

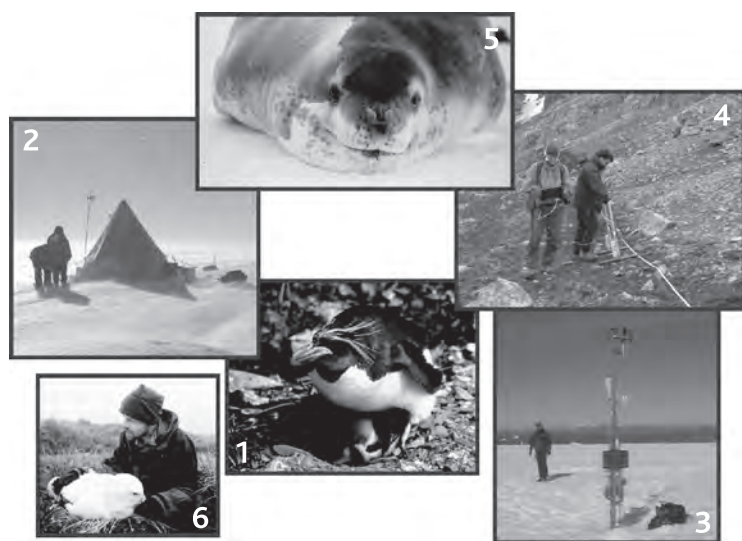


PORTUGAL

Portuguese Committee for the International Polar Year 2007-08



# PORTUGUESE SCIENCE STRATEGY FOR THE INTERNATIONAL POLAR YEAR



- 1 - Macaroni penguin, South Georgia, Antarctic (José Xavier)
- 2 - ANSMET campsite in the Antarctic plateau, Antarctica (Vera Assis Fernandes)
- 3 - Meteorological station in Hurd, Glacier, Livingston Antarctic (Gonçalo Vieira)
- 4 - Permafrost Survey using a Ground Penetrating Radar at Livingston Island, Antarctic (Gonçalo Vieira)
- 5 - Leopard seal, South Georgia, Antarctic (José Xavier)
- 6 - Deployment of a GPS logger on a wandering albatross, South Georgia, Antarctic (Paulo Catry)



## PORTUGAL

**Portuguese Committee for the International Polar Year 2007-08**

# Portuguese science strategy for the International Polar Year 2007-08

**José C. Xavier <sup>(1)</sup>, Gonçalo T. Vieira <sup>(2)</sup> and Adelino Canário <sup>(1)</sup>**

**(1) Centre of Marine Sciences, University of Algarve, Campus de Gambelas, 8000-139 Faro - Portugal**

**(2) Centre for Geographical Studies, University of Lisbon, Faculdade de Letras, Alameda da Universidade, 1600-214 Lisbon - Portugal**



**Centro de  
Estudos Geográficos**  
UNIVERSIDADE DE LISBOA

**FCT** Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR





## TABLE OF CONTENTS

<b>SUMMARY .....</b>	<b>7</b>
<b>1. RATIONALE .....</b>	<b>9</b>
<b>2. THE INTERNATIONAL POLAR YEAR AND THE DEVELOPMENT OF PORTUGUESE POLAR SCIENCE .....</b>	<b>13</b>
2.1 Milestones in the preparation of the IPY-Portugal.....	13
2.2 Portuguese Participation in Core Projects of the IPY.....	15
<b>3. PORTUGUESE SCIENCE PLANS FOR THE IPY .....</b>	<b>19</b>
3.1 Atmospheric Physics .....	19
3.2 Biological Sciences.....	20
3.3 Cryosphere and Climate Change .....	22
3.4 Planetary Sciences.....	23
3.5 Astronomy .....	23
<b>4. GUIDELINES FOR A NATIONAL SCIENCE STRATEGY .....</b>	<b>25</b>
<b>ANNEXES .....</b>	<b>27</b>
<b>A. RECENT PORTUGUESE PUBLICATIONS ON POLAR RESEARCH .....</b>	<b>29</b>
A.1 Papers in peer-reviewed journals and books.....	29
A.2. Conference Proceedings .....	32
<b>B. PORTUGUESE INSTITUTES PARTICIPATING IN IPY SCIENCE .....</b>	<b>37</b>
<b>C. INTERNATIONAL COLLABORATION .....</b>	<b>39</b>
<b>D. PORTUGUESE POLAR RESEARCHERS INVOLVED IN THE IPY .....</b>	<b>41</b>
<b>E. PORTUGUESE COMMITTEE FOR THE IPY.....</b>	<b>45</b>
<b>F. LETTERS OF APPROVAL OF FULL PROPOSALS FROM THE IPY JOINT COMMITTEE.....</b>	<b>47</b>
<b>G. LIST OF ACRONYMS USED IN THIS DOCUMENT .....</b>	<b>53</b>





## SUMMARY

Portugal has a rich history of science, discovery and exploration. Historically, it has been involved at the start of the Polar exploration, in the XVI century. For the last 30 years, 8 Portuguese scientists have carried out research in the Antarctic, in collaborative programmes with 7 member nations of the Scientific Committee for Antarctic Research (SCAR). However, these research activities have always been conducted at an individual level, without the support of a national framework for polar science. Portuguese polar scientists consider the International Polar Year 2007-08 (IPY) as a window of opportunity for the development of the roots of a Portuguese national programme for the polar regions. The international cooperative effort and wide logistical support for Portuguese polar activities (especially Antarctic research) are unique opportunities for the setting up of a Portuguese Polar Programme with a realistic and achievable financial framework.

**IPY is a window of opportunity**

The present document is a collaborative effort of current Portuguese polar scientists. It provides an assessment of the Portuguese critical mass on polar research and presents strategic guidelines for national science during the IPY and beyond. It shows, for the first time, Portugal engaged, as a country, in the science effort at the Poles during the IPY. The activities will focus in -5 scientific areas: atmospheric sciences, biological sciences, earth and cryospheric sciences, astronomy and planetary sciences. It is noteworthy that Portugal is involved at high level in 6 IPY core projects (Activity ID Nrs.: 33, 50, 83, 92, 168 and 542).

The Portuguese science strategy for the IPY is: 1) to consolidate and strengthen collaborative work in major international research programs; 2) to perform high-quality science across the various disciplines in which Portuguese scientists are involved; 3) to obtain, and develop, methods and techniques that can be implemented in the management of the Earth System (including those applicable in Portuguese territory); 4) to promote the Antarctic Treaty policies.

**Science strategy**

With such promising projects, it is imperative for the Portuguese Government to provide solid funding. Such a commitment will determine the viability and quality of the research. Above all, it will enable a strategic framework beyond the IPY that will facilitate multidisciplinary research, the elaboration of international partnerships to yield greater levels of excellence, and establish the core foundations for a Portuguese Polar Programme.





# 1. RATIONALE

Portugal will participate in an International Polar Year (IPY) for the first time in its history. **Portuguese explorers are regularly cited in books on the history of Polar exploration.** For example, **Bartolomeu Dias**, in 1488, was the first European to get into the coldest austral waters, reaching the Cape of Good Hope. Later, in November 1520, **Fernão de Magalhães** questioned if there existed "Terra Australis". This navigator intended to reach China sailing to the West, even if needing to cross the South Pole. He reached the Pacific Ocean, through the Strait that has his name, in Tierra del Fuego. Such discoveries, led various navigators from different nations, to explore further south. Another example, related to the boreal waters, is **João Vaz Corte-Real**, one of the distinguished navigators of XV and XVI centuries that discovered Newfoundland (Canada) in 1472. This Portuguese navigator, who reached America 20 years before Columbus, also organized other expeditions that have taken him to the coast of north America, including the Labrador Peninsula.

Historical interest in the polar regions

With a rich history of science, polar discovery and exploration, Portugal will finally be formally engaged in the science carried out in the Poles. Moreover, **this is an unique opportunity for Portuguese scientists to participate in major multi-disciplinary and multinational projects.** The IPY 2007-08 celebrates the 50th Anniversary of the International Geophysical Year of 1957 an important milestone for science and for polar research, giving rise to the unique Antarctic Treaty. It will be the fourth IPY, after 1882-83, 1932-33 and 1957-59 and it already involves more than 50,000 people. This unprecedented international initiative, with teams from more than 60 countries performing high quality science with the objective of examining environmental and societal processes in the Arctic and in the Antarctic. Scientists will assess the relationships between polar regions and the rest of the planet: the Earth system, biodiversity, evolutionary processes and adaptative capacity of polar organisms. It is intended that this international, multi-institutional and interdisciplinary effort will improve our ability to detect global and regional environmental changes and evaluate consequences to human kind and the Planet. The IPY is coordinated by the International Council for Science (ICSU) and by the World Meteorological Organization (WMO) and is endorsed and supported by 27 ICSU and non-ICSU bodies.

More than 50,000 people already involved

**The polar regions play key roles in the global environment of our planet and only there some important hypotheses can be tested.** The polar regions are integral components of the Earth System - linked to the global climate system, sea level, biogeochemical cycles and marine ecosystems. The unique facets of the polar environments such as sea ice, snow cover and major ice sheets, are

Polar regions play key roles in the Earth Climate

variable over a wide range of timescales. Moreover, the polar regions respond to, amplify and drive changes elsewhere in the Earth system. For example, the interplay of the ocean, atmosphere and the cryosphere in the **polar regions makes these regions key in identifying “rapid” climate change** (change on decadal or human timescales). Similarly, the polar marine benthic environment and the extensive sub-glacial environment have been relatively isolated and stable environments over a long time period and hence particularly vulnerable to change. Polar ice, sediments and rocks also represent unique repositories of information on past states of the planet, which provide crucial insights into the past and future. Finally, polar regions are home to unique organisms adapted to a demanding environment, offering incredible opportunities to understand biology, ecology and evolution at the extremes, especially given the tools of modern bioscience (see also <http://www.ipy.org>).

**Global decadal climate changes can be triggered in the polar regions**

**Key biological and ecological issues**

**Portuguese scientists have carried out research in the Antarctic mostly in the last 30 years**, always part of collaborative programmes with member nations of the Scientific Committee for Antarctic Research (SCAR), particularly with Bulgaria, France, Italy, Spain, United Kingdom and United States of America. Portuguese scientists have focused their research in the fields of Earth, Biological, Atmospheric and Planetary sciences.

**30 years of Portuguese Antarctic research**

As a result of the IPY 2007-08 it is expected that more Portuguese researchers from several institutes will be involved, conducting research in the Arctic and the Antarctic. The IPY will enlarge the number of subjects to be studied by Portuguese in the Antarctic, such as paleoclimatology, mesoscale climate modelling and applied geophysics. The IPY constitutes therefore a framework of outmost importance for Portuguese Polar Research and is the **ideal platform for the enlargement of the Portuguese critical mass on polar science and for the preparation of a new generation of polar scientists**.

**IPY and the enlargement of the critical mass**

Besides the science effort, the objectives of the International Polar Year emphasise the **needs for societal linkages** through serious Education and Outreach programmes (E&O). The Portuguese Committee for the IPY will be involved in more than 30 activities during the IPY. The objective is to bridge the gap between science and society by means of providing **education on polar science** to the general public, from kindergarden pupils to the university students.

**Bridge the gap science-society**

Given this framework, there are strong reasons for Portugal to carry out polar science:

- Involvement in the **global movement** that includes numerous countries

**Why should Portugal conduct Polar science?**

leading science, thus enhancing international cooperation in key science-areas;

- ☐ Collaborate and contribute to the **international effort** for monitoring and understanding the Earth System;
- ☐ Use **polar infrastructure** for Earth and Space research;
- ☐ Collaborate and contribute to programmes using **state-of-the-art technology**;
- ☐ Polar regions are showing significant **environmental changes** that are strongly connected to mid-latitudes (e.g. climate change, sea-level change);
- ☐ Strengthen the **critical mass** and develop **leading research** teams in key science niches that show a need for human and logistical resources (e.g. antarctic permafrost);
- ☐ Use the IPY as a platform to develop a **new generation of polar scientists**;
- ☐ Test **portuguese technology and products** in rough climatic conditions (approach industry ? e.g. high-end textiles, electronics, software - and science);
- ☐ Participate in the **decision processes** concerning the polar regions (e.g. ATCS, SCAR, EPB);
- ☐ Benefit from the **logistical support** and **know-how** of partner countries in polar research, especially available during the IPY (e.g. Brazil, Bulgaria, France, Spain and United Kingdom).

The **main objectives of this document** are to:

#### Objectives

- ☐ Provide a background on Portuguese history on Polar exploration and involvement in the IPY;
- ☐ Identify the research projects in which Portugal will be involved during the IPY;
- ☐ Elaborate a science plan for Portugal in key research areas;
- ☐ Assess the role of Portugal in future polar research;
- ☐ Explain why Portugal should fund polar science.



## 2. THE INTERNATIONAL POLAR YEAR AND THE DEVELOPMENT OF PORTUGUESE POLAR SCIENCE

### 2.1 Milestones in the preparation of the IPY-Portugal

Portugal became involved in the International Polar Year 2007-08 after the SCAR Open Science Meeting held in Bremen, in July 2004. Dr. Gonalo Vieira contacted the Joint Committee and emphasised the importance that the IPY could have for the development of Portuguese Polar Science, for a Portuguese application of SCAR membership, for strengthening of scientific relationships with nations conducting polar research, and eventually for signing the Antarctic Treaty. The objective was to become the national point of contact and organise the Portuguese science community in order to create a Portuguese Committee for the IPY.

**1<sup>st</sup> contacts with the  
IPY Planning Group**

An informal working group for the IPY was set up in December 2004, jointly coordinated by Dr. Gonalo Vieira and Prof. Adelino Canrio and involving 17 individuals from different backgrounds. In February 2005 Dr. Vieira met with the President of the Portuguese Science Foundation (FCT) Prof. Fernando Ramoa Ribeiro and presented the concept of the IPY and received a promise of support to the event.

**National working  
group**

In March 2005, FCT supported financially the participation of Dr. Gonalo Vieira at the 1<sup>st</sup> Forum for the IPY held at the UNESCO-OSC in Paris to present the general plan for the implementation of the IPY in Portugal. The IPY Joint Committee gave full support to the Portuguese Plan. Also, Brazil and Spain committed themselves to help with the integration of Portugal in Antarctic Research.

**1<sup>st</sup> IPY International  
Forum**

The first meeting of the pro-committee for the International Polar Year was held at the Centre for Geographical Studies (Univ. Lisbon) in April 2005 with the presence of Prof. Adelino Canrio, Dr. Pedro Miranda, Dr. Pedro Soares, Com. Agostinho Ramos da Silva and Dr. Gonalo Vieira. The group decided to invite the Prof. Lus Mendes-Victor (University of Lisbon) to become President of the National Committee for the IPY. Prof. Mendes-Victor had been involved in the activities of the International Geophysical Year in 1957 and is a leading expert in geophysics. A document with the suggested individuals for the National Committee for the IPY was sent, for approval, by the Minister of Science, Technology and Higher Education, Prof. Jos Mariano Gago, on the behalf of the Portuguese Section of the International Union of Astronomy, Geodesy and Geophysics (SPUIAGG). The

**Pro-Committee for  
the IPY**

document included the following members: Prof. Luís Mendes-Victor (President), Prof. Luís Aires de Barros, Prof. Adelino Canário, Dr. Pedro Miranda, Dr. Pedro Viterbo, Dr. José Xavier, Dr. Gonçalo Vieira, and Com. Agostinho Ramos da Silva as a collaborator. The committee was approved in March 2006. A representative of the Portuguese Science Foundation (FCT) will also be incorporated in the committee and with the indication that it should be open to wider representation from other universities. As a result, Prof. Ana Maria Silva from the Centre of Geophysics of the University of Évora and Dr. Vera Assis Fernandes from the Institute of Geophysics of the University of Coimbra were included as members, in March and April 2006, respectively.

**Approval of the  
National Committee  
for the IPY**

In July 2005, Dr. José Xavier was nominated by the national pro-committee for the IPY for the Education & Outreach Sub-Committee, whose objectives are to educate and develop the next generation of polar scientists, engineers, and leaders, whilst capturing the interest of the public and decision-makers.

**Education &  
Outreach Joint-  
Committee**

The 2<sup>nd</sup> Forum for the IPY was held at the Danish Polar Centre in Copenhagen and Portugal was represented by Dr. Gonçalo Vieira, funding was provided by the Centre of Geographical Studies - University of Lisbon. The several IPY partners were informed on the development of national activities.

**2<sup>nd</sup> IPY International  
Forum**

In November 2005 the Portuguese pro-Committee for the International Polar Year organised the 1<sup>st</sup> Workshop "Portugal and the Antarctic: Opportunities for research, education and outreach in the framework of the International Polar Year 2007-08". The organizing committee was formed by Dr. Gonçalo Vieira, Dr. José Xavier and Dr. Mário Neves and the event took place at the Faculty of Letters - University of Lisbon, joining over 100 participants that discussed the activities that are planned for the IPY.

**1<sup>st</sup> Workshop  
Portugal and the  
Antarctic**

In December 2005 the Centre of Marine Sciences of the University of the Algarve (CCMAR) with the support of the members of the pro-committee for the IPY and of the Academy of Sciences of Lisbon (national representative at the International Council for Science- ICSU) submitted a proposal for national representative at the Associate member level to the Scientific Committee for Antarctic Research (SCAR). The CCMAR will represent the interests of all the fields of Portuguese science and will work in close collaboration with the National Committee for the IPY. This is a very significant step for the Portuguese Antarctic Community and can already be considered a major outcome of the IPY. The proposal was approved at the SCAR meeting in Hobart in July 19, 2006. Prof. Adelino Canário was the national representative at the meeting funded by Portuguese National

**Portugal becomes  
member of SCAR**

Science Foundation (FCT) and CCMAR.

In March 2006, following several contacts that started in December 2005 with ESF-European Polar Board (EPB), the National Committee for the IPY proposed to the Academy of Sciences of Lisbon, to designate Gonalo Vieira as national representative in the process of membership of Portugal to the EPB. The EPB acts as a voice and facilitator of cooperation between European National Funding Agencies, National Polar Institutes and research organizations. In Potsdam, in March 2006, took place a first informal meeting of Dr. Gonalo Vieira with the Executive Secretary of the EPB, Dr. Paul Eggerton, in order to share information and discuss the necessary steps to advance with the Portuguese membership.

**Contacts with the  
European Polar  
Board (ESF)**

In May 2006 the 2<sup>nd</sup> Workshop "Portugal and the International Polar Year 2007-08" organized by the National Committee for the IPY, the Centre for Geographical Studies – University of Lisbon, Centre of Marine Sciences and Oceanário de Lisboa. At the workshop were present some 40 invited participants and was an important milestone for the distribution of tasks in Science, Education and Outreach activities for the events of IPY – Portugal.

**2<sup>nd</sup> Workshop  
Portugal and the IPY**

## 2.2 Portuguese Participation in Core Projects of the IPY

Portugal participation in the IPY will involve a number of research projects during the IPY at international and national levels.

**Portugal is involved in 6 IPY Core Projects:**

**Portugal in 6 IPY  
Core Projects**

1) **ICED-IPY - Integrated analyses of circumpolar Climate interactions and Ecosystem Dynamics in the Southern Ocean – International Polar Year** (Activity ID No: 92; National contact: Dr. Jos Xavier) - This project links the Ecosystems and Biogeochemistry of the Southern Ocean Consortium, including the Synoptic Circum-Antarctic Climate-processes and Ecosystem studies, the atmospheric inputs of organic carbon and pollutants to the polar oceans studies, the effects of CO<sub>2</sub> on CaCO<sub>3</sub> accretion and primary productivity studies, the iron Fertilisation Experiment in the Scotia Sea studies, the study of biogeochemistry of the southern Ocean through interactions between nutrients, dynamics, and ecosystem structure, the study of Antarctic Sea ice ecosystems and the study on carbon in sea ice in relation to fluxes and biogeochemistry. Dr. Jos Xavier is linked to this project in collaboration with the British Antarctic Survey (BAS).

**Climate and  
Ecosystems in the  
Southern Ocean**



2) **CAML - Census of Antarctic Marine Life** (Activity ID No. 83; National contact: Dr. José Xavier) - This proposal was accepted by the ICSU/WMO Joint Committee and considered as scientifically very strong, gathering support from a wide range of countries. The project will integrate knowledge across all regions, habitats and fields of study to strengthen our knowledge of ecosystem dynamics in this high latitude, frozen ocean system. Only through such a multi-scale level of investigation a better understanding of the diversity and status of Antarctica's marine life will be obtained.

**Census of Antarctic  
Marine Life**

3) **TSP - Permafrost Observatory Project: A Contribution to the Thermal State of Permafrost** (Activity ID No: 50; National Contact: Dr. Gonalo Vieira) - This project will measure temperatures in existing and new boreholes over a fixed time period to provide a "snapshot" of permafrost temperatures in both time and space. TSP, a component of the Global Terrestrial Network for Permafrost (GTN-P - WMO/GCOS), addresses broader concerns related to a warming Earth and the attendant societal issues in its high-latitude and high-mountain regions. The contribution of Portugal to TSP will be conducted in the Maritime Antarctic, especially in the South Shetland Islands in collaboration with the Spanish Antarctic Programme.

**Thermal State of  
Permafrost**

4) **ANTPAS - Antarctic and Sub-Antarctic Permafrost, Soils and Periglacial Environments** (Activity ID No: 33; National Contact: Dr. Gonalo Vieira). The ANT PAS contribution to the IPY focuses on integrated studies of permafrost, active layer conditions and processes, polar soils and data management. The goals include integrating existing and new data on the distribution, thickness, age, history, physical and geochemical properties of permafrost on the Antarctic continent and sub-Antarctic islands. The contribution of Portugal to TSP will be conducted in the Maritime Antarctic, especially in the South Shetland Islands in collaboration with the Spanish and Bulgarian Antarctic Programmes. Dr. Gonalo Vieira is member of the ANT PAS Steering Committee.

**Antarctic and Sub-  
Antarctic Permafrost  
and Periglacial  
Environments**

5) **PO3L - Polar Ozone Loss** (Activity ID No: 542; National Contact: Dr. Daniele Bortoli) - The main goal of the project is to precisely quantify polar ozone losses in both hemispheres and to document the magnitude of ozone depletion before a major recovery initiated estimated by the expected healing effect of the Montreal protocol. This will be achieved with concerted international campaigns during which hundreds of ozonesondes will be launched in real-time coordination from station networks in the Arctic and Antarctic.

**Polar Ozone Loss**

6) **IPY-YSC - International Polar Year Youth Steering Committee** (Activity ID No: 168; National contacts: Dr. José Xavier and Dr. Gonalo Vieira) - This

**International Youth  
Steering Committee**

proposal was also accepted by the ICSU/WMO Joint Committee and considered as strong in education and outreach components and demonstrates a high level of adherence to IPY themes and goals. The young Portuguese scientists (Dr. José Xavier and Dr. Gonalo Vieira) are members of the Youth Steering Committee for the IPY (YSC), which has the objective to ensure that the next generation of polar scientists is informed and involved in the upcoming Polar Year.

Another important project of the IPY that is not a core project and where Portugal is involved is **PYRN - Permafrost Young Researchers Network** (Activity ID No: 1111; National Contact: Raquel Melo) - This is an international activity bringing together young permafrost researchers during the IPY, aiming to build a network of young researchers within the field of permafrost and related topics.

**Permafrost Young  
Researchers Network**



### 3. PORTUGUESE SCIENCE PLANS FOR THE IPY

A brief introduction to the science plans of Portuguese researchers for the IPY is presented. Five main research areas have been identified: atmospheric physics, biological sciences, cryosphere and climate change, astronomy and planetary sciences. In all these subjects Portugal has already a critical mass and, therefore, considered by the National Committee for the IPY as the key areas for the development of Portuguese research in the IPY.

#### 3.1 Atmospheric Physics

**Dr. Daniele Bortoli** and **Prof. Ana Maria Almeida e Silva** (Department of Physics and Geophysics Centre of Évora - University of Évora) will be involved in work in polar regions on measurements of trace gases connected to the chemistry of the stratospheric ozone, to the physical interactions of such compounds and to the effects of the measured trace gases on atmospheric aerosols. The work at the Italian Antarctic station of Terra Nova Bay foresees the maintenance of measurements of columnar contents of  $O_3$  and  $NO_2$  started in 1996, and will also aim the substitution of the Gas Analyzer Spectrometer Correlating Optical Differences (GASCOD) instrument with a **new Spectrometer for Atmospheric Tracers Monitoring (SPATRAM) like equipment**. The main objective of replacing GASCOD is to extend the monitoring of other gases, including BrO and OCIO as these two compounds are closely connected to the chemistry of ozone in the stratosphere and troposphere. The priority is to continue adding data into the historical series of  $O_3$  and  $NO_2$  which will allow climatological studies of the trends of the concentrations of these gases in the polar regions. In addition, the results obtained for  $O_3$  and  $NO_2$  can be used for comparison/validation of spectrophotometric satellite data from different sensors such as the Global Ozone Monitoring Experiment (GOME), Ozone Monitoring Instrument (OMI) and Scanning Imaging Absorption Spectrometer for Atmospheric Chartography (SCIAMACHY). The French-Italian Antarctic Station of DOME/Concordia, will be equipped (during the IPY) with a modified SPATRAM like Spectrometer for the measurements of the scattered solar radiation in directions different from the zenith and opposite to the sun (the so-called “Off-Axis” geometry”) in unattended mode, with the aim to obtain information's not only on the total column of the investigated species, but also on the vertical distribution (the profile) of the compounds with marked absorption features in the analyzed spectral intervals. This last activity will be carried out in collaboration with the French Team working on Ozone at DOME/C. The intention to start such measurements with the new SPATRAM equipment will improve the knowledge of Antarctic atmospheric chemical and physical processes particularly regarding ozone recovery and

Trace gases and  
atmospheric  
aerosols in the  
Antarctic

climate change.

### 3.2 Biological Sciences

The Portuguese research will focus on both poles, assessing predator-prey interactions in relation to environmental and climate change, modelling marine organisms distribution and habitat use, conservation of seabirds, physiological adaptations of marine organisms to climate change, population genetics, development of tracking and diet techniques, oceanography and the impact of viral infections in marine organisms. Organisms studied will include albatrosses, penguins, seals, reindeer, squid, fish and crustaceans.

**Dr. J  el Bried** (Department of Oceanography and Fisheries, University of Azores) works on conservation of seabirds in Antarctic and sub-Antarctic Islands (particularly in French Islands) and has four papers submitted. Two are related to population dynamics and population genetics of the wandering albatross, another on modelling the impact of mammals on seabird breeding populations, and a book chapter on *Chionis minor* for the *Encyclopedia of the Antarctic* (edited by Professor Beau Riffenburgh).

Conservation of  
seabirds

**Prof. Adelino V.M. Can  rio** (Centre of Marine Sciences, University of Algarve) will investigate the adaptative responses to environmental change in collaboration with Dr Melody Clark of the British Antarctic Survey. Emphasis will be placed on the fish and shellfish endocrine system. Several studies have reported non-standard stress responses of organisms at low temperatures, both at the biochemical and endocrine levels. The proposed work will focus on the responses to temperature and handling stress on osmoregulatory capacity, hormone changes and regulation of gene transcription. At present joint PhD supervision on bivalve stress response is under way and results from preliminary experiments carried out in January 2005 at the British Antarctic station Rothera are undergoing analysis. The outcome of this analysis will establish a more precise plan for further experimental approaches during IPY.

Physiological  
adaptative responses  
to climate change

**Dr. Paulo Catry** (Behavioural Ecology Unit, Institute of Applied Psychology) focus his work on the behavioural ecology of Southern Ocean seabirds, particularly albatrosses, including studies of population dynamics, foraging ecology, habitat selection and brooding behaviour. Current and future research will be carried out in partnership with British Antarctic Survey. Part of the research in the Falklands is funded by the British Foreign and Commonwealth Office, through the Overseas

Behavioural ecology  
of seabirds

Territories Environment Program. Numerous research papers are planned to be published during the IPY.

**Carla Freitas** (Norwegian Polar Institute/University of Tromsø) is working on her Ph.D. studies in the Arctic region titled "Habitat Utilization by Arctic Pinnipeds: the Biological and Physical Environment". Carla aims to publish various research papers dealing with this research theme, including the diving behaviour of ringed seals (*Pusa hispida*) and Walrus (*Odobenus rosmarus*) in Svalbard, Norway. Furthermore, some interesting work will be focusing on physical factors affecting the haulout behaviour of two pinniped species in the high Arctic.

**Arctic seals**

**Carlos das Neves** (Arctic Veterinary Medicine-Norwegian School of Veterinary Science, Tromsø) is working on his Ph.D. studies on virology in the Arctic region. His studies focuses on persistent viral infections in reindeer in both Norwegian arctic regions of Finnmark and Svalbard. He participates in various other research projects at the Marine Research Institute (Tromsø), the Norwegian Polar Institute and at the University of Tromsø. This focus on seals (Grey seal, harp seal, hooded seal) and research on *Brucella* (marine variant) in Svalbard and in Greenland.

**Virology in reindeer and seals in the Arctic region**

**Dr. José Xavier** (Centre of Marine Sciences, University of Algarve) will perform collaborative work with UK and France on predator-prey interactions in the Southern Ocean. The project involves multi-disciplinary work on predator-prey interactions between a wide range of predators (e.g. deep-sea fish, demersal and pelagic fish, and seabirds) and cephalopods to test hypotheses related to food chain structure and the distribution, and ecology patterns, of cephalopods. Most hypotheses will be tested in the Antarctic waters, at the Antarctic Peninsula and Scotia Sea, in collaborative work with the British Antarctic Survey. Along with the collaborative institutions, work will be focused on to the development of new scientific diet techniques and methods applied to trophic relationship (e.g. stable isotope signatures, Geographical Information Systems and environmental modelling). The data collected will allow a better understanding of trophic relationships in the Antarctic and investigate the importance of the ecology of cephalopods (including trophic level and distribution patterns hypotheses) in marine ecosystems. The work carried out is mostly carried out with the British Antarctic Survey and is intended to be published in international peer reviewed journals.

**Predator-prey interactions in the Southern Ocean**

### 3.3 Cryosphere and Climate Change

Portuguese research will focus on the study of the interactions between permafrost, periglacial environments and climate change in the Maritime Antarctic. The research teams of the Centre for Geographical Studies (Univ. Lisbon), Centre for Geophysics (Univ. Lisbon) and Centre of Geophysics (Univ. Évora) are working together in a coordinated effort to contribute strongly to the IPY Core projects TSP and ANTPAS. Permafrost has been recently recognized as a key element of the Earth System, by the World Climate Research Programme (WCRP/WMO), where future research efforts should focus and is a key area of the Portuguese Science Strategy for the International Polar Year. Collaboration is currently conducted with the Spanish and Bulgarian Antarctic Programmes, and collaboration with the Argentinean and Brazilian Antarctic programmes is being planned.

**Dr. António Correia** (Department of Physics and Geophysics Centre of Évora - University of Évora) works on paleoclimatology, climate change and ground-air coupling. Research has been focused in the mid-latitudes, but the methodologies of analysing, processing and interpreting temperature data from boreholes for those studies are well tested and constitute a very useful background and know-how that will be used in Antarctic projects in collaboration with the groups of the Centre of Geographical Studies and Centre of Geophysics of the University of Lisbon.

Heat flow in Antarctic permafrost

**Dr. Gonçalo Vieira's** (Centre of Geographical Studies, University of Lisbon) research group includes **Dr. Mário Neves, Dr. José Luís Zêzere, Dr. Carla Mora, Alexandre Trindade** and **Vanessa Batista** and several undergraduate students and works on permafrost and its response to climate change in the Maritime Antarctic (<http://permamodel.no.sapo.pt>). During the IPY the research will focus in the South Shetlands (Maritime Antarctic) mainly in collaboration with the Spanish and Bulgarian Antarctic Programmes, with the objectives of 1) installing new permafrost monitoring boreholes for the integration in GTN-P; 2) installing new sites for the Network Circumpolar Active Layer Monitoring (CALM-S); 3) geophysical surveying of permafrost characteristics; 4) modelling the spatial distribution of permafrost based on geomorphological surveys, ground temperature monitoring, active layer thickness mapping, radiation balance modelling and snow distribution modelling; 5) studying the seasonal evolution of the snow cover and its relationship with permafrost characteristics and distribution; 6) monitoring the geomorphological dynamics in the Maritime Antarctic in relation to climate change; and 7) evaluating the coupling of mesoscale atmospheric models with existing ground temperature data. Dr.

Antarctic permafrost environments and climate change



Gonalo Vieira is member of the Steering Committee of the IPY core project ANTPAS. Collaboration with the Argentinean and Brazilian Antarctic programmes is being planned.

**Dr. Pedro Viterbo** (Institute of Meteorology, Centre of Geophysics – University of Lisbon and European Centre for Medium Range Weather Forecast) and **Dr. Pedro Miranda** (Centre of Geophysics – University of Lisbon) research will focus on snow cover and relations with permafrost and mesoscale modelling. The study of climate change in Austral regions, based on the re-analyses of ERA-40 (project funded by the European Union under its Framework Programme in Energy, Environment and Sustainable Development) will be also be conducted.

Climate modelling  
and permafrost

### 3.4 Planetary Sciences

**Dr. Vera Fernandes** (University of Coimbra/University of Manchester), the first Portuguese at the South Pole, is planning to work again on the collaborative project ANSMET (Antarctic search for meteorites). The project, funded by the Office of Polar Programs of the National Science Foundation (NSF, USA) and National Aeronautics and Space Agency (NASA, USA), has recovered more than 10,000 specimens from meteorite stranding along the surfaces of Transantarctic Mountains and continental ice fields. The ANSMET specimens are the main reliable, continuous source of new, non-microscopic extraterrestrial material. The study of ANSMET meteorites has greatly extended our knowledge of extra-terrestrial materials and proved that some specimens represent materials delivered to us from the Moon and Mars and other parts of the Solar System.

Antarctic search for  
meteorites

### 3.5 Astronomy

**Dr. Jarle Brinchmann** and **Dr. Paulo Garcia** (Astrophysics Centre, University of Oporto) carry out research the Italian-French Concordia Station and this has led to the establishment of a European network to evaluate this site for the possible construction of an astronomical observatory - the ARENA network. The Antarctic plateau provides the best sites on the Earth's surface for the astronomical observations, from optical to millimetre wavelengths. CAUP is one of the 23 partners of this network and is leading the effort to assess the usefulness of Concordia for extra-galactic research. During the IPY the group will be assembling a science case for this area and arrange an international workshop on the topic in Oporto. This will be an important ingredient in assessing the potential of

One of the best sites  
on Earth for  
astronomy

Concordia as a centre for ground-based astronomical research in the coming decades.

## 4. GUIDELINES FOR A NATIONAL SCIENCE STRATEGY

This is the first Polar Science document that Portugal has ever produced. The document emphasizes the research that Portuguese scientists have been performing, through excellent collaborative work with various countries. Portugal, through these individuals, has been conducting research for 30 years in Polar regions. Due to the lack of official involvement in the research processes at the national level, the results of the Portuguese science have not been recognized by the international community as Portuguese, but as integrated within other country's activities.

30 years of individual  
non-coordinated  
research

The international movement and wide logistical support for Portuguese polar activities (e.g. Antarctic research) that have already been achieved and that will be especially available during the IPY, are unique opportunities for the setting up of the roots of a national polar programme with a realistic and easily achievable financial budget.

Roots of a polar  
programme with a  
realistic budget

In order to consolidate polar science in Portugal the guidelines for a national strategy for the IPY are therefore to:

Guidelines of the  
science strategy

- ☐ **Consolidate and strengthen** collaborative work in major international research programs (recognized as Portugal's science)
- ☐ Perform **high-quality science** across the various disciplines in which Portuguese scientists are involved
- ☐ Obtain and develop methods and techniques that can be implemented in the **management of the Earth System** (including techniques applicable in the Portuguese territory)
- ☐ Prepare a **new generation** of leading polar scientists
- ☐ Create the roots of a **national polar programme** to last beyond the IPY
- ☐ Promote the **Antarctic Treaty policies**.

During the IPY, Portugal will make a relevant contribution to biological and Earth sciences in both the Arctic and the Antarctic. Portugal's Polar science will be studying complex systems and processes that transcend the boundaries of traditional disciplines and involve collaboration between many countries. In line with such a context, it is imperative for **to have a solid financial background**. Such commitment will **determine the quality of the research obtained, provide an analysis across its science and innovation system**. It will also enable a new planning framework that will facilitate multi-disciplinary research, permit the

Portugal will make  
relevant  
contributions to polar  
science in the IPY

elaboration of new partnerships to yield greater levels of excellence and knowledge, and establish the foundations for Portugal Polar scientific research.

## **ANNEXES**

- A. Recent Portuguese publications on polar research
- B. Portuguese institutes participating in IPY science
- C. International collaboration
- D. Portuguese polar researchers involved in the IPY
- E. Portuguese committee for the IPY (preliminary list of members)
- F. Letters from the IPY Joint Committee
- G. List of acronyms



## A. RECENT PORTUGUESE PUBLICATIONS ON POLAR RESEARCH

### A.1 Papers in peer-reviewed journals and books

Arata, J. & Xavier, J. C. (2003). The diet of black-browed albatrosses at the Diego Ramirez Islands, Chile. *Polar Biology* 26 (10): 638-647

Arata, J., Robertson, G. Valencia, J., Xavier, J. C. & Moreno, C. (2003). The diet of grey-headed albatrosses at the Diego Ramirez Islands, Chile: ecological implications. *Antarctic science* 16 (3): 263-275

Betts, A.K., and Viterbo, P. (2000). Hydrological budgets and surface energy balance of seven sub-basins of the Mackenzie River from the ECMWF model. *J. Hydrometeorol.*, 1, 47-60.

Betts, A.K., P. Viterbo, A. Beljaars, and B. van den Hurk (2001). Impact of BOREAS on the ECMWF forecast model. *J. Geophys. Res.*, 106D, 33,593-33,604.

Betts, A.K., J.H. Ball, and P. Viterbo (2003). Evaluation of the ERA-40 surface water budget and surface temperature for the Mackenzie River. *J. Hydrometeorol.*, 4, 1194-1211.

Betts, A.K., J.H. Ball, A.G. Barr, T.A. Black, J.H. McCaughey, and P. Viterbo (2006). A comparison of the surface-BL-cloud coupling in ERA-40 with the BERMS data. *Agr. For. Meteorol.*, in press.

Betts, A.K., P. Viterbo, A.C.M. Beljaars, H.-L. Pan, S.-Y. Hong, M. Goulden, and S. Wofsky (1998). Evaluation of the land-surface interaction in the ECMWF and NCEP/NCAR reanalysis models over grassland (FIFE) and boreal forest (BOREAS). *J. Geophys. Res.*, 103D, 23,079-23,085.

Bortoli, D., G. Giovanelli, F. Ravegnani, I. Kostadinov and A. Petritoli. (2005). Stratospheric Nitrogen Dioxide in the Antarctic, *Int J. Of Remote Sensing*, 26, 16, 3395–3412,

Bowling, L.C., D.P. Lettenmaier, B. Nijssen, L.P. Graham, D. Clark, M. El Maayar, R. Essery, S. Goers, F. Habets, B. van den Hurk, J. Jing, D. Kahan, D. Lohman, S. Mahanama, D. Mocko, O. Nasonova, P. Samuelsson, A.B. Shmakina, K. Takata, D. Verseghy, P. Viterbo, M. Xieyao, Y. Xue, and Z.-L. Yang, (2003): Simulation of high latitude hydrological processes in the Torne-Kalix basin: PILPS Phase 2(e) - 1.: Experiment description and summary intercomparisons. *Global and Planetary Change*, 38, 1-30.

Catry, P., Phillips, R., Phalan, B. & Croxall, J.P. (2006). Senescence effects in an extremely long-lived bird: the grey-headed albatross *Thalassarche chrysostoma*. *Proceedings of the Royal Society B*. In press

Catry, P., Phillips, R., Forcada, J. & Croxall, J.P. (2006). Factors affecting the solution of a parental dilemma in albatrosses: at what age should chicks be left unattended? *Animal Behaviour* in press

Catry, P., Phillips, R. and Croxall, J.P. (2005). Sexual segregation in birds: patterns, processes and implications for conservation. In Ruckstuhl, K.E. & Neuhaus, P. (eds). *Sexual Segregation in Vertebrates: Ecology of the Two Sexes*. Cambridge University Press, Cambridge. In Press. Catry, P., Phillips, R.A. and Croxall, J.P. 2004 Sustained fast travel by a grey-headed albatross *Thalassarche chrysostoma* riding an Antarctic Storm. *Auk* 121: 1208-1213.

Catry, P., Phillips, R.A., Phalan, B., Silk, J.R.D. and Croxall, J.P. (2004). Foraging strategies of grey-headed albatrosses *Thalassarche chrysostoma*: integration of movements, activity and feeding events. *Marine Ecology Progress Series* 280: 261-273.

Catry, P., Campos, A., Segurado, P., Silva, M. and Strange, I. (2003). Population census and nesting habitat selection of thin-billed prion *Pachyptila belcheri* on New Island, Falkland Islands. *Polar Biology* 26: 202-207.



- Correia, A. and Safanda, J. (1999). Preliminary ground surface temperature history in mainland Portugal reconstructed from borehole temperature logs. *Tectonophysics*, 306, 269-275.
- Correia, A. and Safanda, J. (2001). Ground surface temperature history at a single site in southern Portugal reconstructed from borehole temperatures. *Global and Planetary Change*, 29, 155-165.
- Drusch, M., D. Vasiljevic and Viterbo, P. (2004): ECMWF global snow analysis: Assessment and revision based on satellite observations. *J. Appl. Meteor.*, 43, 1282-1294.
- Giovanelli, G., D. Bortoli, A. Petritoli, E. Castelli, I. Kostadinov, F. Ravegnani, G. Redaelli, C. M. Volk, U. Cortesi, G. Bianchini and B. Carli, Stratospheric minor gas distribution over the Antarctic Peninsula during the APE-GAIA campaign, *Int J. Of Remote Sensing*, 26, 16, 3343–3360, 2005
- Gustafsson, D., E. Lewan, B.J.J.M. van den Hurk, P. Viterbo, A. Grelle, A. Lindroth, E. Cienciala, M. Mölder, S. Halldin, and Lundin, L.-C. (2003). Boreal-forest surface parameterisation in the ECMWF model – 1D test with NOPEX long-term data. *J. App. Meteor.*, 42, 95-112.
- Hauck, C.; Vieira, G.; Gruber, S.; Blanco, J.J.; Ramos, M. Geophysical identification of permafrost in Livingston Island, Maritime Antarctica. Submitted to *Journal of Geophysical Research*.
- Herber, A., K. Dethloff, L.W. Thomason, P. Viterbo, V.F. Radionov, and Leitene r, U. (1996). Volcanic perturbation of the atmosphere in both polar regions: 1991-1994. *J. Geophys. Res.*, 101D, 3921-3928.
- Nijssen, B.J., L.C. Bowling, D.P. Lettenmaier, D. Clark, M. El Maayar, R. Essery, S. Goers, F. Habets, B. van den Hurk, J. Jing, D. Kahan, D. Lohman, S. Mahanama, D. Mocko, O. Nasonova, P. Samuelsson, A.B. Shmakin, K. Takata, D. Verseghy, P. Viterbo, Y. Xia, Xieyao Ma, Y. Xue, and Yang, Z.-L. (2003). Simulation of high latitude hydrological processes in the Torne-Kalix basin: PILPS Phase 2(e) - 2.: Comparison of model results with observations. *Global and Planetary Change*, 38, 31-53.
- Phalan, B., Phillips, R.A., Silk, J.R.D., Afanasyev, V., Fukuda, A., Fox, J., Catry, P. & Croxall, J.P. (2006). Foraging behaviour of four albatross species by day and night. *Marine Ecology Progress Series in press*
- Phillips, R. A., Xavier, J. C. & Croxall, J. P. ( 2003). Effects of satellite transmitters on albatrosses and petrels. *Auk* 120 (4):1082-1090
- Phillips, R.A, Silk, J.R.D., Phalan, B., Catry, P.and Croxall, J.P. (2004). Seasonal sexual segregation in two *Thalassarche* albatross species: competitive exclusion, reproductive role specialization or foraging niche divergence? *Proceedings of the Royal Society of London, B* 271: 1283-1291
- Piepenburg, D.; Chernova, N.V; Von Dorrien, C.F.; Gutt, J.; Neyelov, A.V.; Rachor, E.; Saldanha, L. and Schmid, M. K. (1996). Megabenthic communities in the waters around Svalbard. *Polar Biology*, 16: 431-446.
- Pilling, G. M., Purves, M. G., Daw, T. M., Agnew, D. A. & Xavier, J. C. (2001). The diet of Patagonian toothfish (*Dissostichus eleginoides*) around South Georgia. *Journal of Fish Biology*, 59:1370-1384
- Ramos, M. & Vieira, G. (2003) – Active layer and permafrost monitoring in Livingston Island, Antarctic. First results from 2000 and 2001. In: M. Phillips, S.M. Springman e L.U. Arenson (Eds.), Permafrost. Balkema – Swets & Zeitlinger, Lisse: 929-933.
- Ramos, M.; Vieira, G. (2004) - Variabilidad térmica de la capa activa y evaluación de la energía perdida por el suelo durante el proceso de congelación en la Isla Livingston (Antártida). Inviernos 2000, 2001 y 2002, Boletín de la Real Sociedad Española de Historia Natural, Sección Geológica, Madrid, 99 (1-4): 83-92.
- Ramos, M.; Vieira, G.; Crespo, F. & Bretón, L. (2002) – Seguimiento de la evolución temporal del gradiente térmico de capa activa en las proximidades de la B.A.E. Juan Carlos I (Antártida), Periglaciario en montaña y altas latitudes, E. Serrano e A. García (eds.), Dep. Geografía, Univ. Valladolid.

- Saldanha, L. (1983). Aspectos biológicos. In: Ciclo de Conferências sobre as Regiões Polares. *Boletim da Sociedade de Geografia de Lisboa*, Série 101 (7-12): 79-91.
- Saldanha, L.; Almeida, A.; Leydoyer, M and Ré, P. ( 1990). Operations réalisées dans le cratère de l'île Saint-Paul au cours de la Campagne MD-50/JASUS. in Patrick M. Arnaud (Ed.) *Publications de la Mission de Recherche des Terres Australes et Antartiques Françaises - Les rapports des campagnes à la mer - La campagne MD 50/JASUS aux îles Saint-Paul et Amsterdam à bord du "Marion Dufresne" - 3 juillet - 1<sup>er</sup> août 1986* - ed T.A.A.F.: 86-04: 121-123.
- Saldanha, L.; Almeida, A.; Leydoyer, M. and Ré, P. (1990). Aspects de la zonation benthique dans le cratère de l'île Saint-Paul. in Patrick M. Arnaud (Ed.) *Publications de la Mission de Recherche des Terres Australes et Antartiques Françaises - Les rapports des campagnes à la mer - La campagne MD 50/JASUS aux îles Saint-Paul et Amsterdam à bord du "Marion Dufresne" - 3 juillet - 1<sup>er</sup> août 1986* - ed T.A.A.F.: 86-04: 127-131.
- Saldanha, L. (1991). Aspects de la zonation benthique dans le cratère de l'île St. Paul (Océan Indien). *Actas do V Simposio Ibérico de Estudios del Bentos Marino*, 1: 19-26.
- van den Hurk, B.J.J.M., P. Graham, and P. Viterbo (2002). Comparison of land surface hydrology in regional climate simulations of the Baltic Sea catchment. *J. Hydrol.*, 255, 169-193.
- van den Hurk, B.J.J.M., and P. Viterbo (2003). The Torne-Kalix PIL PS2E experiment as a test bed for modifications to the ECMWF land surface scheme. *Global and Planetary Change*, 38, 165-173.
- Vieira, G.; Ramos, M. & Garate, J. (2000). Detailed geomorphological mapping with kinematic GPS. Examples from Livingston Island, Antarctic, *Estudos do Quaternário*, 4: 35-42.
- Vieira, G. & Ramos, M. (2003). Geographic factors and geocryological activity in Livingston Island, Antarctic. Preliminary results. In: M. Phillips, S.M. Springman e L.U. Arenson (Eds.), *Permafrost, Balkema – Swets & Zeitlinger*, Lisse: 1183-1188.
- Vieira, G.; Mora, C. & Ramos, M. (2004). Ground temperature regimes and geomorphological implications in a Mediterranean mountain (Serra da Estrela, Portugal), *Geomorphology*, 52: 57-72.
- Viterbo, P., and A.K. Betts (1999). Impact on ECMWF forecasts of changes to the albedo of the boreal forests in the presence of snow. *J. Geophys. Res.*, 104D, 27,803-27,810.
- Viterbo, P., A.C.M. Beljaars, J.-F. Mahfouf, and J. Teixeira (1999). The representation of soil moisture freezing and its impact on the stable boundary layer. *Q. J. Roy. Meteor. Soc.*, 125, 2401-2426.
- Xavier, J. C., Tarling, G. A. and Croxall, J. P. (2006). Determining large scale distribution of pelagic cephalopods, fish and crustaceans in the South Atlantic from wandering albatross (*Diomedea exulans*) foraging data. *Ecography* 29 (2): 260-272
- Xavier, J. C. & Croxall, J. P. (2005). Sexual differences in foraging behaviour and food choice: a case study of wandering albatrosses. In Kruckstuhl, K. & Neuhaus, P. *Sexual Segregation in Vertebrates*. Cambridge University Press: 74-91
- Xavier, J. C., Croxall, J. P. and Cresswell, K. A. (2005). Boluses: a simple, cost-effective diet method to assess the cephalopod prey of albatrosses? *Auk* 122: 1182-1190
- Xavier, J.C., Trathan, P. N., Croxall, J. P., Wood, A. G., Podesta, G. & Rodhouse, P. G. (2004). Foraging ecology and interactions with fisheries of wandering albatrosses at South Georgia. *Fisheries Oceanography* 13 (5): 324-344
- Xavier, J.C., Croxall, J. P., Trathan, P. N. & Wood, A. G. (2003). Feeding strategies and diets of breeding grey-headed and wandering albatrosses at South Georgia. *Marine Biology* 143:221-232
- Xavier, J.C., Croxall, J. P., Trathan, P. N. & Rodhouse, P. G (2003). Inter-annual variation in the cephalopod component of the diet of wandering albatrosses *Diomedea exulans* breeding at Bird Island, South Georgia. *Marine Biology* 26:20-26

Xavier, J. C., Croxall, J. P. & Reid, K. (2003). Inter-annual variation in the diets of two albatross species breeding at South Georgia: implications of breeding performance. *Ibis* 145: 593-610

Xavier, J.C., Rodhouse, P. G., Purves, M.G., Daw, T. M., Arata, J. & Pilling, G. M.(2002). Distribution of cephalopods in the diet of the toothfish *Dissostichus eleginoides* around South Georgia. *Polar Biology*, 25: 323-330

Xavier, J. C., Rodhouse, P. G., Trathan, P. N. & Wood, A. G. (1999). A geographical Information System (GIS) Atlas of cephalopod distribution of the Southern Ocean. *Antarctic Science*, 11 (1): 61-62

## A.2. Conference Proceedings

Betts, A.K., and P. Viterbo (2002). Basin-Scale Hydrologic budgets from ERA-40 for the Mississippi, Mackenzie and Amazon rivers. *16<sup>th</sup> Conference on Hydrology, American Meteorological Society Annual Meeting*, 9-13 January 2002, Long Beach, CA

Betts, A.K., M.L. Goulden, S.F. Wofsky, P. Viterbo, H.L. Pan. And S.Y. Hong (1999). Impact of the boreal forests on climate. *14<sup>th</sup> Conference on Hydrology, Amer. Meteor. Soc.*, 79<sup>th</sup> Annual Meeting, Dallas, Jan 11-16, 1999, TX, USA

Blanco, J.J. ; Ramos, M.; Hauck, C.; Gruber, S.; Vieira, G. (2006). Using shallow ground temperature measurements for the detection and monitoring of climatic trends and signals in the maritime Antarctic - examples from Livingston Island. *Geophysical Research Abstracts*, Vol. 8, 09507, 2006. SRef-ID: 1607-7962/gra/EGU06-A-09507

Bortoli, D., F. Ravegnani, G. Giovanelli, Iv. Kostadinov, A. Petritoli. (2000). Stratospheric nitrogen dioxide observations at Mid and High latitude performed with ground based spectrometers, *Proc. SPIE*, Vol. 4168, 297-308.

Bortoli, D., F. Ravegnani, G. Giovanelli, Iv Kostadinov, A. Petritoli and G. Trivellane (2000). Continuous observation of NO<sub>2</sub> and O<sub>3</sub> total columns at Terra Nova bat station Antarctica, *Proc. SIF*, Vol. 69, 363-374.

Bortoli, D., F. Ravegnani, Iv. Kostadinov, G. Giovanelli, A. Petritoli, P. Bonasoni and R. Werner (2002). Stratospheric ozone and nitrogen dioxide amount obtained with gascod type doas spectrometer at terra nova bay (antarctica) during december 2000-january 2001, *Proc. SPIE*, Vol. 4485, 225-235.

Bortoli, D., F. Ravegnani, Iv. Kostadinov, G. Giovanelli, A. Petritoli, F. Calzolari, M.J. Costa, A.M. Silva, S. Beirle, T. Wagner, M. Wenig and U. Platt (2003). Stratospheric nitrogen dioxide in Antarctic regions from ground based and satellite observation during 2001, *Proc. SPIE*, Vol. 4882 304-313.

Correia, A. and Safanda, J. (2002). Geothermal climate change and coupling of the air and soil temperatures at a single site in Portugal. Proceedings of the international conference "*The Earth's Thermal State and Related Research Methods*", 37-40. (Moscow, Russia, July 17-20).

Giovanelli, G., D. Bortoli, I. Kostadinov, A. Petritoli and F. Ravegnani (2001). Thin Optical Depth Stratospheric Gases Detection With Ground Based Off-Axis UV-Vis Spectrometer at Dome Concordia NDSC Station, *Polar Atmospheres - Scientific and technical report series*, 2, 47-53.

Herber, A., K. Dethloff, L.W. Thomason, and P. Viterbo (1995). Meridional transport of volcanic aerosols into polar regions. *XX General Assembly of the European Geophysical Society*, Hamburg, April 1995.

Lewan, E., D. Gustafsson, P. Viterbo, A. Grelle, A. Lindroth, E. Cienciala, M. Molder, S. Halldin, and L-C. Lundin (2000). Comparison of the ECMWF surface model for a boreal forest site using NOPEX long term flux data. *XXV General Assembly of the European Geophysical Society*, Nice, April 2000.

Marrero, J.M.; Ramos, M.; Vieira, G.; Serrano, A.; Ortiz, R. (2004). Ground surface energy balance in Deception Island during the summer (South Shetlands, Antarctic). Terra Nostra, SCAR Open Science Conference "Antarctica and the Southern Ocean in the Global System", Abstract Volume: 338.

Marrero, J.M.; Ramos, M.; Vieira, G.; García, J.A.; Ortiz, R. (2004). Spatial distribution of the ground energy balance in a volcano (Deception Island, Antarctica). Geophysical Research Abstracts, Vol. 6, 00190, 2004.

Marrero, J.M.; Ramos, M.; Vieira, G.; García, J.A.; Ortiz, R. (2004). Balance de energia distribuida espacialmente sobre la superficie del volcán Decepción (Shetlands del Sur, Antártida). 4ª Assembleia Luso-Espanhola de Geofísica, Figueira da Foz, 3-7 Janeiro de 2004.

Ramos, M.; Vieira, G. (2004). Active layer temperature monitoring and energy balance of the ground surface during the freezing periods of 2001 and 2002 (Livingston Island, Antarctica). Geophysical Research Abstracts, Vol. 6, 00076, 2004.

Ramos, M. & Vieira, G. (2004). Active layer monitoring in Livingston and Deception islands (South Shetlands). Methodology and results. International Workshop on Antarctic Permafrost and Soils, IPA-NSF, Madison, WI (EUA), 14-18 de Novembro de 2004.

Ramos, M. & Vieira, G. (2005). Active layer monitoring in Livingston and Deception islands (South Shetlands, Antarctic). Methodology and results. Terra Nostra, 2005/2, 2nd European Conference on Permafrost – Programme and Abstracts: 145.

Ramos, M.; Vieira, G. & Crespo, F. (2001). Permafrost distribution in the area of the Spanish Antarctic Station (Livingston Island): ground temperatures in 1995, 1st European Permafrost Conference – Abstracts, Rome, p. 100.

Ramos, M. & Vieira, G. (2003). Active layer and permafrost monitoring in Livingston Island, Antarctic. First results from 2000 and 2001. Permafrost. Programme, abstracts and IPA reports, Eight International Conference on Permafrost, 21-25 July 2003, Zurich, Switzerland: 81.

Ramos, M. & Vieira, G. (2005). Ground surface enthalpy balance during freeze and thaw seasons in Livingston Island, Antarctic. Geophysical Research Abstracts.

Ramos, M. & Vieira, G. (2003). Variabilidad térmica de la capa activa y evaluación de la energía perdida por el suelo durante el proceso de congelacion en la Isla Livingston (Antártida). Inviernos de 2000, 2001 y 2002. Programa y resúmenes de las comunicaciones, VI Reunión IPA-España, El periglaciario en relación con otros procesos, San Ildefonso – La Granja (Segovia - Espanha), 25 a 27 de Junho: 18-20: 36-39.

Ramos, M.; Vieira, G.; Crespo, F. & Bretón, L. (2001). Seguimiento de la evolución temporal del gradiente térmico de capa activa en las proximidades de la B.A.E. Juan Carlos I (Antártida), V Reunión IPA-España, Periglaciario en montaña y altas latitudes, Potes, 27-29 Junho 2001, p. 44-45.

Ramos, M.; Vieira, G.; García, J.A.; Hoelzle, M.; Gruber, S.; Ortiz, R.; Marrero, J.M. & Mora, C. (2004). Permafrost and Active Layer Monitoring and Modelling in Livingston and Deception Islands (South Shetlands, Antarctic) – PERMAMODEL. International Workshop on Antarctic Permafrost and Soils, IPA-NSF, Madison, WI (EUA), 14-18 de Novembro de 2004.

Ramos, M.; Vieira, G.; García, J.A.; Serrano, A.; Arias, M.R. (2003). Balance de energia en la capa activa del permafrost durante el período de congelacion. Isla Livingston (Antártida), Inviernos de 2001 y 2002, Bienal de Física, Espanha.

Ramos, M.; Vieira, G.; García, J.A.; Hoelzle, M. & Gruber, S. (2004). Permafrost and active layer monitoring and modelling in Livingston and Deception Islands (South Shetlands, Antarctic) – Permamodel. II Congresso Nacional de Geomorfologia – "Geomorfologia: ciência e sociedade", Coimbra, 11 e 12 de Novembro de 2004.



Ramos, M.; Vieira, G.; García, J.A.; Hoelzle, M. & Gruber, S. (2004). Permafrost and active layer monitoring and modelling in Livingston and Deception Islands (South Shetlands, Antarctic) – PermaModel. Terra Nostra, SCAR Open Science Conference “Antarctica and the Southern Ocean in the Global System”, Abstract Volume: 336.

Safanda, J.; Correia, A.; Majorowicz, J. and Rajver, D. (2002). Inverse method for reconstruction of ground surface temperature history from borehole temperatures. In: *Geothermal / Dendrochronological Paleoclimate Reconstruction across Eastern Margin of Euroasia, Proceedings 2002 of the International Matsuyama Workshop* (M. Yamano, T. Nagao and T. Sweda (eds.)), 163-178. (Matsuyama, Japan, November 28-30).

Strange, I.J. & Catry, P. (2006). Research and monitoring on albatrosses and petrels on New Island South, Falkland Islands. UK Overseas Territories ACAP Workshop, Port Stanley, Falkland Islands, 12-15 March 2006.

van den Hurk, B. and Viterbo, P. (2001). Test of a number of modifications to the ECMWF land surface scheme using the Torne/Kallin PILPS2E experiment. 3<sup>rd</sup> Study Conference on BALTEX, Åland, Finland, 2-6 July 2001.

Vieira, G.; Ramos, M. & Garate, J. (2000). A utilização do GPS cinemático na cartografia geomorfológica de pormenor. Exemplos da Ilha Livingston (Shetlands do Sul, Antárctida), II Jornadas do Quaternário, APEQ, Porto, 12-13 de Outubro.

Vieira, G. & Ramos, M. (2001). Observations on the Geomorphological Dynamics of the Ice-free Areas of Hurd Peninsula, Livingston Island, Antarctic, Transactions, Japanese Geomorphological Union, 22(4): 256.

Vieira, G. & Ramos, M. (2001). Observations on the periglacial dynamics of the south slope of Johnsons ridge, Livingston Island, South Shetlands, 1st European Permafrost Conference – Abstracts, Rome, p. 98.

Vieira, G. & Ramos, M. (2002). Aspectos da dinâmica periglaciária da vertente sul de Johnsons Ridge (Ilha Livingston, Shetlands do Sul, Antárctida), I Seminário de Geomorfologia - Resumos, Associação Portuguesa de Geomorfólogos.

Vieira, G. & Ramos, M. (2003). Geographic factors and geocryological activity in Livingston Island, Antarctic. Preliminary results. Permafrost. Programme, abstracts and IPA reports, Eight International Conference on Permafrost, 21-25 July 2003, Zurich, Switzerland: 102.

Vieira, G. & Ramos, M. (2005). Micrometeorological controls on the temperature regimes of the active layer during the summer in Livingston and Deception Islands, Antarctic. Terra Nostra, 2005/2, 2nd European Conference on Permafrost – Programme and Abstracts: 151.

Vieira, G.; Hauck, C.; Gruber, S.; Blanco, J. J.; Ramos, M. (2006). Geophysical surveying for permafrost research in the Maritime Antarctic. First results from Livingston and Deceptions Islands. *Geophysical Research Abstracts*, Vol. 8, 09446, 2006. SRef-ID: 1607-7962/gra/EGU06-A-09446

Vieira, G. & Ramos, M. (2005). Factores geográficos e dinâmica geomorfológica na Península Hurd (Ilha Livingston, Antárctida). Colóquio “A Geografia e as Tecnologias de Informação Geográfica”, CEG, Lisboa, 7-8 Abril de 2005.

Viterbo, P., and A.K. Betts (1997). The forecast impact of changes to the snow albedo of the boreal forests. *Research Activities in Atmospheric and Oceanic Modelling*, ed. by A. Staniforth (pp. 4.42-4.43), Rep. 25 of the CAS/JSC Working Group on Numerical Experimentation, WMO/TD-no. 792, Geneva.

Viterbo, P., and A.K. Betts (1998). Impact of the snow albedo of the boreal forests on spring forecasts in the ECMWF model. *12th Conference on Numerical Weather Prediction*, Amer. Meteor. Soc. Annual Meeting, Phoenix, AZ, USA, Jan 11-16, 1998.

Xavier, J. C., Croxall, J. P. and C. Nigmatullin (2006). Predator-prey interactions in the Southern Ocean: identification of growth and post-spawning periods of Antarctic squids using albatross diets.

“Cephalopods life-cycles: biology, management and conservation”, Cephalopod International Advisory Council (CIAC) conference, Hobart, Australia, 2-10 February

Xavier, J. C. and Cherel, Y. (2006). Cephalopod beak guide for the Southern Ocean. Workshop Southern Ocean Cephalopods, in “Cephalopods life-cycles: biology, management and conservation”, Cephalopod International Advisory Council (CIAC) conference, Hobart, Australia 2-10 February

Xavier, J. C., Croxall, J. P., Trathan, P. N. and Wood, A. G. (2004). Contrasting feeding strategies and diets of breeding grey-headed and wandering albatrosses at South Georgia under abnormal oceanographic conditions. International Albatross and Petrel Conference, Uruguay, 21-27 August

Xavier, J. C., Tarling, G. A., Croxall, J. P. and Rodhouse, P. G. (2003). Interpreting cephalopod distribution using predators foraging. Cephalopod International Advisory Council (CIAC) Symposium, Phuket, Thailand, 18-21 February

Xavier, J. C., Croxall, J. P., Rodhouse, P. G., Reid, K. and Trathan, P. N. (2003). Can cephalopods be cephalopod dependent? International Symposium on Bio-logging science, Tokyo, Japan, 17-21 March

Xavier, J. C., Phillips, R. A., Wood, A. G. and Croxall, J. P. (2002) Sexual segregation on wandering albatrosses: an important reason for high mortality in females? Sexual segregation workshop, Cambridge, England, 16-18 September

Xavier, J. C., Croxall, J. P., Rodhouse, P. G., Reid, K. and Trathan, P. N. (2002). Can cephalopods be cephalopod dependent? Marine Biology Postgraduate workshop, Plymouth, England, 22-24 April

Xavier, J. C., Rodhouse, P. G., Croxall, J. P., Reid, K. and Trathan, P. N. (2002). Unusual presence of *Illex argentinus* (Ommastrephidae) in the diet of albatrosses breeding in Bird Island, South Georgia. Marine Biology Postgraduate workshop, Plymouth, England, 22-24 April

Xavier, J. C., Wood, A. G., Croxall, J. P. and Rodhouse, P. G. (2001) New estimates of the *Martialia hyadesi* stock based on predator diet: implications for south Atlantic squid fisheries. International Council for the Exploration of the Sea (ICES) meeting, Oslo, Norway, 26-29 September

Xavier, J. C., Croxall, J. P., Rodhouse, P. G., Reid, K. and Trathan, P. N. (2001). Can cephalopods be cephalopod dependent? Scientific Committee for Antarctic Research (SCAR) Conference, Amsterdam, Netherlands, 26 August- 1 September

Xavier, J. C., Wood, A. G., Croxall, J. P. and Rodhouse, P. G. (2000). Unusual presence of *Illex argentinus* (Cephalopoda: ommastrephidae) in the diet of albatrosses breeding at Bird Island, South Georgia. Cephalopod International Advisory Council (CIAC) Symposium, Aberdeen, Scotland, 3-7 July.





## **B. PORTUGUESE INSTITUTES PARTICIPATING IN IPY SCIENCE**

- ☐ Centre of Geographical Studies, University of Lisbon
- ☐ Centre of Geophysics, University of Lisbon
- ☐ Centre of Geophysics, University of Évora
- ☐ Centre of Marine Sciences, University of Algarve
- ☐ Department of Oceanography and Fisheries, University of the Azores
- ☐ Institute of Applied Psychology, Lisbon
- ☐ Institute of Geophysics, University of Coimbra
- ☐ Institute of Meteorology, Lisbon
- ☐ Centre of Astrophysics, University of Oporto



## C. INTERNATIONAL COLLABORATION

- ☐ British Antarctic Survey (United Kingdom)
- ☐ Centre Nationale de la Recherche Scientifique (France)
- ☐ Department of Geography, University of Zurich (Switzerland)
- ☐ Department of Geography, University of Valladolid (Spain)
- ☐ Department of Geology, Autonomous University of Madrid (Spain)
- ☐ Department of Physics, University of Alcalá de Henares (Spain)
- ☐ European Centre for Medium-Range Weather Forecasts, Reading (United Kingdom)
- ☐ Institute for Atmospheric Sciences and Climate/National Council for the Research (Italy)
- ☐ National Project for Antarctic Research (Italy)
- ☐ Norwegian Polar Institute (Norway)
- ☐ Norwegian School of Veterinary Science, Tromsø (Norway)
- ☐ University of Manchester (United Kingdom)
- ☐ University of Karlsruhe (Germany)
- ☐ University of Tromsø (Norway)



## **D. PORTUGUESE POLAR RESEARCHERS INVOLVED IN THE IPY**

Adelino Canário  
Centre of Marine Sciences, University of Algarve  
Faculty of Marine and Environmental Sciences  
Campus of Gambelas  
8000-139 Faro, Portugal  
Email: acanario@ualg.pt

Alexandre Trindade  
Centre of Geographical Studies, University of Lisbon  
Faculdade de Letras, Alameda da Universidade  
1600-214 Lisboa, Portugal  
Email: alexandretn@gmail.com

Ana Maria Silva  
Geophysics Centre of Évora, Évora University  
Rua Romão Ramalho 59  
7000-671 Évora, Portugal  
E-Mails: db@uevora.pt/asilva@uevora.pt

António Correia  
Department of Physics and Geophysics Centre of Évora, University of Évora  
Rua Romão Ramalho, 59  
7000-671 Evora, Portugal  
E-mail: correia@uevora.pt

António Pedro Viterbo  
Institute of Meteorology  
Rua C do Aeroporto  
1749-077 Lisboa, Portugal  
Email: pedro.viterbo@meteo.pt

Carla Freitas  
Norwegian Polar Institute  
Polar Environmental Centre  
N-9296 Tromsø  
Norway  
Email: carla.freitas@npolar.no

Carla Mora  
Centre of Geographical Studies, University of Lisbon  
Faculdade de Letras, Alameda da Universidade  
1600-214 Lisboa, Portugal  
Email: carla.mora@netvisao.pt

Carlos das Neves,  
Norwegian School of Veterinary Science,  
Institute of Food Safety and Infection Biology, Section of Arctic Veterinary Medicine  
Stakkevollveien, 23b, Post Box 6204  
NO 9292 Tromsø  
Norway  
Email: calhi415@hotmail.com

Daniele Bortoli  
Geophysics Centre of Évora-Évora University  
Rua Romão Ramalho 59  
7000-671 Évora, Portugal  
E-Mails: db@uevora.pt/asilva@uevora.pt

Gonalo Vieira  
Centre of Geographical Studies, University of Lisbon  
Faculdade de Letras, Alameda da Universidade  
1600-214 Lisboa, Portugal  
Email: gtvieira@ceg.ul.pt

Jarle Brinchmann  
Centre of Astrophysics, University of Oporto  
Rua das Estrelas  
4150-762 Porto, Portugal  
Email: jarle@astro.up.pt

Jos  Lu s Z zere  
Centre of Geographical Studies, University of Lisbon  
Faculdade de Letras, Alameda da Universidade  
1600-214 Lisboa, Portugal  
Email: jlzezere@fl.ul.pt

Jo l Bried  
Department of Oceanography and Fisheries, University of the Azores  
IMAR  
9901-862 Horta, A ores  
Email: joelbried@yahoo.com

Jos  Xavier  
Centre of Marine Sciences, University of Algarve  
Faculty of Marine and Environmental Sciences  
Campus of Gambelas  
8000-139 Faro, Portugal  
Email: jxavier@ualg.pt

M rio Neves  
Centre of Geographical Studies, University of Lisbon  
Faculdade de Letras, Alameda da Universidade  
1600-214 Lisboa, Portugal  
Email: marioneves@ceg.ul.pt

Paulo Garcia  
Centre of Astrophysics, University of Oporto  
Rua das Estrelas  
4150-762 Porto, Portugal  
Email: pgarcia@astro.up.pt

Paulo Catry  
Institute of Applied Psychology  
Rua Jardim do Tabaco 44  
1100 Lisboa, Portugal  
Email: paulo.catry@netc.pt

Pedro Miranda  
Centre of Geophysics, University of Lisbon  
Faculdade de Ci ncias, Lisboa  
Email: pmmiranda@fc.ul.pt

Vanessa Batista  
Centre of Geographical Studies, University of Lisbon  
Faculdade de Letras, Alameda da Universidade  
1600-214 Lisboa, Portugal  
Email: vanessambatista@gmail.com

Vera Fernandes  
Geophysical Institute  
Rua Dr. Dias da Silva  
3000-134 Coimbra, Portugal  
Email: verafern@ci.uc.pt





## **E. PORTUGUESE COMMITTEE FOR THE IPY**

### **(Preliminary list of members)**

- ☐ Luís Mendes-Victor, Centre of Geophysics, University of Lisbon (President)
- ☐ Adelino Canário, Centre of Marine Sciences, University of Algarve
- ☐ Agostinho Ramos da Silva, Geographical Society of Lisbon
- ☐ Ana Maria Silva, Centre of Geophysics, University of Évora
- ☐ António Pedro Viterbo, Institute of Meteorology
- ☐ Gonçalo Vieira, Centre of Geographical Studies, University of Lisbon (Point of contact)
- ☐ José Xavier, Centre of Marine Sciences, University of Algarve
- ☐ Luís Aires-Barros, Geographical Society of Lisbon
- ☐ Pedro Miranda, Centre of Geophysics, University of Lisbon
- ☐ Vera Fernandes, Institute of Geophysics, University of Coimbra



## F. LETTERS OF APPROVAL OF FULL PROPOSALS FROM THE IPY JOINT COMMITTEE

### INTEGRATED ANALYSES OF CIRCUMPOLAR CLIMATE INTERACTIONS AND ECOSYSTEM DYNAMICS IN THE SOUTHERN OCEAN—INTERNATIONAL POLAR YEAR



30 November 2005

Dear Prof Eugene Murphy

On behalf of the ICSU/WMO Joint Committee for the International Polar Year 2007-2008 we wish to thank you for submitting a proposal entitled 'Integrated analyses of circumpolar Climate interactions and Ecosystem Dynamics in the Southern Ocean—International Polar Year' for consideration as an IPY activity. Success of the IPY depends fundamentally on excellent research and support and on a high level of international coordination, derived from the talents and energy of groups such as yours.

At its November meeting in Geneva the Joint Committee completed evaluations of all proposals received up to 30 September 2005 for scientific or educational significance, for consistency with the IPY themes, regions and time frames, for evidence of international collaboration, and for development of effective management plans covering communications, operations, data, and education and outreach. In addition, the Joint Committee examined each proposal for evidence of involvement by scientists from non-polar nations, for indications of interdisciplinarity within the proposal and of linkages to other IPY activities, and for evidence that activities proposed would contribute to an IPY legacy. The Joint Committee evaluated more than 200 coordination proposals and expects to evaluate one additional set of coordination proposals submitted by 31 January 2006.

The Joint Committee considers that your proposal as submitted includes very strong scientific, education and outreach components and demonstrates a high level of adherence to IPY themes and goals. The Joint Committee therefore endorses your proposal as a prominent and valued part of the IPY program. The Joint Committee intends that these endorsements will provide assistance as IPY participants seek funding for the work proposed.

The IPY International Programme Office will shortly provide additional guidance for project coordinators and steering groups, including description of initial IPY information management processes. As part of that information exchange, we will expect project coordinators to keep the IPO informed about funding status of their projects and about substantial changes from the projects as proposed. In all cases, we wish you enormous success with your component of the IPY.

Yours sincerely

Co-chairs of Joint Committee

A handwritten signature in black ink, appearing to read 'Ian Allison'.

Ian Allison

A handwritten signature in black ink, appearing to read 'Michel Béland'.

Michel Béland

cc: Prof Ulrich Bathmann

## A CENSUS OF ANTARCTIC MARINE LIFE



30 November 2005

Dear Prof Michael Stoddart

On behalf of the ICSU/WMO Joint Committee for the International Polar Year 20072008 we wish to thank you for submitting a proposal entitled 'A Census of Antarctic Marine Life' for consideration as an IPY activity. Success of the IPY depends fundamentally on excellent research and support and on a high level of international coordination, derived from the talents and energy of groups such as yours.

At its November meeting in Geneva the Joint Committee completed evaluations of all proposals received up to 30 September 2005 for scientific or educational significance, for consistency with the IPY themes, regions and time frames, for evidence of international collaboration, and for development of effective management plans covering communications, operations, data, and education and outreach. In addition, the Joint Committee examined each proposal for evidence of involvement by scientists from nonpolar nations, for indications of interdisciplinarity within the proposal and of linkages to other IPY activities, and for evidence that activities proposed would contribute to an IPY legacy. The Joint Committee evaluated more than 200 coordination proposals and expects to evaluate one additional set of coordination proposals submitted by 31 January 2006.

The Joint Committee considers that your proposal as submitted includes very strong scientific, education and outreach components and demonstrates a high level of adherence to IPY themes and goals. The Joint Committee therefore endorses your proposal as a prominent and valued part of the IPY program. The Joint Committee intends that these endorsements will provide assistance as IPY participants seek funding for the work proposed.

The IPY International Programme Office will shortly provide additional guidance for project coordinators and steering groups, including description of initial IPY information management processes. As part of that information exchange, we will expect project coordinators to keep the IPO informed about funding status of their projects and about substantial changes from the projects as proposed. In all cases, we wish you enormous success with your component of the IPY.

Yours sincerely

Co-chairs of Joint Committee

A handwritten signature in black ink, appearing to read 'Ian Allison'.

Ian Allison

A handwritten signature in black ink, appearing to read 'Michel Béland'.

Michel Béland

cc: Dr Victoria Wadley

## ANTARCTIC AND SUB-ANTARCTIC PERMAFROST, PERIGLACIAL AND SOIL ENVIRONMENTS



30 November 2005

Dear Dr Jan Boelhouwers

On behalf of the ICSU/WMO Joint Committee for the International Polar Year 2007-2008 we wish to thank you for submitting a proposal entitled 'Antarctic and sub-Antarctic Permafrost, Periglacial and Soil Environments' for consideration as an IPY activity. Success of the IPY depends fundamentally on excellent research and support and on a high level of international coordination, derived from the talents and energy of groups such as yours.

At its November meeting in Geneva the Joint Committee completed evaluations of all proposals received up to 30 September 2005 for scientific or educational significance, for consistency with the IPY themes, regions and time frames, for evidence of international collaboration, and for development of effective management plans covering communications, operations, data, and education and outreach. In addition, the Joint Committee examined each proposal for evidence of involvement by scientists from non-polar nations, for indications of interdisciplinarity within the proposal and of linkages to other IPY activities, and for evidence that activities proposed would contribute to an IPY legacy. The Joint Committee evaluated more than 200 coordination proposals and expects to evaluate one additional set of coordination proposals submitted by 31 January 2006.

The Joint Committee considers that your proposal as submitted includes very strong scientific, education and outreach components and demonstrates a high level of adherence to IPY themes and goals. The Joint Committee therefore endorses your proposal as a prominent and valued part of the IPY program. The Joint Committee intends that these endorsements will provide assistance as IPY participants seek funding for the work proposed.

The IPY International Programme Office will shortly provide additional guidance for project coordinators and steering groups, including description of initial IPY information management processes. As part of that information exchange, we will expect project coordinators to keep the IPO informed about funding status of their projects and about substantial changes from the projects as proposed. In all cases, we wish you enormous success with your component of the IPY.

Yours sincerely

Co-chairs of Joint Committee

Ian Allison

Michel Béland

cc: Dr Megan Balks

**PERMAFROST OBSERVATORY PROJECT: A CONTRIBUTION TO THE THERMAL STATE OF PERMAFROST (TSP-125)**



30 November 2005

Dear Dr Jerry Brown

On behalf of the ICSU/WMO Joint Committee for the International Polar Year 2007-2008 we wish to thank you for submitting a proposal entitled 'Permafrost Observatory Project: A Contribution to the Thermal State of Permafrost (TSP-125)' for consideration as an IPY activity. Success of the IPY depends fundamentally on excellent research and support and on a high level of international coordination, derived from the talents and energy of groups such as yours.

At its November meeting in Geneva the Joint Committee completed evaluations of all proposals received up to 30 September 2005 for scientific or educational significance, for consistency with the IPY themes, regions and time frames, for evidence of international collaboration, and for development of effective management plans covering communications, operations, data, and education and outreach. In addition, the Joint Committee examined each proposal for evidence of involvement by scientists from non-polar nations, for indications of interdisciplinarity within the proposal and of linkages to other IPY activities, and for evidence that activities proposed would contribute to an IPY legacy. The Joint Committee evaluated more than 200 coordination proposals and expects to evaluate one additional set of coordination proposals submitted by 31 January 2006.

The Joint Committee considers that your proposal as submitted includes very strong scientific, education and outreach components and demonstrates a high level of adherence to IPY themes and goals. The Joint Committee therefore endorses your proposal as a prominent and valued part of the IPY program. The Joint Committee intends that these endorsements will provide assistance as IPY participants seek funding for the work proposed.

The IPY International Programme Office will shortly provide additional guidance for project coordinators and steering groups, including description of initial IPY information management processes. As part of that information exchange, we will expect project coordinators to keep the IPO informed about funding status of their projects and about substantial changes from the projects as proposed. In all cases, we wish you enormous success with your component of the IPY.

Yours sincerely

Co-chairs of Joint Committee

Ian Allison

Michel Béland

cc: Dr Hanne Christiansen

**INTERNATIONAL POLAR YEAR YOUTH STEERING COMMITTEE (IPY YSC)**



30 November 2005

Dear Ms Amber Church

On behalf of the ICSU/WMO Joint Committee for the International Polar Year 2007-2008 we wish to thank you for submitting a proposal entitled 'International Polar Year Youth Steering Committee (IPY YSC)' for consideration as an IPY activity. Success of the IPY depends fundamentally on excellent research and support and on a high level of international coordination, derived from the talents and energy of groups such as yours.

At its November meeting in Geneva the Joint Committee completed evaluations of all proposals received up to 30 September 2005 for scientific or educational significance, for consistency with the IPY themes, regions and time frames, for evidence of international collaboration, and for development of effective management plans covering communications, operations, data, and education and outreach. In addition, the Joint Committee examined each proposal for evidence of involvement by scientists from non-polar nations, for indications of interdisciplinarity within the proposal and of linkages to other IPY activities, and for evidence that activities proposed would contribute to an IPY legacy. The Joint Committee evaluated more than 200 coordination proposals and expects to evaluate one additional set of coordination proposals submitted by 31 January 2006.

The Joint Committee considers that your proposal as submitted includes very strong scientific, education and outreach components and demonstrates a high level of adherence to IPY themes and goals. The Joint Committee therefore endorses your proposal as a prominent and valued part of the IPY program. The Joint Committee intends that these endorsements will provide assistance as IPY participants seek funding for the work proposed.

The IPY International Programme Office will shortly provide additional guidance for project coordinators and steering groups, including description of initial IPY information management processes. As part of that information exchange, we will expect project coordinators to keep the IPO informed about funding status of their projects and about substantial changes from the projects as proposed. In all cases, we wish you enormous success with your component of the IPY.

Yours sincerely

Co-chairs of Joint Committee

Ian Allison

Michel Béland

cc: Mr Tyler Kuhn







## **G. LIST OF ACRONYMS USED IN THIS DOCUMENT**

ANSMET – Antarctic search for meteorites

ANTPAS – Antarctic and Sub-Antarctic Permafrost, Soils and Periglacial Environments

BAS – British Antarctic Survey

CAML – Census of Antarctic Marine Life

CALM-S –Circum-polar Active Layer Monitoring network to the Antarctic region

CCMAR – Centre of Marine Sciences, University of Algarve

ECMRWF – European Centre for Medium-Range Weather Forecasts

EPB – European Polar Board

FACC-FCT – Support Fund to the scientific community of the Portuguese Science Foundation

FCT – Portuguese Science Foundation

GASCOD – Gas Analyzer Spectrometer Correlating Optical Differences

GOME – Global Ozone Monitoring Experiment

GTN-P - WMO/GCOS – Global Terrestrial Network for Permafrost, part of the World Meteorological Organization/Global Climate Observing System

ICED -IPY – Integrated analyses of circumpolar Climate interactions and Ecosystem Dynamics in the Southern Ocean-International Polar Year

ICSU – International Council for Science

IPY – International Polar Year

NASA – National Aeronautics and Space Agency

NSF – National Science Foundation

OMI – Ozone Monitoring Instrument

PYRN – Permafrost Young Researchers Network

TSP – Permafrost Observatory Project

SCAR – Scientific Committee for Antarctic Research

SCIAMACHY– Scanning Imaging Absorption Spectrometer for Atmospheric Chartography

SPUIAGG – Portuguese Section of the International Union of Astronomy, Geodesy and Geophysics

WCRP/WMO – World Climate Research Programme/World Meteorological Organization

WMO – World Meteorological Organization

UNESCO-OSC – Open Science Conference of the United Nations Educational, Scientific and Cultural Organization  
YSC – Youth Steering Committee for the International Polar Year

SPATRAM – Spectrometer for Atmospheric Tracers Monitoring



**Centro de  
Estudos Geográficos**  
UNIVERSIDADE DE LISBOA

**FCT** Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

