



9th PORTUGUESE POLAR SCIENCES CONFERENCE

UNIVERSIDADE DA BEIRA INTERIOR - COVILHÃ, PORTUGAL

6 - 7 NOVEMBER 2017

ABSTRACT BOOK & PROGRAM

Organização
 UNIVERSIDADE
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 SEGAL

Apoio



 Collaboratory
For Geosciences

 IGOT Instituto de Geografia
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UNIVERSIDADE DE LISBOA



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CONTACTS

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SUPPORT



ABOUT

The Portuguese Conference on Polar Sciences is the forum where the most recent advances in Portuguese polar projects are presented. This annual conference seeks to create a highly interactive environment and lively debate among participants on polar issues, and to help delineate new strategies for national and international cooperation. The conferences are targeted to the national polar community conducting research in the polar regions, and also to students, teachers, and to the wider community interested in the polar regions and their global importance.

The Portuguese Polar Program (PROPOLAR) and the Portuguese Foundation for Science and Technology (FCT) support these annual events by promoting the participation of partners from other countries with whom Portugal has been strengthening scientific and logistic collaborations.

This year, the 9th Portuguese Polar Sciences Conference includes the presentation of 27 national communications on a wide range of scientific research topics, with an education and outreach dimension, all related to polar regions - the Arctic and the Antarctica.

Aimed at the young researchers, the Portuguese Association of Polar Early Career Scientists (APECS Portugal) joins this conference by carrying out the 8th APECS Portugal Workshop entitled "Science Pathways"

The event also includes the participation of two international invitees, Rodolfo Andrés Sánchez, Director of the Argentine Antarctic Institute (IAA), and Stephanie Winnard, International Marine Project Manager at the Royal Society for the Protection of Birds (RSPB).

The 9th Portuguese Polar Sciences Conference is held at the University of Beira Interior (Covilhã), embedded in a verdurous landscape, and located at the bottom of the highest Portuguese mountain range, Serra da Estrela. Founded in 1986, the University of Beira Interior hosts more than 6 thousand students spread across five faculties – Engineering, Sciences, Health Sciences, Arts and Letters, Social and Human Sciences – with laboratories and research structures to support the teaching process and strong links to society and to the business world.

The local organization is coordinated by SEGAL (Space & Earth Geodetic Analysis Laboratory), which is a scientific partnership between UBI and Instituto D. Luiz (IDL), the major Research Unit of Geosciences in Portugal, located at UBI. SEGAL is focused on the use of high accurate techniques for geo-referencing.

We would like to welcome you to the 9th Portuguese Polar Sciences Conference, at the University of Beira Interior, Covilhã, and emphasize that we are very much honored to receive the multidisciplinary national scientific community that has been deeply dedicated to the research, education, and dissemination of the Polar Sciences.

The Organizing Committee

Rui Fernandes, Lílian Chein Féres, Ana Salomé David, Teresa Cabrita, Hugo Valentim.

INVITED SPEAKERS



Rodolfo Andrés Sánchez

Rodolfo Andrés Sánchez es Licenciado en Ciencias Geológicas, graduado en la Universidad de Buenos Aires con Diploma de Honor, y Magíster en Políticas Públicas de la Universidad Torcuato Di Tella.

Cursó además estudios de posgrado en la República Federal de Alemania y en la República Federativa de Brasil. Para el desarrollo de estos estudios obtuvo becas del Servicio de Intercambio Cultural de la República Federal de Alemania, de la Universidad de las Naciones Unidas, del Instituto Nacional de la

Administración Pública (INAP, Secretaria de Gabinete y Gestión Pública) y del Fondo Permanente de Capacitación y Recalificación Laboral (FOPECAP - Jefatura de Gabinete de Ministros de la República Argentina).

Desde el año 2005 hasta 2012 se desempeñó como jefe del Programa de Gestión Ambiental y Turismo de la Dirección Nacional del Antártico (DNA, Cancillería Argentina), para la cual comenzó a trabajar en 1990, como investigador asistente del Instituto Antártico Argentino (IAA). Desempeñó también funciones en la Dirección General de Asuntos Ambientales (DIGMA, 2012-2016) y en la entonces Dirección General de Asuntos Antárticos (DIGEA, 2016) del Ministerio de Relaciones Exteriores y Culto. Fue designado Director del Instituto Antártico Argentino en febrero de 2017. Posee amplia experiencia como delegado argentino en reuniones internacionales, en las que participa desde 1997, incluyendo los principales foros de negociación antártica, así como también en foros multilaterales ligados a temas de conservación. En el ámbito antártico, ha sido coordinador de grupos y talleres internacionales de trabajo, vinculados a la temática ambiental y al turismo, cuya labor ha dado lugar, por ejemplo, a la ampliación del marco normativo antártico internacional. También ha formado parte de programas de cooperación internacional, tanto a nivel bilateral como multilateral, en temas de su competencia. Entre 2016 y 2017 fue sido designado observador de la República Argentina para el desarrollo de actividades de inspección previstas en el Artículo VII del Tratado Antártico. Como parte de la DNA-IAA ha participado en 14 campañas de verano en distintas zonas de la Antártida.

Ha coordinado y dictado numerosos cursos de capacitación antártica en el marco del Programa Antártico Argentino, del Sistema Nacional de Capacitación, dependiente del Instituto Nacional de la Administración Pública (INAP) y de la Universidad Nacional de Tierra del Fuego, donde fue nombrado Docente Visitante Ad Honorem (2014-2015). Ha tenido también experiencia docente en niveles terciario y universitario.

Ha publicado numerosos artículos, incluyendo contribuciones a libros, en publicaciones nacionales e internacionales sobre asuntos antárticos.

En 2007 publicó *Antártida. Introducción a un continente remoto* (Editorial Albatros), libro de divulgación que aborda los aspectos más relevantes asociados al continente antártico. Ha realizado asimismo actividades de referato de artículos científicos sobre temas antárticos para publicaciones internacionales.

INVITED SPEAKERS



Stephanie Winnard

Stephanie Winnard is a conservationist with a particular interest in seabirds and marine biology. She worked for the British Antarctic Survey on South Georgia for 2.5 years at two research stations, monitoring bird and mammal species, in particular four albatross species, gentoo penguins and Antarctic fur seals.

Her current role is with the Royal Society for the Protection of Birds (RSPB) as project officer for the Albatross Task Force.

Having spent so long monitoring albatross populations and witnessing first hand their decline, Stephanie Winnard is passionate in her role working to directly mitigate their declines, as she describes herself.

Previously, she was a warranted Environment Officer with broad experience in environmental management, including in the waste, water and agricultural industries. She also holds specialities in pollution incident management, auditing, water quality, enforcement, water resources and project management.

CONFERENCE PROGRAM

6th NOVEMBER 2017

15:00 - 16:30 **Registration desk**

16:00 - 16:30 **Coffee Break**

16:30 - 16:50 **Opening Session**

OPEN SESSION: **Opportunities and challenges on/of Polar Research : Invited Talks**

Moderators: Rui Fernandes, UBI and José Xavier, MARE-UC

16:50 - 17:10 The Portuguese Polar Program - PROPOLAR
Teresa Cabrita, PROPOLAR

17:10 - 17:30 The FCT Polar Office - Portuguese Foundation for Science and
Technology
Germana Santos, FCT

17:30 - 17:50 The Argentine Antarctic Institute (IAA)
Rodolfo Sánchez, IAA

17:50 - 18:10 The APECS Portugal - Association of Polar Early Career Scientists
José Seco and José Queirós

18:10 - 19:00 Open Forum

20:00 - ____ **Dinner**

7th NOVEMBER 2017

08:30 - 09:00 **Registration desk & Poster Fixing**

08:50 - 09:00 **Opening Sessions**

SESSION 1 : **Polar atmosphere characterization and predictability**

Moderators: Victoria Cachorro, Un.Valladolid and Renan Zocca, UBI

09:00 - 09:20 In situ characterization of aerosol particles at the ALOMAR station,
Andenes, Norway
Sandra Mogo, UBI

09:20 - 09:40 Precipitation predictability, properties and impacts during the Antarctic
Circumnavigation Expedition
Irina Gorodetskaya, CESAM-UA

SESSION 2 : **Bio-Responses on extreme conditions (part 1)**

Moderators: João Canário, CQE/IST-ULISBOA and José Queirós, MARE-UC

09:40 - 10:00 Ecotoxicity of sporadic permafrost soils from the Canadian Subarctic
Joana Pereira, CESAM-UA

10:00 - 10:20 Trace metals in Antarctic Krill *Euphausia superba*: Does sex matter?
José Seco, UA

10:20 - 11:00 **Coffee Break & Poster Discussion**

SESSION 2 : **Bio-Responses on extreme conditions (part 2)**

Moderators: Pedro Guerreiro, CCMAR and Jorge Pereira, MARE-UC

11:00 - 11:20 Response of Antarctic desert microbial communities to extreme
environmental disturbance
Catarina Magalhães, CIIMAR

11:20 - 11:40 The Arctic microbial communities during the winter-spring transition
north of Svalbard: diversity and nitrogen cycling functional genes
António Sousa, CIIMAR

11:40 - 12:00 Determining prey distribution from stomach-contents of GIS-tracked
high-predators of the Southern Ocean
José Xavier, MARE-UC

12:00 - 12:20 Expression of stress and osmotic related genes in the Antarctic fish *Notothenia rossii* upon thermal and haline challenges
Sandra Silva, UALG

12:20 - 14:00 **Lunch**

SESSION 3 : **Human engagement in Polar Regions**

Moderators: José Xavier, MARE-UC and Joana Pereira, CESAM-UA

14:00 - 14:20 An expanded perspective on creativity - The art of science communication
Miguel Petchkovsky, ABVC

14:20 - 14:40 Antarctic Research & Education Program: Bulgarian Base - Campaign 2017-2018
Nuno Pereira, IPB

14:40 - 15:00 What Drives Effective Teamwork in Antarctica Science Teams? A Qualitative Study
Pedro Quinteiro, ISPA-Inst.Universitário

15:00 - 16:00 **Coffee Break & Poster Discussion**

SESSION 4 : **Monitoring polar physical environments**

Moderators: Pedro Almeida, UBI and Pedro Freitas, IGOT-ULISBOA

16:00 - 16:20 Ocean tide loading at the Primavera Station: First results
Machiel Bos, UBI/IDL

16:20 - 16:40 Multiscale image integration for vegetation mapping in Maritime Antarctica
Pedro Pina, CERENA/IST

16:40 - 17:00 Snow cover characterization in Maritime Antarctica through Radar remote sensing imagery and observational data
Javier Jimenez, CEG/IGOT-ULISBOA

17:00 - 17:20 The PERMANTAR network of permafrost observatories in the Western Antarctic Peninsula 10 years after the IPY
Gonçalo Vieira, CEG/IGOT-ULISBOA

17:20 - 17:30 Closing Ceremony
Rui Fernandes, UBI and Gonçalo Vieira, CEG/IGOT-ULISBOA

ABSTRACTS

SESSION 1 : Polar atmosphere characterization and predictability

ORAL COMMUNICATIONS

- In situ characterization of aerosol particles at the ALOMAR station, Andenes, Norway [Sandra Mogo, UBI]
- Precipitation predictability, properties and impacts during the Antarctic Circumnavigation Expedition [Irina Gorodetskaya, CESAM-UA]

POSTER COMMUNICATIONS

- Starting long-term aerosol observations in the Arctic Ny-Ålesund base (Svalbard, 79°N) by a sun-sky-lunar photometer [Victoria Cachorro, Un Valladolid]

SESSION 2 : Bio-Responses on extreme conditions

ORAL COMMUNICATIONS

- Ecotoxicity of sporadic permafrost soils from the Canadian Subarctic [Joana Pereira, CESAM-UA]
- Trace metals in Antarctic Krill *Euphausia superba*: Does sex matter? [José Seco, UA]
- Response of Antarctic desert microbial communities to extreme environmental disturbance, [Catarina Magalhães, CIIMAR]
- The Arctic microbial communities during the winter-spring transition north of Svalbard: diversity and nitrogen cycling functional genes, [António Sousa, CIIMAR]
- Determining prey distribution from stomach-contents of GIS-tracked high-predators of the Southern Ocean, [José Xavier, MARE-UC]
- Expression of stress and osmotic related genes in the Antarctic fish *Notothenia rossii* upon thermal and haline challenges, [Sandra Silva, UALG]

POSTER COMMUNICATIONS

- Modulation of iron-related immune genes and oxidative stress genes in the Antarctic Bullhead, *Notothenia coriiceps* challenged with a bacterial endotoxin [Pedro M Guerreiro, CCMAR]
- Expression of Heat Shock Protein and Metabolic genes in the sub-Antarctic fish *Eleginops maclovinus* exposed to different thermal regimes [Carolina Vargas-Lago, ICML-Chile]
- Evolution of the immune system in antarctic notothenioids – a first approach [Cármén SV Sousa, CCMAR]
- Evolution of the immune system in antarctic nototFeeding ecology of Antarctic fur seals under environmental change (2009-2013): can their Antarctic squids prey be an environmental indicator? [José Abreu, MARE-UC]
- The devil is in detail: small-scale sexual segregation despite large-scale spatial overlap in the wandering albatross [Jorge Pereira, MARE-UC]

- Mysteries of the Deep: Unrevealing the life of the Giant Antarctic Octopus *Megaleledone Setebos*, [José P. Queirós, MARE-UC]
- Tissue-specific isotopic discrimination ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) in wild penguins (adults and chicks) feeding on Antarctic krill *Euphausia superba*, [Filipe Ceia, MARE-UC]

SESSION 3 : Human engagement in Polar Regions

ORAL COMMUNICATIONS

- An expanded perspective on creativity - The art of science communication, [Miguel Petchkovsky, ABVC]
- Antarctic Research & Education Program: Bulgarian Base - Campaign 2017-2018, [Nuno Pereira, IPB]
- What Drives Effective Teamwork in Antarctica Science Teams? A Qualitative Study, [Pedro Quinteiro, ISPA-Inst.Universitário]

SESSION 4 : Monitoring polar physical environments

ORAL COMMUNICATIONS

- Ocean tide loading at the Primavera Station: First results, [Machiel Bos, UBI/IDL]
- Multiscale image integration for vegetation mapping in Maritime Antarctica, [Pedro Pina, CERENA/IST]
- Snow cover characterization in Maritime Antarctica through Radar remote sensing imagery and observational data, [Javier Jimenez, CEG/IGOT-ULISBOA]
- The PERMANTAR network of permafrost observatories in the Western Antarctic Peninsula 10 years after the IPY, [Gonçalo Vieira, CEG/IGOT-ULISBOA]

POSTER COMMUNICATIONS

- Volcanic rocks in Fildes Peninsula: textural, mineral and chemical characteristics, [Pedro Ferreira, LNEG]
- Remote sensing to evaluate permafrost degradation and terrestrial ecosystem changes in the Canadian Sub-Arctic – a multiscale approach (project Shrubifly), [Pedro Freitas, CEG/IGOT-ULISBOA]
- Snow cover influence in the active layer and permafrost thermal regime. Crater Lake CALM-S site (Deception Island, Antarctica), [Miguel Ramos, Universidad de Alcalá]
- Present-Day Tectonics of Antarctica inferred from GPS velocities, [RMS Fernandes, UBI]

SESSION 1 : Polar atmosphere characterization and predictability
ORAL COMMUNICATIONS

**In situ characterization of aerosol particles at the ALOMAR station,
Andenes, Norway**

Sandra Mogo (1), Edgar Conceição (1), Renan Zocca(1), Ana Barroso (1),
Rafhael Monteiro (1), Victoria Cachorro (2)

(1) University of Beira Interior]

(2) University of Valladolid

This work presents in situ data from aerosol measurements that took place at ALOMAR, the Arctic Lidar Observatory for Middle Atmosphere Research, located in the Andøya island close to the town of Andenes (69°16'N, 16°00'E, 380 m a.s.l.), ~300 km north of the Arctic Circle. The main goal of the campaigns is the characterization of individual aerosol particles to know their morphology, size distribution, mass and chemical composition.

The technique used is the collection of aerosol particles on polycarbonate filters for posterior analysis in the laboratory. The system is composed by an inlet, an in-line filter holder, a vacuum pump and a flow meter. The filters are weighed before and after collection for determination of the amount of particulate matter. After weighed, the filters are prepared for observation on a scanning electron microscope (SEM) or on a transmission electron microscope (TEM). Both electron microscopes allow to see the size and morphology of the individual particles. Aerosols on the size range 0.5-10 µm will be analyzed using the SEM and aerosols <0.5 µm will be analyzed using the TEM. A RONTEC energy dispersive x-ray system allows to obtain the information about elemental composition of the particles.

This work is supported by Fundação para a Ciência e Tecnologia (FCT) through the Portuguese Polar Program (ProPolar), Projecto POLARUBI.

SESSION 1 : Polar atmosphere characterization and predictability
ORAL COMMUNICATIONS

Precipitation predictability, properties and impacts during the Antarctic Circumnavigation Expedition

Irina Gorodetskaya (1), Annick Terpstra (2), Claudio Duran (3), Iris Turnherr (4),
Katherine Leonard (5,6), Alexis Berne (5), Christophe Genthon (3), Heini Wernli (4),
F. Martin Ralph (7)

(1) University of Aveiro, Centre for Environmental and Marine Sciences, Portugal

(2) University of Bergen, Norway

(3) Laboratory of Glaciology and Geophysical Environment, Grenoble, France

(4) ETH Zurich, Switzerland

(5) EPFL, Lausanne, Switzerland

(6) University of Boulder, Colorado, USA

(7) Scripps Institution of Oceanography, UC San Diego, California, USA

The global hydrological cycle has intensified over the last half a century resulting in increased precipitation at high latitudes and decreased precipitation in the subtropics. This has been suggested by models and confirmed by both land records and satellite records, and ocean salinity changes. While increased precipitation over the Southern Ocean (SO) can be responsible for its freshening, increased snowfall over the ice sheet leads to larger snow accumulation with consequence for the ice sheet total mass balance. In this project, we use unique measurements acquired during the Antarctic Circumnavigation Expedition (ACE) in order to gain better insight in SO/Antarctic precipitation properties and mechanisms behind. In particular, we analyze an intense precipitation event that affected the region of Dumont D'Urville (DDU) station and Mertz glacier on 8-10 February 2017. This case is compared to a weaker precipitation event observed a week earlier affecting the same region and measured from the ACE vessel in the vicinity of the Mertz glacier. Both events were forecasted and closely monitored using the ECMWF operational forecast and Polar WRF/AMPS and we explore the predictability of both events by these models. Both models show a jump in the intense precipitation case predictability skill at 2-day forecast lead-time. Predictability of the integrated water vapor content and transport shows high skill about a day earlier. Changes in the precipitation forecast have drastic consequences shifting from the majority of precipitation over the ocean to intense precipitation over land. Similarly to the intense precipitation case, forecast for the weaker precipitation event changed strongly depending on the lead-time affecting the ocean-land partitioning of precipitation. Unique measurements available at the DDU station and from ACE give an opportunity to better understand precipitation properties and the governing mechanisms and improve the forecast in the future.

SESSION 1 : Polar atmosphere characterization and predictability
POSTER COMMUNICATIONS

Starting long-term aerosol observations in the Arctic Ny-Ålesund base (Svalbard, 79°N) by a sun-sky-lunar photometer

Victoria Cachorro (1), David Mateos (1), Cristian Velasco-Merino (1), Sandra Mogo (2),
Christoph Ritter (3), Carlos Toledano (1), Roland Neuber (3), Ramiro González (1),
Marcos Herreras (1), Abel Calle (1), Ángel de Frutos (1)

(1) University of Valladolid

(2) University of Beira Interior

(3) Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research

The Arctic is expected to be very sensitive to global changes in climate; however, there is a lack of knowledge about the spatio-temporal distribution of Polar atmospheric aerosols. The Atmospheric Optics Group of the University of Valladolid and the Alfred Wegener Institute (AWI) have started a joint research project which included the installation of a new generation Cimel sun-sky- lunar radiometer (CE318-T) at Ny-Ålesund. This kind of instrument, in the framework of the worldwide AERosol ROBotic NETwork (AERONET), can provide aerosol properties during summer (sun) and winter (moon) time. This instrument also follows all the standardized AERONET daylight observations and gives a large set of aerosol properties that can be combined with lidar and other collocated instruments using novel algorithms such as GRASP (Generalized Retrieval of Atmosphere and Surface Properties) open source code.

We present here the preliminary results of the starting of CIMEL optical and microphysical observations in the French and German joint facility AWIPEV in Ny-Ålesund. The instrument is operational since June 1st, 2017. Hence, more than 1,500 raw observations are available. The existing database at the AWIPEV site will allow comparison with the long-term instrumentation already installed on the site. For instance, the aerosol optical depth time series from a Schulz sun photometer (operating since 1991) can be linked to the CIMEL sun photometer series. A first comparison of the two collocated instruments using the first week of data exhibits a notable agreement between both instruments.

This work was supported by: project POLARMOON (CTM2015-66742- R) and IJCI-2014- 19477 and PTA2014-09522- I grants of Spanish Government (MINECO), EU-H2020 under Grant Agreement Nr. 654109 [ACTRIS 2]; VA100U14 of Junta de Castilla y León; and RIS-ID 10745 project. Thanks to station crew: W. Ruhe, P. Kupiszewski, B. Laurent, and R. Merceron.

SESSION 2 : Bio-Responses on extreme conditions
ORAL COMMUNICATIONS**Ecotoxicity of sporadic permafrost soils from the Canadian Subarctic**

Joana Luísa Pereira (1), Libânia Queirós (1), Tânia Vida (1), Patrícia Pereira (1), Mário Pacheco (1),
Fernando Gonçalves (1), Warwick F. Vincent (2), Gonçalo Vieira (3), João Canário (4)

(1) CESAM, Department of Biology, University of Aveiro

(2) Centre d'Études Nordiques, Université Laval, Québec, Canada

(3) CEG – Centro de Estudos Geográficos, IGOT, Universidade de Lisboa

(4) CEQ - Centro de Química Estrutural, Instituto Superior Técnico, Universidade de Lisboa

Permafrost degradation is a complex process involving bouncing-back interactions with climate change, hydrology and geomorphology. Depending on the biogeochemical processes involved, bioavailability of trace elements following permafrost thawing can constrain the establishment of biological communities. Here we aimed at complementing previous physic-chemical characterisation of degraded permafrost with a bioassay-based ecotoxicological assessment, towards a better insight on the effects of the bioavailable fraction of its trace elements (TE) contamination.

Soils were collected near permafrost thaw lakes in northern Quebec: two close to Whapmagoostui-Kuujuarapik (W-K), at Sasapimakwananisikw and Kwakwatanikapistikw River valleys (SAS and KWAK, respectively), and one at Sheldrake River valley (BGR) near Umiujaq. A reference, non-permafrost soil was collected near W-K. Soils were sieved, dried and preserved for further analyses. Soil elutriates were prepared at 4 °C for use as the matrix in ecotoxicological tests with bacteria, microalgae, macrophytes and cladoceran; a benthic ostracod was directly tested against each soil.

BGR was the poorest soil in organic matter content. Al, Cr, Cu, Ni, Pb and Zn concentrations in all sites were within the tens ng/Kg range or lower, with BGR tending to bear slightly higher levels while showing the lowest sulphur content. Cladocerans were not sensitive to any elutriate, but elutriates from KWAK and SAS showed much higher toxicity than BGR to bacteria, microalgae and macrophytes. The response by ostracods in direct-contact tests with the bulk soils was consistent with this pattern. By melting such an ecotoxicological figure with the physic-chemical analysis of the soils suggests that sulphur bioavailability (likely higher in KWAK and SAS compared to BGR for similar levels of the other TE) is a major driver of putative effects in the biota establishing in degraded permafrost thermokarst soils.

SESSION 2 : Bio-Responses on extreme conditions
ORAL COMMUNICATIONS**Trace metals in Antarctic Krill *Euphausia superba*: Does sex matter?**

José Seco (1,2), Pedro Coelho (1), José Xavier (3), Geraint Tarling (4), Miguel Pardal (4),
Paco Bustamante (5), Andrew Brierley (2), Maria Pereira (1)

- (1) University of Aveiro
- (2) University of St. Andrews
- (3) University of Coimbra
- (4) British Antarctic Survey
- (5) Université La Rochelle

Although Antarctica is seen as the remote and pristine continent, the levels of contaminants in the Southern Ocean have increased significantly. With this study we aim to better understand the concentration of different trace elements (Hg, As, Cd, Co, Cr, Cu, Fe, Ni, Pb, Se, V, Zn) in one of the most important marine organisms in the Southern Ocean, the Antarctic Krill (*Euphausia superba*). Antarctic Krill is considered to be an important trophic link between primary producers and top predators, but accumulation processes of trace elements in krill and the propagation of these elements through the Antarctic food web are still poorly understood.

Samples of Antarctic krill were collected during the austral summer of 2016 (January-February) around the South Orkney Islands (60°58'S, 045°50' W), in one important Antarctic krill fishing area. The samples were collected using two Rectangular Mid-water Trawls (RMT25 and RMT8). A total of 523 individuals were collected and analysed (182 Males, 175 Females and 166 Sub-adults/juveniles) from 9 different stations (5 on -shelf and 4 off-shelf).

This presentation will specifically evaluate the effect of sex and maturity on trace element content in Antarctic krill in order to test if differences in accumulation between sexes can be explained by the fact that females can use egg-laying as an elimination route for some trace metals, thus leading to lower concentrations than found in males. Sub-adults are expected to have lower concentrations levels as they had less life time to bio-accumulate these elements. Establishing the base levels of trace elements in Antarctic krill is crucial to understanding the pathways of trace metals in Antarctic ecosystems.

SESSION 2 : Bio-Responses on extreme conditions
ORAL COMMUNICATIONS**Response of Antarctic desert microbial communities to extreme environmental disturbance**

Catarina Magalhães (1), Charles Lee (2), Maria Monteiro (2), Luis Torgo (3), Craig Cary (2)

(1) CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, University of Porto, Porto, Portugal

(2) International Centre for Terrestrial Antarctic Research, University of Waikato, Hamilton, New Zealand

(3) LIAAD-INESC Porto LA, University of Porto, Porto, Portugal

In this study, we design an experiment to test how the same disturbance applied to different microbial communities living in extreme habitat conditions drive diversity and functional relationships. Given the fact that water and availability of Carbon (C) and Nitrogen (N) are major limiting factors to the existence of life in Antarctica Dry Valleys, we apply to Miers and Beacon soils a drastic disturbance by adding water, N and C in controlled time series experiments. We hypothesized that the microbial communities native to the two Dry Valleys initially be unique, but would converge on a microbial community with similar structure and function, as a result of the same disturbance applied. Although, our results demonstrated that when communities from different Antarctica Dry Valleys (Miers and Beacon) are subject to the same experimental disturbance the community turnover, at the overall community and rare biosphere levels (for 16S rDNA and 16S rRNA data sets), diverge with time, even though both communities were subject to the same highly selective pressure. Results from this study reinforce the idea that microbial abundance and diversity distributions, including the rare biosphere, varies greatly within the same ecosystem (Antarctica Dry Valleys).

Interestingly, the drastic divergence in community composition at both 16S rDNA and 16S rRNA levels was not clearly reflected in function, since our results suggested a conversion in the predicted functional capabilities, based on PICRUSt analysis of 16S rRNA transcripts, in both Miers and Beacon communities at the major metabolic pathways as well as at the level of predicted KOs involved in specific metabolisms (an example for N metabolism is given). Indeed our findings strongly support the occurrence of microbial functional persistence and resilience. This finding will represent an actual observation of the importance of microbial seed banks in maintaining the diverse functional capabilities of a microbial community.

SESSION 2 : Bio-Responses on extreme conditions
ORAL COMMUNICATIONS**The Arctic microbial communities during the winter-spring transition north of Svalbard: diversity and nitrogen cycling functional genes**

António Gaspar Gonçalves de Sousa (1,2), Maria Paola Tomasino (1), Pedro Duarte(3),
Mar Fernández-Méndez (3), Philipp Assmy (3), Hugo Ribeiro (1), Jaroslaw Surkont (4),
Ricardo Leite (4), José Pereira Leal (4), Luís Torgo (5, 6), Catarina Magalhães (1, 2)

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One of the most prominent manifestations of climate change is the reduction of the summer sea-ice extent and a shift from thicker, perennial multiyear ice towards thinner, first-year ice in the Arctic Ocean. Microbial communities are a key component of the ecosystem when evaluating the ecological impact of the changing ice regime, as they constitute the basis of the marine food web and biogeochemical cycles. During the Norwegian young sea ICE expedition (N-ICE2015), that took place in drifting pack ice north of Svalbard between January-June 2015, seawater was collected at 5, 20 or 50, and 250 m depth in 9th March, 27th April and 16th June, together with environmental data. The SSU rRNA amplicon and environmental DNA were sequenced to study the Arctic's microbiome structure and key Nitrogen-cycling functions through the winter-spring transition. Results show that Alpha-(30.7%) and Gammaproteobacteria (28.6%) are the most abundant across prokaryotic libraries and the most diverse. Surprisingly the high number and relative abundance of hydrocarbonoclastic bacteria, e.g. *Marinobacter* (6.3%) and *Alcanivorax* (54.3%), supports evidence of an Arctic's unexpected biosphere, prone to degrade petroleum-derived hydrocarbons and perhaps linked to natural oil seepage. Besides, nitrifiers are more represented in the subsurface waters underneath of winter-early spring pack ice than late spring, suggesting nitrifying activity underneath of winter pack ice. Urease and AMO encoding genes are positively correlated with total dissolved nitrogen (urea included) suggesting the coupling of ureolysis and ammonia oxidation. Urease encoding gene increases along depth meaning that distinct species of thaumarchaeal ammonia oxidizers found at different depths in the water column have different potential to carry out ureolysis. The microbial and metagenomic libraries from N-ICE2015 provides comprehensive new knowledge about the microbiota and N-cycling communities and pathways in the Arctic Ocean.

SESSION 2 : Bio-Responses on extreme conditions
ORAL COMMUNICATIONS**Determining prey distribution from stomach-contents of GIS-tracked high-predators of the Southern Ocean**

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The distribution of many cephalopod, crustacean and fish species in the Southern Ocean, and adjacent waters, is poorly known, particularly during times of the year when research surveys are rare. To address this challenge put forward recently at SCAR Horizon Scan (Xavier et al. 2016), and following a previous study addressing this issue (Xavier et al. 2006), we analysed tracked seventeen wandering albatrosses *Diomedea exulans* in Bird Island, South Georgia (54°S; 38°W) over the austral winter (breeding period) with GPS-loggers, activity recorders and stomach temperature probes (plus at logger retrieval, diet composition was accessed via stomach flushings of the tagged individuals), which combined information provided a novel method to assess where their prey was caught (Pereira et al., 2017). Wandering albatrosses captured circumpolar and rarer oceanic squid in all water masses of the Southern Ocean (i.e. Antarctic, sub-Antarctic and subtropical waters), complementing much of the knowledge about the cephalopod distribution in the Atlantic sector of the Southern Ocean. This new methodology was able to predict the distributions of a wide number of species, complementing the information gathered from scientific nets and fisheries, and making a contribution to obtain prey ecological information via their predators.

Reference:

Pereira, J. M., Vitor H. Paiva, V. H. & Xavier, J. C. (2017). Seabirds mapping the distribution of elusive cephalopod species. *Marine Ecology Progress Series* 567: 257-262

SESSION 2 : Bio-Responses on extreme conditions
ORAL COMMUNICATIONS

Expression of stress and osmotic related genes in the Antarctic fish *Notothenia rossii* upon thermal and haline challenges

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(1) CCMAR

Antarctica is a unique natural laboratory to study the relationship between climate, evolution and molecular adaptation. Isolation and glaciations of the Southern Ocean resulted in major extinction and geographic speciation and over the last 25 million years notothenioids developed features to adapt to the extremely cold and stable environment, but also suffered genetic losses that implied disappearance of traits that now might prove costly. What is the potential for genetic (and phenotypic) plasticity in a fast changing climate, that implies warmer (and less saline) waters?

Samples were collected in experiments run in the Arctowski station, King George Island, in Jan/Feb 2012. Fish were collected by boat at 5-25-meter-deep using fishing poles and transferred to tanks, in cold rooms, at natural temperatures (0-2°C), and exposed to gradual changes in water temperature or/and salinity (to 6°C using thermostat-controlled heaters, to 20-10‰ by addition of freshwater to recirculating tanks) over a period of up to 10 days. RNA extraction and cDNA synthesis were performed using the Maxwell[®] 16 Total RNA Purification Kit and Ribolock/RevertAid from Life Technologies. Candidate genes for molecular chaperones (hsc70, hsp70, hp90, grp78) and osmoregulation (aq1, aq3, cldn4, cldn7, Na/K APTase) were selected and specific primer pairs were designed using the Primer-3 software. Gene expression was analysed by QPCR using EvaGreen[®] Supermix and a iCycler thermocycler (Bio-Rad).

N. rossii, in sharp contrast to temperate fish, showed an inability to mount a typical heat shock response upon stress. The downregulation of chaperones could be related with a low capacity for acclimation. The increase in Na/K APTase and claudins gene expression and the downregulation of aquaporins in osmoregulatory tissues is likely a compensatory mechanism for the hypo-osmoregulation induced by both warm and low salinity-acclimation.

Supported by FCT grants PTDC/BIAANM/3484/2014 and CCMAR/Multi/04326/2013.

SESSION 2 : Bio-Responses on extreme conditions
PORTER COMMUNICATIONS**Modulation of iron-related immune genes and oxidative stress genes in the Antarctic Bullhead, *Notothenia coriiceps* challenged with a bacterial endotoxin**

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The evolution in chronic cold was accompanied by gene loss and reduced function of stress related proteins. However genomic-wide studies also indicate up-regulation of genes such as ferritin and transferrin that bind free iron (Fe²⁺) and hepcidin (antibacterial agent and iron regulation factor). Iron is essential for survival, but toxic when in excess. The proteins of the above genes interact to transport and store iron, removing it from the blood stream, crucial for controlling Fe²⁺-catalyzed oxidative stress in oxygen-rich cold waters. These genes also respond to infection, depleting iron required by bacteria, a defense mechanism known as nutritional immunity or hypoferremia of inflammation. We aimed to describe the role of iron-related genes in infection and iron metabolism in Antarctic fish.

Fish were collected from a boat using fishing poles and transported to an open system kept at 2°C by continuously pumped sea water. After one-week in captivity, 3 groups (n=7) were treated: non-injected control, saline and lipopolysaccharide (LPS). Fish were injected at days 0 and 2 and sacrificed at day 8. Plasma and tissues involved in the immune, stress and metabolic processes were collected. In the laboratory, plasma was evaluated for Fe²⁺ and RNA extracted from headkidney and liver used for cDNA synthesis and analysis of selected genes by QPCR. Genes studied were Hepcidin, Transferrin and Transferrin receptor, Ferroportin, Ferritin (M subunit and H chain), the ferroxidase enzyme Ceruloplasmin, and the α and β chains of the Interlukin-6 receptor.

The results suggest activation of immune-related iron regulation in the group immunostimulated with LPS, with Ft, TF and Hp elevated in both headkidney and liver. This is the first study to evaluate this antimicrobial mechanism in Antarctic fish and further work is required to complement the results at the protein and functional levels.

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SESSION 2 : Bio-Responses on extreme conditions
POSTER COMMUNICATIONS**Expression of Heat Shock Protein and Metabolic genes in the sub-Antarctic fish
Eleginops maclovinus exposed to different thermal regimes**

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Eleginops maclovinus is a sub-Antarctic notothenioid species, that inhabits in several latitudes along both coasts of South America. In contrary to their Antarctic relatives, these fish are exposed to a wide range of temperatures. At the physiological level, in adverse conditions of elevated temperature the protein machinery would be subjected to a high denaturation process. This is counteracted by the action of a family of chaperones called Heat Shock Protein (HSP), whose function is to stabilize the heat-denatured polypeptides and dissociate proteins that have begun to interact with each other in potentially cytotoxic aggregations. The aim of this study was to evaluate the plasticity of the expression of HSP genes involved in physiological mechanisms of adaptation to acute and gradual changes in temperature.

The specimens were previously acclimatized at 17°C, then 6 experimental groups were used, each of which was challenged with a temperature shock at 10°C or 17°C or 24°C, and sacrificed at 1 or 4 hours, or 8 days after transfer. RNA extraction and cDNA synthesis were performed using the Maxwell[®] 16 Total RNA Purification Kit and Ribolock/RevertAid from Life Technologies. Gene expression was performed by QPCR using EvaGreen[®] Supermix and a iCycler thermocycler (Bio-Rad). The genes analyzed were hsp60, hsp70 and hsp90, and expression levels were normalized using the 18S ribosomal RNA.

Results will be dissected and discussed in the frame of a larger context that includes the plasticity of the thermal response in Antarctic and sub-Antarctic fish. As *E. maclovinus* is a temperate sister group of the notothenioids in cold shelf waters of Antarctica, thought to have separated early during the radiation of nototheniid fishes it is of interest to understand notothenioid diversification and the conservation or loss of important features.

Supported by FCT grant PTDC/BIAANM/3484/2014 and CCMAR/Multi/04326/2013 and Fondap-IDEAL Grant N°15150003.

SESSION 2 : Bio-Responses on extreme conditions
POSTER COMMUNICATIONS**Evolution of the immune system in antarctic notothenioids – a first approach**

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The Antarctic notothenioids evolved in a very cold and stable environment and through adaptive radiation from a single benthic now encompass over a hundred of species. This process included both the acquisition and loss of genes and phenotypic traits, a continuous process that was extremely important for survival. There is little information on the immune response of Antarctic fish, the interaction of the host-parasite relationships, how cold environment shaped its evolution and how it may respond to the predicted increases in environmental temperature.

An initial experiment was performed in Great Wall Station in King George Island, during the Antarctic summer of 2017. Fish (n=48) were collected from 5 to 15 meter deep using fishing poles from a boat, and transported to 6 tanks in an open system with seawater pumped from the ocean. Experimental design included three groups (non-injected, saline-injected and LPS-injected) with two tanks each (n=8 per tank). One tank per group was kept at 2°C while the other was gradually warmed to 6°C. Injections occurred at day 0 and day 2 and fish were sacrificed at day 8. Blood and plasma samples, mucous and several tissues included in the immune, stress and metabolic processes were collected. Internal macroscopic parasites were identified and the infestation level recorded to relate to the immune response.

Laboratory analysis are currently in progress and include lysozyme assays, the determination of cortisol, a key of stress hormone, and the expression of key genes in immune-related tissues. RNA sequencing was performed and a transcriptomic analysis is underway to identify the gene networks involved. We hope to identify the specificities of the immune-response in Antarctic fish and of its evolution under constant cold, to compare with the information on temperate and tropical fish species. We will also dwell into the responses of the microbiome to temperature change and its importance in the modulation of the immune system.

SESSION 2 : Bio-Responses on extreme conditions
POSTER COMMUNICATIONS**Feeding ecology of Antarctic fur seals under environmental change (2009-2013):
can their Antarctic squids prey be an environmental indicator?**

José Abreu (1)

(1) Marine and Environmental Sciences Centre - Universidade de Coimbra

Understanding the processes and causes of change in environmental conditions on prey and their predators is fundamental for interpreting variability in natural marine ecosystems. We used the Antarctic fur seals (*Arctocephalus gazella*) as a cephalopod top predator, to evaluate its potential as an indicator of change in prey availability and local/regional environment conditions. As the squid *S. circumantarctica* is one of the most abundant cephalopod prey species in this area of Antarctic fur seals, scats (i.e. faeces) of Antarctic fur seals were used to assess the cephalopod component of their diet from a period of five years (2009-2013), to collect the lower beaks, to relate stable isotopes of lower beaks ($\delta^{13}C$ and $\delta^{15}N$) and respective oceanographic conditions around South Georgia. Our results showed that Antarctic fur seals are capable of feeding on a wide variety of ecologically different species of squid, with *S. circumantarctica* the most frequent and with the highest number of lower beaks in the scats collected. Isotopic data revealed that *S. circumantarctica* is an Antarctic water species, predominantly inhabiting an offshore/oceanic habitat, with low trophic level in relation to other species of Antarctic squids. From an ecological perspective, for years related to abnormal climate conditions and poor Antarctic krill *Euphasia superba* density, *S. circumantarctica* recorded a higher trophic level as well a clear predominance in offshore areas and, furthermore, a higher consumption of squid by Antarctic fur seals.

SESSION 2 : Bio-Responses on extreme conditions
POSTER COMMUNICATIONS**The devil is in detail: small-scale sexual segregation despite large-scale spatial overlap in the wandering albatross**

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(2) British Antarctic Survey

Sexual segregation in foraging habitat occurs in many marine predators and is usually attributed to intra-specific competition or habitat specialisation associated with sexual size dimorphism. However, relatively few studies have attempted to understand the fine-scale patterns and underlying drivers. We studied habitat use, diet and feeding ecology of female and male wandering albatrosses *Diomedea exulans*, fitted with GPS and stomach-temperature loggers during the chick-rearing period (austral winter) at South Georgia. During this period, when oceanographic conditions were unusual and prey availability was low in Antarctic waters, the tracked wandering albatrosses showed high consistency in foraging areas at a large spatial scale, and both males and females targeted sub-Antarctic and subtropical waters. Despite consistency in overall habitat use, males and females showed different foraging behaviours in response to oceanographic conditions. Males appeared to be more opportunistic, exploiting oceanic (2003.7 ± 1966.0 Meters) and less productive waters (1.0 ± 0.6 Net Primary Productivity) mostly to scavenge for offal or non-target fish discarded by fishing vessels (e.g. *Antimora rostrata*). In contrast, females targeted natural productivity hotspots, and fed on a wide variety of fish (47.4%) and cephalopods (51.2%). Indeed, female wandering albatrosses commuted directly to these areas; most prey ingestions were on the outbound part of the trip, and they often started their return after ingesting large prey at the farthest point reached from the colony. The consistency in habitat use at a large scale, and sex differences in feeding ecology and behaviour at finer scale, indicate that males and females adopt different strategies in core foraging areas when prey availability is low. This leads to differences in diet composition between sexes in the absence of large-scale sexual segregation.

SESSION 2 : Bio-Responses on extreme conditions
POSTER COMMUNICATIONS**Mysteries of the Deep: Unrevealing the life of the Giant Antarctic Octopus
Megaleledone Setebos**

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Gigantism among Southern Ocean organisms is a very common feature. The cold and oxygen-rich water of this region allow this growing, leading to the amazing marine fauna present in this ocean. Within molluscs the colossal squid (*Mesonychoteuthis hamiltoni*) is the heaviest invertebrate on the ocean and the giant squid (*Architeuthis dux*) the longest cephalopod. There is, for that, no surprise the presence of a giant octopus in this region. The Giant Antarctic Octopus (*Megaleledone Setebos*), is known to inhabit the Southern Ocean and reaching sizes up to 90cm of total length and 14500g of weight. In our study, we report the largest specimen ever found with 115cm total length and 18300g of weight, caught January of 2017 in the Dumont D'Urville Sea. The specimen was also important to confirm the presence of this species in the diet of the valuable Antarctic toothfish (*Dissostichus mawsoni*) and other charismatic top predators. Regardless this major importance nothing is known about this species. To answer some questions, we used beaks found in the diet of Antarctic toothfish and measured the content of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ along the beak to reveal the habitat and trophic ecology of this species along its life. Our results show that the values of $\delta^{13}\text{C}$ are relative stable along the life, suggesting that this species doesn't migrate, however the small increase of carbon-13 content may suggest a little movement towards offshore. In terms of $\delta^{15}\text{N}$ values, an increase of values in the end of the beak suggest an increase of the trophic position along the life. Also, a correlation between $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values suggest that the movement towards offshore and the increase in the trophic chain are related and occur in parallel during the octopus life. Being a benthic species, the results might suggest that the octopus tend to descend the slope along the life, going to deeper waters and changing the type of diet along the life, being also available in bigger sizes to the deep-sea predators.

SESSION 2 : Bio-Responses on extreme conditions
POSTER COMMUNICATIONS**Tissue-specific isotopic discrimination ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) in wild penguins (adults and chicks) feeding on Antarctic krill *Euphausia superba***

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Information on isotopic discrimination factors (DF) between food and consumers' tissues are essential to estimate diets through stable isotope mixing models. In marine environments, DF are expected to range from 0-1‰ in $\delta^{13}\text{C}$ and 3-5‰ in $\delta^{15}\text{N}$. However, these are typical values, based on few studies and species, most of them conducted in the laboratory. Here, we determined DF between food and specific tissues (adults: blood and feathers; chicks: feathers, nails and flesh) of two wild penguin species (chinstrap *Pygoscelis antarctica* and Gentoo *P. papua*) breeding in sympatry at Livingston Island (Antarctica). A total of 45 adults and 28 chicks, and food items, comprised exclusively by Antarctic krill (*Euphausia superba*), were sampled for stable isotope analyses. Overall, DF vary from -1.0 to 2.0‰ in $\delta^{13}\text{C}$ values. Results indicate an increment of 1.0 and 1.8‰ between Antarctic krill and feathers of adult chinstrap and Gentoo penguins, respectively. However, and surprisingly, negative DF were found in blood of chinstraps and Gentoos (-0.3 and -1.0‰, respectively). Even more surprising, chicks showed very distinct DF between both related species. While chinstrap chicks always showed a decrease in $\delta^{13}\text{C}$ values between Antarctic krill and tissue-specific (from -1.4 to -0.3‰), Gentoo chicks showed an increment (from 0.5 to 2.0‰). In relation to $\delta^{15}\text{N}$ values, DF vary between 1.3 and 3.7‰. There was an increment of 3.7‰ of $\delta^{15}\text{N}$ values in feathers of both species and 1.9‰ (chinstraps) and 2.7‰ (Gentoos) in blood. All chicks showed an increment in tissue-specific (from 1.3 to 3.5‰). These results show that DF can differ substantially from typical values. Among other potential variables (e.g. prey, sex and individual), this variation can be tissue-, species- and life-stage-specific. Related species preying on similar prey may have specific DF, possibly associated to physiological and/or stress factors which may fluctuate in the wild, and this was particularly evident on chicks.

SESSION 3 : Human engagement in Polar Regions
ORAL COMMUNICATIONS

An expanded perspective on creativity - The art of science communication

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(1) Antarctic Biennale Vision Club ABVC

This is the title of a multidisciplinary project that within its configuration suggests a innovative articulation between the creative contemporary practice and the science discourse oriented on critical environment issues.

The scope of this proposal envision a transversal enquiry into the multiple narratives of the state of the environment in our planet and how the artistic practice can contribute in a tangible way to inspire the new generation worldwide to be more proactive to this effort to save the world from further damage. The main goal is to explore new ways of communication beyond the academic platforms in order to make it more attractive and therefore promoting more engagement.

The contemporary artistic practice, especially in using new technologies, is a valuable asset that can interface with science and with a thoughtful method of education, can pave the way to results in a near future.

This inspiration came from my participation at the first Antarctic Biennale, an expedition that was organized in March this year with 100 artists, thinkers and scientists that have launched something unique that, in my view needs to me nurtured and promoted. I am part of the Antarctic Biennale Vision Club, ABVC

SESSION 3 : Human engagement in Polar Regions
ORAL COMMUNICATIONS

Antarctic Research & Education Program: Bulgarian Base - Campaign 2017-2018

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The Antarctic Research & Education Program is going to be implemented on the "St. Kliment Ohridski" Antarctic Bulgarian Base as a collaboration between the Bulgarian Antarctic Institute, Sofia University St. Kliment Ohridski, and the Physics and Instrumentation Laboratory of the Polytechnic Institute of Beja, Portugal. This first edition of the program will have two projects: ViRAL – Virtual Reality Antarctic Laboratory, and Antarctuino – Physical Computing with Arduino in Antarctica. While the first is a science outreach project that will use virtual reality as a tool to bring Antarctica to the public, Antarctuino aims the development of programming competences with an open source hardware platform, the Arduino, engaging educators and students in project based learning in the framework of physical computing in extreme environments. Both projects will increase public awareness on Antarctica related issues, such as global warming, and the importance of research, and monitoring in this region of the Planet. This communication will address the main objectives of these projects, the road map to its implementation, and the current status of this first edition of the program.

SESSION 3 : Human engagement in Polar Regions
ORAL COMMUNICATIONS

What Drives Effective Teamwork in Antarctica Science Teams? A Qualitative Study

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The number of empirical studies addressing teamwork effectiveness in Antarctica is scant. This limits our capacity to fully understand why some campaigns succeed and others fail. Therefore, research is needed to develop policies and guidelines to promote successful campaigns. In the current research we have aimed to answer the question of “what drives teamwork effectiveness in Antarctica Science Teams”.

Participants were 9 researchers from 6 research projects. We have adopted a multi-source, longitudinal data collection approach where data from 16 semi-structured interviews, campaign blogs, and 5 campaign diaries were analyzed iteratively following a grounded theory approach.

The results of ongoing analysis suggest that teamwork effectiveness is determined by the collective capacity to adapt to environmental, contextual, and human stressors. Effective teams are those that are composed by at least one experienced team member, and whose team members have a flexible mind set. Through our analysis we are identifying campaign stage specific drivers of effective teamwork. During the pre-mission phase, most successful teams are those investing more time in mission planning (especially contingency planning) and relationship building. During campaigns, the most successful teams are those where team members communicate more clearly, and support each other. Once the campaign is completed effective teams are those that reflect on the lessons learned, and try to implement those in future campaigns.

Our results suggest that overall campaign stressors are environmental, contextual, and human driven; and that the best strategy to mitigate the negative influence of campaign stressors on mission success is through effective teamwork. This can be achieved if teams devote time to plan their mission and relationship building, and are also capable of developing a flexible mind set (made easier through contingency planning) and communicate in a clear and open way.

SESSION 4 : Monitoring polar physical environments
ORAL COMMUNICATIONS**Ocean tide loading at the Primavera Station: First results**

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In January 2016, a permanent GNSS station was installed in the scope of the LATA project (Loadings and Tectonics of Antarctica peninsula) at the Argentinean base Primavera on the Antarctica Peninsula. We will present almost one year of observations and discuss our progress how these measurements, together with those of 16 GNSS stations in the peninsula, can be used to study the ocean tides around the station.

The varying weight of the ocean tides deforms the ocean floor and the neighbouring land. This phenomenon is better known as ocean tide loading. These displacements are at several millimetres level and are clearly visible in the GNSS observations. Given the fact that the ocean tides around the Antarctica are still one of the least known around the world, due to the lack of tide gauges and satellite altimetry data in the polar regions, our GNSS observations will help to improve the ocean tide loading models in this area.

We have analysed all GNSS observations with GIPSY/OASIS in kinematic mode and obtained a position every 5 minutes. These coordinate time series have been analysed using the ETERNA (Wenzel, 1996) software package to estimate the tidal amplitude and phase-lag for the 4 largest semi-diurnal and 4 largest diurnal harmonics. In this work, we compare the estimated ocean tide loading displacements with the predicted deformations using the recent global tide models FES2012, FES2014, GOT4.8 and TPX08 and the regional tide model CATS2008.

SESSION 4 : Monitoring polar physical environments
ORAL COMMUNICATIONS**Multiscale image integration for vegetation mapping in Maritime Antarctica**

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The widespread biological response to a rapid warming in the Antarctic Peninsula [1] reinforces the necessity of accurately mapping and monitoring the vegetation. Remote sensing based methods are the most adequate since allow creating a comprehensive baseline description of the extent of the vegetation. Current approaches perform well when the spectral mixing is low which, due to the sparse and patchy nature of the vegetation in terrestrial regions of Antarctica, is often not verified, meaning that many vegetated areas are being incorrectly identified as un-vegetated. The ultra-high resolution (cm to mm/pixel) of the images captured by UAS (Unmanned Aerial Systems) permits distinguishing many details related to the vegetation not evident in satellite imagery, namely about their communities (for instance, lichen or moss) but also about their texture, degree of density and limits of occurrence. The use of this local but detailed information together with the one collected at ground level [2] greatly improves the detection of the vegetation for definitely creating a more accurate and reliable mapping. An approach integrating the details extracted from higher resolution images (UAS) into the lower resolution ones (WorldView2 satellite) is therefore presented, describing the procedures required for a complete processing sequence. The improvements achieved using the imagery acquired with an UAS during the 2017 field campaign developed in Fildes Peninsula, King George Island (62°S) in the frame of PROPOLAR (Portuguese Polar Program) are presented.

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SESSION 4 : Monitoring polar physical environments
ORAL COMMUNICATIONS**Snow cover characterization in Maritime Antarctica through Radar remote sensing imagery and observational data**

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Starting with C- band backscattering analysis (Mora et al. 2013) to study the potential for regional snow cover evaluation in high cloudiness environments, as in South Shetland Islands, limitations for dry snow detection arose. The application of X-band imaging (TerraSAR X, Spotlight mode) to local scale offered a better capacity to detect summer snow cover (wet), a procedure that was validated with ground truthing conducted simultaneously to image acquisition using snow pit descriptions (stratigraphy, grain-size, density, SWE) and DGPS delimitation of snow patches (Mora et al., 2017).

In the framework of the project PermaSnow (de Pablo et al., 2016) multitemporal studies are being conducted, aiming at identifying wet-snow, dry-snow and bare soil surfaces in a regional basis and locally at a CALM site at Deception Island. A research agreement with DLR allows for access to high spatial resolution scenes (0.671 m azimuth x 0.455 m range) obtained in Staring Spotlight mode. Moreover, a new snow monitoring station installed in Deception Island in January 2017 offers continuous monitoring of snow physical parameters allowing a further step in ground truthing. Additionally, to characterize snow stratigraphy, selected snow sites have been described during the 2016/2017 Antarctic Campaign to cross-correlate with the surface backscattering, opening new data sources for reliable surface classification at regional scale and at the local CALM site scale (100 x 100 m²).

This experimental information, jointly with previous microwave remote sensing imagery acquired over Hurd and Fildes Peninsulas (Livingston and King George Islands, respectively) are brought together to develop a new snow cover analysis methodology for Maritime Antarctica, aiming at contributing to identify the snow controls on active layer and permafrost.

SESSION 4 : Monitoring polar physical environments
ORAL COMMUNICATIONS

The PERMANTAR network of permafrost observatories in the Western Antarctic Peninsula 10 years after the IPY

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The Permafrost and Climate Change in the Western Antarctic Peninsula network (PERMANTAR) developed collaboratively with the Brazilian and Spanish networks of permafrost and active layer observatories, with the Instituto Antártico Argentino and Bulgarian Antarctic Institute and as a result of the International Polar Year 2007-08 program on Antarctic Permafrost, Soils and Periglacial Environments. The main objectives of the network were to fill observational gaps identified in the ANTPAS Workshop (Madison 2004) and thus contribute to the better understanding of permafrost thermal state and characteristics in the Western Antarctic Peninsula. Through international collaborations and with financial support of the Fundação Calouste Gulbenkian, Fundação para a Ciência e a Tecnologia, the Spanish Polar Program and the National Science Foundation, the following observational sites have been installed: i. Livingston Island (Reina Sofia 1 and 2, Papagal, Ohridski and Base meteo), ii. Deception Island (Irizar, Refugio Chileno, Abanico Base Argentina), iii. Cierva Cove (Cierva Cove main, Primavera), iv. Amsler Island (Amsler deep, Soil station).

Most of the research focus on permafrost thermal state, geomorphological dynamics, landcover and snow dynamics, using various techniques, such as descriptive statistics, physical-based and GIS modelling and remote sensing (satellite and UAV).

This presentation briefly overviews the PERMANTAR network and the main outcomes of research since the IPY, discusses the future potential use of the observatories and points for new directions, mainly as a contribution to SCAR Horizon Scan question # 42: How will permafrost, the active layer and water availability in Antarctic soils and marine sediments change in a warming climate, and what are the effects on ecosystems and biogeochemical cycles?

SESSION 4 : Monitoring polar physical environments
POSTER COMMUNICATIONS**Volcanic rocks in Fildes Peninsula: textural, mineral and chemical characteristics**

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Fildes Peninsula is lithologically composed by a succession of lavas intercalated with pyroclastic rocks. Subvolcanic intrusions and dykes were also mapped during the field campaigns carried out in the framework of the GEOPERM project. All rocks show textural and chemical characteristics caused by post-magmatic alteration processes, such as the high loss-on-ignition values, that are frequently above 2 wt%, and the common observation of carbonate minerals and zeolites under the petrographic microscope. Such alteration, probably, has modified some major element magmatic concentrations producing an ambiguous classification in respect to the magma series type (tholeiitic versus calc-alkaline). The majority of the lavas are basalts and andesitic-basalts, whereas the sub volcanic rocks can range to dacites. All the study samples represent magmas that have a co-genetic link, and the chemical variation identified can be ascribed to the effects of crystal fractionation of pyroxene and plagioclase (also Fe-Ti in the last stages of magma differentiation). Significantly are the low ratios involving the large ion lithophile and the high field strength elements, and the negative anomalies obtained in the primitive mantle normalized Nb concentrations. The mineral chemistry carried out by electron microprobe show a large dispersion in the anorthite molar content (from oligoclase to anorthite types) of plagioclases. Conversely, the chemical composition dispersion of pyroxenes are restricted and the majority are classified as augites. All the opaque minerals are spinels and their chemical composition are restrict to the solid-solution between ulvospinel-magnetite solid solution. All the chemical data obtained until present support the generation of Fildes volcanism under the influence of a subduction process, resulting from the sinking of the Phoenix plate under the Antarctic plate.

SESSION 4 : Monitoring polar physical environments
POSTER COMMUNICATIONS**Remote sensing to evaluate permafrost degradation and terrestrial ecosystem changes in the Canadian Sub-Arctic – a multiscale approach (project Shrubifly)**

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Global warming generate multiple and complex inter-related feedbacks affecting the dynamics of Earth's ecosystems. The Arctic and Sub-Arctic are regions of prime importance to study the impacts of climate change. Thaw ponds (small thermokarst lakes) are frequent features in these regions. They result from ice-rich permafrost degradation and are thus important players in the carbon cycle and show global scale impacts.

In the tundra biome, thermokarst areas are essentially anaerobic environments and are showing a significant increase in biomass in the last decades due to the increase of shrubs and trees. The tundra boreal forest boundary has thus shown an increased dynamics. One of the main obstacles to study the evolution of these remote areas and to quantify processes affecting polar wetlands is the spatial resolution of optical satellite sensors providing high repeat times (e.g. the Landsat series) and also the high cloudiness. Small thaw lakes and ponds, which are features that show large spectral diversity, become sub-pixel features, generating mixed spectral signatures. The release of Sentinel 2-A in 2015 and Sentinel 2-B in 2017, with 10 m spatial resolution, and a repeat time that will become better than 5 days, introduce new possibilities to study these areas at increased detail.

Two field surveying missions have been conducted in the summer of 2015 and 2017 at four study areas, in Eastern Hudson Bay (Nunavik) in the Canadian Sub-Arctic (Whapmagoostui, Kuujjuarapik and Umiujaq), using an Unmanned Aerial Vehicle (UAV). In 2015 the UAV flights were conducted using two cameras, one RGB and one modified to NIRGB. In 2017, a multispectral Sequoia camera (G, R, RE, NIR, RGB) was used.

In this presentation we present the preliminary results regarding the comparison of Landsat 8 (13/09/2017) and Sentinel-2 (23/08/2017) with the field surveying results.

SESSION 4 : Monitoring polar physical environments
POSTER COMMUNICATIONS**Snow cover influence in the active layer and permafrost thermal regime. Crater Lake CALM-S site (Deception Island. Antarctica)**

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The thermal behavior of permafrost and the active layer is influenced by the isolation effect caused by the snow layer accumulated on the soil surface. During previous research projects, our team has focus in the experimental study of the thermal evolution of permafrost and the active layer in a highly climatic variability polar region: the South Shetland Islands, on the north tip of the Antarctic Peninsula. Thus, we set various monitoring stations at different sites in Livingston and Deception Islands, focused on the measure of the temperature evolution in several boreholes and the analysis of the active layer dynamics related to the local meteorological parameters. In the last 2016-17 Antarctic campaign, our research team had the first fieldwork of a new project, named PERMASNOW, which main objectives are to characterize the soil gradient temperatures, the snow cover, and their thermal effect on permafrost thermal behavior. For this reason, we have deployed a set of new instrumentation to acquire information about snow parameters as snow density, snow thickness evolution, snow water equivalent, snow surface temperature, contents of liquid water and ice, and soil humidity. The resulting data will be correlated with the thermal records obtained for permafrost and the meteorological parameters. Here we develop a complete description of the instrumentation and their physical principles, as well as for the new instrumental setting for the experimental "Crater Lake" CALM-S site and their capabilities.

SESSION 4 : Monitoring polar physical environments
POSTER COMMUNICATIONS**Present-Day Tectonics of Antarctica inferred from GPS velocities**

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One of the objectives of the LATA project (Loadings and Tectonics of Antarctica peninsula) is to investigate the present-day kinematics of the Antarctica, in particular of the Antarctica Peninsula. The Antarctica Peninsula has been considered to be located on the Antarctica tectonic plate (e.g., Bird, 2003), which is divided in two major geological provinces with the Antarctica Peninsula being one of the major terranes of West Antarctica (Poblete et al., 2011). In its extreme northern tip, the Antarctica Peninsula forms part of a complex tectonic system resulting of the convergence between two major tectonic plates: Antarctica and South America that also created several minor plates/blocks, namely the Scotia plate and the South Shetland block (e.g., Prates et al., 2013).

Previous works based on GNSS observations has evaluated the internal stability of the Antarctica Peninsula showing the existence of some level of deformation between West Antarctica and the East Antarctica Craton (e.g., Dietrich et al., 2004). Furthermore, there are significant differences between the predictions when different angular velocity models are used. This is more evident between the geodetic (e.g., GEODVEL; REVEL) and geological (e.g., NUVEL-1A; MORVEL) estimates. The differences can reach more than 5mm/yr and are larger than the opening of Terceira Rift in the Azores, the main active plate tectonic boundary in Portugal. Such level of difference can be attributed to the uncertainties/errors of the current models (since few stations with long time-series have been used) or real differences caused by real alterations in the present-day angular motion of the Antarctica plate (e.g., Lodolo et al., 2013).

In this work, we present a new model based on the data available for several dozen of stations that have been installed in the last decades. The spatial distribution and temporal scale allow us to develop this dedicated model and to evaluate the internal deformation of Antarctica at mm level.