctic tip continental shelf and slope, during austral summer period of January-March 2008, as a contribution to the project Synoptic Antarctic Shelf-Slope Interactions (SASSI), planned by the iAnZone group for the IPY 2007-2008. Furthermore, we hope to participate in an international focused effort to make observations along the three SO chokepoints where the meridional spread of the SO dynamics is constrained and where the transport measurements and interocean exchanges can be accurately monitored. These actions are part of the more general strategy presented by the CLIVAR/CliC/SCAR Southern Ocean Implementation Panel.

**Integrated Circumpolar Studies of Antarctic Marine Ecosystem to the
Conservation of Living Resources (AMES) – Brazil**

Dr. Helena Kawall
Universidade Federal do Paraná (UFPR), Brazil

In this core program we will study the biomass and production capacity of large marine ecosystems, focusing particularly on the geographic distribution and abundance of Antarctic krill, plankton and nekton, considering a combination of factors such as the interaction between species life cycles, ocean circulation, frontal systems, sea-ice cover, food supply, and concentration of vertebrate predators, such as fish, birds, and marine mammals. We will provide an integrated view of the communities and their functioning within the oceanic ecosystems. This will be done through ecosystem-based surveys to map the biological production at all trophic levels, and by comparing the trophic structure and interactions. Such studies are vital for the development of integrated large-ecosystem models that can be used to manage exploited species in an open ocean pelagic environment.

Some component projects will cover large spatial regions such as the Southwest Atlantic at relatively low resolution while others focus on smaller areas to study in more detail the role of key species within the trophic web and consider the effect of seasonality. Key physical processes within the marine ecosystems will be monitored and modelled to establish the physical framework for exploring the variability of the biological production.

Objectives: Obtain a synoptic circumpolar assessment of the Antarctic marine pelagic resources, their environment, food supply and their main predators.

LA CAML 34

Geological and Paleontological integrated studies on the long term South America and Antarctic Peninsula connection, and their evolutionary consequences over the modern biota of Chile and Argentina (GeoPaSAA)

Dr. Marcelo Leppe
Instituto Antártico Chileno (INACH)

The evolutionary connections between South America and Antarctica involves distinct dimensions. The first one is the geological dimension, the history of the link and breakup of the southern part of South America and the Antarctic Peninsula. The second one is the paleontological evidence of the biotical change associated with the biogeographical patterns and the geological setting. Both dimensions are conditioning the third dimension, the present marine and terrestrial biota, explained through an historical point of view, where the actual distributions of taxa are a reflex of the interaction between the climatic change, flora and fauna migrations, reduction and expansion of ecospace and extinctions during the Meso-Cenozoic lapse of time. The objective of the proposal is to study the interaction of these three dimensions in the Antarctic Peninsula and Chile-Argentina. A interdisciplinary team of scientist (Geologists, paleontologists and biogeographers) will work mainly in the South Shetland islands and Antarctic Peninsula trying to compleat the paleontological and geological database, with the sampling of the sedimentary outcrops of western Antarctic Peninsula and adjacent islands. That will be called "first phase", and it will be carried out on summer of 2006-2007. in parallel, another team will begin the study of the biota and outcroppings of the extreme south-west of South America. After the sampling period, the geological setting, and the inclusion into databases, becomes a correlation with the other groups working with INACH (Instituto Antártico Chileno) and the other countries leading IPY proposals. The activities culminate with the generation of biological and geological evolution models for the area between the Mesozoic and the Cenozoic (Triassic-Miocene), through geological tools (fision tracks, isotopes, etc.), biogeographic patterns (similarity index, parsimony analyses of endemicy, etc) and paleontological-stratigraphical correlations.

LA CAML 61

Hydro-sensor-FLOWS Arctic and antarctic glacier hydrosystems as natural sensors for recent climatic variations – Uruguay

Albert Lluberas
Instituto Antártico Uruguayo (IAU), Uruguay

This activity joins EoI n° 535 (LovenFLOWS presented by M. Griselin, France and EoI n° 233 (SUGLANET, presented by A. Eraso, Spain). The two teams worked together for a long time concerning Svalbard Hydrology and are linked by a convention between CNRS (French Scientific Research Center) and IPEV (French Polar Institute). The objective of this clustering project is to investigate the hydrology of polar and subpolar glacier basins. It is known that discharge of temperate glaciers ($1-1.2 \text{ m}^3 \cdot \text{s}^{-1} \text{ km}^{-2}$) is bigger than that coming from subpolar glaciers ($0.2-0.3 \text{ m}^3 \cdot \text{s}^{-1} \text{ km}^{-2}$), but also it is true that extension of subpolar glaciers (ca. $750,000 \text{ km}^2$) is 10 times bigger than that of temperate glaciers (ca. $70,000 \text{ km}^2$). By considering these data, the discharge of subpolar glaciers due to the global warming may be as important as those coming from temperate glaciers. However, the hydrological response of subpolar glaciers to atmospheric inputs is not well-known and may be precised by continuous monitoring of some parameters at key-locations on basins. New technologies in the fields of information and communication drastically increased the observation capacity of scientists. In very reactive environments such as polar regions, it is now possible to enhance qualitative and quantitative observations using automatic data collection sensor webs. The development of such networks is bringing new tools to answer hypothesis that were so far lacking a continuous database to be studied. Such is the situation of arctic hydro-systems for which the most data available over the last forty years are discontinuous, usually summer measurements. The originality of this program is to investigate the hydrology of glacier basins through continuous survey, over a period of several years, which is necessary to quantify the hydrosystems reactivity to climatic variations (hourly, daily, seasonally even yearly).

Historic evolution of the human activities based on indicators of burning of fossil fuels in sediment of the Admiralty Bay, King George Island, Antarctic Peninsula.

Dr. Rosalinda Carmela Montone
Universidade de São Paulo (USP), Brasil

The Antarctic environment has been considered as one of the pristine areas of the world, where the human influence is restricted to the scientific activities around the research stations and the tourism around this region. Therefore, the main sources of pollution in this region are the introduction of sewage and domestic effluents, and the burning of fossil fuels. The utilization of fossil fuels in the generation of energy for the human activities has contributed for long time to the introduction of a complex mixture of gases and of anthropogenic particulate containing polycyclic aromatic hydrocarbons, heavy metals and others pollutants.

The main aim of this project is to study the historic evolution of the human activities in the region of the Admiralty Bay using indicators of the burning of fossil fuel in sediments cores, dated from radiometrics measures such as the determination of the radionuclides ^{137}Cs and ^{210}Pb . Those indicators are named “fly-ash” particles and they are present in the particulate material and in the smog generated from the burning of fossil fuel. There are two kinds of “fly-ash” particles: spheroidal carbonaceous particle (SCPs) and the inorganic particulate (IASs) and they have been studied a lot in the North Hemisphere but never were analysed in the South Hemisphere.

The distribution of these particles in sediments cores and the spatial distribution in superficial sediments can reflect the extension and intensity of anthropogenic activities, mainly when there is the utilization of coal, fuel oils and burning of biomass. The methodology to process the samples will involve the counting of “fly-ash” particles by light microscopy, the analysis of organic biomarkers by gas chromatography (GC-MS) and the radiometric measures (gamma rays emission) for the radionuclides. The results of this proposal will allow a relatively quick evaluation of the emission of particulate material originating from the burning of fossil fuels. In addition, it will be possible to describe the historic evolution of the pollution in the region and to establish a baseline for those indicators in the sediment cores. The integration of radionuclides and “fly-ash” particles will permit the development of an approach and quickly method for the determination of the rate of sedimentation in the region of the Admiralty Bay.

LA CAML 25

Marine Mammal Exploration of the Oceans Pole to Pole (MEOP-BR)

Dr. Mônica M.C. Muelbert

Fundação Universidade Federal do Rio Grande (FURG), Brasil

MEOP-BR is the Brazilian counterpart of Marine Mammal Exploration of the Oceans Pole to Pole (MEOP – IPY no. 153), a project that will deploy state-of-the-art animal-borne CTD tags on strategically chosen, deep-diving marine mammal species to explore their movement patterns, behaviour and habitat utilization in Polar Regions. Concomitant with the ecological data regarding these top predators, a vast, high-precision oceanographic data set will be collected covering logistically difficult areas of ocean in Polar Seas at the fringes of the North and South Atlantic and the South Pacific that are strategically important to climate and ocean modelling. The cross-disciplinary merging of classical oceanography and marine mammal ecology will significantly advance our understanding of the world's oceans and top predators that live in them. CTD-tags will be deployed on beluga whales (*Delphinapterus leucas*), hooded seals (*Cystophora cristata*), Weddell seals (*Leptonychotes weddellii*), crabeater seals (*Lobodon carcinophagus*) and southern elephant seals (*Mirounga leonina*). These species forage in oceanic “hot-spots” where productivity is high, areas which also coincide with human fisheries efforts and areas of high oceanographic interest. IPY affords a unique opportunity to collect novel data sets from relatively little-known polar marine mammal species simultaneously with dedicated oceanographic cruises sampling along systematic grids using traditional ship-based CTD technology. Co-operation between biological and oceanographic programmes within IPY will provide MEOP with comprehensive, synoptic oceanographic coverage that will provide a unique opportunity to quantify factors determining habitat selection and use by key polar marine mammal species. The oceanographic data collected in MEOP will, in turn, provide otherwise unobtainable oceanographic data sets collected at natural hot-spots of productivity, as input data to physically-oriented modeling projects (e.g. the Bipolar Atlantic Thermohaline Circulation Programme, Transport through gaps across the Kerguelen Plateau and inter-basin exchange). This study is especially timely given the predictions for ecosystem changes in both Arctic and Antarctic systems within the coming decades due to climate change, in addition to increasing fisheries and tourism activities in both the Arctic and Antarctic.

Microbial Diversity of Terrestrial and Maritime ecosystems in Antarctic Peninsula

Dr. Vivian Helena Pellizari
Universidade de São Paulo (USP), Brazil

Polar environments are colonized by microorganisms that have evolved a series of adaptations to survive in these cold ecosystems. Psychrophilic and cold-tolerant microorganisms contribute essentially to the processes of nutrient turnover, biomass production and litter decomposition and consequently are strictly connected with climatic change. Moreover, these microorganisms and their cellular constituents or products provide a large biotechnological potential. The objective of this proposal is to bring together the database generated by scientists of Latin America working in Antarctic Peninsula and to exchange ideas and experiences on an international scale. With this purpose the data generated will cover the biodiversity and biogeography of terrestrial and aquatic ecosystems of the Antarctic Peninsula, including soils, permafrost, ice, lakes, marine waters and sediments. This study will consider a broad range group of microorganisms as bacteria, archaea, virus, yeast and filamentous fungi. Microbial community structure analysis based in molecular tools as denaturing gradient gel electrophoresis (DGGE), terminal restriction fragment length (TRFLP) and clone library of 16S rDNA, rpoB and functional genes will be done to give us an understanding of functional and biogeographic relationships. These data are vital for an improved understanding of ecosystems process and the role of microorganisms play in Antarctic environment. Information obtained from soil and permafrost will be compared with data from Arctic region in collaboration with the Canadian activities. Despite these culturable-independent studies, efforts will be done mainly to cultivate not yet culturable microorganisms and physiological, taxonomic studies and exploitation of bacteria and fungi will be developed. In the Uruguayan project the objective is to study the microbial N cycle in the Antarctic ecosystem. In particular the genes involved in each process will be studied (nitrogen-fixation, nifH/vnfH/anfH, ammonia oxidation, amoA and nitrite reduction (denitrification) (nirS/nirK)), as well as 16S rRNA ribotypes. Morphological characterization of the cyanobacteria will be done and attempts will be made to culture these as well as prokaryotes capable of nitrogen-fixation, ammonia oxidization or denitrification. The results obtained from the genomic and the isolated strains will contribute to the database for the present project. The occurrence of virus in birds and mammals of Peninsula will be covered as part of the epidemiological studies of viral diseases spread over a wide geographical range. Programs as Brazilian Antarctic Program have been developed for 24 years in Antarctic Peninsula, but to date relatively few studies has been addressed to improve the knowledge of microbial ecology in Antarctic Peninsula. However the data generated in the region are not organized and accessible. The creation of a database to display the activities, strains isolated and location of culture collections, publications and gene sequences generated from Brazil and Uruguay will be developed to compare the biodiversity and biogeography of Antarctic Peninsula. The integration of this data with the Arctic will be useful to understand the microbial biodiversity in Polar regions.

Origin and evolution of the antarctic benthic marine fauna: genetic diversity and molecular divergence between congeneric species from Antarctica and South America.

Dr. Elie Poulin

Instituto de Ecología y Biodiversidad, Departamento de Ciencias Ecológicas, Universidad de Chile, Chile

The present project proposes to estimate the divergence times between Antarctic and South American benthonic species in genus of echinoderms and mollusks with contrasting developmental modes. Among them, we initiated analysis of COI gene in several antarctic and subantarctic echinoid species of *Sterechinus* (planktotrophic development) and *Abatus* (brooder) genus. Several species of the mollusk *Nacella* collected from Patagonia and Antarctic Peninsula are also currently studied. Divergence times among taxa located in different continents is expected to be greater for brooding species than for planktotrophic developers. Estimated time of molecular divergence among antarctic and south American brooding species (i.e. *Abatus*) may coincide with the beginning of the separation between the Antarctic continent and South America (28 My approx). On the contrary, the existence of a planktotrophic larva (*Sterechinus*, *Nacella* or *Odontaster* species) that remains several weeks or months in the water column, may have maintain the contact between taxa for a longer time. These molecular divergence data will also allow the evaluation of the hypothesis of a permanent connection between benthonic fauna through submarine mounts of the Scotia Arc.

The second objective of the present project consists on comparing the genetic diversity between Antarctic and South American species within the same genus to infer the demographic history of these species. By this way, we pretend to evaluate how the last glacial periods have affected the marine invertebrates in relation to their geographic distribution (Antarctica versus South America) and their developmental mode (planktotrophic versus brooding). In general, the intense glaciation events of the Pleistocene may have impacted much more the species that live on the narrow Antarctic continental platform than to those of South America. This would be test for all genus. Nevertheless, when comparing among them, it would be hoped to observe a greater impact in the species that develop through planktotrophic larva. This prediction is based on the hypothesis that the predominance in the number of brooding species over those that have pelagic larvae resulted from a greater extinction rate of the latter during the glacial periods of the Pleistocene (Poulin et al. 2002¹).

International collaborations: France (Dr. Jean-Pierre Féral and Dr. Bruno David), Argentina (Dr. Claudia Bremec and Dr. Héctor Zaixso), Chile (Dr. Alvaro Palma and Dr. Ivan

<http://lem.dm.cl>

¹ Poulin E., A. T. Palma and J-P. Féral 2002. Evolutionary versus ecological success of developmental modes in coastal Antarctic benthic invertebrates. Trends in Ecology and Evolution 17: 218-222.

LA CAML 58

**Biology and Ecology of pelagic communities from Bransfield Strait and
Elephant Island surrounding areas (COPEPOD)**

Dr. Gladys Cardenas Quintana
Instituto del Mar del Perú (IMARPE), Peru

The research will focus on the analysis of the nictemeral behaviour and distribution of the main pelagic species from the Sub-Antarctic and Antarctic regions (CCAMLR 48.1) according to the primary production, top predators abundance, and environmental parameters. The study proposes analysing inter and intra specific relationships of the pelagic communities and the interactions with the environmental parameters. To reach this goal it has been defined four key areas: biology and ecology; behaviour; oceanography; and top predators. For the analysis, it will be considered data interchange with national and international scientific community.

The following institutions are supporting in this project: Instituto del Mar del Perú, Universidad Nacional Mayor de San Marcos, British Antarctic Survey (UK), Washington University, USA, and IRD-Francia (France).

LA CAML 49

Climate and microclimate effects on breeding ecology of Antarctic tern *Sterna vittata* (Gmelin 1789) at Punta Crepin, King George Island, Antarctica

Raúl Sánchez Scaglioni

Asociación Peruana para la Conservación de la Naturaleza (APECO), Peru

The research project aims to quantify the microclimate variability on the Antarctic tern breeding areas, and its relationship with the Antarctic tern population dynamic. On this matter, we aim to analyse the biological and physical factors that might affect the Antarctic tern breeding, such as breeding success, features of the nests, clutch size, etc. From these factors we may consider the weather and daytime microclimate effects, and skua predation. Moreover, it will also be taken comparative microclimate analysis between the breeding and not breeding areas.

The project will be conducted by the *Asociación Peruana para la Conservación de la Naturaleza* (APECO).

LA CAML 2 & 9

Impact of Climate induced Glacial Melting on Marine and Terrestrial Coastal Communities on a Gradient along the Western Antarctic Peninsula (ClicOPEN) – Argentina and Brazil

Dr. Irene Schloss

Instituto Antártico Argentino (IAA), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina

Dr. Jorge Arigony

Universidade Federal do Rio Grande do Sul (UFRGS), Brazil

The Southern Ocean exerts a strong influence on global climate through the circulation of the Circumpolar Current and the seasonal shift of the sea-ice cover. While currently there are many different ways of assessing the intensity of phenomena associated with Climatic Change (ozone depletion, increase of temperature, CO₂ and UV radiation), there is no single tool for measuring the indirect effects of these alterations, most of which are critical to the functioning of ecosystems. In the marine environment, changes in thermal gradients modify the global oceanic circulation pattern, thus bringing unpredictable consequences to the structure of communities, trophic relationships and biogeochemical cycling. The geographic distribution and abundance of plankton stem from a combination of factors that include the interaction between the life cycle of species, oceanic circulation, formation of eddies, the behaviour of frontal systems (e.g., advance and retreat of the sea-ice cover), and the abundance of vertebrate predators (fish, birds and marine mammals). Any alteration, natural and/or anthropogenic (e.g., fisheries), in the intensity of predation leads to a change in the structure of trophic webs, thus affecting biodiversity, concentration of key Antarctic species, nutrient loading and carbon fluxes to the deep-sea, often resulting in the general unbalance of the ecosystem. In order to examine within an integral framework this conjunction of factors, the present project will focus on the seasonality of one of the most peculiar areas of the Southern Ocean: the Drake Passage, a key open-ocean choke point for the Antarctic Circumpolar Current. The pronounced continental constriction between South America and the Antarctic Peninsula causes the northern deflection of the ACC and, jointly with the ENSO cycles, influences directly the Southwestern Atlantic in terms of oceanographic-atmospheric and biological processes. Drake Bioseas is intended to achieve a first step towards the understanding of these processes by covering aspects that range from the assessment of air-sea interactions to geochronological surveys of the sea bottom, and from organisms living in the pelagic realm to benthic communities and micro-paleontological indicators, emphasising in the Magellan-Antarctic regions and the Atlantic-Pacific connections. Specific richness, population density, biomass and geographic distribution, shifts in community structure and biogeography, oxidative stress biomarkers and antioxidant defenses will be examined for bacteria, protozoa, planktonic algae, meso- and macrozooplankton, sea birds and marine mammals. Antarctic and subantarctic fishes will be examined only as to their systematic (morphological and molecular) and oxidative stress; this will allow elucidating the patterns of distribution of key species, migration processes and physiological responses to environmental changes. Special attention will be paid to dormant stages of

microscopic organisms (non active bacteria, auxospore formation, cysts, resting propagules) as well as to factors controlling the timing of activation. The role of species within the trophic web will be evaluated, taking into consideration a wide spectrum of topics, including fluctuations in the nutritional mode of unicellular organisms, diet composition, energy content, interspecific food overlapping in top predators, etc. Previous information from land, coastal and open ocean communities, provided from scientists involved in the project and by official and private institutions dedicated to fisheries, will constitute the tools for comparisons of past and current conditions. Such objectives make Drake Bioseas directly link to CCAMLR, EBA SCAR and CAML projects. This will be the first time in which a multidisciplinary and integrated approach is made on waters of the Drake Passage and its surroundings, emphasizing on the seasonal and inter-annual dynamics (2007-2008) of marine communities in natural boundaries such as Subantarctic vs. Antarctic, neritic vs. oceanic, Pacific vs. Atlantic, summer vs. winter, low- vs. mid-latitude environments, and on trophic relationships (areas/seasons/years of dominance of net phytoplanktonic cells vs. DOM-based microbial food web, and of crustacean vs. gelatinous zooplankton) and the magnitude of ecosystem fluctuations due to frontal behaviour (Subantarctic Front, Polar Front, Ice-Edge, winter conjunction of Polar and Ice fronts). Manipulative experimental work (productivity, grazing, physiological responses) on board will be carried out to complement in situ studies. Besides its scientific goals, the priorities of this endeavour embrace the legacy of an Experimental Research Centre for multidisciplinary studies on cold-water organisms, and an Argentine icebreaker reconditioned for scientific purposes. These legacies are expected to significantly contribute to the formation of a new generation of “bio-seas” scientists.

LA CAML 2

Impact of Climate induced Glacial Melting on Marine and Terrestrial Coastal Communities on a Gradient along the Western Antarctic Peninsula (ClicOPEN) – Argentina

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On the Western Antarctic Peninsula (WAP) a recent rapid regional warming with a temperature increase of more than 2.5 K has been observed over the last 50 years. The glacial systems on the WAP show direct responses to these climatic changes, including retreat of ice fronts and increased melt water production. The anticipated primary effects of glacial melting on marine coastal systems are the increased fresh water and particle transport which will entail changes of water column stratification, light climate and the concentrations trace elements and nutrients. These changes impact on almost every compartment (population or community) in the coastal ecosystems along the WAP, but the effect is geographically weighted. The present project is part of the IPY programme ClicOPEN (EoI 193 of IPY lead projects) which aims to monitor glacial retreat at the Antarctic Peninsula and adjacent islands and the effects on marine and terrestrial coastal systems along a latitudinal gradient on the Antarctic Peninsula. It is a multi-disciplinary and international synoptic programme with standardized methods and sampling protocols as well as centrally managed and accessible data archiving. The Argentinean participation focuses on the effects of glacier retreat on populations of phytoplankton (composition and primary production), zooplankton (composition, structure and filtration rates) and benthic communities (macroalgal and macrofaunal) as well as the interactions between them along the WAP.