Western Antarctic Peninsula Coastal Environments under a Changing Climate | COASTANTAR 2024 Expedition

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Polar & Extreme Environments
UNIVERSIDADE DE LISBOA

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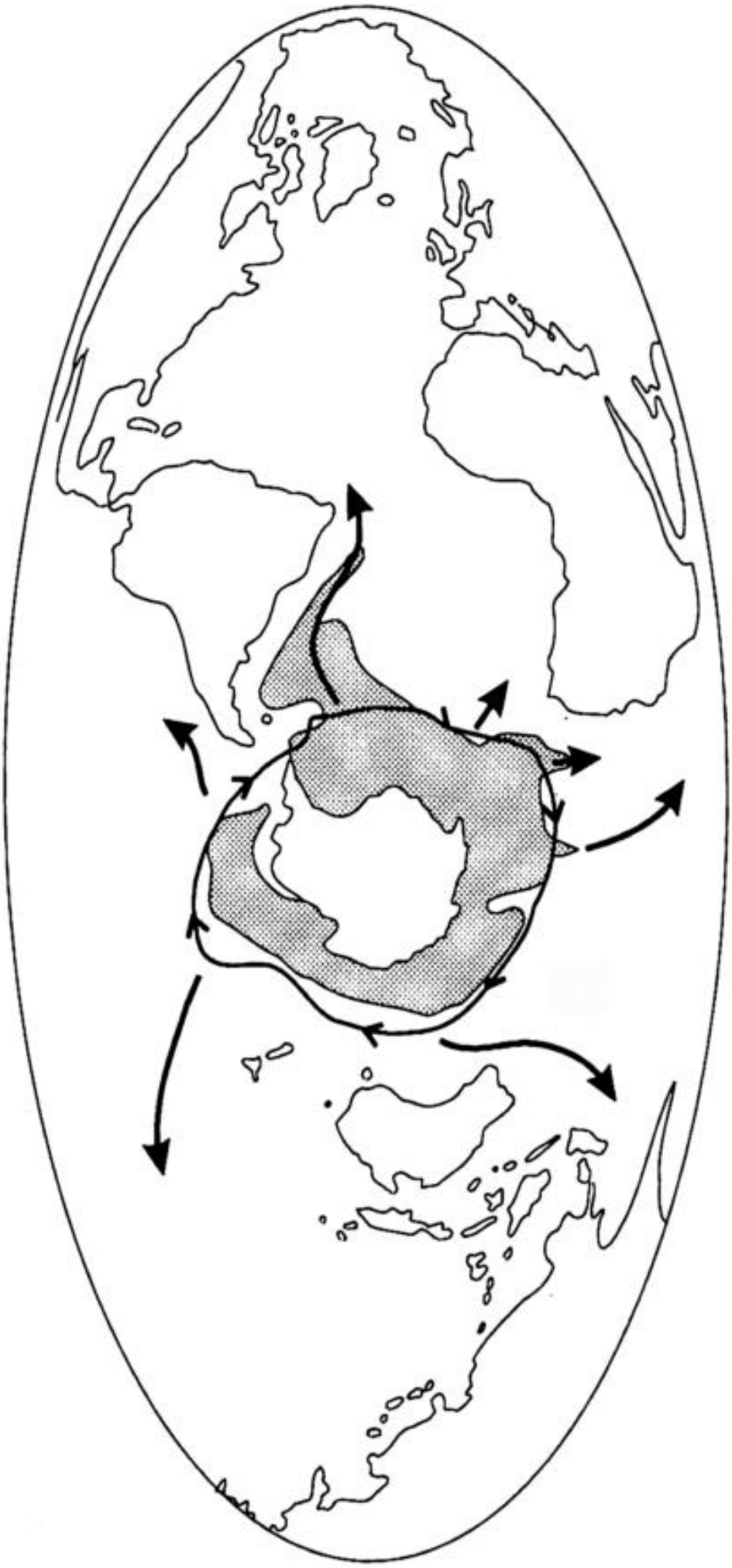

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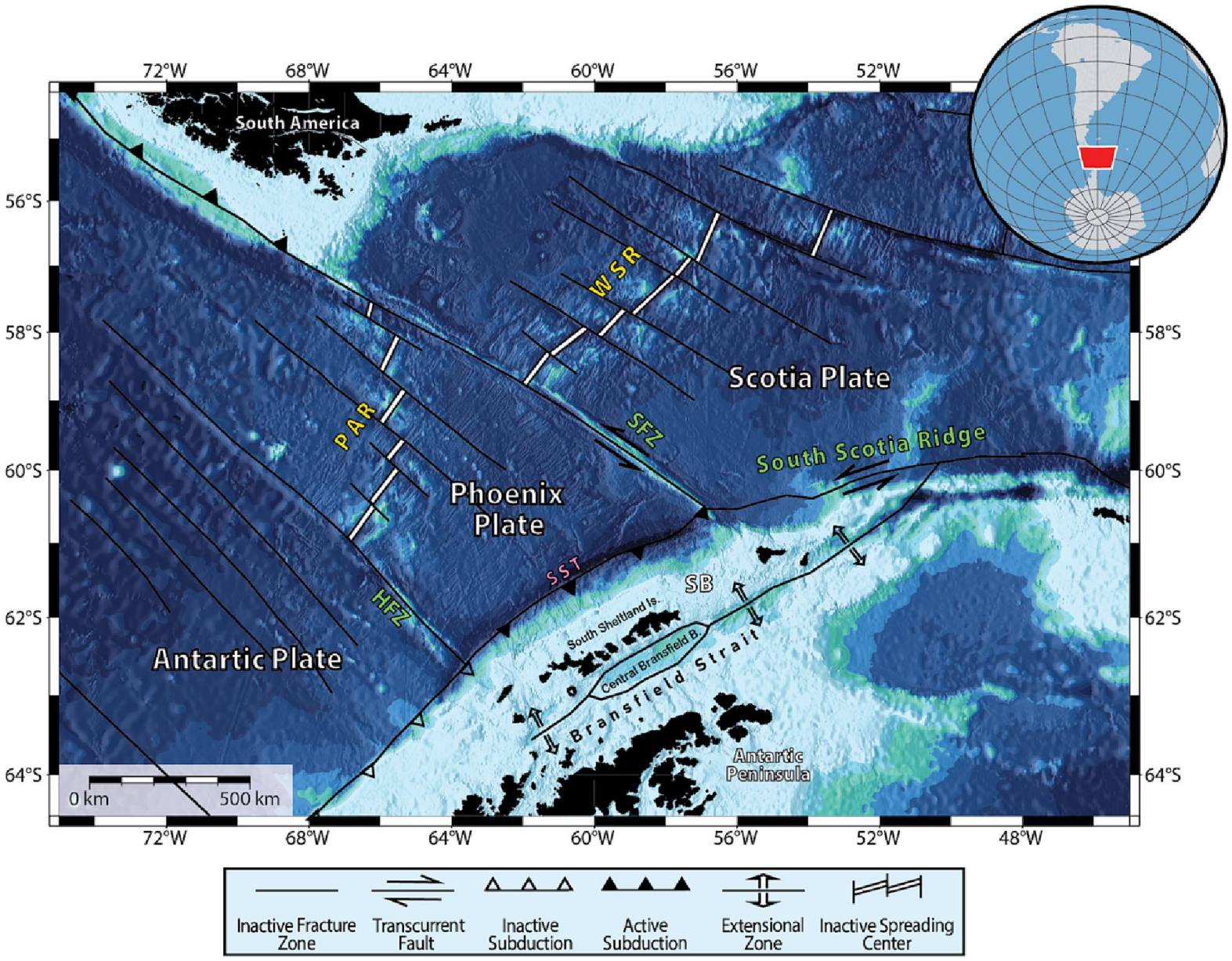
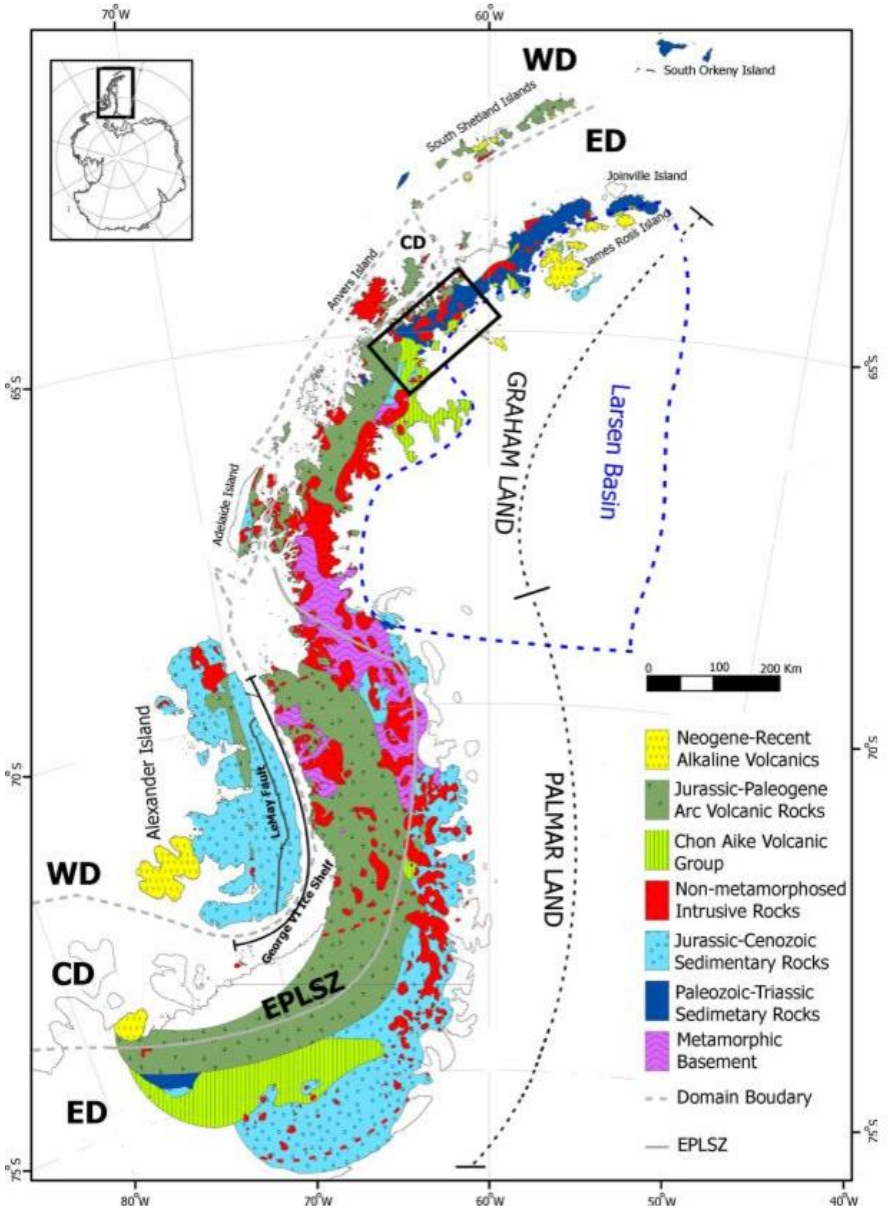
Um voo de sudoeste para nordeste

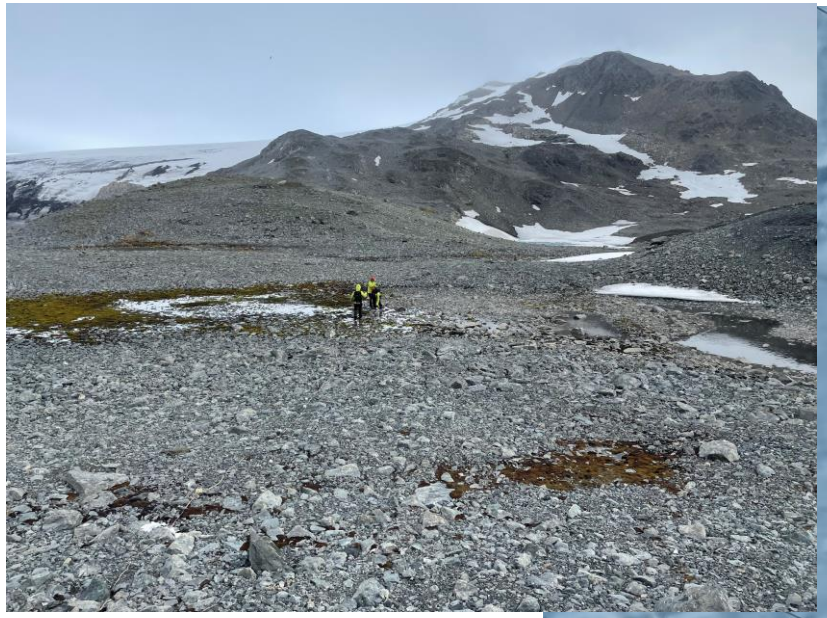
Um quadro geotectónico complexo

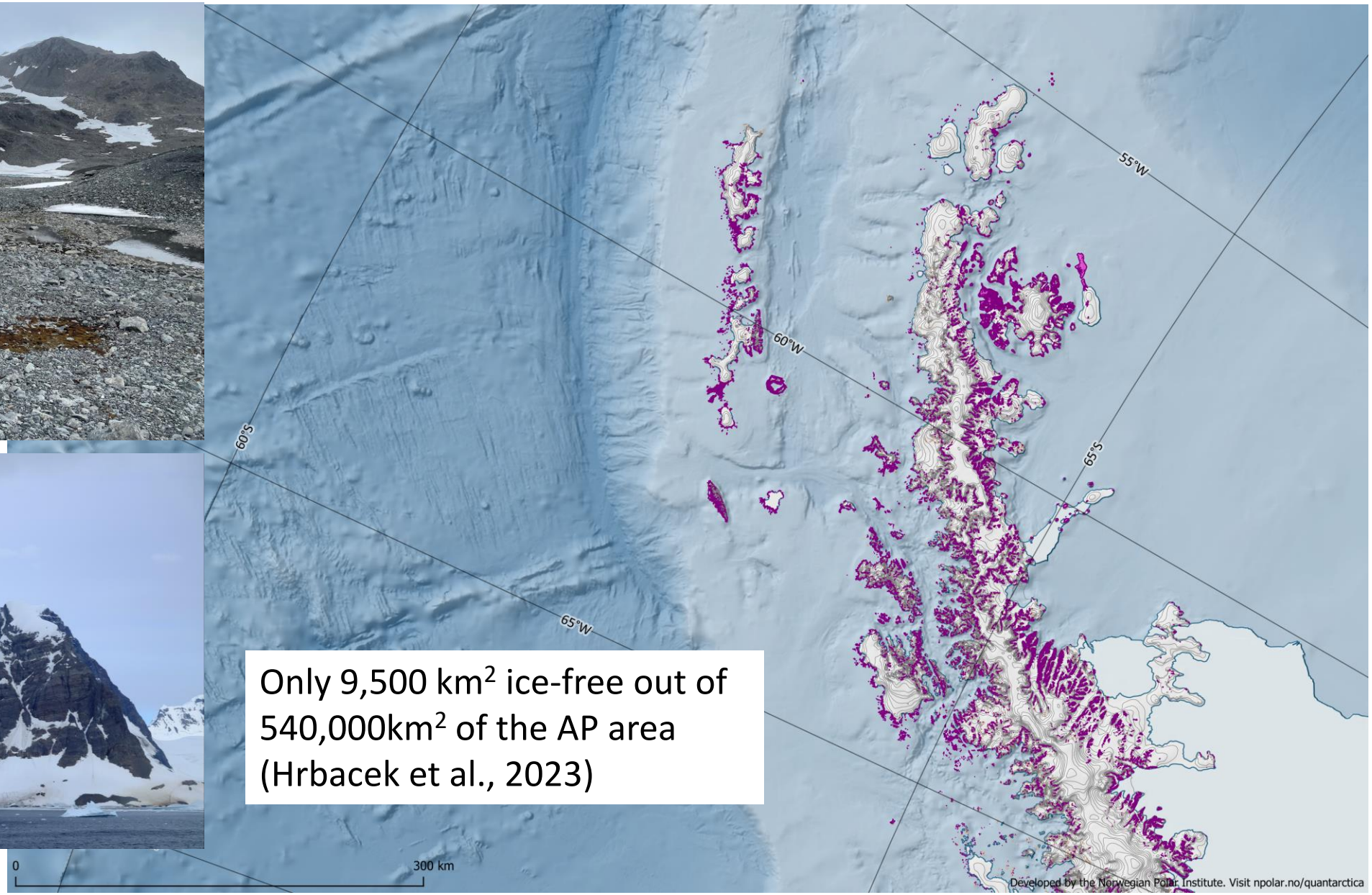




REGIONAL GEOLOGICAL MAPPING IN THE GRAHAM LAND OF ANTARCTIC PENINSULA USING LANDSAT-8 REMOTE SENSING DATAA. B. Pour, M. Hashim, Yongcheol Park

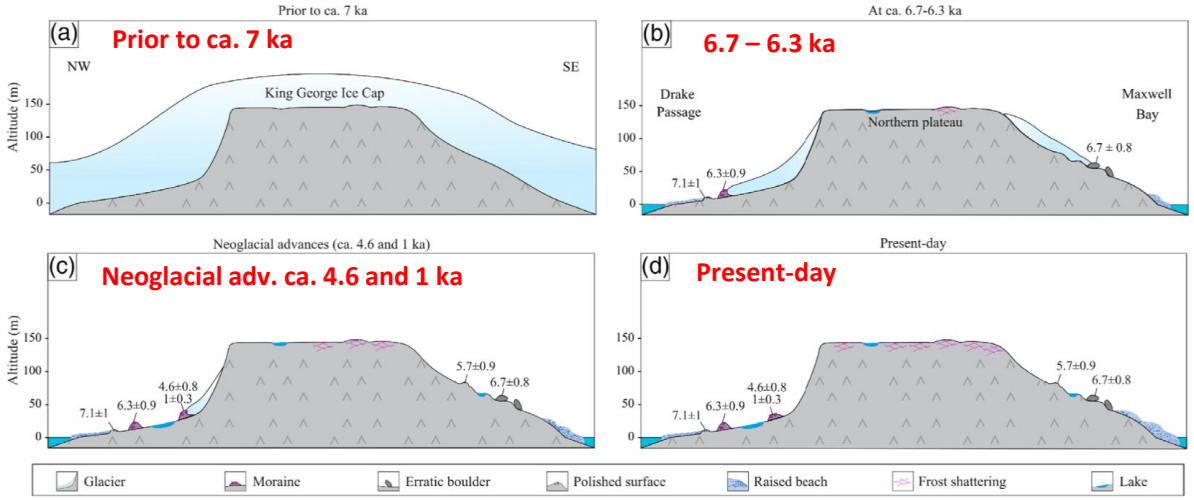
O domínio dos glaciares com pequenas áreas livres de gelo



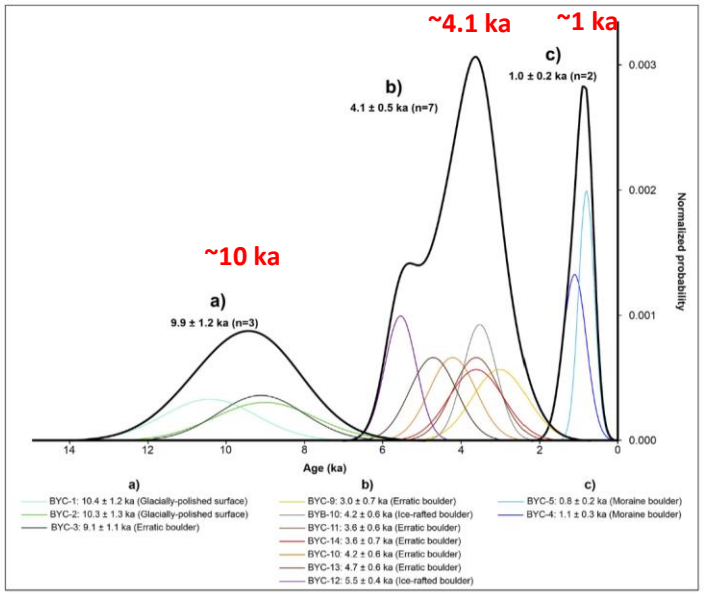


Only 9,500 km^2 ice-free out of 540,000km^2 of the AP area (Hrbacek et al., 2023)

Uma história de perda de gelo glaciário nos últimos 7 mil anos

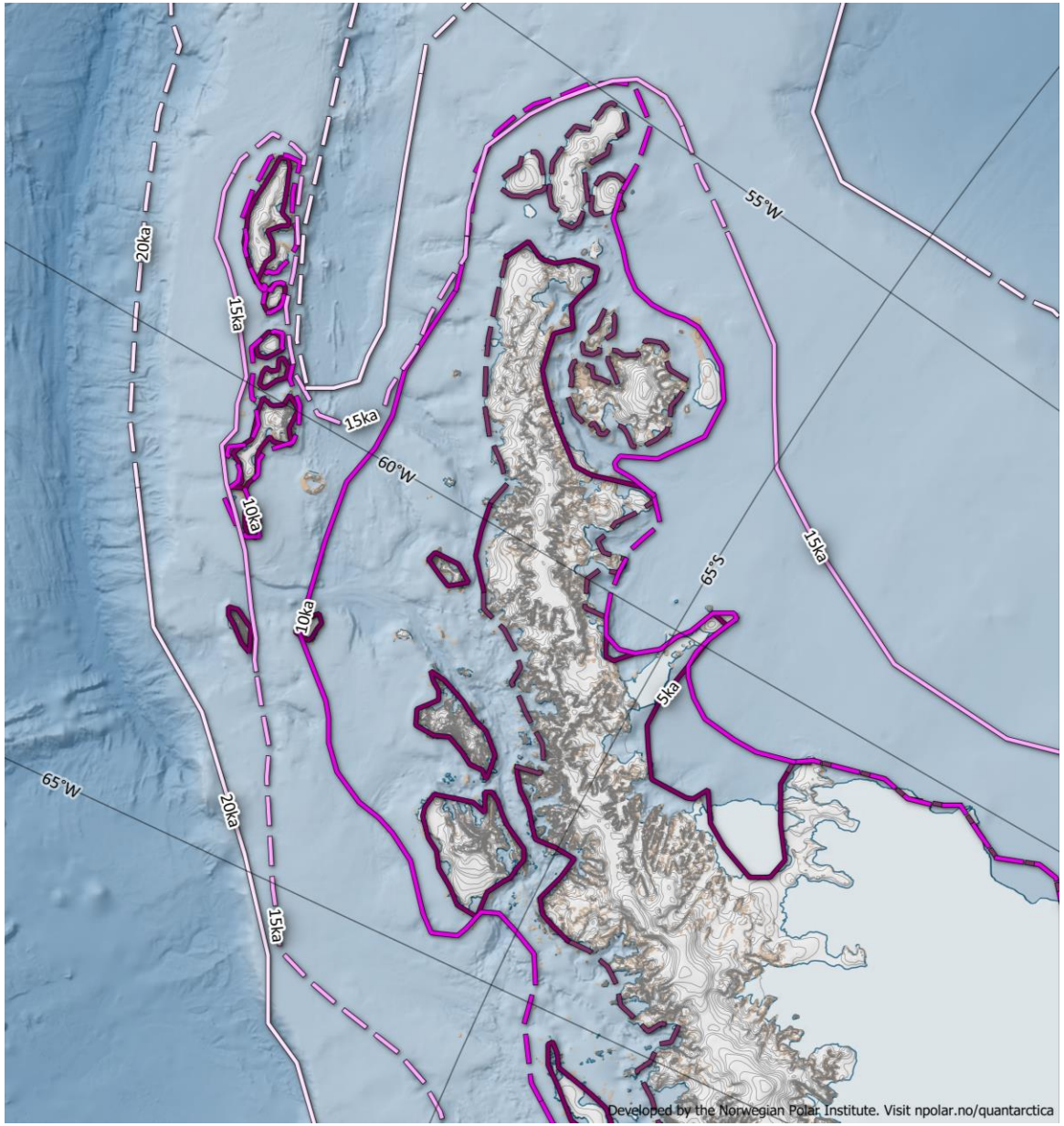


Oliva et al (2023)

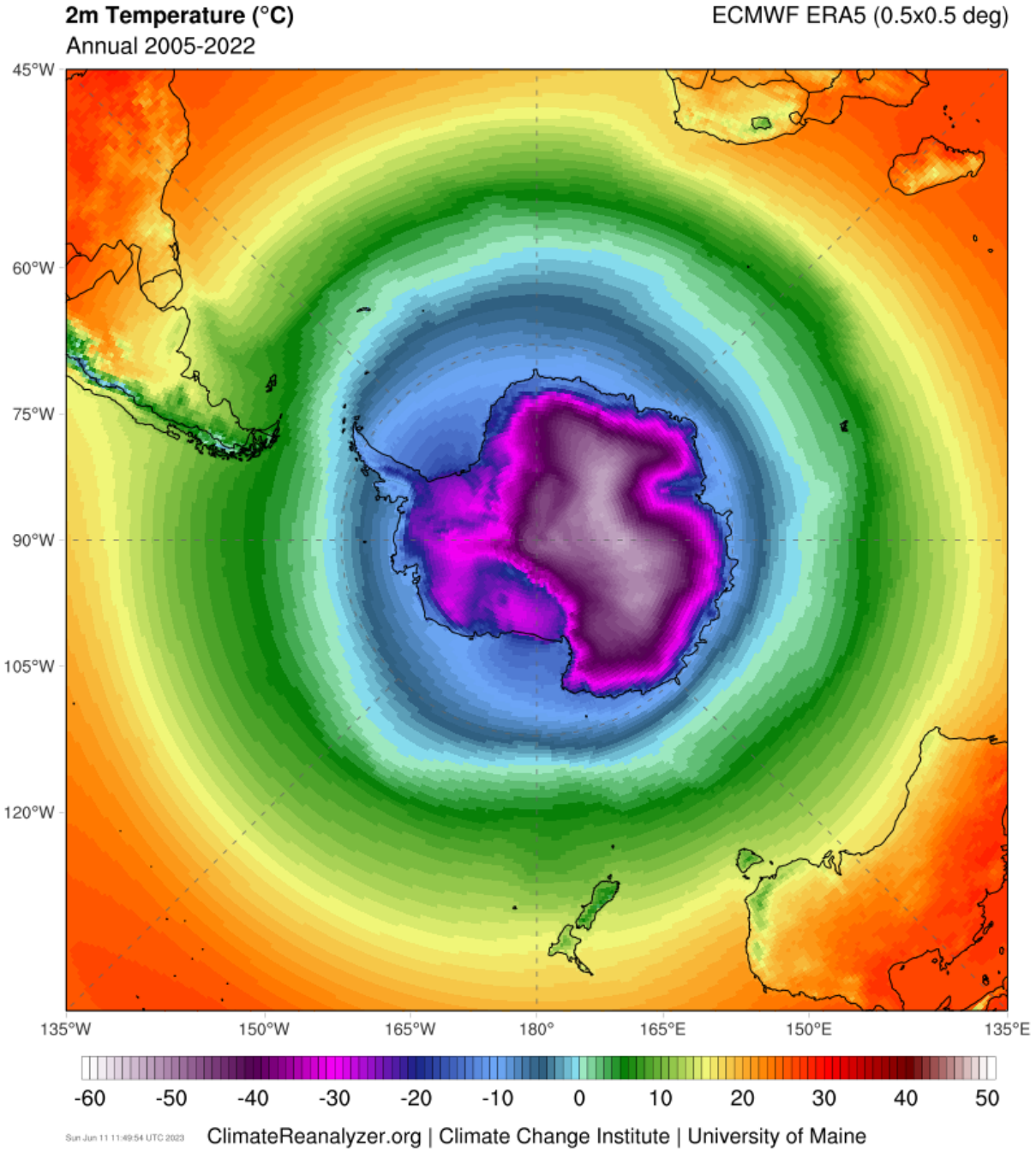


Palacios et al (2020)

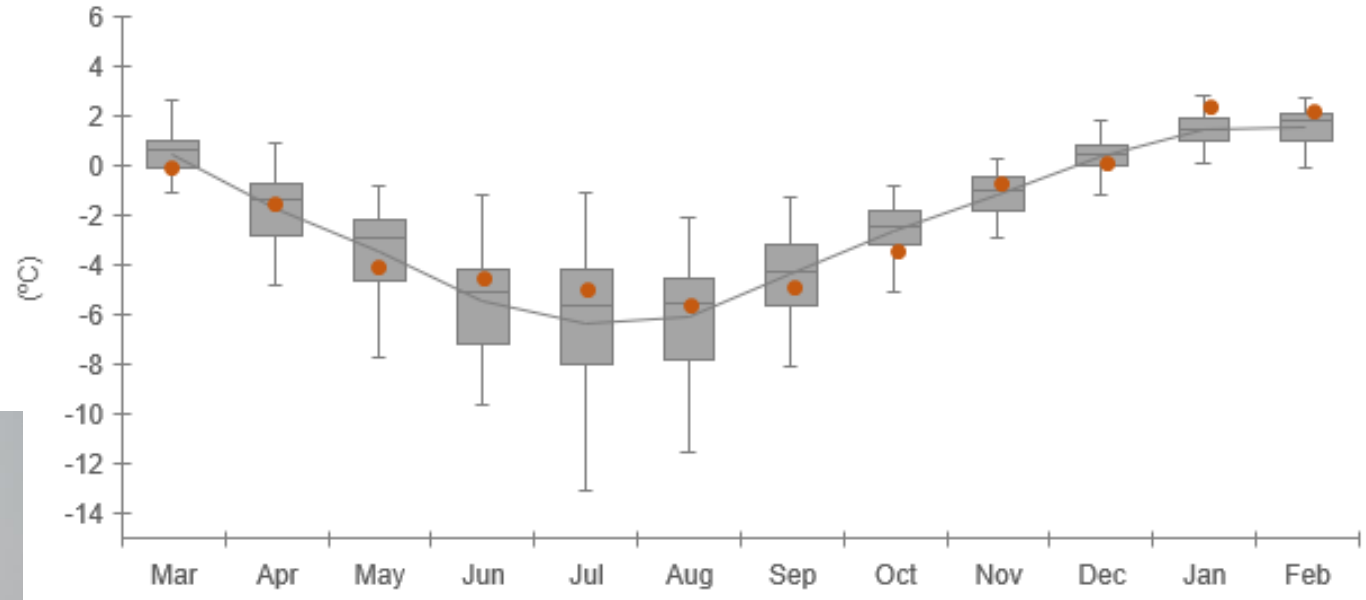
Fig. 3. Probability density plots of CRE ages for differentiated chronostratigraphical units: A) Deglaciation, b) First Neoglacial advance and c) Second Neoglacial advance. This figure is available in colour in the online version.



O braço do gigante gelado

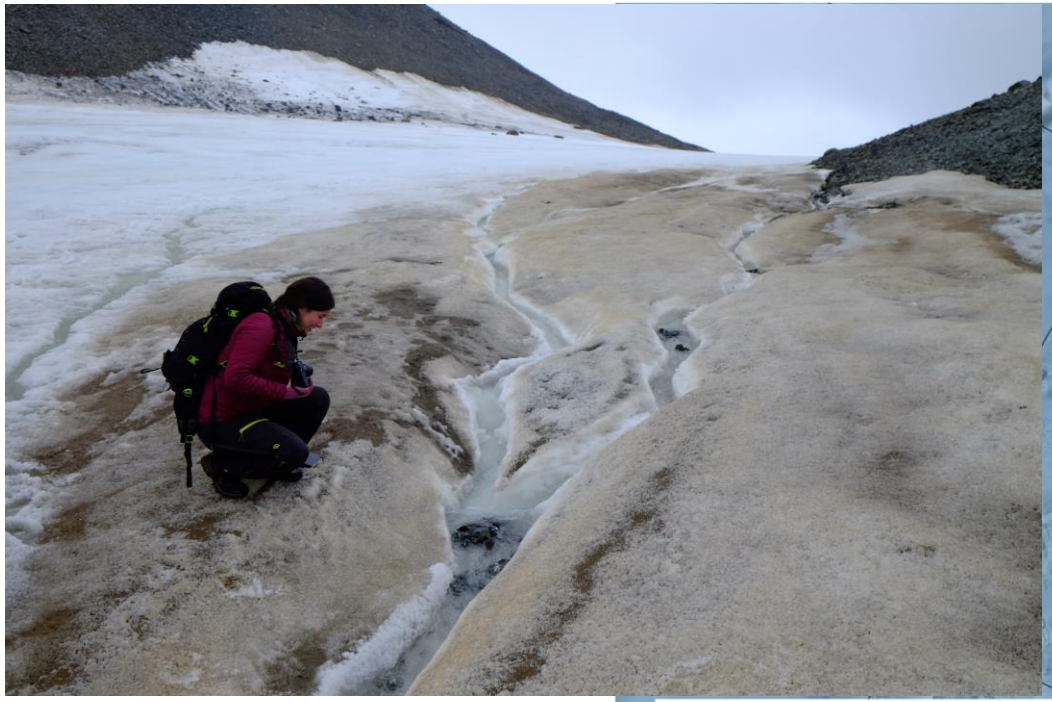


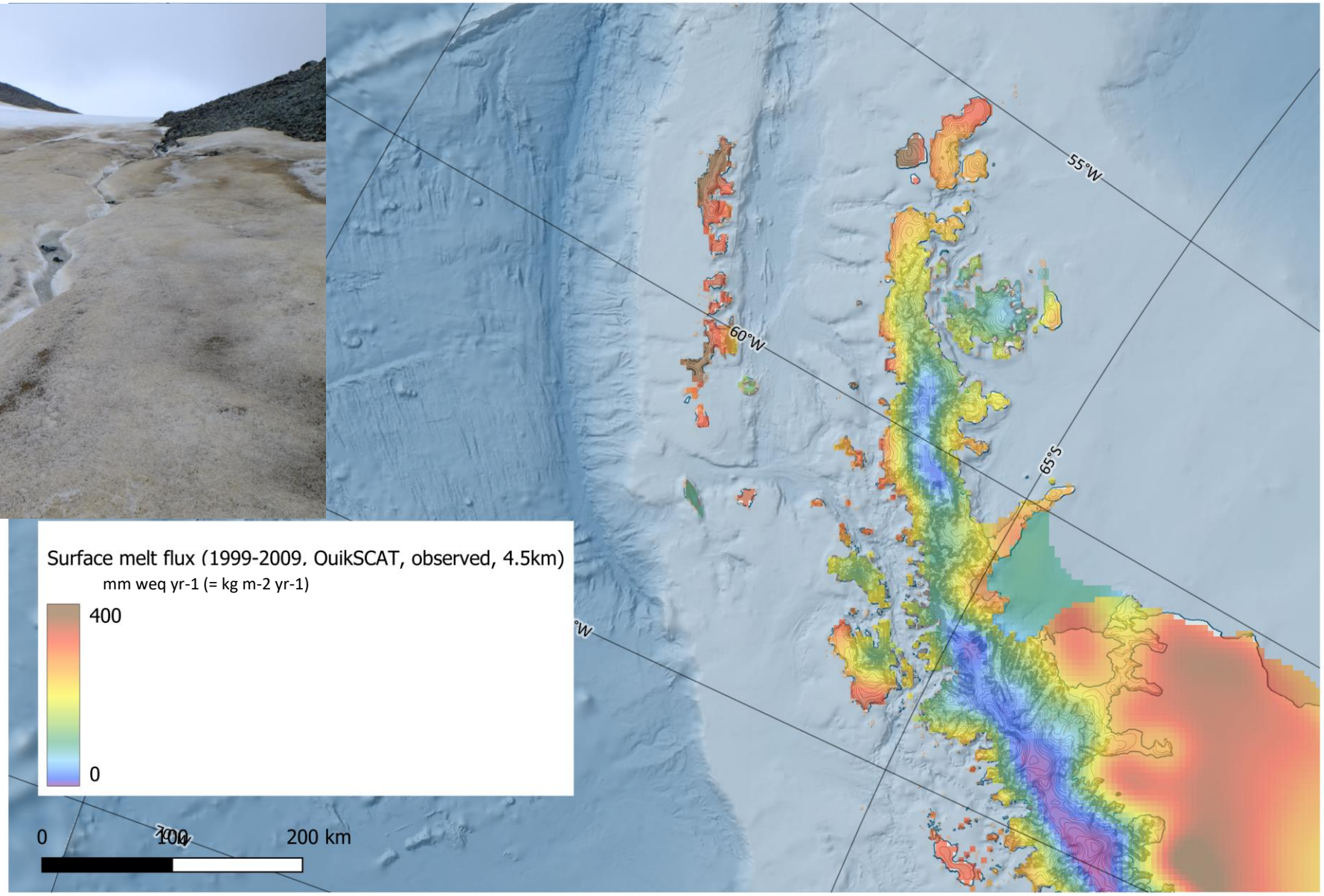
Um clima polar marítimo com verões frios



Mean monthly air temperatures in Bellingshausen Station, King George Island (1969 – 2020)- Orange dots represent 2019-20 (Baptista et al. in prep)-

Onde os glaciares têm muita fusão estival

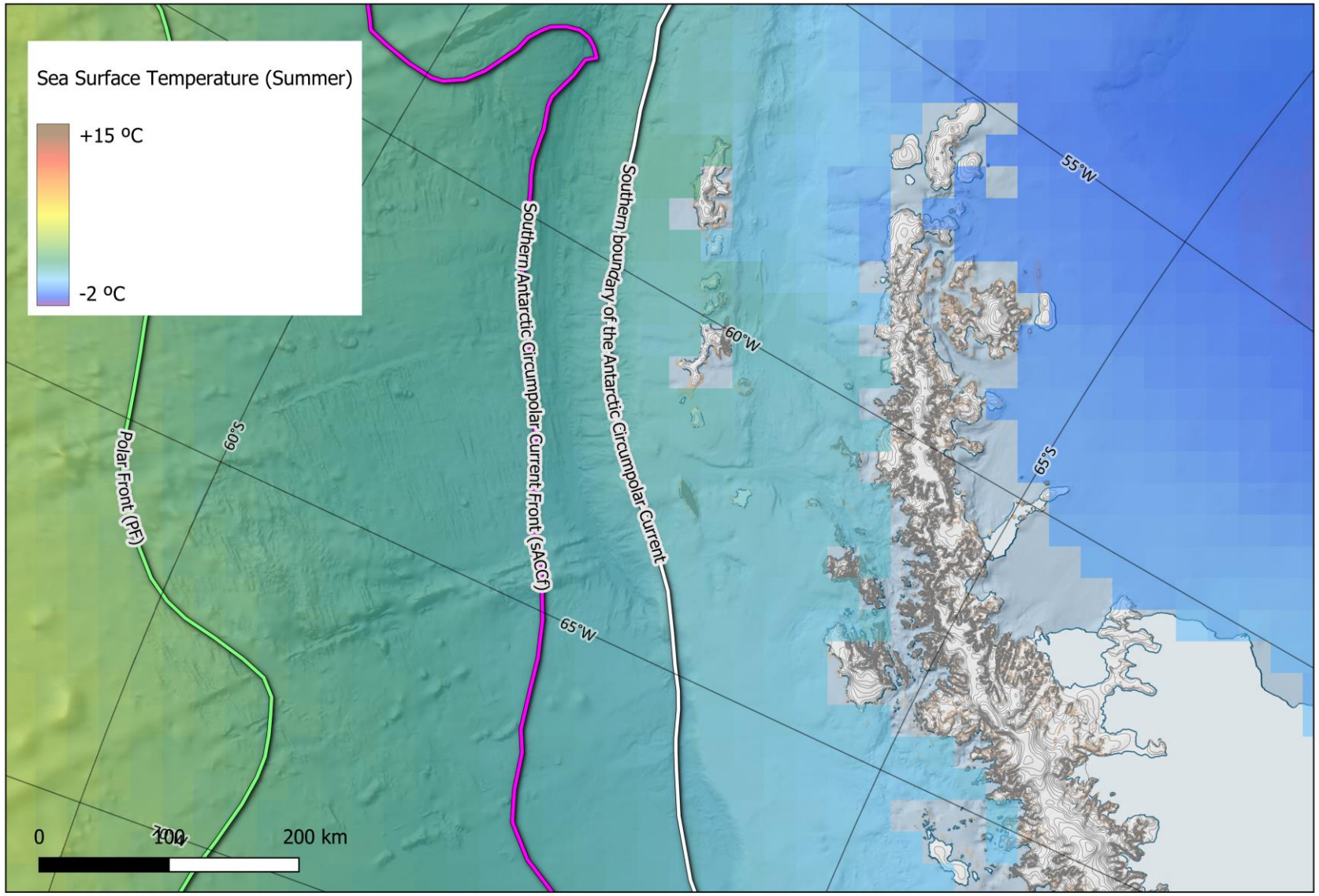




QUANTARCTICA

Trusel et al (2013)

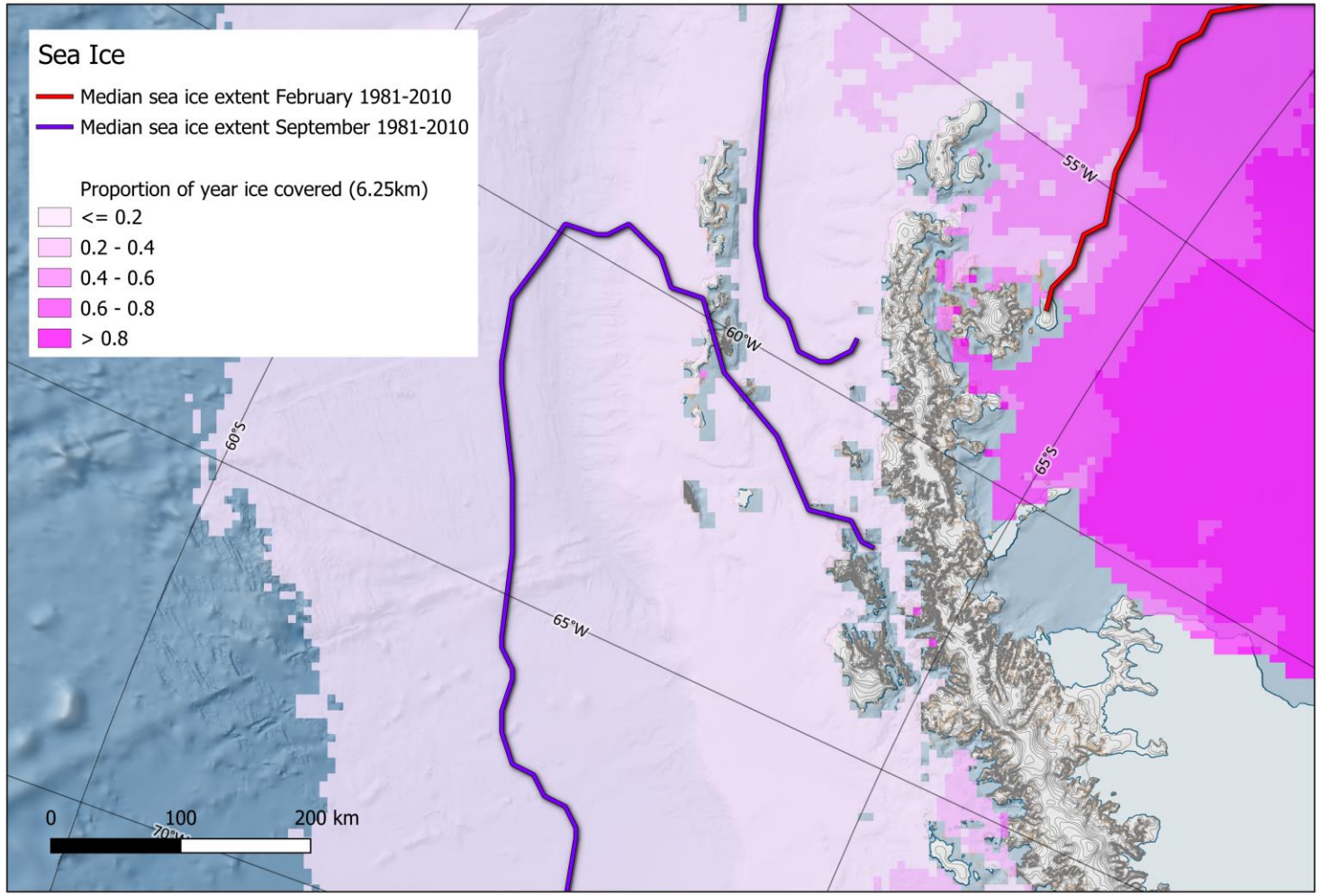
Um mar de águas frias

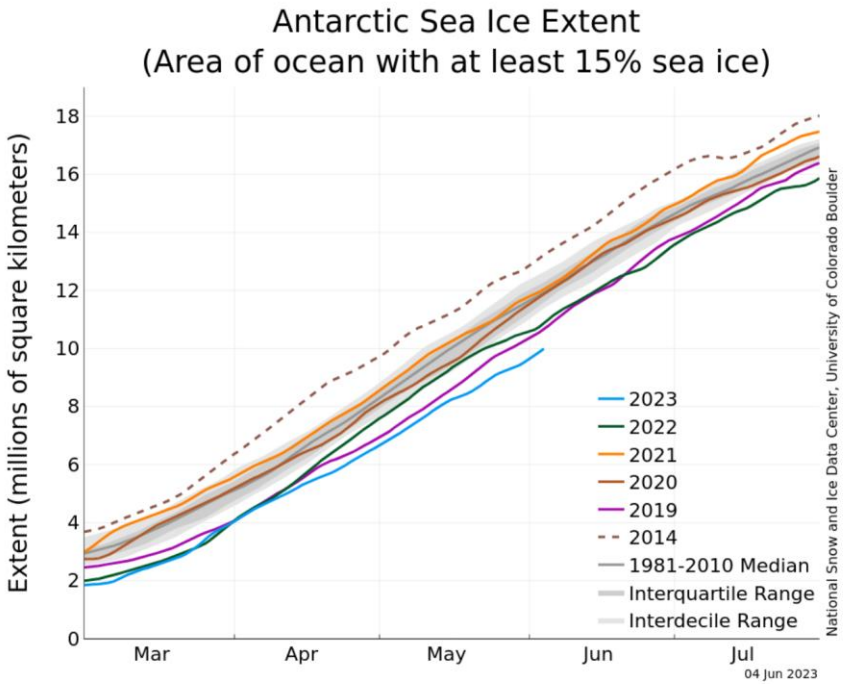


Locarnini, R. A., A. V. Mishonov, J. I. Antonov, T. P. Boyer, H. E. Garcia, O. K. Baranova, M. M. Zweng, C. R. Paver, J. R. Reagan, D. R. Johnson, M. Hamilton, and D. Seidov, 2013. World Ocean Atlas 2013, Volume 1: Temperature. S. Levitus, Ed., A. Mishonov Technical Ed.; NOAA Atlas NESDIS 73, 40 pp.

https://www.nodc.noaa.gov/OC5/woa13/ FAQ available at https://www.nodc.noaa.gov/OC5/wod-woa-faqs.html

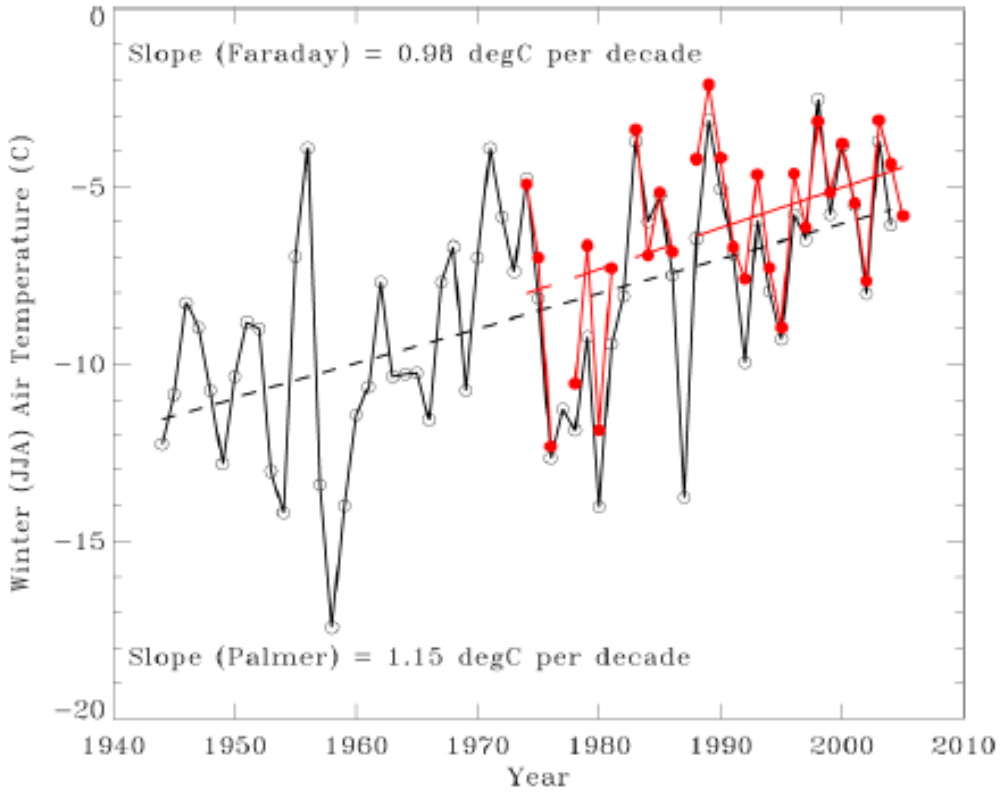
Marcado pelo pulsar do gelo marinho



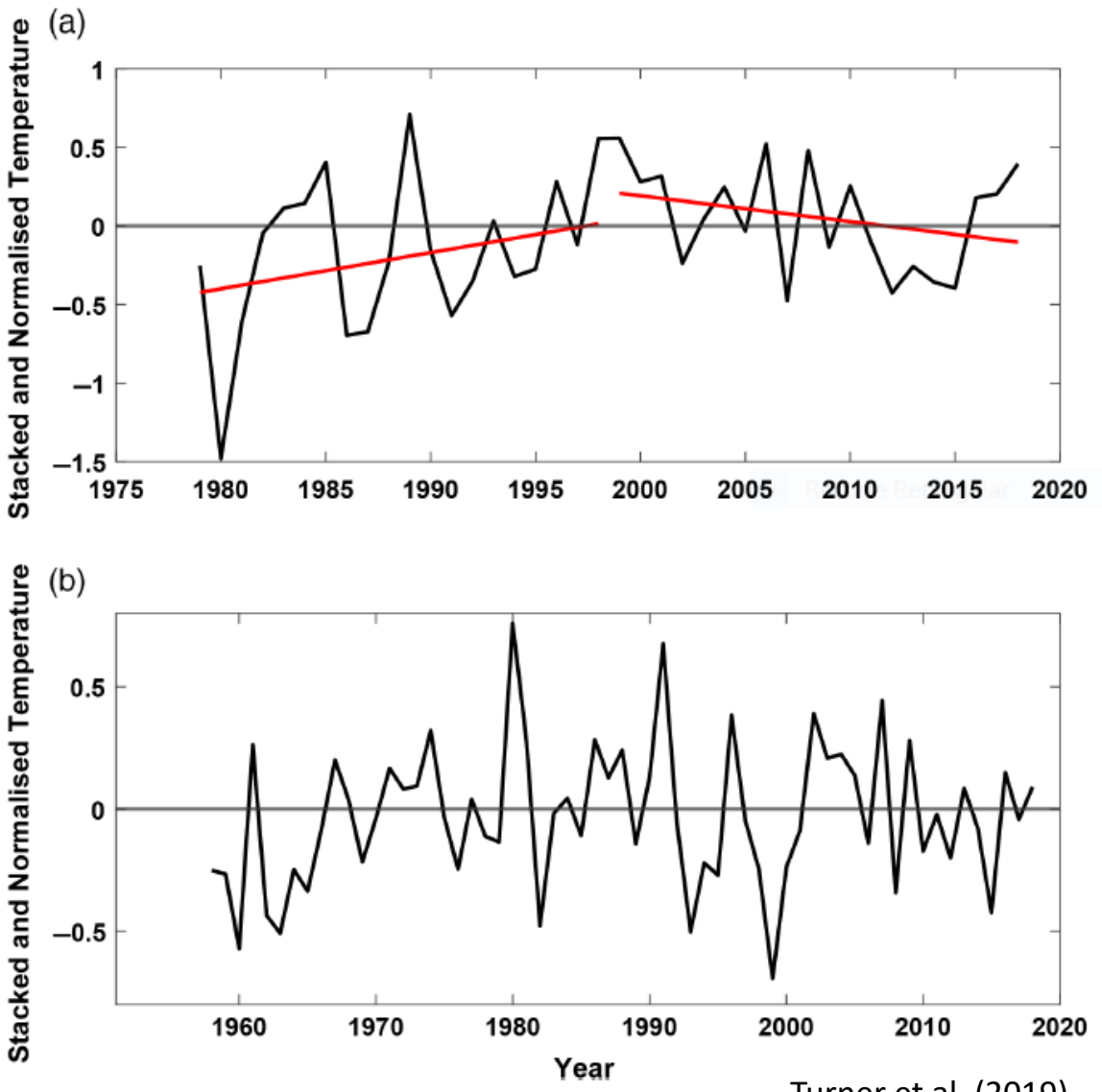


NSIDC Sea Ice Extent
Monthly median sea ice extents for the period 1981-2010.
Fetterer, F., K. Knowles, W. Meier, M. Savoie, and A. K. Windnagel. 2016, updated daily. Sea Ice Index, Version 2. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. doi: http://dx.doi.org/10.7265/N5736NV7. [Date Accessed]. http://nsidc.org/data/g02135

Numa Península Antártica em rápida mudança



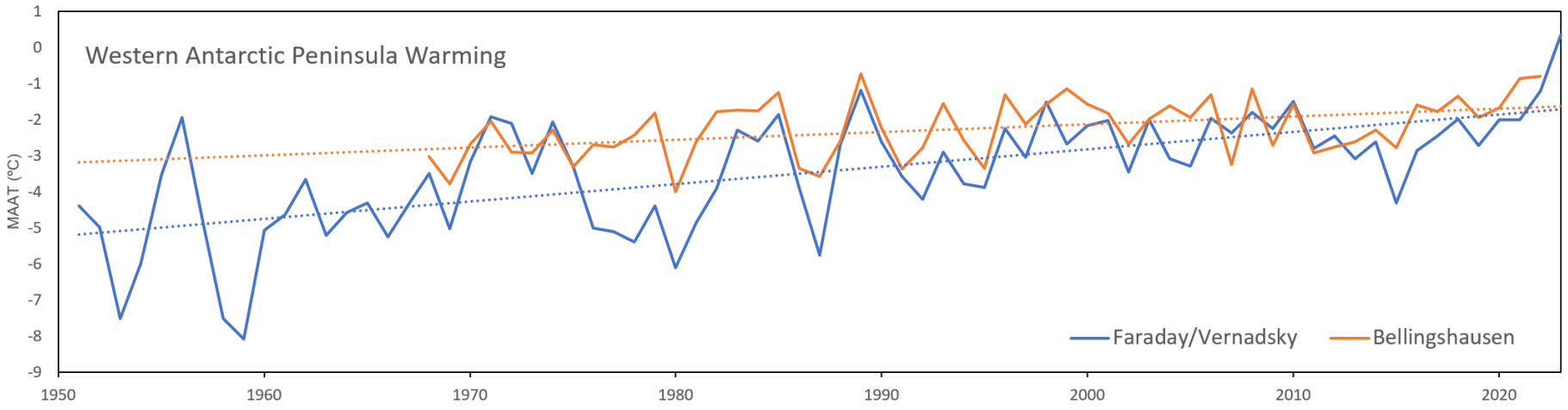
Turner et al. (2005)



Turner et al. (2019)

FIGURE 10 The stacked and normalized temperatures for (a) the Peninsula and (b) East Antarctica. The red lines on (a) show the linear trends for the periods 1979–1997 and 1999–2018 [Colour figure can be viewed at wileyonlinelibrary.com]

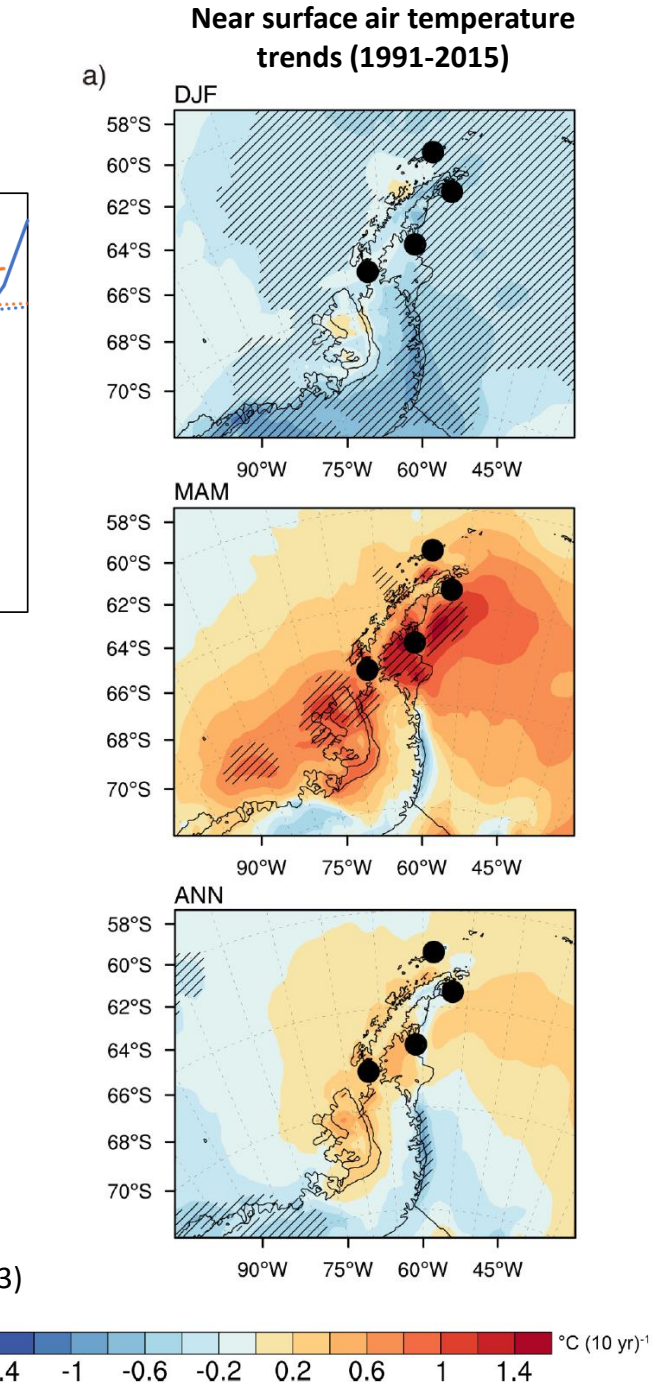
Com ritmos regionais diferentes



Source: Antarctic READER database

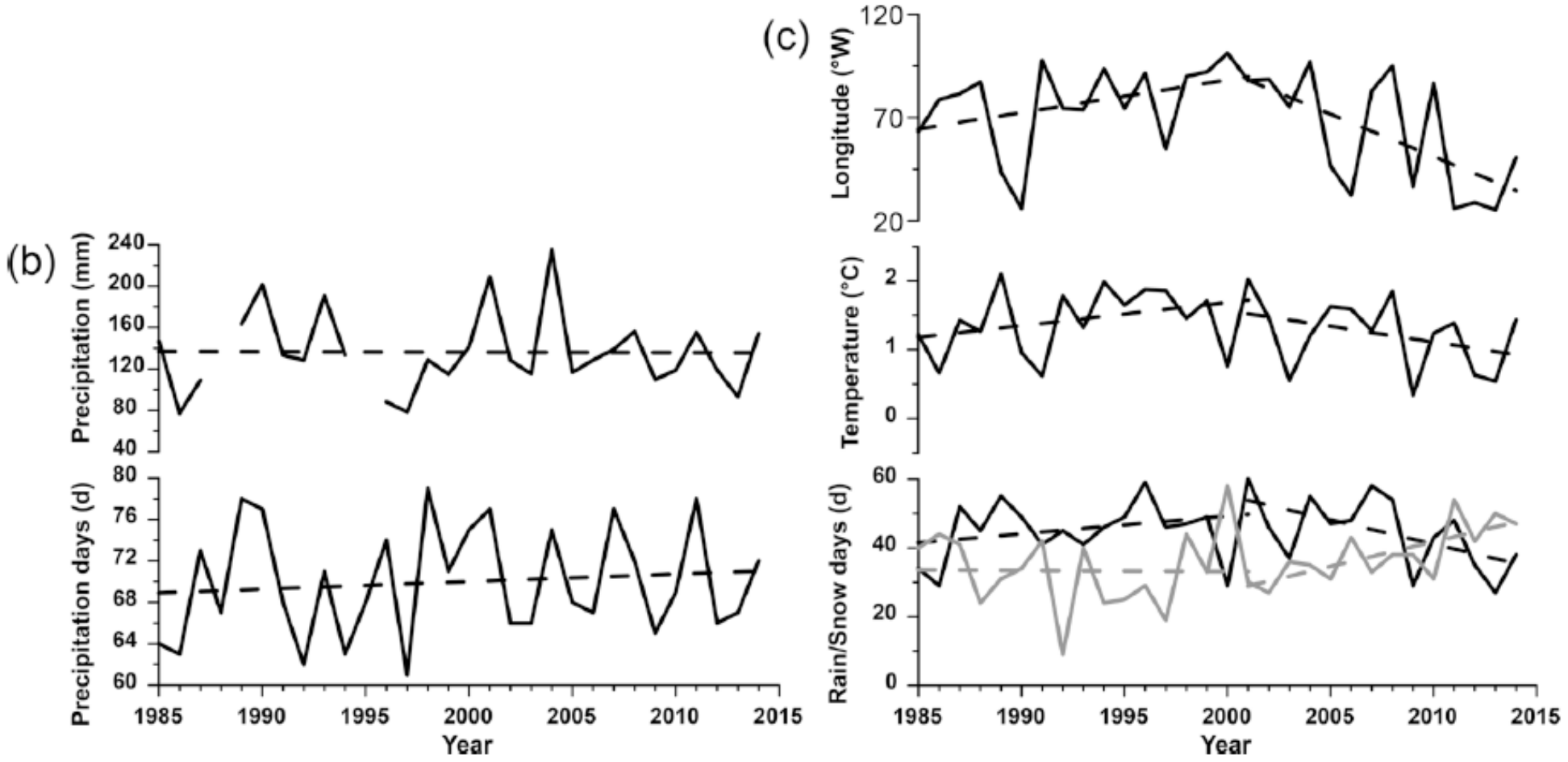
Ritmos climático na Pen Antática Ocidental

- até c. 2000 em Bellingshausen
- Até c. 2009 em Faraday/Vernadsky
- Arrefecimento até c.. 2015
- Aquecimento após 2017



Bozkurt et al (2013)

Verões com neve a mudar para verões com chuva



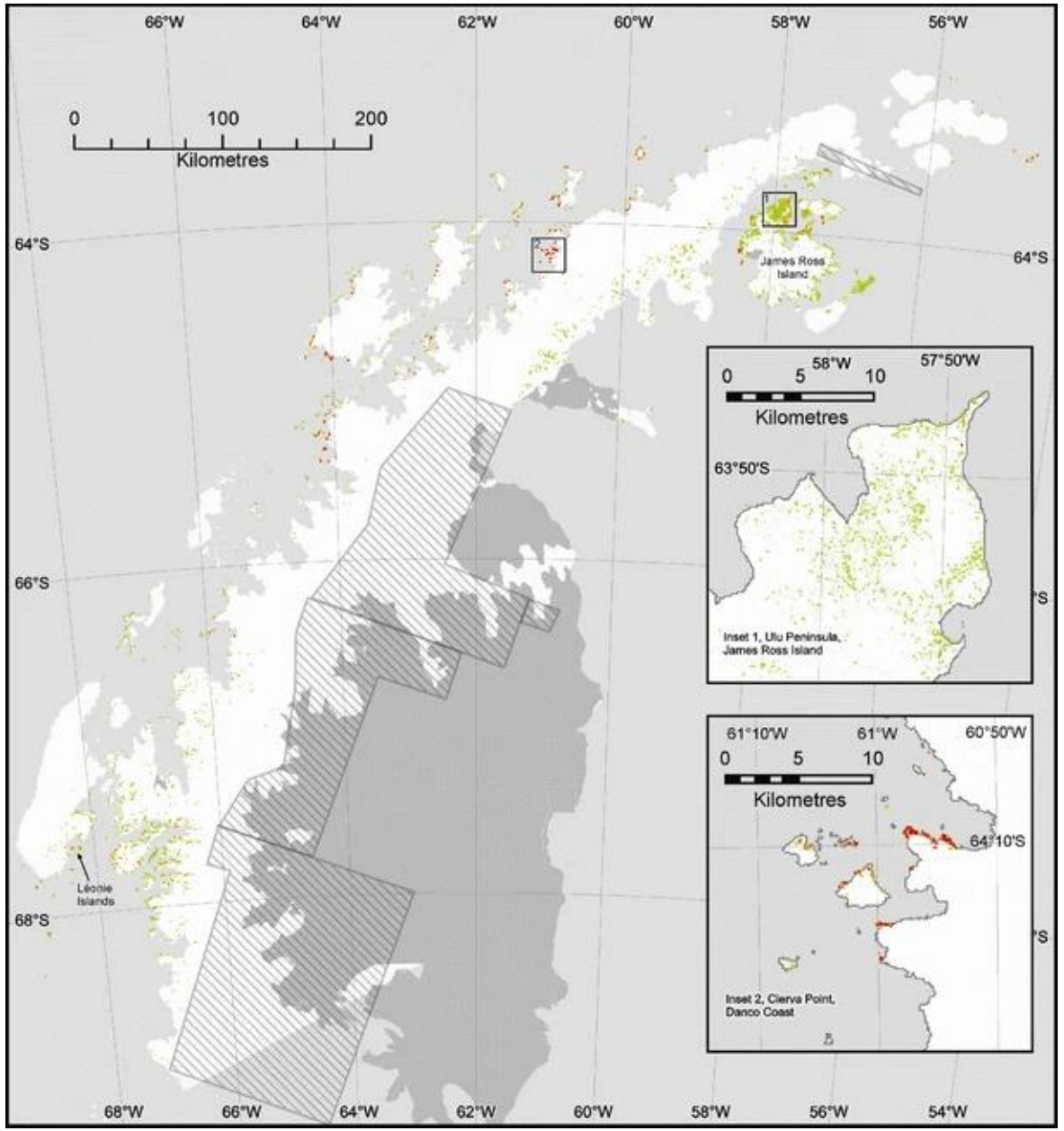
Snow

Rain

Fig. 1. (a) Location of Great Wall Station on the AP. (b) Average precipitation amount and number of precipitation days in summer for the years 1985–2014. (c) Summer longitudinal locations of the ASL (top); average summer surface air temperature (middle); number of rain days (dark line) and snow days (light line) (bottom) at Great Wall Station (1985–2014).

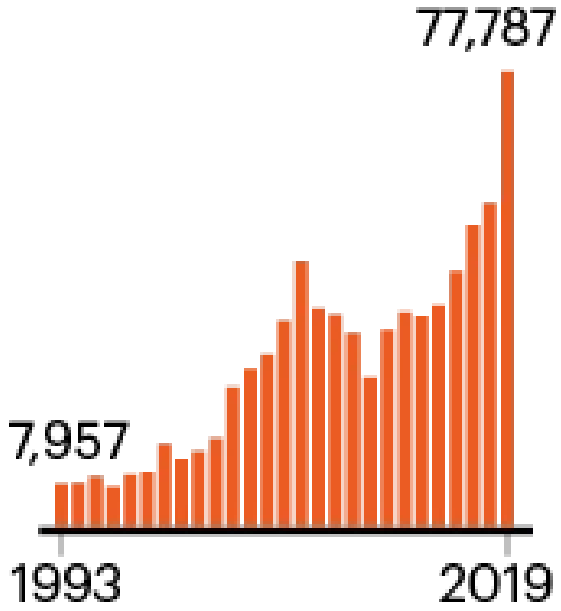
Ding et al. (2020)

Uma vegetação rasteira e escassa, mas em expansão

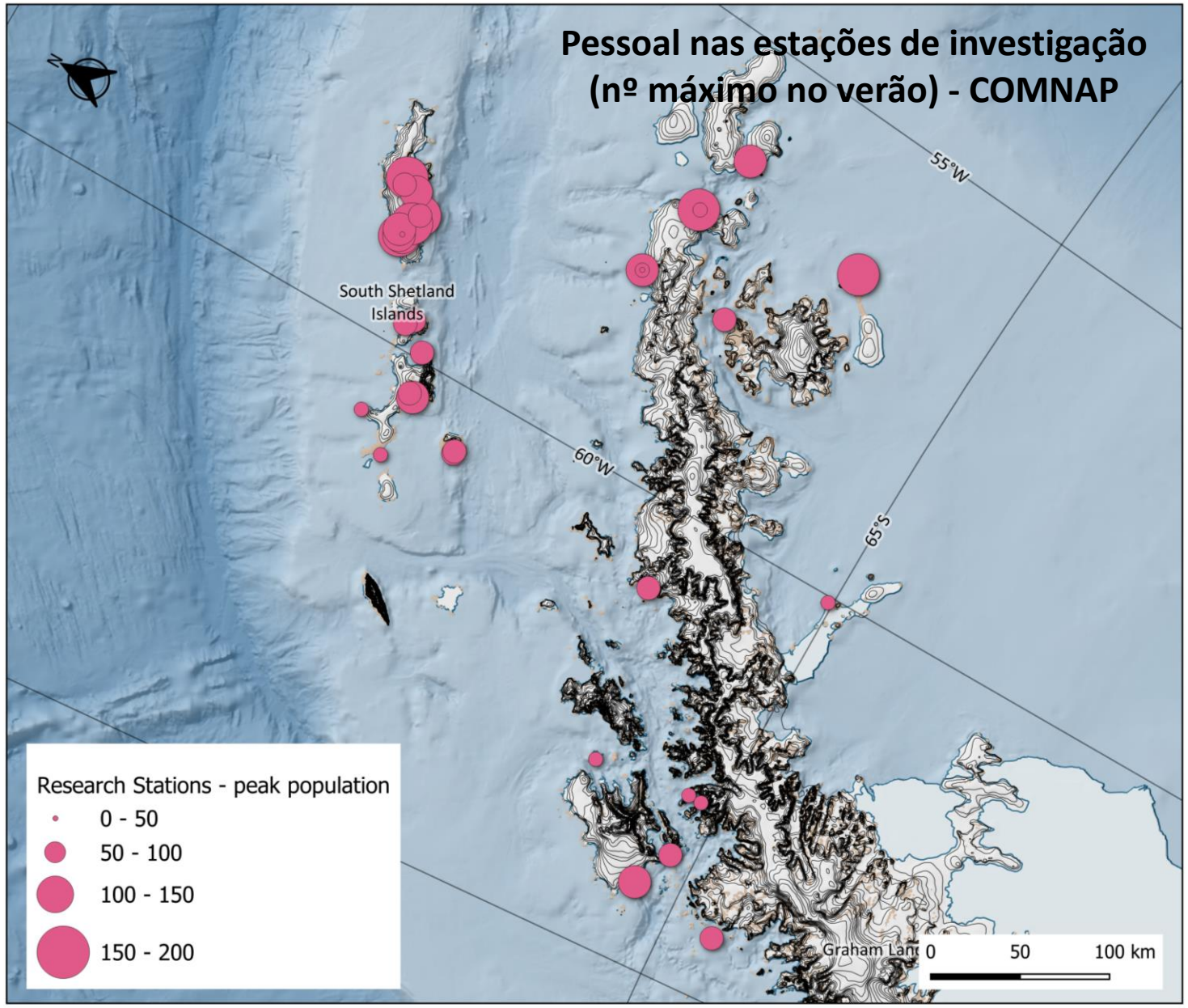


NDVI
Fretwell et al 2011

Uma atividade humana crescente



Hogg et al. (2020)



Setting the agenda in research

Comment

Nature 2020

Humans, marine mammals, penguins and other seabirds coexist on the Antarctic Peninsula alongside ships and buildings.

Protect the Antarctic Peninsula – before it's too late

Carolyn J. Hogg, Mary-Anne Lea, Marga Gual Soler, Valeri N. Vasquez, Ana Payo-Payo, Marissa L. Parrott, M. Mercedes Santos, Justine Shaw & Cassandra M. Brooks

Annual Review of Environment and Resources

The State and Future of Antarctic Environments in a Global Context

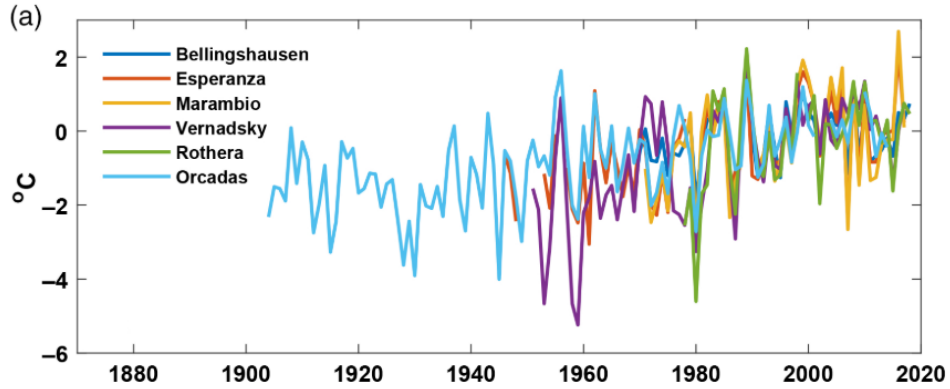
Steven L. Chown[1] and Cassandra M. Brooks[2]

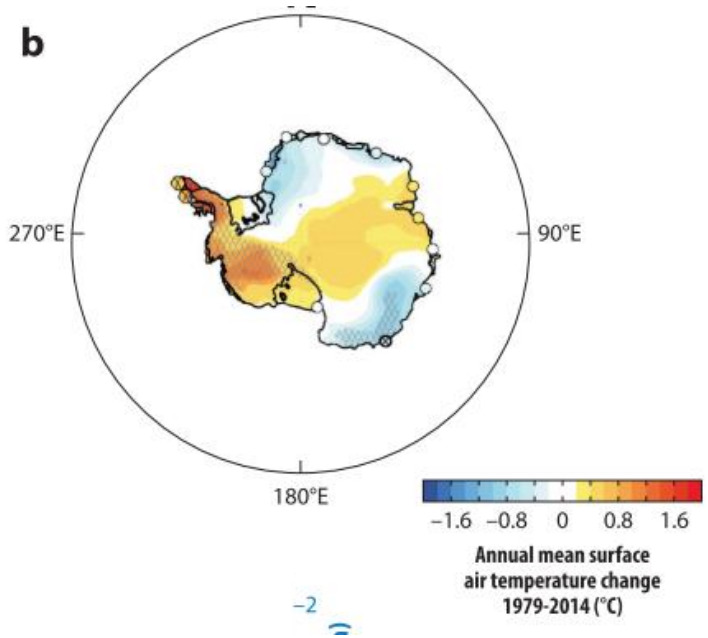
[1]School of Biological Sciences, Monash University, Victoria 3800, Australia; email: steven.chown@monash.edu

[2]Environmental Studies Program, University of Colorado, Boulder, Colorado 80309, USA; email: cassandra.brooks@colorado.edu

FIGURE 5 The annual mean station temperature anomalies from 1981 to 2010. (a) the Antarctic Peninsula, (b) East Antarctic and (c) the plateau and Ross ice shelf [Colour figure can be viewed at wileyonlinelibrary.com]

Turner et al (2019)





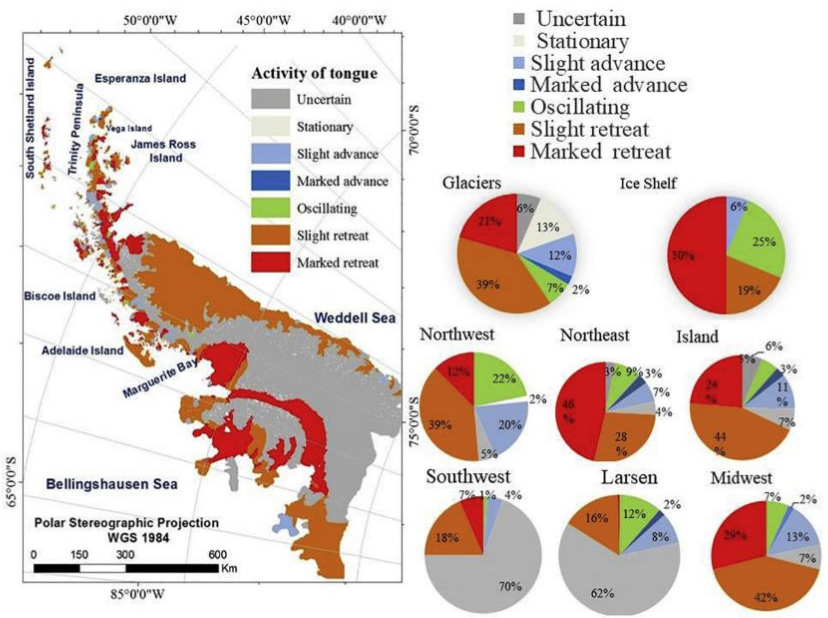
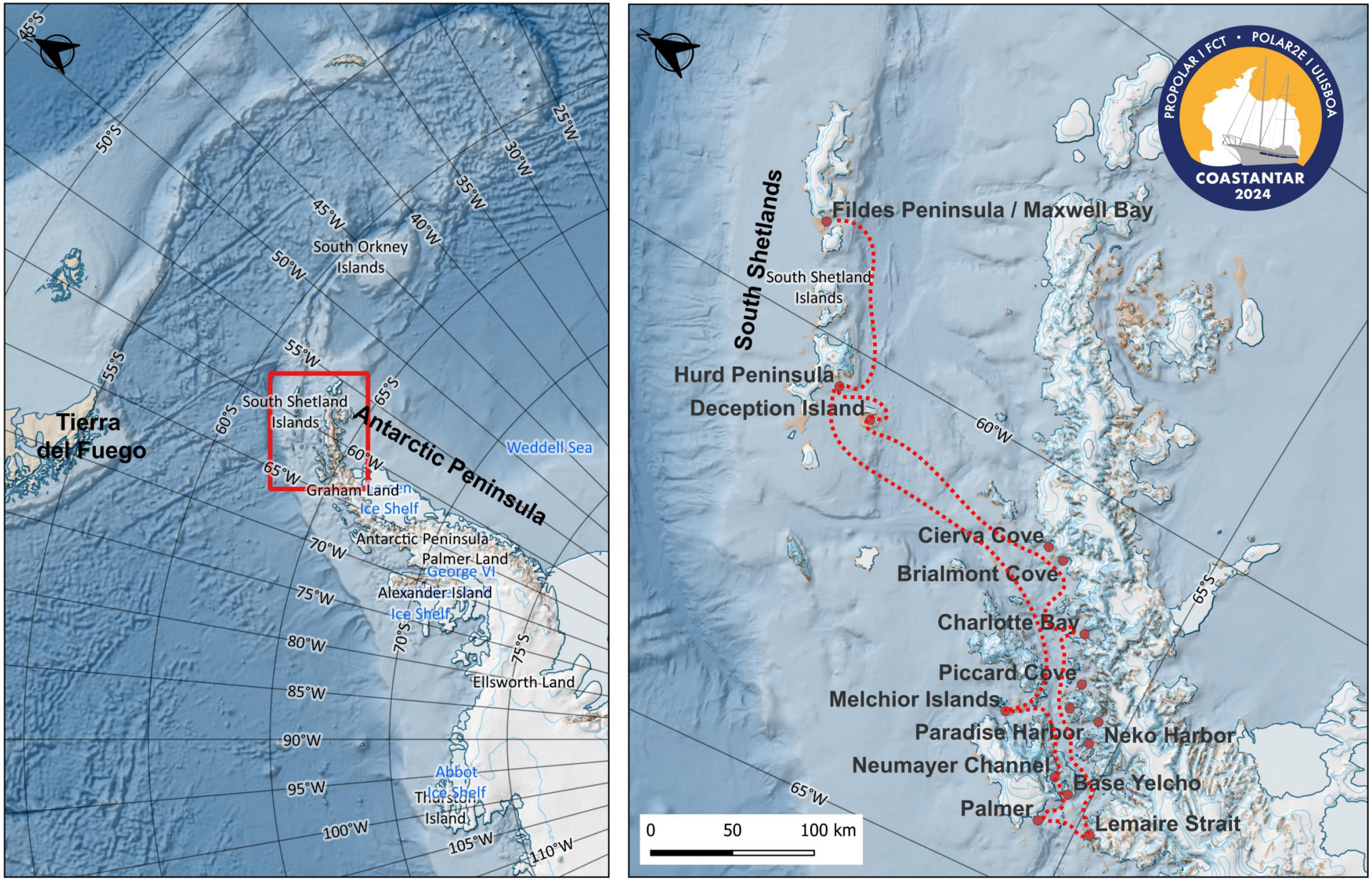


Fig. 4. Glacier tongue activity in the front of AP glaciers and ice shelves, separated by sectors.

Western Antarctic Peninsula Coastal Environments under a Changing Climate
COASTANTAR 2024 Expedition

Algumas datas relevantes

- 2007 – Ano Polar Internacional
- 2010 – Proposta Ministério da Ciência
- Início do PROPOLAR e voos antárticos portugueses
- 2014 – Associação David Melgueiro
- 2020 – Proposta COASTANTAR



Base map: Norwegian Polar Institute's Quantarctica package.

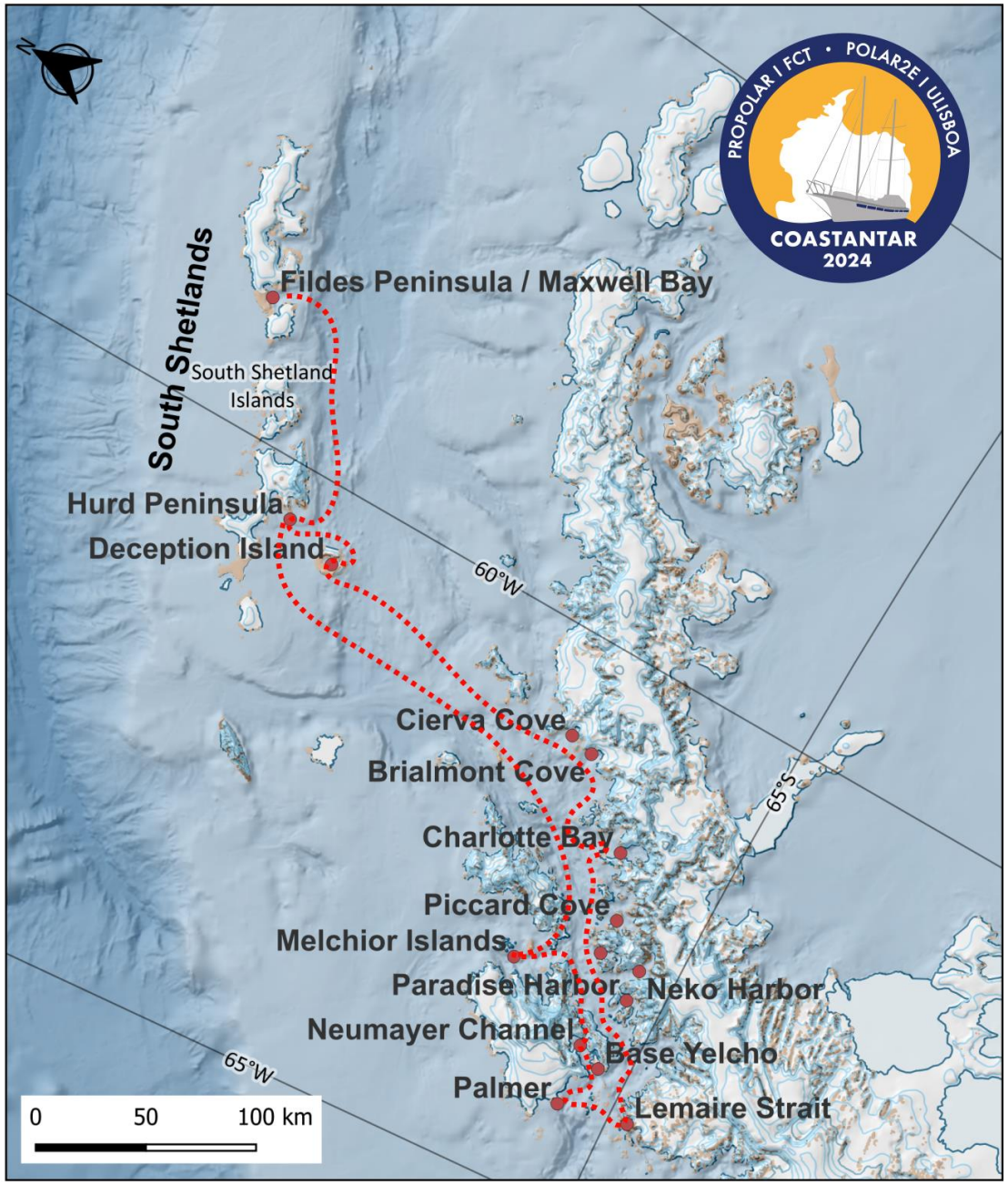
Trajeto:

- 28 janeiro – Lisboa – Punta Arenas
- 1 de fevereiro – Punta Arenas – Ilha do Rei Jorge (voo PROPOLAR)
- 5 de fevereiro – Início da missão
- 20 de fevereiro – Fim da missão – Ilha do Rei Jorge
- 29 de fevereiro – Regresso a Lisboa

A maior parte da equipa sai de Lisboa a 28 de janeiro.

A equipa reunir-se-á em Punta Arenas a 29 de janeiro para os últimos preparativos.

Os investigadores Henrique Zilhão, Joana Baptista e Pedro Guerreiro, encontram-se já na Antártida. Os dois primeiros na ilha Livingston a realizar tarefas do projeto THAWIMPACT e o último na ilha do Rei Jorge no projeto DETOXANTAR.



Base map: Norwegian Polar Institute's Quantarctica package.

Western Antarctic Peninsula Coastal Environments under a Changing Climate
COASTANTAR 2024 Expedition

1 mês de expedição

15 dias de navegação

10 Projetos de investigação

11 Cientistas a bordo

5 Universidades

1 Realizadora

4 Tripulantes

Projetos

DETOXANTAR – Cellular and molecular detoxifying mechanisms and microbiomes in Antarctic marine organisms
(PI: Pedro Guerreiro, CCMAR - UALG)

SAIL-BIO – Longitudinal Analyses of Pollution and Zooplankton in Antarctic Peninsula Region
(PI: José Xavier, MARE - UC)

BIOCRUST-2023 – Biocrust biodiversity as an indicator to diagnose, monitor and predict climate change impacts in Antarctic ecosystems' functioning
(PI: Paula Matos, CEG/IGOT - ULisboa)

THAWIMPACT-CONTAMINANTS - Antarctic Peninsula permafrost under a changing climate: sensitivity, fate and impacts – Contaminants
(PI: Rute Cesário, CQE/IST-ULisboa)

THAWIMPACT-COASTANTAR - Antarctic Peninsula permafrost under a changing climate: sensitivity, fate and impacts - Permafrost modelling
(PI: Gonçalo Vieira, CEG/IGOT - ULisboa)

Projetos

RISKANTAR - Multi-hazard exposure of people and assets in Northwest Antarctic Peninsula
(PI: José Luís Zêzere, CEG-IGOT/ULisboa)

POLARBUILDINGS - Polar Buildings Performance: Environment, Energy and Comfort
(PI: Manuel Guedes, IST-ULisboa)

SCANTAR - From Science and Public Diplomacy towards Citizen Diplomacy: the case of the Antarctic Peninsula
(PI: Sandra Balão, ISCSP-ULisboa)

MICROAIRPOLAR2 - Biogeography, transport and adaptation of polar microorganisms
(PI: Antonio Quesada, UAM)

MARMOREAL - Multidomain microbiomics of Antarctic niches under a global warming scenario

(PI: Jean-Baptiste Ramond, Pontificia Universidad Católica de Chile)

Timeline

- 1st approval POLAR2E-FCT 2022 – Postponed
- 2nd submission – approved for 2024
- Announcement at CPCP Faro November 2023
- 1st Webinar COASTANTAR – April 2023
- Selection of freight company – April 2023
- Open call for Projects – PROPOLAR – May 2023
- Selection procedure at ULISBOA – May 2023
- Invitation to partner programs – July 2023
- Final list of Projects – September 2023
- Visit to El Doblon in Periapolis, Uruguay – September 2023
- Sponsoring – October 2023
- Shipping of cargo – November 2023
- Sea safety training – November 2023
- Science retreat in Serra da Estrela – November 2023
- BLS and first aid course – November 2023
- Environmental Impact Assessment – November 2023
- Expedition – February 2024

Gonçalo Vieira
(CEG/IGOT)
Expedition Leader
Cryosphere

Pedro Guerreiro
(CCMAR/UALG)
Co-Expedition Leader
Marine Biology

Ana Justel
(UAM)
Microbiology

Carlos Vital
(PROPOLAR/POLAR2E)
Research Assistant

Gabriel Goyanes
(CERENA/IST)
Vegetation Mapping

Henrique Zilhão
(CQE/IST)
Permafrost Contaminants

Jean-Baptiste Ramond
(E^2ME/FCB/PUC)
Microbiology

Joana Baptista
(CEG/IGOT)
Permafrost Modelling

Madalena Boto
Film Director

Manuel Guedes
(ICIST/IST)
Sustainable Buildings

Milene Guerreiro
(DCV/UC)
Marine Biology

Sandra Balão
(ISCSP/UL)
Science Diplomacy

Equipa a bordo

António Quesada
(UAM)
MICROAIRPOLAR2
Biogeography, transport and adaptation of polar microorganisms.

Gonçalo Vieira
(CEG/IGOT)
THAWIMPACT – COASTANTAR
Antarctic Peninsula permafrost under a changing climate: sensitivity, fate and impacts – Permafrost modelling.

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Sandra Balão
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SCANTAR
From Science and Public Diplomacy towards Citizen Diplomacy: the case of the Antarctic Peninsula.

Investigadores Principais

Gonçalo Vieira
Coordination

Pedro Guerreiro
Coordination

Teresa Cabrita
Coordination

Ana David
Logistics

Carlos Vital
Logistics

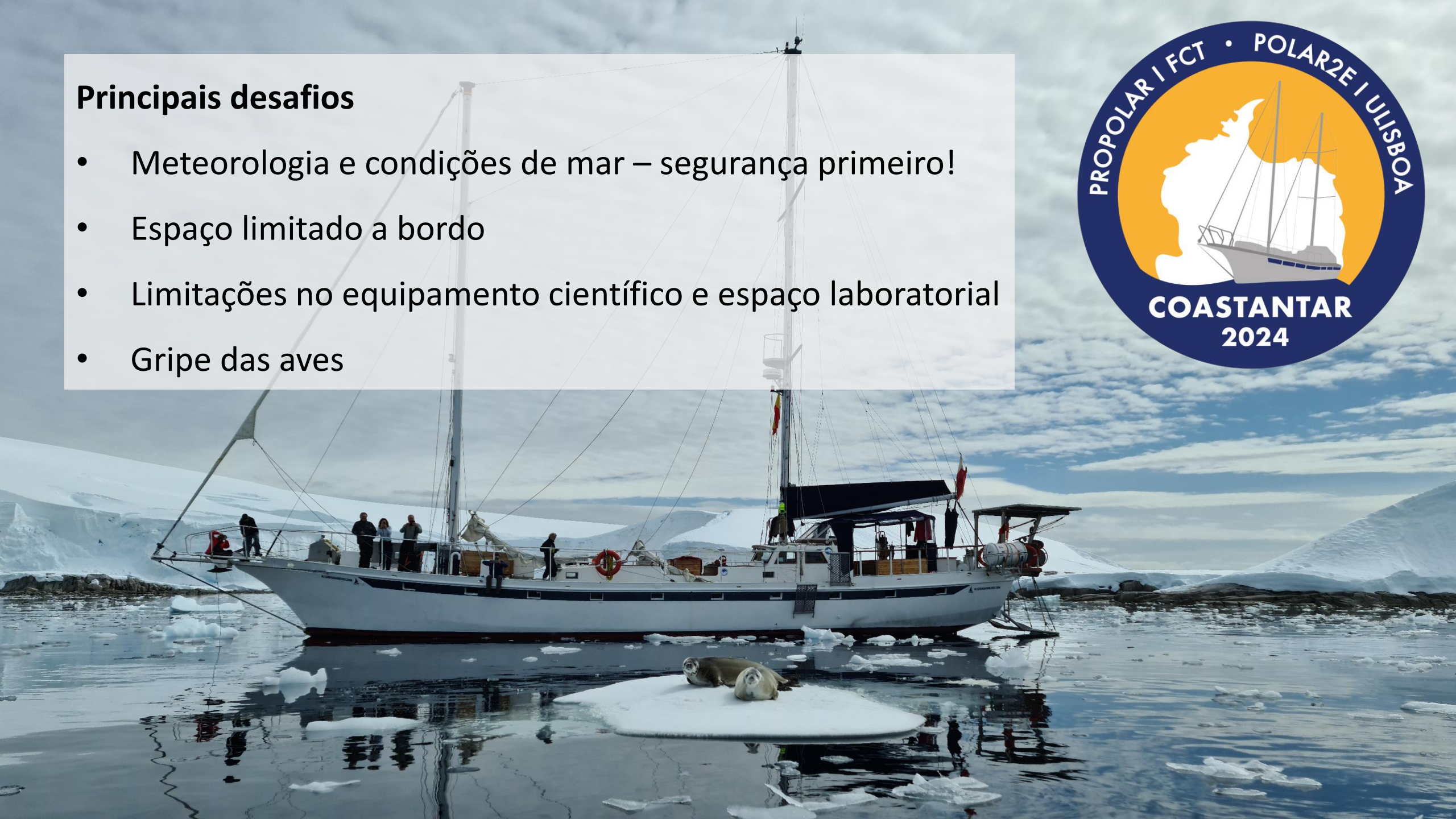
Equipa de Coordenação

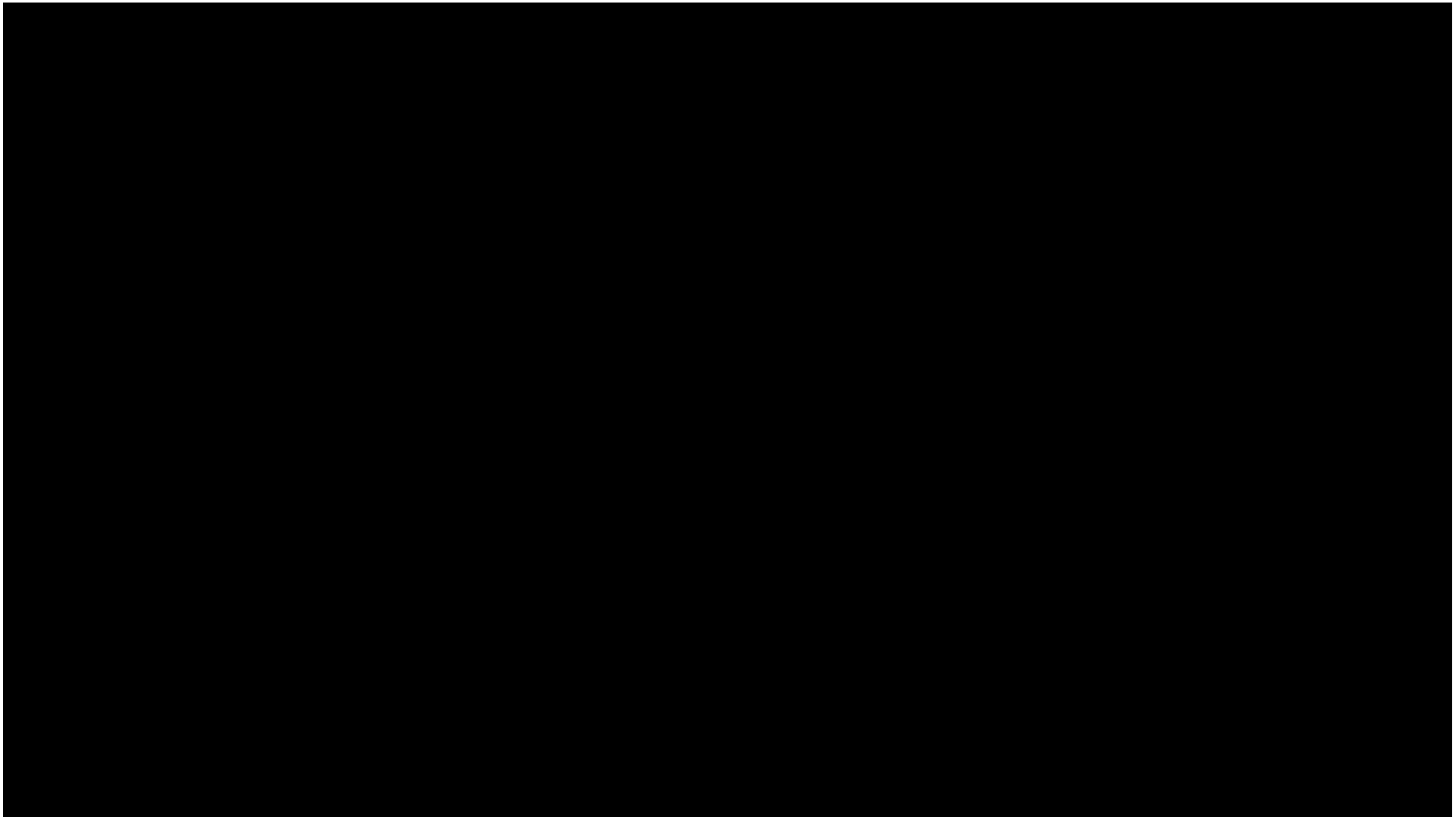
Vantagens

- 10 projetos científicos e 1 Grande projeto colaborativo
- Possibilidade de acesso a áreas impossíveis para embarcações maiores
- Formação de jovens investigadores
- Internacionalização
- Pegada ecológica reduzida
- Custo reduzido
- Consolidação da atividade científica portuguesa na Antártida

Principais desafios

- Meteorologia e condições de mar – segurança primeiro!
- Espaço limitado a bordo
- Limitações no equipamento científico e espaço laboratorial
- Gripe das aves



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Programa Polar Português
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