CHILEAN ANTARCTIC SCIENCE PROGRAM 2021

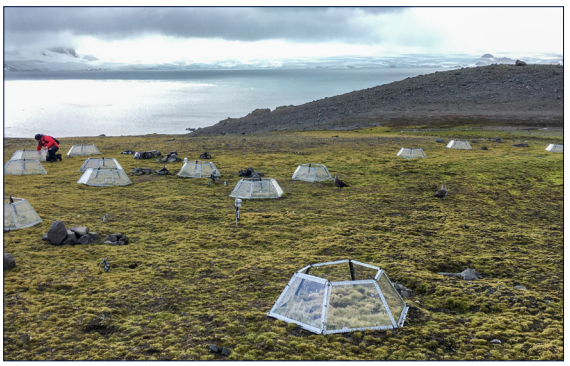
H. DÍAZ

The Chilean Antarctic Science Program (PROCIEN, for the Spanish abbreviation) is conducted by the Chilean Antarctic Institute (INACH) and consists of projects that it finances, organizes, coordinates, and executes directly or with assistance from other agencies in the country. Scientific activity is supported by several public, transparent, and internationally peer-reviewed competitive funding sources.

PROCIEN features initiatives financed by INACH and the Chilean Research and Development Agency (ANID). It also includes internal and international cooperative projects.

Chilean Antarctic scientific work offers robust efforts dedicated to the study and understanding of the polar environment in a climate change scenario, as well as work to uncovering its physical and biological dimensions, the nature of its past and present, and modeling of future scenarios. To better achieve this, the program has added social and humanities studies to provide for further understanding of the Antarctic identity in its many expressions and contexts. As a result, the Institute maintains seven lines of study, framed within priorities established by the Scientific Committee on Antarctic Research (SCAR), but also takes into account areas of geopolitical advantage and national interest.

I. The State of the Antarctic Ecosystem



Dra. Patricia Sáez's project seeks to determine the morpho-physiological traits of different vascular plants in adverse climatic conditions (Andes and Antarctica) and compare them with those of temperate climates to elucidate a possible convergence triggered by the extreme conditions in which they live. This project is funded by ANID.

Biological diversity is understood to be the variety of life forms, including various levels of organization, such as genes, species, populations, and communities. Collectively, the interaction of these varieties at different levels determines the functioning of ecosystems and supports the planet's biosphere. This line of work was originally associated with the former Scientific Committee on Antarctic Research (SCAR) program called Antarctic Ecosystem (ANTECO). Its objective was to understand current diversity patterns in order to differentiate these from process impacts from past conditions, and to understand and develop future scenarios through a multidisciplinary approach. Through research being carried out in this area, it has been possible to: 1) evaluate the contribution of environmental changes in evolutionary processes in both marine and terrestrial ecosystems in Antarctic and sub-Antarctic regions; 2) understand the spatial-temporal factors that determine the distribution of Antarctic life, from species to populations; and 3) quantify the degree of sensitivity and risk for species, populations, and ecosystems to environmental changes, such as climate change and other drivers associated with pollution, introduction of non-native species, and fishery activities.*

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CODE	TITLE	PI	INSTITUTION	YEARS
AN_01-17	*Genomics insight into the past and present of Antarctic Biodiversity: a tool to assess the fate of a unique ecosystem in a changing world (GAB)*	Elie Poulin	UCHILE	2017-2022
AM_01-18	*Marine Protected Areas: Oceanographic conditions, top predators and benthic habitats monitoring in the western Antarctic Peninsula*	César Cárdenas	INACH	2018-2021
FR_02-20	*Molecular and physiological framework to understand the impact of Antarctic regional warming on reproductive growth of vascular plant species* Deschampsia antarctica *and* Colobanthus quitensis	León Bravo	UFRO	2020-2023
FR_01-21	*Does rafting allow connectivity across the Antarctic Polar Front? A case study of the direct developer periwinkle* Laevilitorina caliginosa *Gould 1849*	Claudio González Wevar	UACH	2021-2025
FR_04-21	*Assessing the uniqueness of the Antarctic vascular plants: a comparison among populations, other harsh climate species and closely related temperate species*	Patricia Sáez Delgado	UDEC	2021-2024
FR_05-21	*Microbial biogeography in the Southern Ocean: from communities to oligotypes*	Léa Cabrol	IEB	2021-2025
FR_06-21	*Filling the gap: characterization of winter hydrographic conditions and habitat use in the Northern Antarctic Peninsula using instrumented seals and ocean modeling*	Andrea Piñones	UACH	2021-2025
FI_01-18	*Unravelling the dynamics between fisheries and a scavenging seabird species off Antarctic waters: a management perspective*	Lucas Krüger	INACH	2018-2021
FI_01-19	*Cryptic speciation in the Southern Ocean: integrating genomics, morphology and species distribution models to elucidate the speciation process of a gastropod group*	Angie Díaz	UDEC	2019-2022
FI_03-19	*The unseen lotic ecosystem: geobiological interactions across and beyond the Andean convergent margin*	Gerdhard Jessen	UACH	2019-2022
FP_06-18	*Unraveling the DNA of coralline algae: from molecular diversity to divergence time in the Magellanes sub-Antarctic and Antarctic regions*	Martha Calderón	UMAG	2018-2021
FR_04-18	*The influence of penguin colonies on the development of tundra communities in the Antarctic Peninsula*	Angélica Casanova	UCT	2018-2022
FP_02-19	*Connecting the zooplankton microbiome with ecosystem processes in the Southern Ocean*	Mireia Mestre	UDEC	2019-2021
FP_04-19	*Adaptive history of speciation in the notothenioid fish* Harpagifer *in the Southern Ocean*	Nicolás Segovia	IEB	2019-2022
FP_02-21	*Transport and ecological role of bacteriophages in the rhizosphere of Antarctic native vascular plants*	Sergio Guajardo Leiva	UNAB	2021-2024
FP_03-21	*Intercellular communications and nutrient cycles in the Antarctic sponge-associated archaeon,* Nitrosopumilus *sp.*	Mario Moreno Pino	UMAYOR	2021-2024

CODE	TITLE	PI	INSTITUTION	YEARS
RT_34-17	*Dynamics of sponge-associated microbial photosynthetic eukaryotes during seasonal transitions in Antarctica*	Nicole Trefault	UMAYOR	2018-2021
RT_08-18	*A matter of size: Coupling early life history traits of Antarctic fishes and environmental forcing in a warming ocean*	Mauricio Landaeta	UV	2019-2022
RT_68-18	*Trophic interactions and spatial overlap between krill* Euphausia superba *and mackerel icefish* Champsocephalus gunnari, *in the South Orkney Islands*	Edwin Niklitschek	ULAGOS	2019-2022
RT_04-19	*Identity and effects of RNA and DNA viruses on bacterio- and phytoplankton dynamics in Chile Bay (Antarctica)*	Beatriz Díez	PUC	2020-2023
RT_35-19	*Molecular flyways of emerging viruses: Role of* Chionis albus *as a reservoir for the transport of viruses with zoonotic potential to the southern cone*	Gonzalo Barriga	UCHILE	2020-2023
RT_07-20	*Evolution below the ice: Antarctic phylogeography in chitons with different reproductive strategies*	Christian Ibáñez Carvajal	UNAB	2021-2024
RT_42-20	*TROY: Tracking key eukaryote pathobiome members in AntaRctic coastal communities, with emphasis on OomYcete parasites*	Pedro Murúa Andrade	UACH	2021-2024
RG_49-19	*Connectivity of* Euphausia superba *populations: an assessment through the microbiota of krill exoskeleton*	Mireia Mestre	UDEC	2020-2022
DT_11-20	*Connectivity and selection patterns in* Harpagifer antarcticus *in the Maritime Antarctic: An approach to early life stages*	Valentina Bernal	UCHILE	2020-2022
DG_04-19	*Diversification patterns and historical biogeography of primnoids (Cnidaria: Octocorallia: Primnoidae) in the Southern Ocean*	Mónica Núñez	UDEC	2019-2021
DG_06-20	*Characterization of giant virus communities and their association with phytoplankton in Antarctic and Subantarctic marine waters*	Marianne Buscaglia	PUC	2020-2022
DG_12-20	*Secretion Systems: Genomic architecture and gene expression in bacterial symbionts from Antarctic sponges*	Patricio Flores	UMAYOR	2020-2022
DG_15-20	*Role of dinoflagellates in the Antarctic sponge holobiont*	Marileyxis López	UMAYOR	2020-2022
MG_14-18	*Structure and dynamics of* Parochlus steinenii *(Diptera: Chironomidae) populations of South Shetland Islands, Antarctic*	Carolina Pérez	UMAG	2018-2021

H. DÍAZ

Marine sponges establish one of the most basal and complex microbial-animal symbiotic relationships, with microorganisms composed of bacteria, archaea, and microbial eukaryotes, which display a relevant role in the biogeochemical cycling of carbon and nitrogen. The archaea component of the Antarctic sponge microbiome comprises Thaumarchaeota, where the genus *Nitrosopumilus* dominates the assemblage. Recently, the metagenomic analysis performed by Dr. Mario Moreno and his team, of two Antarctic sponge, Myxilla sp. and Leucetta antarctica, indicated that *Nitrosopumilus* sp. plays a crucial role in the carbon and nitrogen cycles carrying out autotrophic ammonia oxidation. Consequently, it becomes crucial to understand the detailed mechanism and regulations of nitrogen and carbon cycle performed by this archaeon associated with Antarctic marine sponges, one of the objectives of his current project funded by ANID.

II. Antarctic Thresholds: Ecosystem Resilience and Adaptation

The Southern Ocean and the Antarctic continent are not immune to the effects of anthropogenic activities. The increase in atmospheric and sea surface temperatures, ice retraction, ocean acidification, changes in wind regimes, plastic pollution, and the increasing human presence are all observable phenomena whose trends become more evident year after year. A comprehensive evaluation of such phenomena is of utmost importance in order to: (1) fully understand the impacts and consequences of environmental changes over different levels of biological organization, and (2) forecast and develop conservation/management actions that improve the resilience of ecosystems.

Within the framework of the former SCAR's ANT-ERA program, scientists have agreed on the importance of determining how Antarctic organisms have adapted to the particular conditions of this region, and how they might respond to environmental changes. The set of these evaluations, from the individual to the ecosystem level, allows the development of a broad ecological debate about the environmental state of Antarctica and its biosphere (particularly in the Antarctic Peninsula where those changes are occurring at a faster pace). ✸

The objective of the María Estrella Alcamán project is to determine the diversity of the microbial communities of snow, air and surface ocean to determine their biological and chemical interaction with their nearby environments, revealing the biogeochemical role and active metabolic pathways related to inorganic carbon, nitrogen and dominant atmospheric organic pollutants. The results of this project funded by ANID would reveal for the first time on the West Antarctic Peninsula the structure of the snow microbial community and its interaction with the surface ocean and the air, determining whether the snow ecosystem is mainly influenced by atmospheric deposition or the coastal ocean. Furthermore, these results will provide invaluable information to elucidate the effect of long-distance air transport and local pollution on Antarctic coastal ecosystems.

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CODE	TITLE	PI	INSTITUTION	YEARS
FD_01-15	*Research Center: High Latitude Marine Ecosystems Dynamic*	Humberto González	UACH	2015-2025
FR_03-18	*Genomic, physiological and ecological approaches to examine Antarctic and Sub-Antarctic macroalgal responses to climate change and glacial retreat*	Andrés Mansilla	UMAG	2018-2022
FI_01-20	*Unveiling the biological interactions of the snow microbial community with the airborne and ocean surface in the west Antarctic Peninsula*	María Estrella Alcamán	UDEC	2020-2023
FP_01-18	*From low to high latitudes: thermal adaptations of seals in a changing world*	Alicia Guerrero	UV	2018-2022
RT_14-17	*Adaptive responses of Antarctic mosses to climate change*	Gustavo Zúñiga	USACH	2018-2021
RT_27-17	*Impacts of climate change and coastal ice retreat on Antarctic seaweed communities over deglaciation and latitudinal gradients*	Andrés Mansilla	UMAG	2018-2021
RT_18-18	*Nocturnal in situ warming: Filling the gaps to unravel plant responses to regional warming of Antarctic Peninsula*	León Bravo	UFRO	2019-2022
RT_03-19	*Impacts of ocean acidification and warming on the carbon concentrating mechanisms (CCMs) of Antarctic seaweeds: a phenotypic and genetic approach*	Pamela Fernández	ULAGOS	2020-2023
RT_12-19	*Inorganic nanoparticles and commercial sunscreens in Antarctica: fate and effects to natural microbial communities (INCSA)*	Pedro Echeveste	UANTOF	2020-2023

Seabirds offer an ideal model system to investigate how adaptation for efficient thermogenesis, especially in the poles, has occurred across an assemblage of endothermic organisms tied to a marine lifestyle. The Arctic and Antarctica are two independent polar ecosystems that include extreme cold, presence of extensive ice cover, and large variation in solar radiation. The most charismatic groups of seabirds from the poles are the Alcids (e.g. puffins) around the Arctic region; and the penguins around Antarctica. Given the separate hemispheric distributions of the taxa, signatures of convergent evolution are expected at loci widespread across the genome and will include signals of adaptation for genes that govern thermoregulation. Dr. Juliana Vianna predicts that environmental heterogeneity, geographic distance and barriers limiting gene flow will promote local adaptation within species across both poles. They will model the "adaptive potential" of species to the future as a means to understand and attempt to mitigate the impact of climate change on those most affected regions. This project is under a national/international collaboration, will involve under- and graduate students, and will disseminate our results at conferences, publishing manuscripts in international, high-ranked ISI journals, as well as to the public through mass media.

CODE	TITLE	PI	INSTITUTION	YEARS
RT_20-19	*Physiological strategy of the Antarctic psychrotroph* Streptomyces fildesensis *for coping with temperature changes and its effect on microbial community structure*	Paris Lavín	UANTOF	2020-2023
RG_16-19	*Genomic characterization of aquatic birnaviruses detected in Antarctic fish of the genus* Notothenia. *Searching for the key to the adaptation of fish viruses to temperatures close to freezing*	Marcelo Cortez	USACH	2020-2022
RG_51-19	*Predicting future extinction risk of Antarctic marine invertebrates*	Marcelo Rivadeneira	CEAZA	2020-2022
RG_48-20	*Genomic adaptation: convergent evolution between Arctic puffins and Antarctic penguins?*	Juliana Vianna	PUC	2021-2023
DT_18-19	*Effect of low temperatures and climate change on the epigenetic regulation of key genes in response to cold, in the Antarctic plant* Colobanthus quitensis	Rasme Hereme	UTALCA	2019-2021
DG_01-19	*Evolution of actinobacteria in the Antarctic environment and its potential for the discovery of antibiotic molecules*	Kattia Núñez	UFRO	2019-2021
DG_12-19	*Antarctic snow algae: integration of physiological and transcriptomic approaches to understand processes of acclimation to environmental stress*	Francisca Gálvez	UACH	2019-2021
DG_13-20	*Effect of temperature on the innate immune system and stress response in Antarctic and Sub-Antarctic notothenioid fish* Harpagifer antarcticus *and* Harpagifer bispinis	María Julia Saravia	UACH	2020-2022

III. Antarctic Climate Change

The threat of a global climate crisis urgently challenges both humanity's ability to understand key aspects of recent environmental changes and its capacity to take action. Thus, everywhere there is a growing need for evaluation of changing trends and estimation -under different scenarios- of potential impacts, to support decision-making and adoption of global agreements.

Antarctica's territorial domain and its surrounding regions of the Earth are linked through teleconnections. Some of these interactions, verified in recent decades, include remarkable changes in air and ocean temperatures, shifting patterns of atmospheric circulation, variability of sea ice extension, thickness thinning and loss of several ice shelves, among other phenomena.

In this context, the PROCIEN includes a set of projects under the Climate Change in Antarctica (CCA) research line, that focus on answering questions associated with the study of climatic variability in different time and spatial scales, considering characterization of processes and cryosphere variability and interactions with associated land, atmosphere, and ocean geosystems.

PROCIEN's projects under this research framework align with and contribute to the goals of several Scientific Research Programs (SRPs) implemented by the Scientific Committee on Antarctic Research (SCAR). These are:

A. The new "AntClimnow - Near-term Variability and Prediction of the Antarctic Climate System," designed to answer fundamental science questions (as identified by the SCAR Horizon Scan), relating to Antarctic Climate variability aiming to take a regional approach to observing and modelling the Antarctica environment, but taking an integrated approach that will consider the Antarctic as a whole;

B. The new "INSTANT - INStabilities and Thresholds in ANTarctica", that will address a first-order question about Antarctica's contribution to sea level, encompassing geoscience, physical sciences and biological sciences, of the way in which interactions between the ocean, atmosphere and cryosphere have influenced ice-sheets in the past, and what expectations will be in the future with a special focus on quantifying the contributions to global sea level change, aiming to quantify the Antarctic ice sheet's contribution to past and future global sea-level change;

C. As well as the goals of the former SRP "Antarctic Climate Change in the 21st century (AntClim21)", "Past Antarctic Ice Sheet dynamics (PAIS)" and "Solid Earth Response and influence on Cryospheric Evolution (SERCE)."

F. TRUEBA

The MoCliM Program is conducting studies in three key sectors of the Magallanes region to develop state-of-the-art climate models in the region, with a strong database obtained in the field and with the collaboration of German scientists from the universities of Humboldt and Erlangen-Nürnberg. In the photo, Dr. Ricardo Jaña, director of this program, during a past campaign on the Unión glacier.

R. CANALES

One of the most common responses to the effects of climate change is the change in the distribution of species and with this the modification of the architecture of genetic diversity. The main objective of Claudia Maturana's project is to understand the effects of past, present and future climate change on the distribution of the freshwater invertebrate *Branchinecta gaini* using DNA sequences, genomic data and niche modeling. For this, she will combine genetic / genomic data with high-resolution climate layers and thus model under different climate change scenarios from the Intergovernmental Panel on Climate Change (IPCC). This information will make it possible to determine if there is going to be a decoupling with respect to the current distribution and therefore predict the fate of the Antarctic, sub-Antarctic and Magallanes region in the face of the high anthropogenic pressures of current climate change. This project is funded by ANID.

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CODE	TITLE	PI	INSTITUTION	YEARS
IN_01-18	*Climate modeling for planning in the Magallanes region (MoCliM)*	Ricardo Jaña / Christoph Schneider	INACH-HUBERLIN	2018-2022
FR_01-18	*The hydrology of ice shelves: processes and implications for dynamics*	Shelley MacDonell	CEAZA	2018-2021
FR_01-20	*Maritime Antarctic lakes: sentinels of emerging environmental threats*	Pirjo Huovinen	UACH	2020-2024
FR_07-21	*The role of plankton dynamics in air-sea fluxes of climate-relevant trace gases and atmospheric conditions in the Northern Antarctic Peninsula*	Juan Höfer	PUCV	2021-2025
FP_01-21	*Range changes triggered by global warming in the fairy shrimp* Branchinecta gaini*: new insights into freshwater species as sentinels for climate change in Antarctica*	Claudia Maturana Bobadilla	IEB	2021-2024
RT_09-18	*Trophic and functional ecology in Antarctic ecosystems*	José Pulgar	UNAB	2019-2022
RT_69-20	*Assessment of the sensitivity of ice shelves to the enhanced weather variability*	Jaime Pizarro Konczak	USACH	2021-2024
RG_33-19	*Deciphering the molecular mechanisms at play in the acclimation of the Antarctic sea urchin* Sterechinus neumayeri *to future climate change scenario*	Camille Détrée	UACH	2020-2022

IV. Astronomy and Earth Sciences

Antarctica and the surrounding oceans have been and continue to be key elements of our planet's natural history. They provide us with important geological information of the Earth and about the tectonic evolution and changes in the Antarctic environment, and the biota that depend upon it.

For this reason, projects in this line of research focus on the study and understanding of interactions between the terrestrial and cryospheric environments. These projects search for knowledge about the processes that occur within and at the interfaces of the planet's terrestrial, oceanic, cryospheric, and atmospheric systems. This effort also integrates projects in the disciplines of space physics and astronomical observation. In general, these contribute to clarifying many outstanding questions and providing scientific knowledge with multiple applications that contribute to many of the initiatives of the Scientific Research Programs (SRP) and other Action Groups of the Scientific Committee on Antarctic Research (SCAR).

P. RUIZ

The project of Marcelo Carvalho and Cristine Trevisan (in the photo showing a fossil bivalve found in Patagonia) aims to investigate the palaeoenvironmental and paleoclimatic evolution based on the paleoflora found in the Antarctic Peninsula and correlate with South America to understand the distribution of modern flora.

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In the area of geology, one of the projects to be undertaken in these studies will look for improved understanding of the paleo-geographic processes of the lower portion of the Heritage Group in the Ellsworth Mountains of West Antarctica, and at the same time will look into implications for reconstructions of the ancient supercontinent of Gondwana. In the paleontology area, two projects tell the paleogeographic history of Gondwana and its relations with South America, including the biota that lived in the past in Antarctica.

R. CANALES

In previous oceanographic and environmental studies in Chile Bay, Greenwich Island, researcher Laura Farías had observed that not all February months behaved the same and that, in fact, there were intra-weekly variations. Her intention was to capture the phytoplankton bloom. In a situation of high temperatures or excess nutrients, these organisms can multiply and rapidly cause blooms or red tides. In this way, the water first turns a greenish, reddish or brownish color, depending on the pigments in the microalgae. The decomposition and death of these microorganisms, in turn, can lead to oxygen depletion in the water and other effects with consequences for fish and other organisms. It is for this reason that the need arose to carry out studies of environmental variability on a daily, seasonal and interannual scale, focusing particularly on gas dynamics. This project is funded by INACH.

CODE	TITLE	PI	INSTITUTION	YEARS
IN_01-20	*Paleontar - Paleobiology and Paleogeography of South Gondwana: Antarctic and South American Interrelationships*	Alexander Kelner/ Cristine Trevisan	Museu Nacional-UFRJ	2020-2023
IN_04-19	*Understanding the dynamics of an ancient Antarctic glaciation*	Gary Wilson/ Cristine Trevisan	UOTAGO-INACH	2019-2022
IN_02-19	*Climatic evolution of Paleocene-Miocene: connections between the Southern Ocean and the Antarctic Peninsula*	Gerson Fauth/ Cristine Trevisan	UNISINOS-INACH	2019-2023
IN_03-19	*Paleoenvironmental and paleoclimatic evolution of the Antarctic Peninsula: Correlation between the eastern and western margins and South America, based on the paleoflora*	Marcelo Carvalho/ Cristine Trevisan	UFRJ-INACH	2019-2023
FR_02-21	*Role of turbulent transport and total pressure balance in the dynamics of the magnetosphere of the Earth*	Marina Stepanova	USACH	2021-2025
FR_02-19	*Atmospheric Radiation Measurements on King George Island (Southern Ocean / Antarctic Peninsula)*	Raúl Cordero	USACH	2019-2023
RT_05-18	*Temporal dynamics of nitrous oxide and methane in an embayment of the West Antarctic Peninsula (WAP): from daily to inter-annual variability*	Laura Farías	UDEC	2019-2022
RT_44-18	*Paleogeography of the lower Heritage Group, Ellsworth Mountains, Western Antarctica: Implications for Gondwanaland reconstructions*	Fernando Poblete	UCHILE	2019-2022
RT_56-18	*Time constraints for Quaternary volcanism and tectonics in the Bransfield and Larsen rifts, Antarctica*	Luis Lara	SERNAGEOMIN	2019-2022
RT_70-18	*Light-absorbing impurities on coastal snowpacks in the Antarctic Peninsula*	Alessandro Damiani	USACH	2019-2022
RT_70-20	*Unique total solar eclipse observations from the Union Glacier*	Patricio Rojo	UCHILE	2021-2024

V. Biotechnology

This area of research considers the molecular, metabolic, and physiological characteristics of Antarctic organisms, in efforts to use these or their derivatives (biomolecules) for the creation or modification of products, applications, or processes for specific uses. These may include proposed innovative solutions for problems such as drought, energy optimization, or the battles against multi-resistant bacteria, or cancer. In some cases, deciphering the DNA in these organisms, using high-throughput sequencing tools, is a key factor in achieving these solutions. Conducting molecular-level studies in Antarctica is consistent with Chilean national guidelines that endeavor to respond to specific needs through applied research.

In recent decades, the White Continent has become a focus of interest for researchers who are interested not only in studying the adaptations of organisms to extreme Antarctic conditions, but also in possible useful applications. The generation of patents helps protect the research done with public or private funds, without jeopardizing the sharing of the resulting scientific knowledge. On the contrary, this information becomes open and freely accessible after it is generated.

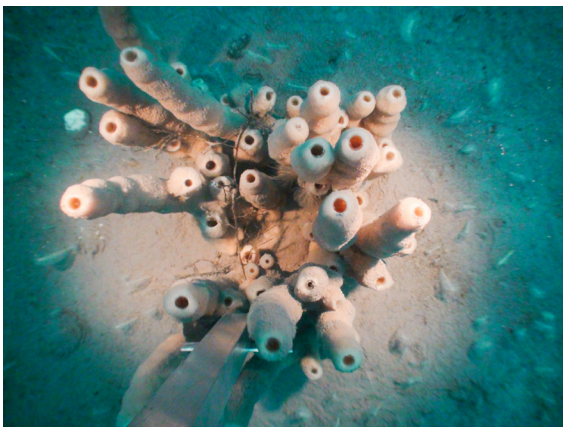
An example of this is the discovery of "Antartina," a new anticancer molecule extracted from the *Deschampsia antarctica* plant that has proven effective against neoplastic cells in cultures representing colorectal cancer. It is hoped that these and other molecules discovered in the future may be used in the fight against cancer. On the other hand, bacteria from this same plant have been isolated and found to help in optimizing the plant's growth, as well as antioxidant compounds that have been discovered in Antarctic plants and mosses.

What is more, these microorganisms may improve the capacities of intensive crop planting to resist salt stress. Improved plant moisture management capacities may also result from these bacteria. Antarctic fungi may also have applications for controlling pests that affect wheat production.

A biotechnological trend already observed in several projects is the biosynthesis of nano-particles by bacteria. These represent an alternative for producing nano-structures with new properties, which could be used in solar panels for the production of "green energy." These Prokaryotes nanoparticles are synthesized with more environmentally sensitive methods and produce less polluting residues. One project started in 2019 that is working in this direction involves the generation of biological fuel cells for producing electricity through renewable, sustainable means. These discoveries may make Antarctica a place where similar solutions can be found. These might include combating global warming effects by optimizing water use and developing crops that are more resistant to the new climate conditions, or decarbonization through increased reliance on solar energy.

Other projects of this course of study consider antimicrobials and, particularly, antibiotics, which have been a central feature of modern medicine for the last eight decades, being essential for improved health around the world. Over the past 60 years, millions of metric tons of antibiotics have been produced and distributed worldwide, although the often irrational use of antibiotics has resulted in the evolution of strains of drug-resistant bacteria.

On the other hand, it is believed that Antarctic science may also affect key activities in the Chilean economy, such as the wine industry. The project "Unveiling the unexplored diversity of Antarctic yeasts and their potential in the Chilean wine industry," led by Cristina Úbeda, will try to solve problems associated with low temperatures in the fermentation of white wines, using yeasts from Antarctica, which may also improve the taste and flavor characteristics of the wine. The wines produced with these yeasts will be analyzed to determine their aromatic composition by gas chromatography combined with mass spectrometry, resistance to oxidation, antioxidant capacity and total phenols. In addition, sensory analysis will be performed to determine if the differences between the wines are perceptible by a trained tasting panel. In this way, Antarctic science is being made accessible to the citizens of Chile, and for the scientific and technological development of the country, supporting key economic activities such as agriculture and renewable energies. Finally, a new scientific project hopes to evaluate the naturally occurring compounds from Antarctic lichens which can be inhibitors of neurodegenerative diseases.



C. LAGGER

The pioneer project of Fabiano Thompson and César Cárdenas proposes the use of sponge holobionts (animal host + microbiota) as biosensors of global changes in the Antarctic continent and the southern portion of the South American continent. In addition, a second relevant innovative aspect is the use of sponges as a source for the discovery of new biotechnological products. We will survey the biodiversity of sponge microbiomes and study the phylogeographic relationships of sponges from Antarctica / South America, in order to map the diversity in a broad oceanographic context and to determine the biocomplexity of the marine environments.

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CODE	TITLE	PI	INSTITUTION	YEARS
IN_01-19	*Sponges as biosensors of global changes and sources of innovation and biotechnology*	Fabiano Thompson/ César Cárdenas	UFRJ-INACH	2019-2022
FR_02-18	*Assessing the ecophysiological and molecular basis of the functional symbiosis: extremophile fungal-endophytes improve the yield and drought tolerance in crops*	Marco Molina	UTALCA	2018-2022
FR_01-19	*Dynamics and functions of sponge microbiomes under the strong seasonal variability of the Antarctic environment*	Nicole Trefault	UMAYOR	2019-2023
FI_02-18	*Auto-inducer molecules as regulators of growing in Antarctic vascular plant as useful tool for increase vegetable response to nutrient limitation*	Claudia Rabert	UAUTÓNOMA	2018-2021
FI_02-19	*Big effects of small nanoparticles: Physiological and transcriptional impact of nanoplastic and nano-metals in the Antarctic clam* Laternula elliptica	Rodolfo Rondón	INACH	2019-2022
RT_16-17	*Anthraquinones, depsides and depsidones from Antarctic lichens: Isolation, molecular simulation and re-myelinating and neuroprotective activity*	Mario Simirgiotis	UACH	2020-2023
RT_42-17	*Isolation and characterization of lactic acid bacteria from Antarctica with technological and bacteriotherapy applications*	Javier Ferrer	UDEC	2018-2021
RT_12-18	*Isolation and characterization of extremophilic microorganisms from Antarctica with application in microbial fuel cells at low temperatures*	Iván Ñancucheo	USS	2019-2022
RT_18-19	*Secondary metabolites isolated from Antarctic lichens as inhibitors and cytoskeleton stabilizers in Tauopathies*	Alberto Cornejo	UNAB	2020-2023
RT_16-20	*Screening of lipids from Antarctic fungi and search for their potential antifungal activity against human pathogenic fungi*	Cledir Santos	UFRO	2021-2024
RT_33-18	*Interdisciplinary network for study of Antarctic fungal bioactive compounds for control of cancer cells, pathogenic yeasts and bacterial strains to human health*	Cristian Paz	UFRO	2019-2022
RG_24-18	*Revealing the unexplored diversity of Antarctic yeast and their potential in Chilean wine industry*	Cristina Úbeda	UMAG	2020-2022
RG_17-19	*A systems-wide understanding of the Antarctic Pseudomonas* frigusceleri *MPC6 strain for fast-growing and novel biopolymer synthesis at low temperatures*	Ignacio Poblete	UNAB	2020-2022
DG_14-19	*Identification of secondary metabolites from Antarctic fungus* Pseudogymnoascus verrucosus	Mariana Montanares	UCHILE	2019-2021
DG_19-19	*Effect of UVB radiation on the interaction of the complex formed by the FtsZ and ZipA proteins of* Pseudoalteromonas haloplanktis *and* Escherichia coli	Valentina Carrasco	UCHILE	2019-2021
MG_07-20	*Annotation of the Antarctic fungi Pseudogymnoacus verrucosus FAE27: identification and bioinformatic analysis of genes involved in nitrogen assimilation and biosynthesis of nitrogenated secondary metabolites*	Pablo Villanueva	UCHILE	2020-2021
DG_14-19	*Identification of secondary metabolites from Antarctic fungus* Pseudogymnoascus verrucosus	Mariana Montanares	UCHILE	2019-2021
DG_19-19	*Effect of UVB radiation on the interaction of the complex formed by the FtsZ and ZipA proteins of* Pseudoalteromonas haloplanktis *and* Escherichia coli	Valentina Carrasco	UCHILE	2019-2021
DT_20-18	*Biological crusts of Antarctic soil: effects on the ecophysiological performance of* Colobanthus quitensis *and the molecular mechanisms involved*	Andrea Barrera	UTALCA	2018-2020

Mario Simirgiotis is leading a multidisciplinary project funded by INACH that encompasses chemical and biological knowledge and will allow a better understanding of the chemistry of lichens (*Usnea aurantiaco-atra*, *Himantormia lugubris* and *Usnea antarctica*) from the White Continent as well as the neuroprotective and re-myelinating activity of its metabolites for the first time. In the photo, pharmaceutical chemist Simirgiotis practicing some taekwondo during field work.

VI. Human Footprints in Antarctica

H. DÍAZ

The Securing Antarctica's Environmental Future (SAEF) initiative, led by Prof. Steven Chown, aims to be the world's leading research program delivering interdisciplinary science to forecast environmental change across the Antarctic region, by deploying effective environmental stewardship strategies in the face of this change, and to secure Antarctica as a natural reserve.

The project entitled "Long-range transport of xenobiotics and microorganisms: Teleconnections and influence on territorial ecosystems," and led by Eduardo Castro, studies the transport of xenobiotics towards the White Continent by atmospheric transport and resulting impacts to the terrestrial plants using as models *Colobanthus quitensis* and *Deschampsia antarctica*. This project is funded by ANID.

Antarctica is home to ecosystems and life forms with unique adaptations, as a result of extreme isolation for millions of years. As climate change deepens and those physical and biological barriers are weakened, there is also concern about anthropogenic threats such as xenobiotics, Persistent Organic Compounds (POPs), and other harmful chemical compounds introduced through tourism, logistical operations, and scientific activities. Consequently, all these activities must be closely monitored and regulated under the umbrella of the Antarctic Treaty System and the Madrid Protocol. The protection of the Antarctic environment is a priority issue for the Antarctic Treaty System, especially important for the Committee for the Protection of the Environment, and other advisory bodies such as the Scientific Committee for Antarctic Science Research (SCAR) and the Convention for the Conservation of Marine Antarctic Marine Living Resources (CCAMLR). Some key questions related to the human footprint in Antarctica include: what will the significant consequences of anthropogenic impacts on the Antarctic ecosystem be observed? How will humans and pathogens affect and adapt to Antarctic environments? How will regulatory mechanisms evolve to deal with the growing pace of Antarctic tourism? How will external pressures and changes in geopolitical conditions affect governance and Antarctic science?

Currently, the PROCIEN includes timely projects focused on evaluating the human footprint in Antarctica, through the detection of POPs in fauna and their influence on the "biological bomb" as well as the Antarctic trophic web, the presence of the intl1 gene in Antarctic bacteria, and the amount and characterization of organic pollutants and microbes across the Antarctic Peninsula, including the mechanisms that modulate their long-scale and local atmospheric transport, and their effect on soils, substrates and vegetation, considering climate change scenarios.

In regards to the most relevant results obtained by PROCIEN researchers in the area of pollution, studies are dealing with the presence of POPs in samples of phytoplankton, water, Antarctic krill, and sediments collected in Fildes Bay. These compounds enter the Antarctic ecosystem through atmospheric transport and through phytoplankton, and are passed on to other levels of the food chain.

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CODE	TITLE	PI	INSTITUTION	YEARS
IN_01-21	*SAEF: Securing Antarctica's environmental future. An evidence-based, informatics approach*	Steven Chown / Marcelo Leppe	MU - INACH	2021-2028
AN_01-19	*Long-range transport of xenobiotics and microorganisms: Teleconnections and influence on territorial ecosystems*	Eduardo Castro	UNAB	2020-2023
FR_03-21	*Impact of sedimentary fluxes of algal blooms on the bioaccumulation and biomagnification of Persistent Organic Pollutants*	Cristóbal Galbán	UMAYOR	2021-2025
FP_01-19	*Where there are humans there is contamination: Early detection of anthropic effects on marine sentinel species of the Antarctic Peninsula*	Lisette Zenteno	UCSC	2019-2022

VII. Social Sciences and Humanities

R. QUINÁN

The Social Sciences and Humanities currently play an essential role in thinking about the future of the country and the world in terms of Antarctica. The uniqueness of the extreme environment also has an analogy in how modern society has solved the challenges of managing a territory of 14 million km^2, under the principles of the Antarctic Treaty, i.e., to dedicate a large continent to peaceful activities, science, and respect for the environment. This calls for asking simple but profound questions: What has happened, what are we heirs to, what is our own in Antarctica, what is our south, how can we distinguish natural from man-made environmental changes, how will this knowledge affect Antarctic governance, how will external pressures and changes in geopolitical configurations of power affect Antarctic governance and science, and how will Antarctic science and governance be affected by external pressures and changes in geopolitical power configurations?

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CODE	TITLE	PI	INSTITUTION	YEARS
FP_03-19	*No man's land, everyone's land. Nature and nationalism in the construction of the cultural figures of the future of the Chilean Antarctic. 1940-2018*	Fulvio Rossetti	PUC	2019-2022

ANTARCTIC SCIENCE PUBLICATIONS

Web of Science
2020

F. TRUEBA

LINE I **THE STATE OF THE ANTARCTIC ECOSYSTEM**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
Global Drivers on Southern Ocean Ecosystems: Changing Physical Environments and Anthropogenic Pressures in an Earth System	Morley, Simon A.; Abele, Doris; Barnes, David K. A.; Cardenas, Cesar A.; Cotte, Cedric; Gutt, Julian; Henley, Sian F.; Hofer, Juan; Hughes, Kevin A.; Martin, Stephanie M.; Moffat, Carlos; Raphael, Marilyn; Stammerjohn, Sharon E.; Suckling, Coleen C.; Tulloch, Vivitskaia J. D.; Waller, Cath L.; Constable, Andrew J.	FRONTIERS IN MARINE SCIENCE	Q1	3.661	10.3389/fmars.2020.547188
Isolation and Characterization of Cold-Tolerant Hyper-ACC-Degrading Bacteria from the Rhizosphere, Endosphere, and Phyllosphere of Antarctic Vascular Plants	Araya, Macarena A.; Valenzuela, Tamara; Inostroza, Nitza G.; Maruyama, Fumito; Jorquera, Milko A.; Acuna, Jacquelinne J.	MICROORGANISMS	Q1	4.128	10.3390/microorganisms8111788
Widespread microbial mercury methylation genes in the global ocean	Villar, Emilie; Cabrol, Lea; Heimburger-Boavida, Lars-Eric	ENVIRONMENTAL MICROBIOLOGY REPORTS	Q2	2.975	10.1111/1758-2229.12829
Sustained RNA virome diversity in Antarctic penguins and their ticks	Wille, Michelle; Harvey, Erin; Shi, Mang; Gonzalez-Acuna, Daniel; Holmes, Edward C.; Hurt, Aeron C.	ISME JOURNAL	Q1	9.18	10.1038/s41396-020-0643-1
Characterizing the microbiomes of Antarctic sponges: a functional metagenomic approach	Moreno-Pino, Mario; Cristi, Antonia; Gillooly, James F.; Trefault, Nicole	SCIENTIFIC REPORTS	Q1	3.998	10.1038/s41598-020-57464-2
Cryptic speciation in gentoo penguins is driven by geographic isolation and regional marine conditions: Unforeseen vulnerabilities to global change	Pertierra, Luis R.; Segovia, Nicolas, I; Noll, Daly; Martinez, Pablo A.; Pliscoff, Patricio; Barbosa, Andres; Aragon, Pedro; Rey, Andrea Raya; Pistorius, Pierre; Trathan, Phil; Polanowski, Andrea; Bonadonna, Francesco; Le Bohec, Celine; Bi, Ke; Wang-Claypool, Cynthia Y.; Gonzalez-Acuna, Daniel; Dantas, Gisele P. M.; Bowie, Rauri C. K.; Poulin, Elie; Vianna, Juliana A.	DIVERSITY AND DISTRIBUTIONS	Q1	3.993	10.1111/ddi.13072
Comments and records on the large branchiopod Crustacea (Anostraca, Notostraca, Laevicaudata, Spinicaudata, Cyclestherida) of the Neotropical and Antarctic bioregions	Rogers, D. Christopher; Severo-Neto, Francisco; Volcan, Matheus Vieira; De los Rios, Patricio; Epele, Luis B.; Ferreira, Aloisio O.; Rabet, Nicolas	STUDIES ON NEOTROPICAL FAUNA AND ENVIRONMENT	Q3	0.943	10.1080/01650521.2020.1728879
Niche Differentiation in the Composition, Predicted Function, and Co-occurrence Networks in Bacterial Communities Associated With Antarctic Vascular Plants	Zhang, Qian; Acuna, Jacquelinne J.; Inostroza, Nitza G.; Duran, Paola; Mora, Maria L.; Sadowsky, Michael J.; Jorquera, Milko A.	FRONTIERS IN MICROBIOLOGY	Q1	4.236	10.3389/fmicb.2020.01036
Unmanned aerial vehicle (UAV) survey of the Antarctic shag (Leucocarbo bransfieldensis) breeding colony at Harmony Point, Nelson Island, South Shetland Islands	Oosthuizen, W. Chris; Kruger, Lucas; Jouanneau, William; Lowther, Andrew D.	POLAR BIOLOGY	Q3	1.728	10.1007/s00300-019-02616-y
Microbial composition and photosynthesis in Antarctic snow algae communities: Integrating metabarcoding and pulse amplitude modulation fluorometry	Soto, Daniela F.; Fuentes, Romina; Huovinen, Pirjo; Gomez, Ivan	ALGAL RESEARCH-BIOMASS BIOFUELS AND BIOPRODUCTS	Q1	4.008	10.1016/j.algal.2019.101738
Genome-wide analyses reveal drivers of penguin diversification	Vianna, Juliana A.; Fernandes, Flavia A. N.; Jose Frugone, Maria; Figueiro, Henrique V.; Pertierra, Luis R.; Nolla, Daly; Bi, Ke; Wang-Claypool, Cynthia Y.; Lowther, Andrew; Parker, Patricia; Le Bohec, Celine; Bonadonna, Francesco; Wienecke, Barbara; Pistorius, Pierre; Steinfurth, Antje; Burridge, Christopher P.; Dantas, Gisele P. M.; Poulin, Elie; Simison, W. Brian; Henderson, Jim; Eizirik, Eduardo; Nery, Mariana F.; Bowie, Rauri C. K.	PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA	Q1	9.412	10.1073/pnas.2006659117
Biodiversity of an Antarctic rocky subtidal community and its relationship with glacier meltdown processes	Valdivia, Nelson; Garrido, Ignacio; Bruning, Paulina; Pinones, Andrea; Miguel Pardo, Luis	MARINE ENVIRONMENTAL RESEARCH	Q1	2.727	10.1016/j.marenvres.2020.104991
The influence of glacial melt and retreat on the nutritional condition of the bivalve Nuculana inaequisculpta (Protobranchia: Nuculanidae) in the West Antarctic Peninsula	Bascur, Miguel; Munoz-Ramirez, Carlos; Roman-Gonzalez, Alejandro; Sheen, Katy; Barnes, David K. A.; Sands, Chester J.; Brante, Antonio; Urzua, Angel	PLOS ONE	Q2	2.74	10.1371/journal.pone.0233513
Multiple late-Pleistocene colonisation events of the Antarctic pearlwort Colobanthus quitensis *(Caryophyllaceae) reveal the recent arrival of native Antarctic vascular flora*	Biersma, Elisabeth M.; Torres-Diaz, Cristian; Molina-Montenegro, Marco A.; Newsham, Kevin. K.; Vidal, Marcela A.; Collado, Gonzalo A.; Acuna-Rodriguez, Ian S.; Ballesteros, Gabriel I.; Figueroa, Christian C.; Goodall-Copestake, William P.; Leppe, Marcelo A.; Cuba-Diaz, Marely; Valladares, Moises A.; Pertierra, Luis R.; Convey, Peter	JOURNAL OF BIOGEOGRAPHY	Q1	3.723	10.1111/jbi.13843
Molecular and morphological data reveal three new species of Thouarella Gray, 1870 (Anthozoa: Octocorallia: Primnoidae) from the Southern Ocean	Nunez-Flores, Monica; Gomez-Uchida, Daniel; Lopez-Gonzalez, Pablo J.	MARINE BIODIVERSITY	Q2	1.487	10.1007/s12526-020-01053-z
Evidence of strong small-scale population structure in the Antarctic freshwater copepod Boeckella poppei in lakes on Signy Island, South Orkney Islands	Maturana, Claudia S.; Segovia, Nicolas, I; Gonzalez-Wevar, Claudio A.; Diaz, Angie; Rosenfeld, Sebastian; Poulin, Elie; Jackson, Jennifer A.; Convey, Peter	LIMNOLOGY AND OCEANOGRAPHY	Q1	3.778	10.1002/lno.11435
Characterization of the Gut Microbiota of the Antarctic Heart Urchin (Spatangoida) Abatus agassizii	Schwob, Guillaume; Cabrol, Lea; Poulin, Elie; Orlando, Julieta	FRONTIERS IN MICROBIOLOGY	Q1	4.236	10.3389/fmicb.2020.00308
Design and operational implementation of the integrated tsunami forecast and warning system in Chile (SIPAT)	Catalan, Patricio A.; Gubler, Alejandra; Canas, Javier; Zuniga, Carlos; Zelaya, Cecilia; Pizarro, Leonardo; Valdes, Carlos; Mena, Rene; Toledo, Eduardo; Cienfuegos, Rodrigo	COASTAL ENGINEERING JOURNAL	Q2	2.032	10.1080/21664250.2020.1727402
Chilean Antarctic krill fishery (2011-2016)	Arana, Patricio M.; Rolleri, Renzo; De Caso, Alvaro	LATIN AMERICAN JOURNAL OF AQUATIC RESEARCH	Q4	0.721	10.3856/vol48-issue2-fulltext-2408

LINE I **THE STATE OF THE ANTARCTIC ECOSYSTEM**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
Fungal Symbionts Enhance N-Uptake for Antarctic Plants Even in Non-N Limited Soils	Acuna-Rodriguez, Ian S.; Galan, Alexander; Torres-Diaz, Cristian; Atala, Cristian; Molina-Montenegro, Marco A.	FRONTIERS IN MICROBIOLOGY	Q1	4.236	10.3389/fmicb.2020.575563
Coprophagic behaviour of southern giant petrels (Macronectes giganteus) during breeding period	Cora, Denyelle Hennayra; Finger, Julia Victoria Grohmann; Kruger, Lucas	POLAR BIOLOGY	Q3	1.728	10.1007/s00300-020-02757-5
Spatial patterns of continental shelf faunal community structure along the Western Antarctic Peninsula	Friedlander, Alan M.; Goodell, Whitney; Salinas-de-Leon, Pelayo; Ballesteros, Enric; Berkenpas, Eric; Capurro, Andrea P.; Cardenas, Cesar A.; Hune, Mathias; Lagger, Cristian; Landaeta, Mauricio F.; Munoz, Alex; Santos, Mercedes; Turchik, Alan; Werner, Rodolfo; Sala, Enric	PLOS ONE	Q2	2.74	10.1371/journal.pone.0239895
Hormonal, autonomic cardiac and mood states changes during an Antarctic expedition: From ship travel to camping in Snow Island	Moraes, Michele M.; Bruzzi, Rubio S.; Martins, Ygor A. T.; Mendes, Thiago T.; Maluf, Chams B.; Ladeira, Roberto V. P.; Nunez-Espinosa, Cristian; Soares, Danusa D.; Wanner, Samuel P.; Arantes, Rosa M. E.	PHYSIOLOGY & BEHAVIOR	Q2	2.826	10.1016/j.physbeh.2020.113069
Antarctic krill fishery effects over penguin populations under adverse climate conditions: Implications for the management of fishing practices	Kruger, Lucas; Huerta, Magdalena F.; Cruz, Francisco Santa; Cardenas, Cesar A.	AMBIO	Q1	4.778	10.1007/s13280-020-01386-w
Gene flow in the Antarctic bivalveAequiyoldia eightsii(Jay, 1839) suggests a role for the Antarctic Peninsula Coastal Current in larval dispersal	Munoz-Ramirez, Carlos P.; Barnes, David K. A.; Cardenas, Leyla; Meredith, Michael P.; Morley, Simon A.; Roman-Gonzalez, Alejandro; Sands, Chester J.; Scourse, James; Brante, Antonio	ROYAL SOCIETY OPEN SCIENCE	Q2	2.646	10.1098/rsos.200603
Evaluation of BOX-PCR and REP-PCR as Molecular Typing Tools for AntarcticStreptomyces	Borba, Marcela Proenca; Ballarini, Ana Elisa; Witusk, Joao Paulo Duarte; Lavin, Paris; Van der Sand, Sueli	CURRENT MICROBIOLOGY	Q4	1.746	10.1007/s00284-020-02199-6
Overcoming the Obstacles Faced by Early Career Researchers in Marine Science: Lessons From the Marine Ecosystem Assessment for the Southern Ocean	Brasier, Madeleine J.; McCormack, Stacey; Bax, Narissa; Caccavo, Jilda A.; Cavan, Emma; Ericson, Jessica A.; Figuerola, Blanca; Hancock, Alyce; Halfter, Svenja; Hellessey, Nicole; Hofer, Juan; Puskic, Peter S.; de Oliveira, Cesar Soares; Subramaniam, Roshni C.; Wallis, Jake; Weldrick, Christine K.	FRONTIERS IN MARINE SCIENCE	Q1	3.661	10.3389/fmars.2020.00692
Circumpolar diversification of the Ixodes uriae tick virome	Pettersson, John H. -O.; Ellstrom, Patrik; Ling, Jiaxin; Nilsson, Ingela; Bergstrom, Sven; Gonzalez-Acuna, Daniel; Olsen, Bjorn; Holmes, Edward C.	PLOS PATHOGENS	Q1	6.218	10.1371/journal.ppat.1008759
Fungal Planet description sheets: 1042-1111	Crous, P. W.; Wingfield, M. J.; Chooi, Y. -H.; Gilchrist, C. L. M.; Lacey, E.; Pitt, J. I.; Roets, F.; Swart, W. J.; Cano-Lira, J. F.; Valenzuela-Lopez, N.; Hubka, V.; Shivas, R. G.; Stchigel, A. M.; Holdom, D. G.; Jurjevic, Z.; Kachalkin, A. V.; Lebel, T.; Lock, C.; Martin, M. P.; Tan, Y. P.; Tomashevskaya, M. A.; Vitelli, J. S.; Baseia, I. G.; Bhatt, V. K.; Brandrud, T. E.; De Souza, J. T.; Dima, B.; Lacey, H. J.; Lombard, L.; Johnston, P. R.; Morte, A.; Papp, V.; Rodriguez, A.; Rodriguez-Andrade, E.; Semwal, K. C.; Tegart, L.; Abad, Z. G.; Akulov, A.; Alvarado, P.; Alves, A.; Andrade, J. P.; Arenas, F.; Asenjo, C.; Ballara, J.; Barrett, M. D.; Berna, L. M.; Berraf-Tebbal, A.; Bianchinotti, M. V.; Bransgrove, K.; Burgess, T. I.; Carmo, F. S.; Chavez, R.; Cmokova, A.; Dearnaley, J. D. W.; Santiago, A. L. C. M. de A.; Freitas-Neto, J. F.; Denman, S.; Douglas, B.; Dovana, F.; Eichmeier, A.; Esteve-Raventos, F.; Farid, A.; Fedosova, A. G.; Ferisin, G.; Ferreira, R. J.; Ferrer, A.; Figueiredo, C. N.; Figueiredo, Y. F.; Reinoso-Fuentealba, C. G.; Garrido-Benavent, I.; Canete-Gibas, C. F.; Gil-Duran, C.; Glushakova, A. M.; Goncalves, M. F. M.; Gonzalez, M.; Gorczak, M.; Gorton, C.; Guard, F. E.; Guarnizo, A. L.; Guarro, J.; Gutierrez, M.; Hamal, P.; Hien, L. T.; Hocking, A. D.; Houbraken, J.; Hunter, G. C.; Inacio, C. A.; Jourdan, M.; Kapitonov, V. I.; Kelly, L.; Khanh, T. N.; Kislo, K.; Kiss, L.; Kiyashko, A.; Kolarik, M.; Kruse, J.; Kubatova, A.; Kucera, V.; Kucerova, I.; Kusan, I.; Lee, H. B.; Levican, G.; Lewis, A.; Liem, N. V.; Liimatainen, K.; Lim, H. J.; Lyons, M. N.; Macia-Vicente, J. G.; Magana-Duenas, V.; Mahiques, R.; Malysheva, E. F.; Marbach, P. A. S.; Marinho, P.; Matocec, N.; McTaggart, A. R.; Mesic, A.; Morin, L.; Munoz-Mohedano, J. M.; Navarro-Rodenas, A.; Nicolli, C. P.; Oliveira, R. L.; Otsing, E.; Ovrebo, C. L.; Pankratov, T. A.; Panos, A.; Paz-Conde, A.; Perez-Sierra, A.; Phosri, C.; Pintos, A.; Posta, A.; Prencipe, S.; Rubio, E.; Saitta, A.; Sales, L. S.; Sanhueza, L.; Shuttleworth, L. A.; Smith, J.; Smith, M. E.; Spadaro, D.; Spetik, M.; Sochor, M.; Sochorova, Z.; Sousa, J. O.; Suwannasai, N.; Tedersoo, L.; Thanh, H. M.; Thao, L. D.; Tkalcec, Z.; Vaghefi, N.; Venzhik, A. S.; Verbeken, A.; Vizzini, A.; Voyron, S.; Wainhouse, M.; Whalley, A. J. S.; Wrzosek, M.; Zapata, M.; Zeil-Rolfe, I.; Groenewald, J. Z.	PERSOONIA	Q1	8.227	10.3767/persoonia.2020.44.11
Infestation dynamics between parasitic Antarctic fish leeches (Piscicolidae) and their crocodile icefish hosts (Channichthyidae)	Parker, Elyse; Jones, Christopher D.; Arana, Patricio M.; Alegria, Nicolas A.; Sarralde, Roberto; Gallardo, Francisco; Phillips, Anna J.; Williams, Bronwyn W.; Dornburg, Alex	POLAR BIOLOGY	Q3	1.728	10.1007/s00300-020-02670-x
Analysis of the complete organellar genomes of Palmaria decipiens (Palmariaceae, Rhodophyta) from Antarctica confirms its taxonomic placement in the genus Palmaria	Bustamante, Danilo E.; Hughey, Jeffery R.; Calderon, Martha S.; Mansilla, Andres; Rodriguez, Juan P.; Mendez, Fabio	MITOCHONDRIAL DNA PART B-RESOURCES	Q4	0.885	10.1080/23802359.2020.1734494

LINE I **THE STATE OF THE ANTARCTIC ECOSYSTEM**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
Continental and Antarctic Lichens: isolation, identification and molecular modeling of the depside tenuiorin from the Antarctic lichen Umbilicaria antarctica as tau protein inhibitor	Salgado, Francisco; Caballero, Julio; Vargas, Reinaldo; Cornejo, Alberto; Areche, Carlos	NATURAL PRODUCT RESEARCH	Q2	2.158	10.1080/14786419.2018.1492576
Detection of the phycotoxin pectenotoxin-2 in waters around King George Island, Antarctica	Krock, Bernd; Schloss, Irene R.; Trefault, Nicole; Tillmann, Urban; Hernando, Marcelo; Deregibus, Dolores; Antoni, Julieta; Almandoz, Gaston O.; Hoppenrath, Mona	POLAR BIOLOGY	Q3	1.728	10.1007/s00300-020-02628-z
LPS Modulates the Expression of Iron-Related Immune Genes in Two Antarctic Notothenoids	Pamela Martinez, Danixa; Sousa, Carmen; Oyarzun, Ricardo; Pontigo, Juan Pablo; Canario, Adelino V. M.; Power, Deborah Mary; Vargas-Chacoff, Luis; Guerreiro, Pedro Miguel	FRONTIERS IN PHYSIOLOGY	Q1	3.367	10.3389/fphys.2020.00102
Sponges from Doumer Island, Antarctic Peninsula, with description of new species of Clathria (Axosuberites) Topsent, 1893 and Hymeniacidon Bowerbank, 1858, and a re-description of H. torquata Topsent, 1916	Fernandez, Julio C. C.; Bravo-Gomez, Diego; Cardenas, Cesar A.; Hajdu, Eduardo	ZOOTAXA	Q3	0.955	10.11646/zootaxa.4728.1.4
Variability in age of a Southern Ocean myctophid (Gymnoscopelus nicholsi) derived from scat-recovered otoliths	Klemmedson, Angela D.; Reiss, Christian S.; Goebel, Michael E.; Kaufmann, Ronald S.; Dorval, Emmanis; Linkowski, Tomasz B.; Borras-Chavez, Renato	MARINE ECOLOGY PROGRESS SERIES	Q1	2.326	10.3354/meps13176
Endoparasitic diversity from the Southern Ocean: is it really low in Antarctic fish?	Munoz, G.; Cartes, F. D.	JOURNAL OF HELMINTHOLOGY	Q3	1.54	10.1017/S0022149X20000590
Incidental catch of marine organisms registered in the Chilean Antarctic krill fishery, years 2012-2016	Arana, Patricio M.; Rolleri, Renzo	LATIN AMERICAN JOURNAL OF AQUATIC RESEARCH	Q4	0.721	10.3856/vol48-issue3-fulltext-2434
Antarctic demersal finfish around the Elephant and the South Orkney islands: distribution, abundance and biological characteristics	Arana, Patricio M.; Jones, Christopher D.; Alegria, Nicolas A.; Sarralde, Roberto; Rolleri, Renzo	LATIN AMERICAN JOURNAL OF AQUATIC RESEARCH	Q4	0.721	10.3856/vol48-issue2-fulltext-2469
Psychrobacter pygoscelis sp. nov. isolated from the penguin Pygoscelis papua	Kaempfer, Peter; Glaeser, Stefanie P.; Irgang, Rute; Fernandez-Negrete, Guillermo; Poblete-Morales, Matias; Fuentes-Messina, Derie; Cortez-San Martin, Marcelo; Avendano-Herrera, Ruben	INTERNATIONAL JOURNAL OF SYSTEMATIC AND EVOLUTIONARY MICROBIOLOGY	Q3	2.415	10.1099/ijsem.0.003739
Genome Sequence of Pseudomonas sp. Strain AN3A02, Isolated from Rhizosphere of Deschampsia antarctica *Desv., with Antagonism against Botrytis cinerea*	Poblete-Morales, Matias; Rabert, Claudia; Olea, Andres F.; Carrasco, Hector; Calderon, Raul; Corsini, Gino; Silva-Moreno, Evelyn	MICROBIOLOGY RESOURCE ANNOUNCEMENTS	Q4	0.88	10.1128/MRA.00320-20

LINE II **ANTARCTIC THRESHOLDS: ECOSYSTEM RESILIENCE AND ADAPTATION**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
In Situ Rhizosphere Microbiome in Antarctic Vascular Plants, Modulated by Soil Condition	Rabert, Claudia; Larama, Giovanni; Fuentes, Alejandra; Gutierrez-Moraga, Ana; Tapia-Valdebenito, Daisy	MICROBIOLOGY RESOURCE ANNOUNCEMENTS	Q4	0.785	10.1128/MRA.01125-20
Temperature Differentially Affects Gene Expression in Antarctic Thraustochytrid Oblongichytrium sp. RT2316-13	Paredes, Paris; Larama, Giovanni; Flores, Liset; Leyton, Allison; Ili, Carmen Gloria; Asenjo, Juan A.; Chisti, Yusuf; Shene, Carolina	MARINE DRUGS	Q1	5.118	10.3390/md18110563
Low-temperature tolerance of the Antarctic species Deschampsia antarctica: A complex metabolic response associated with nutrient remobilization	Clemente-Moreno, Maria Jose; Omranian, Nooshin; Saez, Patricia L.; Figueroa, Carlos Maria; Del-Saz, Nestor; Elso, Mhartyn; Poblete, Leticia; Orf, Isabel; Cuadros-Inostroza, Alvaro; Cavieres, Lohengrin A.; Bravo, Leon; Fernie, Alisdair R.; Ribas-Carbo, Miquel; Flexas, Jaume; Nikoloski, Zoran; Brotman, Yariv; Gago, Jorge	PLANT CELL AND ENVIRONMENT	Q1	6.362	10.1111/pce.13737
Antarctic root endophytes improve physiological performance and yield in crops under salt stress by enhanced energy production and Na+ sequestration	Molina-Montenegro, Marco A.; Acuna-Rodriguez, Ian S.; Torres-Diaz, Cristian; Gundel, Pedro E.; Dreyer, Ingo	SCIENTIFIC REPORTS	Q1	3.998	10.1038/s41598-020-62544-4
In silico analysis of metatranscriptomic data from the Antarctic vascular plant Colobanthus quitensis*: Responses to a global warming scenario through changes in fungal gene expression levels*	Ballesteros, Gabriel, I; Torres-Diaz, Cristian; Bravo, Leon A.; Balboa, Karen; Caruso, Carla; Bertini, Laura; Proietti, Silvia; Molina-Montenegro, Marco A.	FUNGAL ECOLOGY	Q2	2.656	10.1016/j.funeco.2019.100873
It Is Hot in the Sun: Antarctic Mosses Have High Temperature Optima for Photosynthesis Despite Cold Climate	Perera-Castro, Alicia, V; Waterman, Melinda J.; Turnbull, Johanna D.; Ashcroft, Michael B.; McKinley, Ella; Watling, Jennifer R.; Bramley-Alves, Jessica; Casanova-Katny, Angelica; Zuniga, Gustavo; Flexas, Jaume; Robinson, Sharon A.	FRONTIERS IN PLANT SCIENCE	Q1	4.402	10.3389/fpls.2020.01178
Fungal Endophytes Enhance the Photoprotective Mechanisms and Photochemical Efficiency in the Antarctic Colobanthus quitensis *(Kunth) Bartl. Exposed to UV-B Radiation*	Barrera, Andrea; Hereme, Rasme; Ruiz-Lara, Simon; Larrondo, Luis F.; Gundel, Pedro E.; Pollmann, Stephan; Molina-Montenegro, Marco A.; Ramos, Patricio	FRONTIERS IN ECOLOGY AND EVOLUTION	Q2	2.416	10.3389/fevo.2020.00122
Evaluating the effects of ocean warming and freshening on the physiological energetics and transcriptomic response of the Antarctic limpet Nacella concinna	Navarro, Jorge M.; Detree, Camille; Morley, Simon A.; Cardenas, Leyla; Ortiz, Alejandro; Vargas-Chacoff, Luis; Paschke, Kurt; Gallardo, Pablo; Guillemin, Marie-Laure; Gonzalez-Wevar, Claudio	SCIENCE OF THE TOTAL ENVIRONMENT	Q1	6.551	10.1016/j.scitotenv.2020.142448
Evolution of chaperome gene expression and regulatory elements in the antarctic notothenioid fishes	Bilyk, Kevin T.; Zhuang, Xuan; Vargas-Chacoff, Luis; Cheng, C-H Christina	HEREDITY	Q1	3.436	10.1038/s41437-020-00382-w
Decomposition of Calcium Oxalate Crystals in Colobanthus quitensis *under CO2 Limiting Conditions*	Gomez-Espinoza, Olman; Gonzalez-Ramirez, Daniel; Bresta, Panagiota; Karabourniotis, George; Bravo, Leon A.	PLANTS-BASEL	Q1	2.762	10.3390/plants9101307

LINE II **ANTARCTIC THRESHOLDS: ECOSYSTEM RESILIENCE AND ADAPTATION**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
Effects of Climate Change Stressors on the Prokaryotic Communities of the Antarctic SpongeIsodictya kerguelenensis	Rondon, Rodolfo; Gonzalez-Aravena, Marcelo; Font, Alejandro; Osorio, Magdalena; Cardenas, Cesar A.	FRONTIERS IN ECOLOGY AND EVOLUTION	Q2	2.416	10.3389/fevo.2020.00262
Effect of in vitro cold acclimation of Deschampsia antarctica *on the accumulation of proteins with antifreeze activity*	Short, Stefania; Diaz, Rommy; Quinones, John; Beltran, Jorge; Farias, Jorge G.; Graether, Steffen P.; Bravo, Leon A.	JOURNAL OF EXPERIMENTAL BOTANY	Q1	5.908	10.1093/jxb/eraa071
Differential expression after UV-B radiation and characterization of chalcone synthase from the Patagonian hairgrass Deschampsia antarctica	Cuadra, Pedro; Guajardo, Joselin; Carrasco-Orellana, Cristian; Stappung, Yazmina; Fajardo, Victor; Herrera, Raul	PHYTOCHEMISTRY	Q1	4.072	10.1016/j.phytochem.2019.112179

LINE III **ANTARCTIC CLIMATE CHANGE**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
Sea ice dynamics in the Bransfield Strait, Antarctic Peninsula, during past 240 years: a multi-proxy intercomparison study	Vorrath, Maria-Elena; Mueller, Juliane; Rebolledo, Lorena; Cardenas, Paola; Shi, Xiaoxu; Esper, Oliver; Opel, Thomas; Geibert, Walter; Munoz, Praxedes; Haas, Christian; Kuhn, Gerhard; Lange, Carina B.; Lohmann, Gerrit; Mollenhauer, Gesine	CLIMATE OF THE PAST	Q1	3.536	10.5194/cp-16-2459-2020
Subglacial lakes and hydrology across the Ellsworth Subglacial Highlands, West Antarctica	Napoleoni, Felipe; Jamieson, Stewart S. R.; Ross, Neil; Bentley, Michael J.; Rivera, Andres; Smith, Andrew M.; Siegert, Martin J.; Paxman, Guy J. G.; Gacitua, Guisella; Uribe, Jose A.; Zamora, Rodrigo; Brisbourne, Alex M.; Vaughan, David G.	CRYOSPHERE	Q1	4.713	10.5194/tc-14-4507-2020
Analyzing Precipitation Changes in the Northern Tip of the Antarctic Peninsula during the 1970-2019 Period	Carrasco, Jorge E.; Cordero, Raul R.	ATMOSPHERE	Q1	2.397	10.3390/atmos11121270
A tree-ring delta O-18 series from southernmost Fuego-Patagonia is recording flavors of the Antarctic Oscillation	Meier, Wolfgang Jens-Henrik; Aravena, Juan-Carlos; Jana, Ricardo; Braun, Matthias Holger; Hochreuther, Philipp; Soto-Rogel, Pamela; Griessinger, Jussi	GLOBAL AND PLANETARY CHANGE	Q1	4.448	10.1016/j.gloplacha.2020.103302
Fungal Endophytes Exert Positive Effects on Colobanthus quitensis *Under Water Stress but Neutral Under a Projected Climate Change Scenario in Antarctica*	Hereme, Rasme; Morales-Navarro, Samuel; Ballesteros, Gabriel; Barrera, Andrea; Ramos, Patricio; Gundel, Pedro E.; Molina-Montenegro, Marco A.	FRONTIERS IN MICROBIOLOGY	Q1	4.927	10.3389/fmicb.2020.00264
The 2019/2020 summer of Antarctic heatwaves	Robinson, Sharon A.; Klekociuk, Andrew R.; King, Diana H.; Rojas, Marisol Pizarro; Zuniga, Gustavo E.; Bergstrom, Dana M.	GLOBAL CHANGE BIOLOGY	Q1	8.555	10.1111/gcb.15083
Blue carbon gains from glacial retreat along Antarctic fjords: What should we expect?	Barnes, David K. A.; Sands, Chester J.; Cook, Alison; Howard, Floyd; Roman Gonzalez, Alejandro; Munoz-Ramirez, Carlos; Retallick, Kate; Scourse, James; Van Landeghem, Katrien; Zwerschke, Nadescha	GLOBAL CHANGE BIOLOGY	Q1	8.555	10.1111/gcb.15055
Projected shifts in the foraging habitat of crabeater seals along the Antarctic Peninsula	Huckstadt, Luis A.; Pinones, Andrea; Palacios, Daniel M.; McDonald, Birgitte I.; Dinniman, Michael S.; Hofmann, Eileen E.; Burns, Jennifer M.; Crocker, Daniel E.; Costa, Daniel P.	NATURE CLIMATE CHANGE	Q1	20.893	10.1038/s41558-020-0745-9
Rainfall-Induced Landslides forecast using local precipitation and global climate indexes	Fustos, I; Abarca-del-Rio, R.; Moreno-Yaeger, P.; Somos-Valenzuela, M.	NATURAL HAZARDS	Q2	2.427	10.1007/s11069-020-03913-0
Southern Ocean carbon sink enhanced by sea-ice feedbacks at the Antarctic Cold Reversal	Fogwill, C. J.; Turney, C. S. M.; Menviel, L.; Baker, A.; Weber, M. E.; Ellis, B.; Thomas, Z. A.; Golledge, N. R.; Etheridge, D.; Rubino, M.; Thornton, D. P.; van Ommen, T. D.; Moy, A. D.; Curran, M. A. J.; Davies, S.; Bird, M., I; Munksgaard, N. C.; Rootes, C. M.; Millman, H.; Vohra, J.; Rivera, A.; Mackintosh, A.; Pike, J.; Hall, I. R.; Bagshaw, E. A.; Rainsley, E.; Bronk-Ramsey, C.; Montenari, M.; Cage, A. G.; Harris, M. R. P.; Jones, R.; Power, A.; Love, J.; Young, J.; Weyrich, L. S.; Cooper, A.	NATURE GEOSCIENCE	Q1	13.566	10.1038/s41561-020-0587-0
Spatial and temporal analysis of changes in the glaciers of the Antarctic Peninsula	Silva, Aline Barbosa; Arigony-Neto, Jorge; Braun, Matthias Holger; Almeida Espinoza, Jean Marcel; Costi, Juliana; Jana, Ricardo	GLOBAL AND PLANETARY CHANGE	Q1	4.448	10.1016/j.gloplacha.2019.103079
Antarctic intertidal macroalgae under predicted increased temperatures mediated by global climate change: Would they cope?	Celis-Pla, Paula S. M.; Moenne, Fabiola; Rodriguez-Rojas, Fernanda; Pardo, Diego; Lavergne, Celine; Moenne, Alejandra; Brown, Murray T.; Huovinen, Pirjo; Gomez, Ivan; Navarro, Nelso; Saez, Claudio A.	SCIENCE OF THE TOTAL ENVIRONMENT	Q1	6.551	10.1016/j.scitotenv.2020.140379
Projected shifts in the foraging habitat of crabeater seals along the Antarctic Peninsula (vol 56, pg 213, 2020)	Huckstadt, Luis A.; Pinones, Andrea; Palacios, Daniel M.; McDonald, Birgitte I.; Dinniman, Michael S.; Hofmann, Eileen E.; Burns, Jennifer M.; Crocker, Daniel E.; Costa, Daniel P.	NATURE CLIMATE CHANGE	Q1	20.893	10.1038/s41558-020-0850-9
Assessing distribution shifts and ecophysiological characteristics of the only Antarctic winged midge under climate change scenarios	Contador, Tamara; Ganan, Melisa; Bizama, Gustavo; Fuentes-Jaque, Guillermo; Morales, Luis; Rendoll, Javier; Simoes, Felipe; Kennedy, James; Rozzi, Ricardo; Convey, Peter	SCIENTIFIC REPORTS	Q1	3.998	10.1038/s41598-020-65571-3
Preface to the Special Issue on Antarctic Meteorology and Climate: Past, Present and Future	Liu, Jiping; Bromwich, David; Chen, Dake; Cordero, Raul; Jung, Thomas; Raphael, Marilyn; Turner, John; Yang, Qinghua	ADVANCES IN ATMOSPHERIC SCIENCES	Q2	2.583	10.1007/s00376-020-2001-7
Recent Near-surface Temperature Trends in the Antarctic Peninsula from Observed, Reanalysis and Regional Climate Model Data	Bozkurt, Deniz; Bromwich, David H.; Carrasco, Jorge; Hines, Keith M.; Maureira, Juan Carlos; Rondanelli, Roberto	ADVANCES IN ATMOSPHERIC SCIENCES	Q2	2.583	10.1007/s00376-020-9183-x
Stable water isotopes and accumulation rates in the Union Glacier region, Ellsworth Mountains, West Antarctica, over the last 35 years	Hoffmann, Kirstin; Fernandoy, Francisco; Meyer, Hanno; Thomas, Elizabeth R.; Aliaga, Marcelo; Tetzner, Dieter; Freitag, Johannes; Opel, Thomas; Arigony-Neto, Jorge; Gobel, Christian Florian; Jana, Ricardo; Rodriguez Oroz, Delia; Tuckwell, Rebecca; Ludlow, Emily; Mcconnell, Joseph R.; Schneider, Christoph	CRYOSPHERE	Q1	4.713	10.5194/tc-14-881-2020

LINE III **ANTARCTIC CLIMATE CHANGE**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
Modeling present and future ice covers in two Antarctic lakes	Echeverria, Sebastian; Hausner, Mark B.; Bambach, Nicolas; Vicuna, Sebastian; Suarez, Francisco	JOURNAL OF GLACIOLOGY	Q2	3.024	10.1017/jog.2019.78
The Year of Polar Prediction in the Southern Hemisphere (YOPP-SH)	Bromwich, David H.; Werner, Kirstin; Casati, Barbara; Powers, Jordan G.; Gorodetskaya, Irina, V; Massonnet, Francois; Vitale, Vito; Heinrich, Victoria J.; Liggett, Daniela; Arndt, Stefanie; Barja, Boris; Bazile, Eric; Carpentier, Scott; Carrasco, Jorge F.; Choi, Taejin; Choi, Yonghan; Colwell, Steven R.; Cordero, Raul R.; Gervasi, Massimo; Haiden, Thomas; Hirasawa, Naohiko; Inoue, Jun; Jung, Thomas; Kalesse, Heike; Kim, Seong-Joong; Lazzara, Matthew A.; Manning, Kevin W.; Norris, Kimberley; Park, Sang-Jong; Reid, Phillip; Rigor, Ignatius; Rowe, Penny M.; Schmithusen, Holger; Seifert, Patric; Sun, Qizhen; Uttal, Taneil; Zannoni, Mario; Zou, Xun	BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY	Q1	8.776	10.1175/BAMS-D-19-0255.1
The Atmospheric Radiation Measurement (ARM) West Antarctic Radiation Experiment	Lubin, Dan; Zhang, Damao; Silber, Israel; Scott, Ryan C.; Kalogeras, Petros; Battaglia, Alessandro; Bromwich, David H.; Cadeddu, Maria; Eloranta, Edwin; Fridlind, Ann; Frossard, Amanda; Hines, Keith M.; Kneifel, Stefan; Leaitch, W. Richard; Lin, Wuyin; Nicolas, Julien; Powers, Heath; Quinn, Patricia K.; Rowe, Penny; Russell, Lynn M.; Sharma, Sangeeta; Verlinde, Johannes; Vogelmann, Andrew M.	BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY	Q1	8.776	10.1175/BAMS-D-18-0278.1

LINE IV **ASTRONOMY AND EARTH SCIENCES**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
Early Last Interglacial ocean warming drove substantial ice mass loss from Antarctica	Turney, Chris S. M.; Fogwill, Christopher J.; Golledge, Nicholas R.; McKay, Nicholas P.; van Sebille, Erik; Jones, Richard T.; Etheridge, David; Rubino, Mauro; Thornton, David P.; Davies, Siwan M.; Ramsey, Christopher Bronk; Thomas, Zoe A.; Bird, Michael I.; Munksgaard, Niels C.; Kohno, Mika; Woodward, John; Winter, Kate; Weyrich, Laura S.; Rootes, Camilla M.; Millman, Helen; Albert, Paul G.; Rivera, Andres; van Ommen, Tas; Curran, Mark; Moy, Andrew; Rahmstorf, Stefan; Kawamura, Kenji; Hillenbrand, Claus-Dieter; Weber, Michael E.; Manning, Christina J.; Young, Jennifer; Cooper, Alan	PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA	Q1	9.412	10.1073/pnas.1902469117
Holocene glacier behavior around the northern Antarctic Peninsula and possible causes	Kaplan, M. R.; Strelin, J. A.; Schaefer, J. M.; Peltier, C.; Martini, M. A.; Flores, E.; Winckler, G.; Schwartz, R.	EARTH AND PLANETARY SCIENCE LETTERS	Q1	4.824	10.1016/j.epsl.2020.116077
The Gondwanan margin in West Antarctica: Insights from Late Triassic magmatism of the Antarctic Peninsula	Bastias, Joaquin; Spikings, Richard; Ulianov, Alex; Riley, Teal; Burton-Johnson, Alex; Chiaradia, Massimo; Baumgartner, Lukas; Herve, Francisco; Bouvier, Anne-Sophie	GONDWANA RESEARCH	Q1	6.174	10.1016/j.gr.2019.10.018
Detailed quantification of glacier elevation and mass changes in South Georgia	Farias-Barahona, David; Sommer, Christian; Sauter, Tobias; Bannister, Daniel; Seehaus, Thorsten C.; Malz, Philipp; Casassa, Gino; Mayewski, Paul A.; Turton, Jenny, V; Braun, Matthias H.	ENVIRONMENTAL RESEARCH LETTERS	Q1	6.096	10.1088/1748-9326/ab6b32
New Fossil Woods From Lower Cenozoic Volcano-Sedimentary Rocks Of The Fildes Peninsula, King George Island, And The Implications For The Trans-Antarctic Peninsula Eocene Climatic Gradient	Oh, Changhwan; Philippe, Marc; Mcloughlin, Stephen; Woo, Jusun; Leppe, Marcelo; Torres, Teresa; Park, Tae-Yoon S.; Choi, Han-Gu	PAPERS IN PALAEONTOLOGY	Q1	2.259	10.1002/spp2.1256
A giant soft-shelled egg from the Late Cretaceous of Antarctica	Legendre, Lucas J.; Rubilar-Rogers, David; Musser, Grace M.; Davis, Sarah N.; Otero, Rodrigo A.; Vargas, Alexander O.; Clarke, Julia A.	NATURE	Q1	42.779	10.1038/s41586-020-2377-7
Seismic stratigraphy of the Sabrina Coast shelf, East Antarctica: Early history of dynamic meltwater-rich glaciations	Montelli, Aleksandr; Gulick, Sean P. S.; Fernandez, Rodrigo; Frederick, Bruce C.; Shevenell, Amelia E.; Leventer, Amy; Blankenship, Donald D.	GEOLOGICAL SOCIETY OF AMERICA BULLETIN	Q1	3.558	10.1130/B35100.1
An austral fern assemblage from the Upper Cretaceous (Campanian) beds of Cerro Guido, Magallanes Basin, Chilean Patagonia	Trevisan, Cristine; Dutra, Tania; Wilberger, Thiers; Leppe, Marcelo; Manriquez, Leslie	CRETACEOUS RESEARCH	Q2	1.854	10.1016/j.cretres.2019.104215
C-14 and Be-10 dated Late Holocene fluctuations of Patagonian glaciers in Torres del Paine (Chile, 51 degrees S) and connections to Antarctic climate change	Garcia, Juan-Luis; Hall, Brenda L.; Kaplan, Michael R.; Gomez, Gabriel A.; De Pol-Holz, Ricardo; Garcia, Victor J.; Schaefer, Joerg M.; Schwartz, Roseanne	QUATERNARY SCIENCE REVIEWS	Q1	3.803	10.1016/j.quascirev.2020.106541
Quantifying the Effect of the Drake Passage Opening on the Eocene Ocean	Toumoulin, A.; Donnadieu, Y.; Ladant, J-B; Batenburg, S. J.; Poblete, F.; Dupont-Nivet, G.	PALEOCEANOGRAPHY AND PALEOCLIMATOLOGY	Q1	3.09	10.1029/2020PA003889
A Study of a Parametric Method for the Snow Reflection Coefficient Estimation Using Air-Coupled Ultrasonic Waves	Herman, Krzysztof; Gudra, Tadeusz; Opielinski, Krzysztof; Banasiak, Dariusz; Budzik, Tomasz; Risso, Nathalie	SENSORS	Q2	3.275	10.3390/s20154267
Antarctic Circumpolar Current Dynamics at the Pacific Entrance to the Drake Passage Over the Past 1.3 Million Years	Toyos, Maria H.; Lamy, Frank; Lange, Carina B.; Lembke-Jene, Lester; Saavedra-Pellitero, Mariem; Esper, Oliver; Arz, Helge W.	PALEOCEANOGRAPHY AND PALEOCLIMATOLOGY	Q2	2.888	10.1029/2019PA003773
Connection between Antarctic Ozone and Climate: Interannual Precipitation Changes in the Southern Hemisphere	Damiani, Alessandro; Cordero, Raul R.; Llanillo, Pedro J.; Feron, Sarah; Boisier, Juan P.; Garreaud, Rene; Rondanelli, Roberto; Irie, Hitoshi; Watanabe, Shingo	ATMOSPHERE	Q3	2.397	10.3390/atmos11060579

LINE V **BIOTECHNOLOGY**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
Statistical Optimisation of Phenol Degradation and Pathway Identification through Whole Genome Sequencing of the Cold-Adapted Antarctic Bacterium, Rhodococcus sp. Strain AQ5-07	Lee, Gillian Li Yin; Zakaria, Nur Nadhirah; Convey, Peter; Futamata, Hiroyuki; Zulkharnain, Azham; Suzuki, Kenshi; Abdul Khalil, Khalilah; Shaharuddin, Noor Azmi; Alias, Siti Aisyah; Gonzalez-Rocha, Gerardo; Ahmad, Siti Aqlima	INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES	Q1	5.923	10.3390/ijms21249363
Effects of heavy metals on Antarctic bacterial cell growth kinetics and degradation of waste canola oil	Zahri, K. N. M.; Zulkharnain, A.; Gomez-Fuentes, C.; Sabri, S.; Ahmad, S. A.	JOURNAL OF ENVIRONMENTAL BIOLOGY	Q4	0.781	10.22438/jeb/41/6/MRN-1464
Kinetic studies of marine psychrotolerant microorganisms capable of degrading diesel in the presence of heavy metals	Zakaria, N. N.; Roslee, A. F. A.; Gomez-Fuentes, C.; Zulkharnain, A.; Abdulrasheed, M.; Sabri, S.; Ramirez-Moreno, N.; Calisto-Ulloa, N.; Ahmad, S. A.	REVISTA MEXICANA DE INGENIERIA QUIMICA	Q3	1.139	10.24275/rmiq/Bio1072
Biodegradation of diesel oil by cold-adapted bacterial strains of Arthrobacterspp. from Antarctica	Abdulrasheed, Mansur; Zakaria, Nur Nadhirah; Ahmad Roslee, Ahmad Fareez; Shukor, Mohd Yunus; Zulkharnain, Azham; Napis, Suhaimi; Convey, Peter; Alias, Siti Aisyah; Gonzalez-Rocha, Gerardo; Ahmad, Siti Aqlima	ANTARCTIC SCIENCE	Q4	1.417	10.1017/S0954102020000206
Effect of heavy metals and other xenobiotics on biodegradation of waste canola oil by cold-adapted Rhodococcus sp. strain AQ5-07	Ibrahim, S.; Zulkharnain, A.; Zahri, K. N. M.; Lee, G. L. Y.; Convey, P.; Gomez-Fuentes, C.; Sabri, S.; Khalil, K. A. K.; Alias, S. A.; Gonzalez-Rocha, G.; Ahmad, S. A.	REVISTA MEXICANA DE INGENIERIA QUIMICA	Q3	1.139	10.24275/rmiq/Bio917
Antibiotic resistance in bacterial isolates from freshwater samples in Fildes Peninsula, King George Island, Antarctica	Jara, Daniela; Bello-Toledo, Helia; Dominguez, Mariana; Cigarroa, Camila; Fernandez, Paulina; Vergara, Luis; Quezada-Aguiluz, Mario; Opazo-Capurro, Andres; Lima, Celia A.; Gonzalez-Rocha, Gerardo	SCIENTIFIC REPORTS	Q1	3.998	10.1038/s41598-020-60035-0
Response Surface Methodology Optimization and Kinetics of Diesel Degradation by a Cold-Adapted Antarctic Bacterium, Arthrobactersp. Strain AQ5-05	Abdulrasheed, Mansur; Zulkharnain, Azham; Zakaria, Nur Nadhirah; Roslee, Ahmad Fareez Ahmad; Khalil, Khalilah Abdul; Napis, Suhaimi; Convey, Peter; Gomez-Fuentes, Claudio; Ahmad, Siti Aqlima	SUSTAINABILITY	Q2	2.576	10.3390/su12176966
Study of an Antarctic thermophilic consortium and its influence on the electrochemical behavior of aluminum alloy 7075-T6	Atalah, Joaquin; Blamey, Lotse; Kohler, Hans; Alfaro-Valdes, Hilda M.; Galarce, Carlos; Alvarado, Claudia; Sancy, Mamie; Paez, Maritza; Blamey, Jenny M.	BIOELECTROCHEMISTRY	Q1	4.722	10.1016/j.bioelechem.2019.107450
Isolation and characterization of violacein from an Antarctic Iodobacter: a non-pathogenic psychrotolerant microorganism	Atalah, Joaquin; Blamey, Lotse; Munoz-Ibacache, Sebastian; Gutierrez, Felipe; Urzua, Marcela; Encinas, Maria Victoria; Paez, Maritza; Sun, Junsong; Blamey, Jenny M.	EXTREMOPHILES	Q3	2.462	10.1007/s00792-019-01111-w
Optimisation of biodegradation conditions for waste canola oil by cold-adapted Rhodococcus sp. AQ5-07 from Antarctica	Ibrahim, Salihu; Zahri, Khadijah Nabilah Mohd; Convey, Peter; Khalil, Khalilah Abdul; Gomez-Fuentes, Claudio; Zulkarnain, Azham; Alias, Siti Aisyah; Gonzalez-Rocha, Gerardo; Ahmad, Siti Aqlima	ELECTRONIC JOURNAL OF BIOTECHNOLOGY	Q2	2.894	10.1016/j.ejbt.2020.07.005
Biosurfactant Production and Growth Kinetics Studies of the Waste Canola Oil-Degrading Bacterium Rhodococcus erythropolis AQ5-07 from Antarctica	Ibrahim, Salihu; Abdul Khalil, Khalilah; Zahri, Khadijah Nabilah Mohd; Gomez-Fuentes, Claudio; Convey, Peter; Zulkharnain, Azham; Sabri, Suriana; Alias, Siti Aisyah; Gonzalez-Rocha, Gerardo; Ahmad, Siti Aqlima	MOLECULES	Q2	3.267	10.3390/molecules25173878
Root endophyticPenicilliumpromotes growth of Antarctic vascular plants by enhancing nitrogen mineralization	Oses-Pedraza, Romulo; Torres-Diaz, Cristian; Lavin, Paris; Retamales-Molina, Patricio; Atala, Cristian; Gallardo-Cerda, Jorge; Acuna-Rodriguez, Ian S.; Molina-Montenegro, Marco A.	EXTREMOPHILES	Q3	2.462	10.1007/s00792-020-01189-7
Dynamic flux balance analysis of biomass and lipid production by Antarctic thraustochytridOblongichytriumsp. RT2316-13	Shene, Carolina; Paredes, Paris; Flores, Liset; Leyton, Allison; Asenjo, Juan A.; Chisti, Yusuf	BIOTECHNOLOGY AND BIOENGINEERING	Q1	4.002	10.1002/bit.27463
Biotransformation of 2,4,6-Trinitrotoluene by Pseudomonas sp. TNT3 isolated from Deception Island, Antarctica	Angeles Cabrera, Ma; Marquez, Sebastian L.; Quezada, Carolina P.; Osorio, Manuel, I; Castro-Nallar, Eduardo; Gonzalez-Nilo, Fernando D.; Perez-Donoso, Jose M.	ENVIRONMENTAL POLLUTION	Q1	6.793	10.1016/j.envpol.2020.113922
Genomic and Metabolomic Analysis of Antarctic Bacteria Revealed Culture and Elicitation Conditions for the Production of Antimicrobial Compounds	Nunez-Montero, Kattia; Quezada-Solis, Damian; Khalil, Zeinab G.; Capon, Robert J.; Andreote, Fernando D.; Barrientos, Leticia	BIOMOLECULES	Q2	4.082	10.3390/biom10050673
ANTIFUNGAL ACTIVITY SCREENING OF ANTARCTIC ACTINOBACTERIA AGAINST PHYTOPATHOGENIC FUNGI	Santos, Andres; Nunez-Montero, Kattia; Lamilla, Claudio; Pavez, Monica; Quezada-Solis, Damian; Barrientos, Leticia	ACTA BIOLOGICA COLOMBIANA	Q4	0.471	10.15446/abc.v25n2.76405
Pseudomonas fildesensis sp. nov., a psychrotolerant bacterium isolated from Antarctic soil of King George Island, South Shetland Islands	Pavlov, Maria S.; Lira, Felipe; Martinez, Jose Luis; Olivares-Pacheco, Jorge; Marshall, Sergio H.	INTERNATIONAL JOURNAL OF SYSTEMATIC AND EVOLUTIONARY MICROBIOLOGY	Q3	2.415	10.1099/ijsem.0.004165
Isolation of a Psychrotolerant and UV-C-Resistant Bacterium from Elephant Island, Antarctica with a Highly Thermoactive and Thermostable Catalase	Monsalves, Maria T.; Ollivet-Besson, Gabriela P.; Amenabar, Maximiliano J.; Blamey, Jenny M.	MICROORGANISMS	Q2	4.152	10.3390/microorganisms8010095

LINE VI **HUMAN FOOTPRINTS IN ANTARCTICA**

TITLE	AUTHORS	JOURNAL	QUARTILE	JIF	DOI
Effect of Co-contamination by PAHs and Heavy Metals on Bacterial Communities of Diesel Contaminated Soils of South Shetland Islands, Antarctica	Gran-Scheuch, Alejandro; Ramos-Zuniga, Javiera; Fuentes, Edwar; Bravo, Denisse; Perez-Donoso, Jose M.	MICROORGANISMS	Q1	4.128	10.3390/microorganisms8111749
Black carbon pollution in snow and its impact on albedo near the Chilean stations on the Antarctic peninsula: First results	Cereceda-Balic, Francisco; Vidal, Victor; Florencia Ruggeri, Maria; Gonzalez, Humberto E.	SCIENCE OF THE TOTAL ENVIRONMENT	Q1	6.551	10.1016/j.scitotenv.2020.140801
First mussel settlement observed in Antarctica reveals the potential for future invasions	Cardenas, Leyla; Leclerc, Jean-Charles; Bruning, Paulina; Garrido, Ignacio; Detree, Camille; Figueroa, Alvaro; Astorga, Marcela; Navarro, Jorge M.; Johnson, Ladd E.; Carlton, James T.; Pardo, Luis	SCIENTIFIC REPORTS	Q1	3.998	10.1038/s41598-020-62340-0
Advances of native and non-native Antarctic species to in vitro conservation: improvement of disinfection protocols	Cuba-Diaz, Marely; Rivera-Mora, Claudia; Navarrete, Eduardo; Klagges, Macarena	SCIENTIFIC REPORTS	Q1	3.998	10.1038/s41598-020-60533-1
Concentration and Trophic Transfer of Copper, Selenium, and Zinc in Marine Species of the Chilean Patagonia and the Antarctic Peninsula Area	Espejo, Winfred; Padilha, Janeide de A.; Kidd, Karen A.; Dorneles, Paulo; Malm, Olaf; Chiang, Gustavo; Celis, Jose E.	BIOLOGICAL TRACE ELEMENT RESEARCH	Q3	2.639	10.1007/s12011-019-01992-0
Isolation and Identification of Soil Bacteria from Extreme Environments of Chile and Their Plant Beneficial Characteristics	Gaete, Alexis; Mandakovic, Dinka; Gonzalez, Mauricio	MICROORGANISMS	Q2	4.152	10.3390/microorganisms8081213
Black and organic carbon fractions in fine particulate matter by sectors in the South Hemisphere emissions for decision-making on climate change and health effects	Pino-Cortes, Ernesto; Carrasco, Samuel; Diaz-Robles, Luis A.; Cubillos, Francisco; Cereceda-Balic, Francisco	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	Q2	3.056	10.1007/s11356-020-10164-w
Assessing the conservation values and tourism threats in Barrientos Island, Antarctic Peninsula	Cajiao, Daniela; Albertos, Belen; Tejedo, Pablo; Munoz-Puelles, Laura; Garilleti, Ricardo; Lara, Francisco; Sancho, Leopoldo G.; Tirira, Diego G.; Simon-Baile, Debora; Reck, Gunther K.; Olave, Carlos; Benayas, Javier	JOURNAL OF ENVIRONMENTAL MANAGEMENT	Q1	5.647	10.1016/j.jenvman.2020.110593
Does protein content influences accumulation and biomagnification of tantalum in fishes and invertebrates of marine coastal environments?	Ricciardi, Rocio; Espejo, Winfred; Barra, Ricardo; Chiang, Gustavo; Celis, Jose E.	LATIN AMERICAN JOURNAL OF AQUATIC RESEARCH	Q4	0.721	10.3856/vol48-issue2-fulltext-2416

Illustrator Ignacio Ortega
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Santiago, Chile, 1987. Having completed his undergraduate studies at the University of Santiago in Social Communications, Ignacio completed a Diploma course in Illustration and Graphic Narration at the Pontificia Universidad Católica de Chile (2014). The following year he published his first book *Lirio, un revés y un derecho*, published by Santillana, with which he was recognized with a national IBBY award for best Picture Book (2017). In 2020 he was selected as part of the Illustrators committee to represent Chile internationally at the Bologna Children's Book Fair, in the Ibero-American Illustration Catalog (Mexico) and the Bolivian Poster Biennial the following year (2021).

He teaches at communication and design schools at the Universidad de Santiago, Universidad de Chile, and the Arcos Institute, in Santiago.

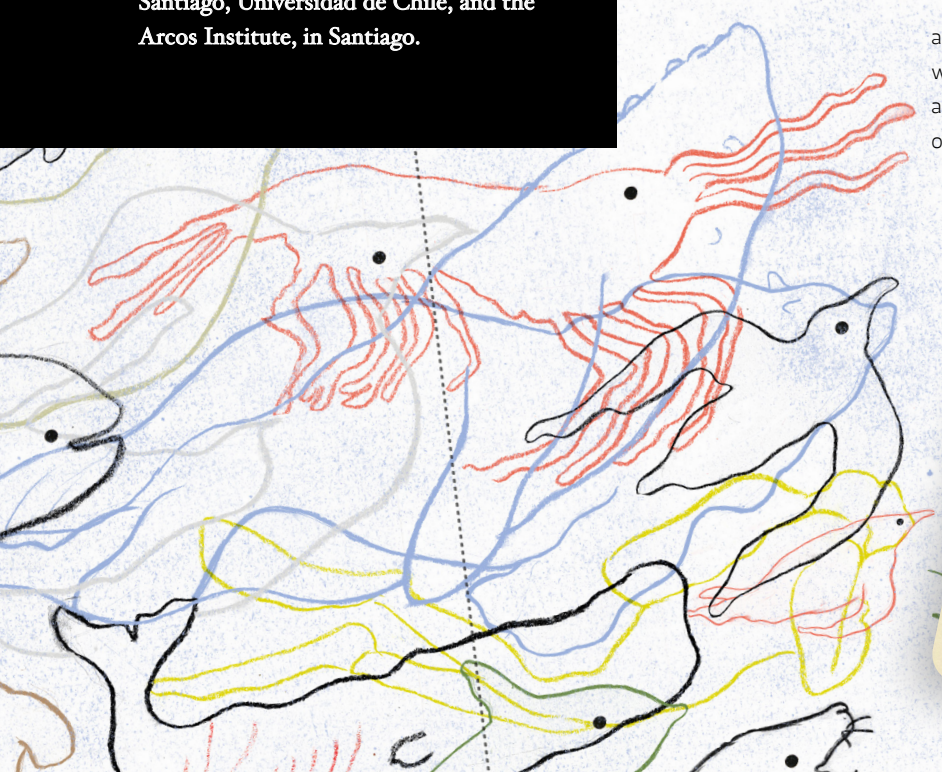
About the Cover

For me this was a new challenge: I had never worked in a creative capacity with leading scientists collaborating internationally within their specific discipline. However, the creative process worked surprisingly well in finding words and images that represented the topic and its value. It was very satisfying to be able to translate the knowledge and insights of the scientific team into the field of poetic abstraction and images. The creative meetings were also very entertaining. The theme was also new to me; having to investigate and identify the particularities of such a complex and unknown ecosystem, and incorporate them into graphic representation, was a difficult but very nourishing task. Not only did I have to recognize the species involved in the trophic chain, but I also needed to represent the importance of Marine Protected Areas and the scientific work that incorporated the concept of justice in environmental management.

The assignment was challenging and full of peculiar conditions. As an anecdote, the presence of krill was always a MUST. Now I understand why.

After conceptualizing, it was my turn to choose a technique that would allow me to represent the cooperation, diversity, and interconnection of species. The answer was to use engraving techniques, such as layering and organic imprinting, to synthesize the concepts mentioned above.

Finally, I must say that the result was very satisfactory, and the process was full of learning opportunities and willingness to exchange within the entire team, who actively work to generate a narrative capable of illustrating the importance of MPAs.



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