Prof. Paulo Horta –UFSC

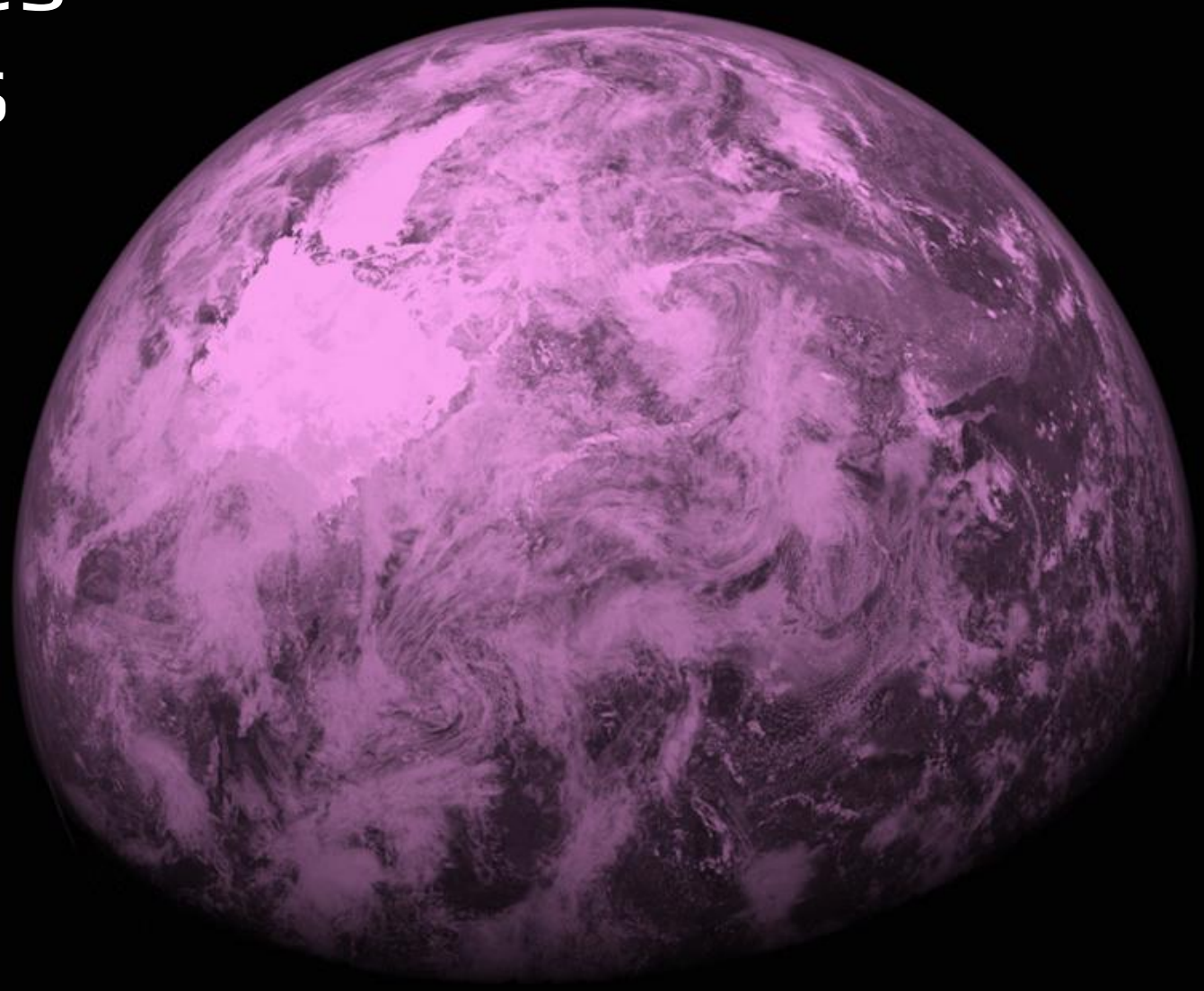
pauloantuneshorta@gmil.com

@profpaulohorta

UNIVERSIDADE FEDERAL DE SANTA CATARINA

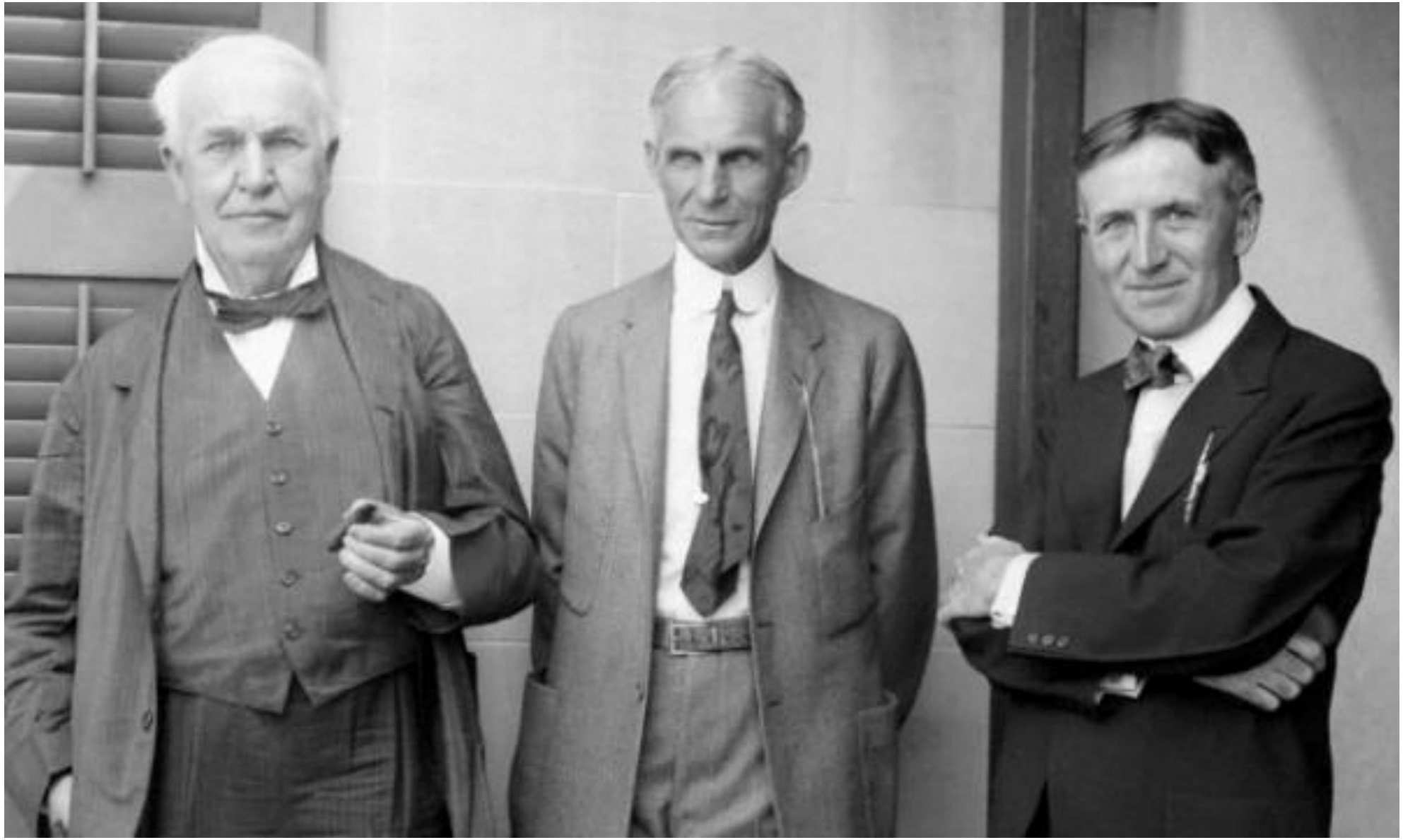

DE VOLTA
PARA O FUTURO

3 bilhões
de anos



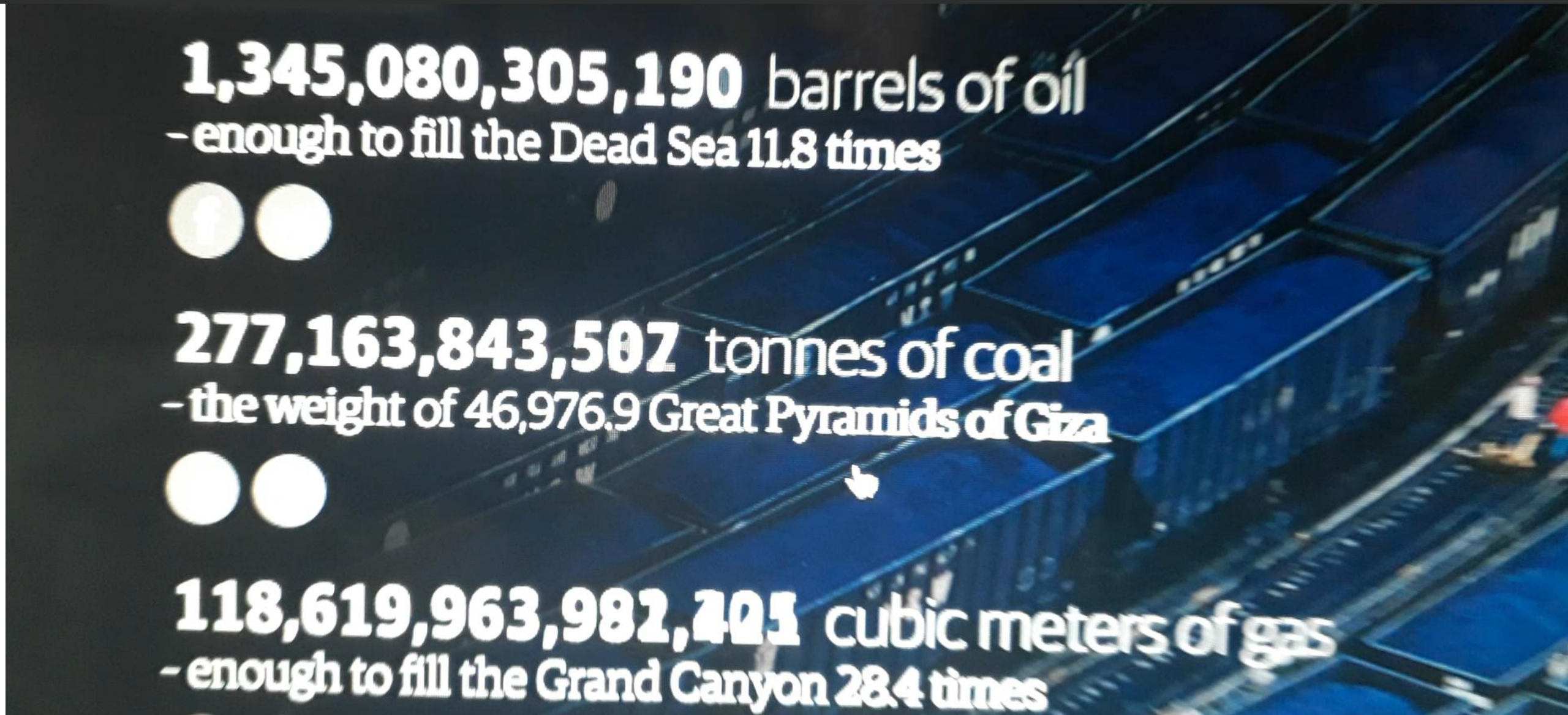
Terrible smell

Thomas Edison, Henry Ford, and Harvey Firestone

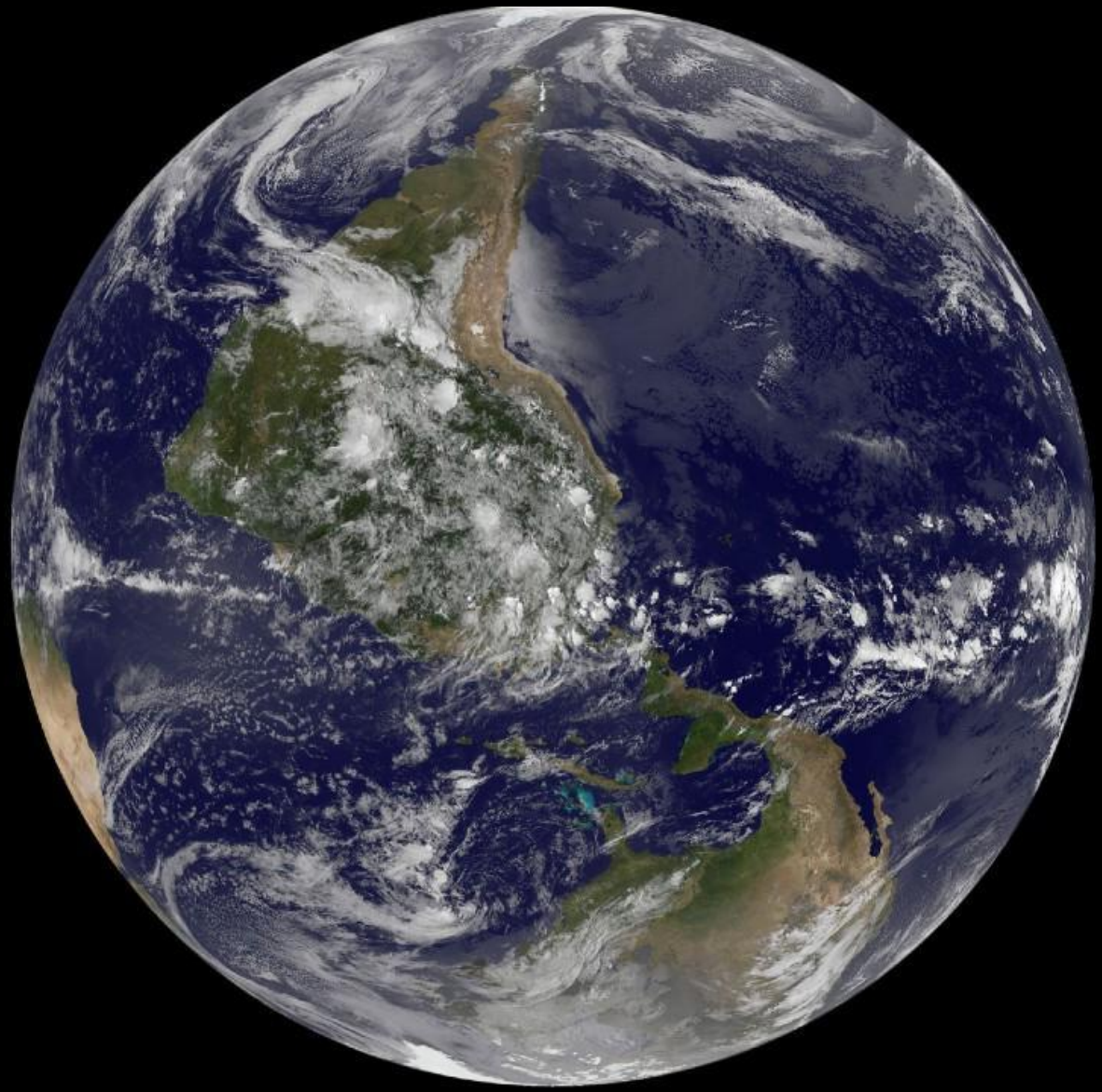


Décadas passadas

Últimas 5 décadas



Hoje



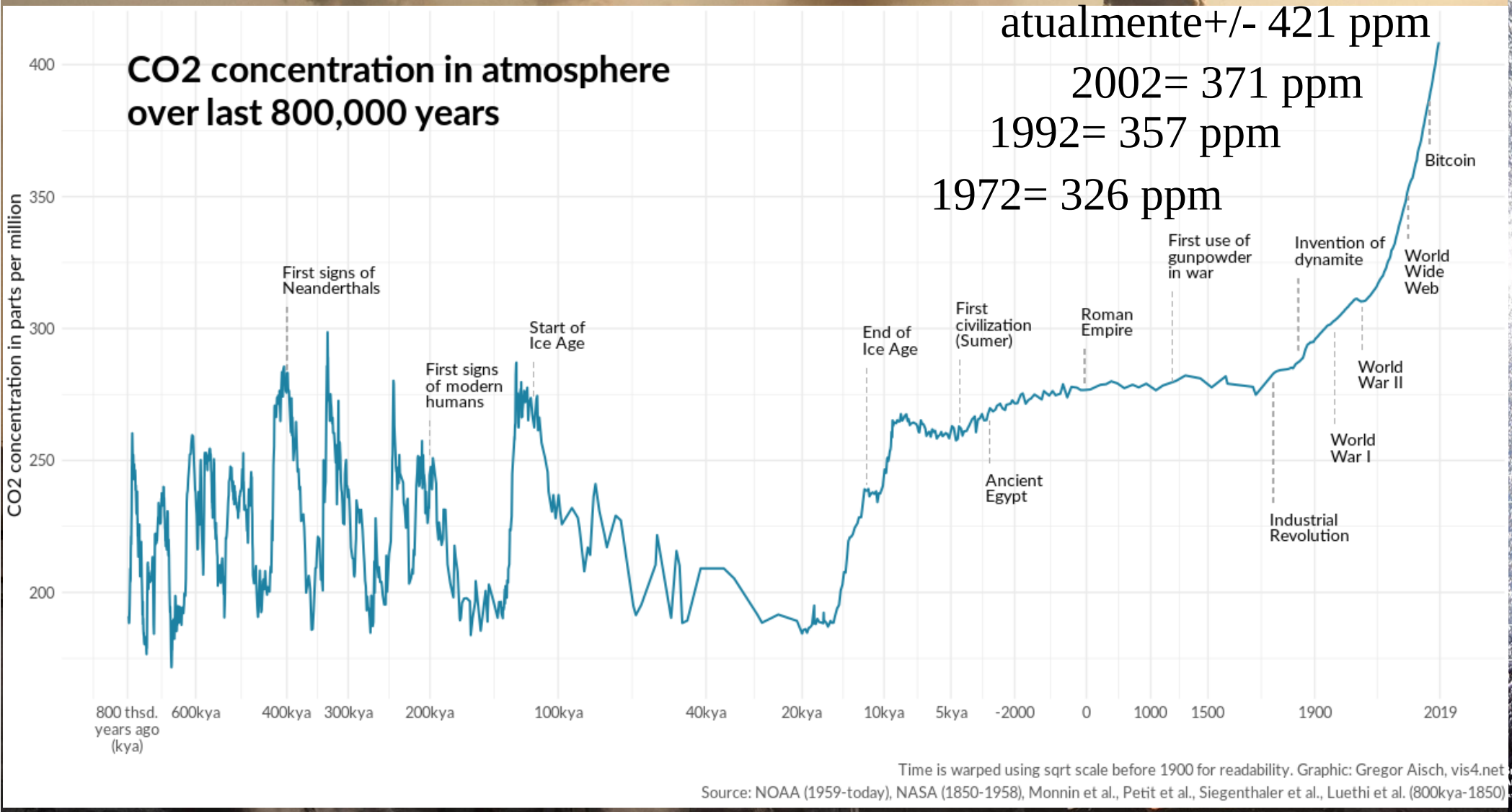
CO2 apresenta as concentrações mais elevadas da história da existência humana

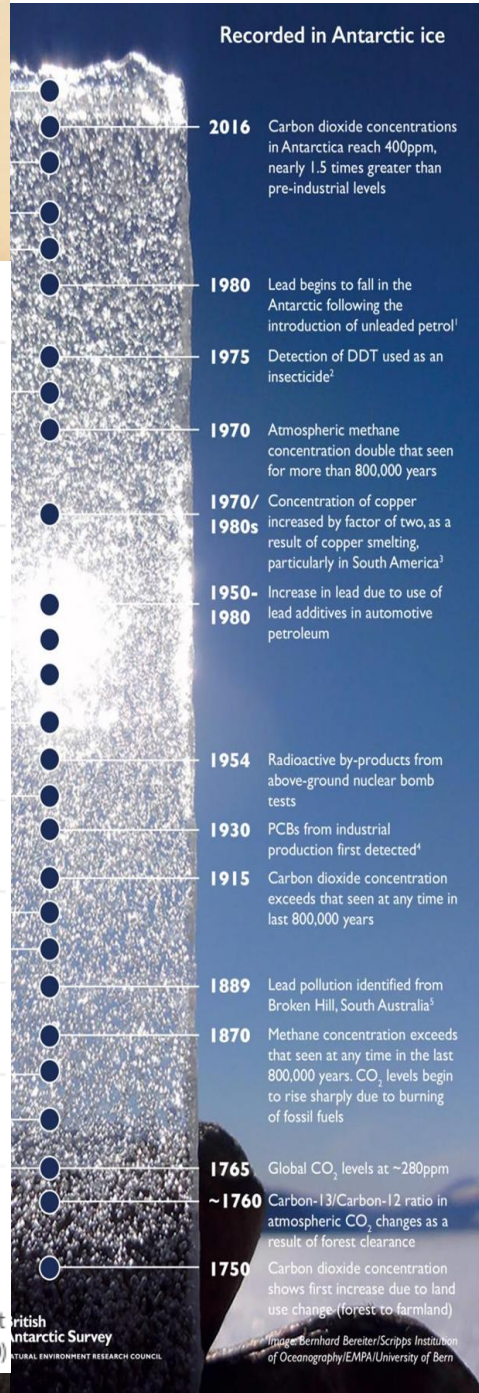
atualmente+/- 421 ppm

2002= 371 ppm

1992= 357 ppm

1972= 326 ppm





25 bilhões de bombas atômicas

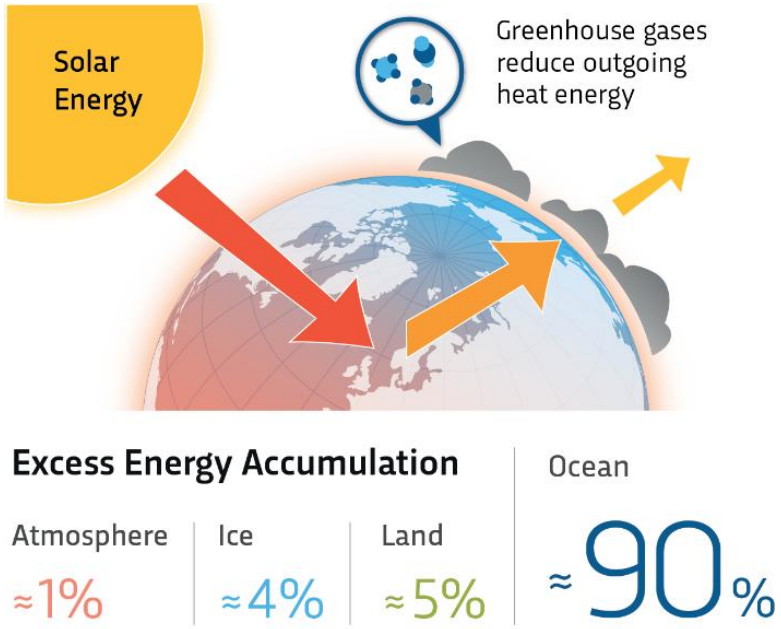
https://doi.org/10.5194/essd-15-1675-2023

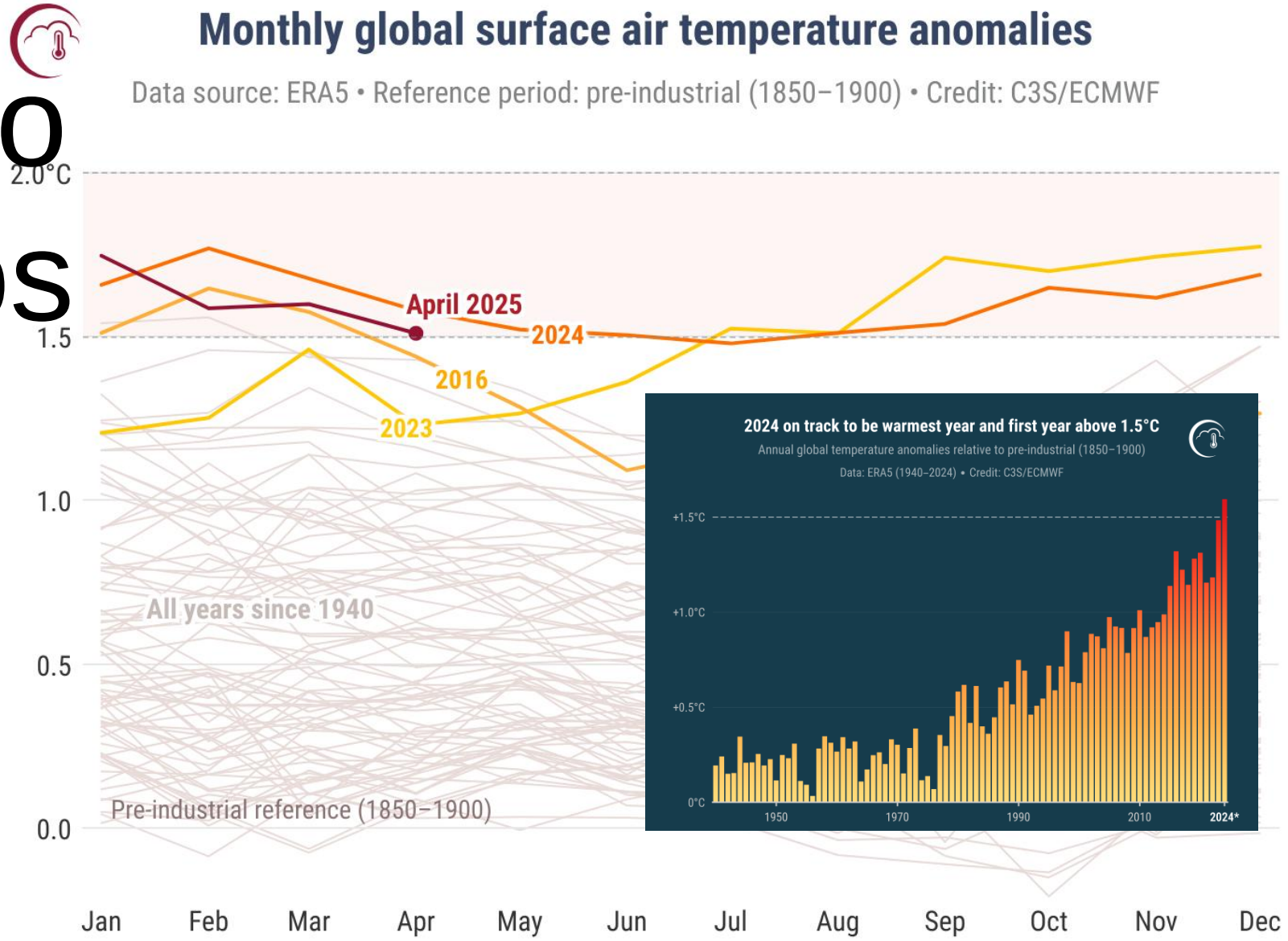
Article | Assets | Peer rev

Data description paper | CC BY

Heat stored in the Earth system 1960–2020: wher does the energy go?

Aquecimento dos Oceanos





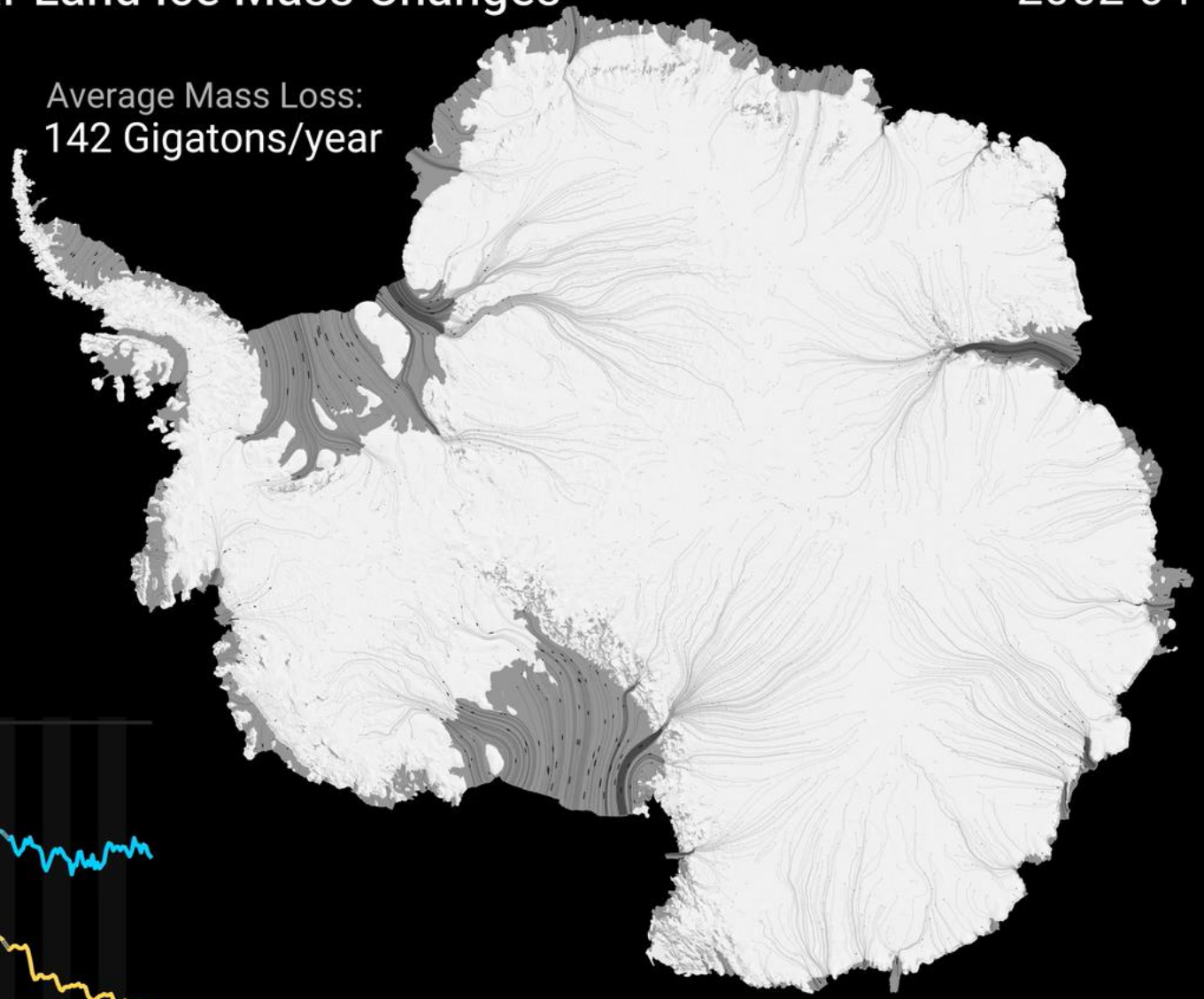
PROGRAMME OF THE EUROPEAN UNION
Copernicus
Climate Change Service
IMPLEMENTED BY ECMWF

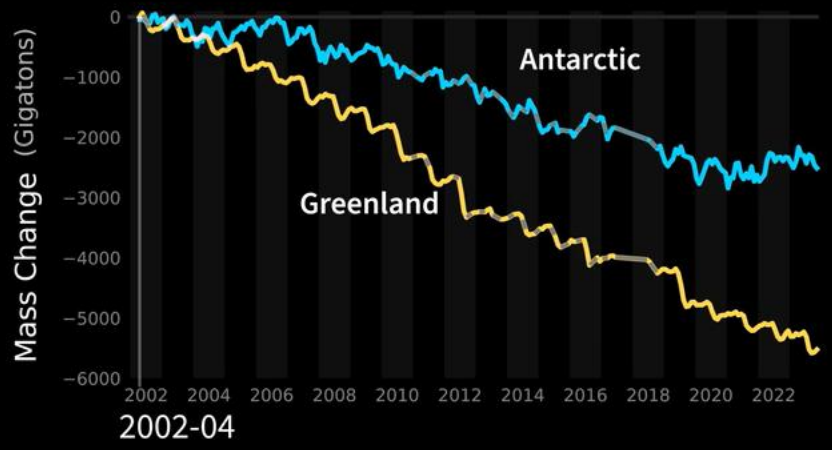
GRACE and GRACE-FO Observations of Polar Land Ice Mass Changes

2002-04

Average Mass Loss:
269 Gigatons/year

Average Mass Loss:
142 Gigatons/year

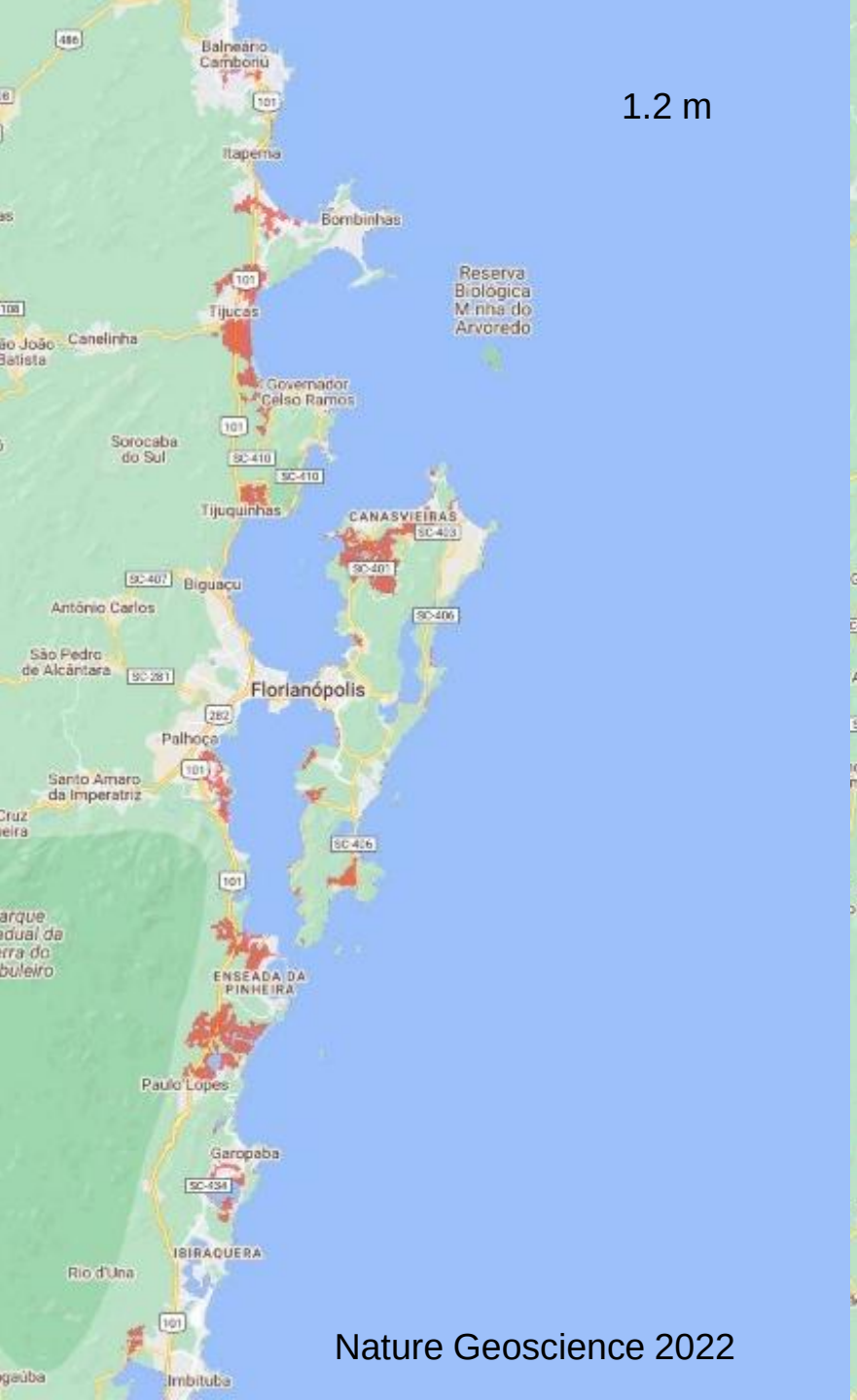


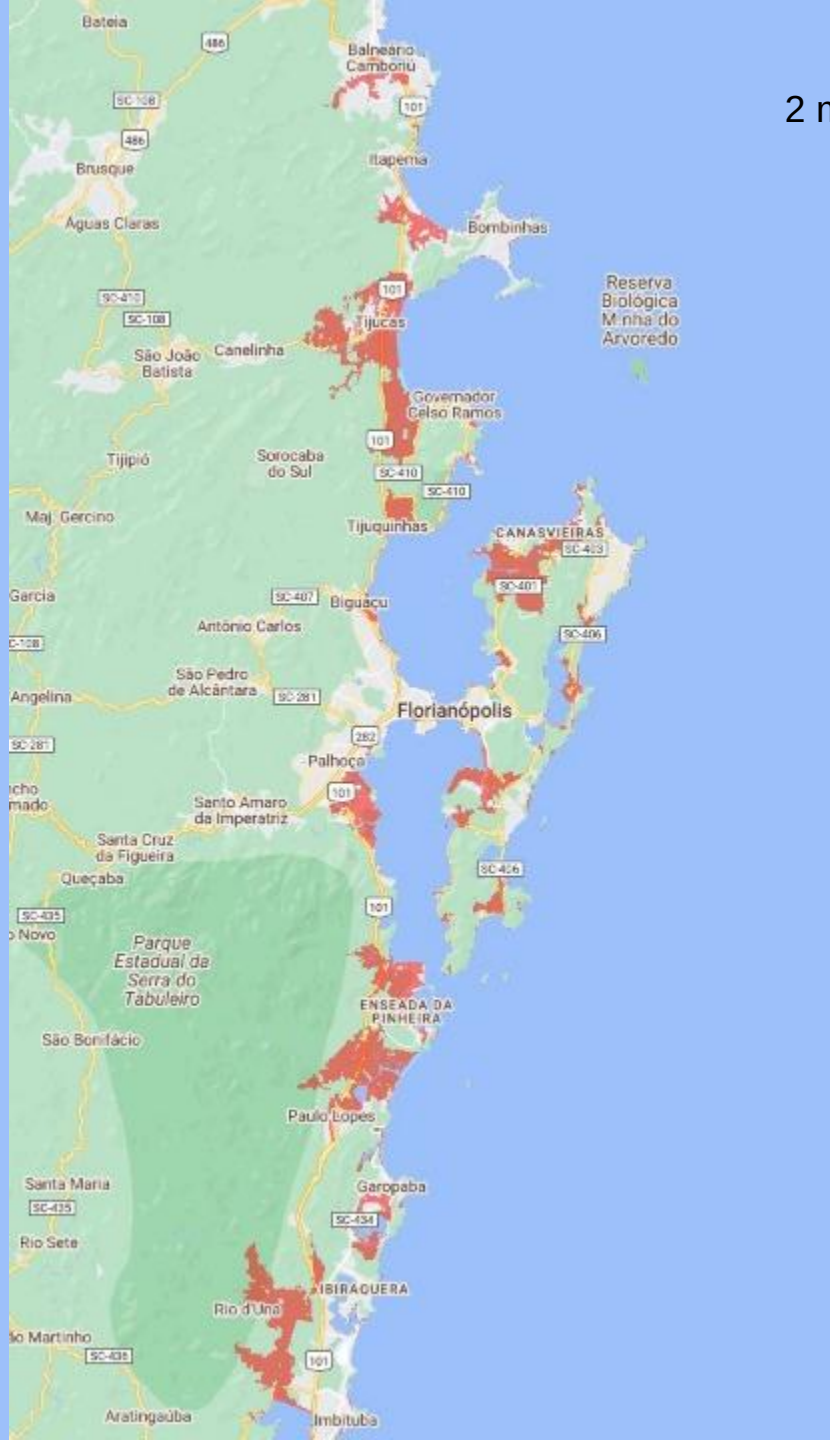


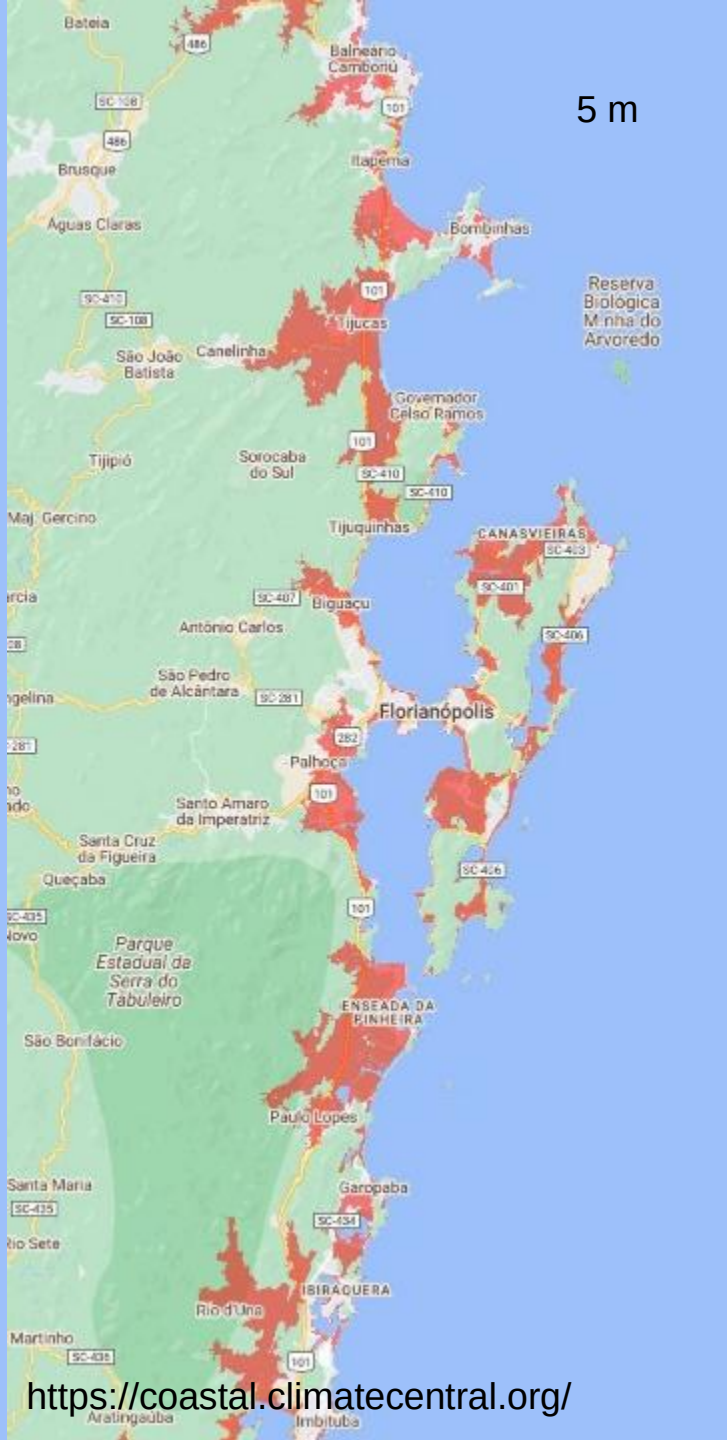
2002-04

Ice Mass Change
(meters water equivalent relative to 2002)

-6 -4 -2 0 2



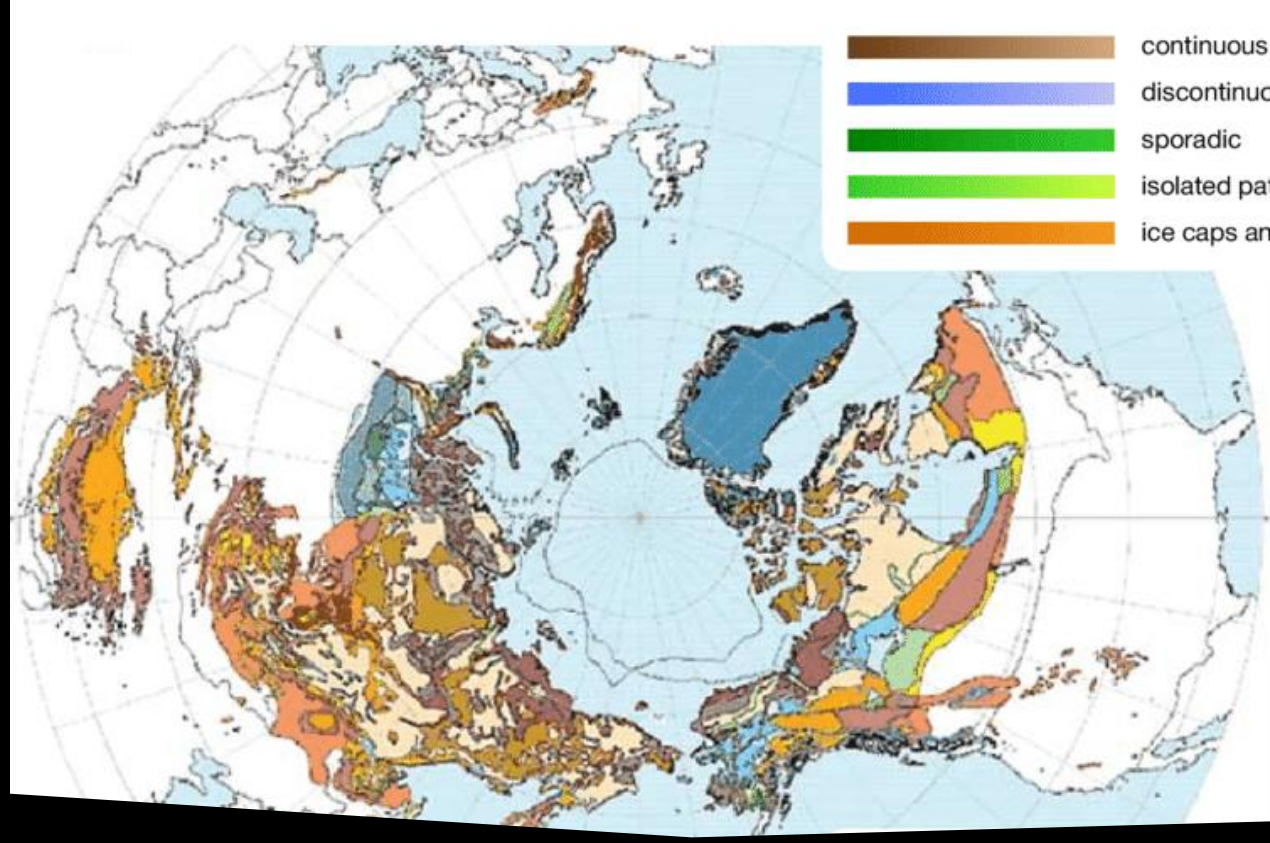




Nature Geoscience 2022

https://coastal.climatecentral.org/

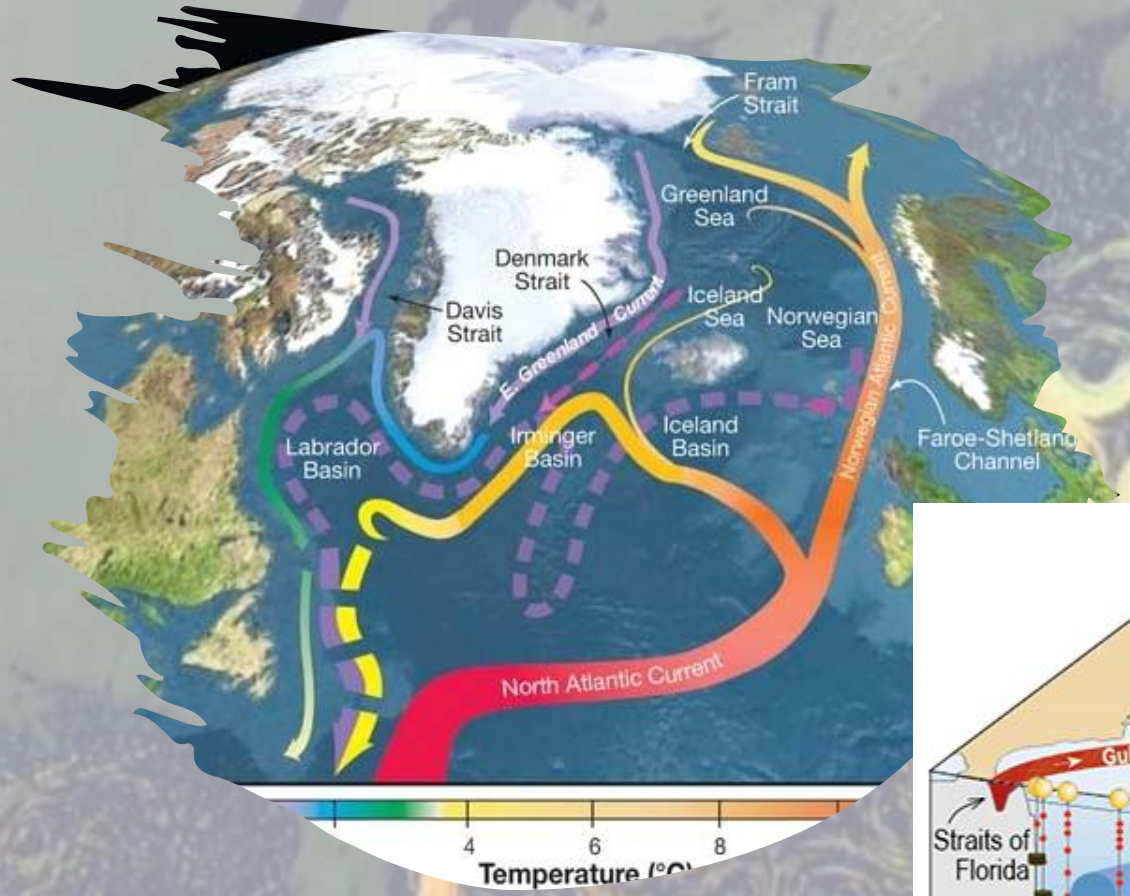

Branqueamento

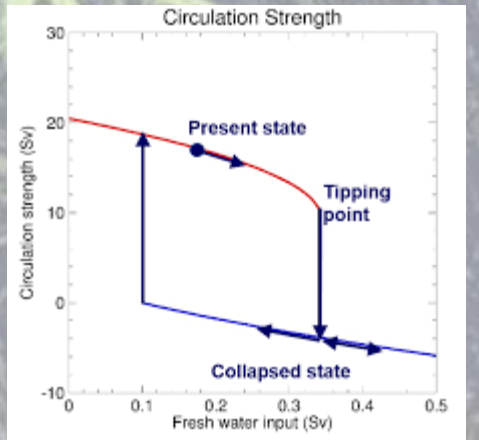


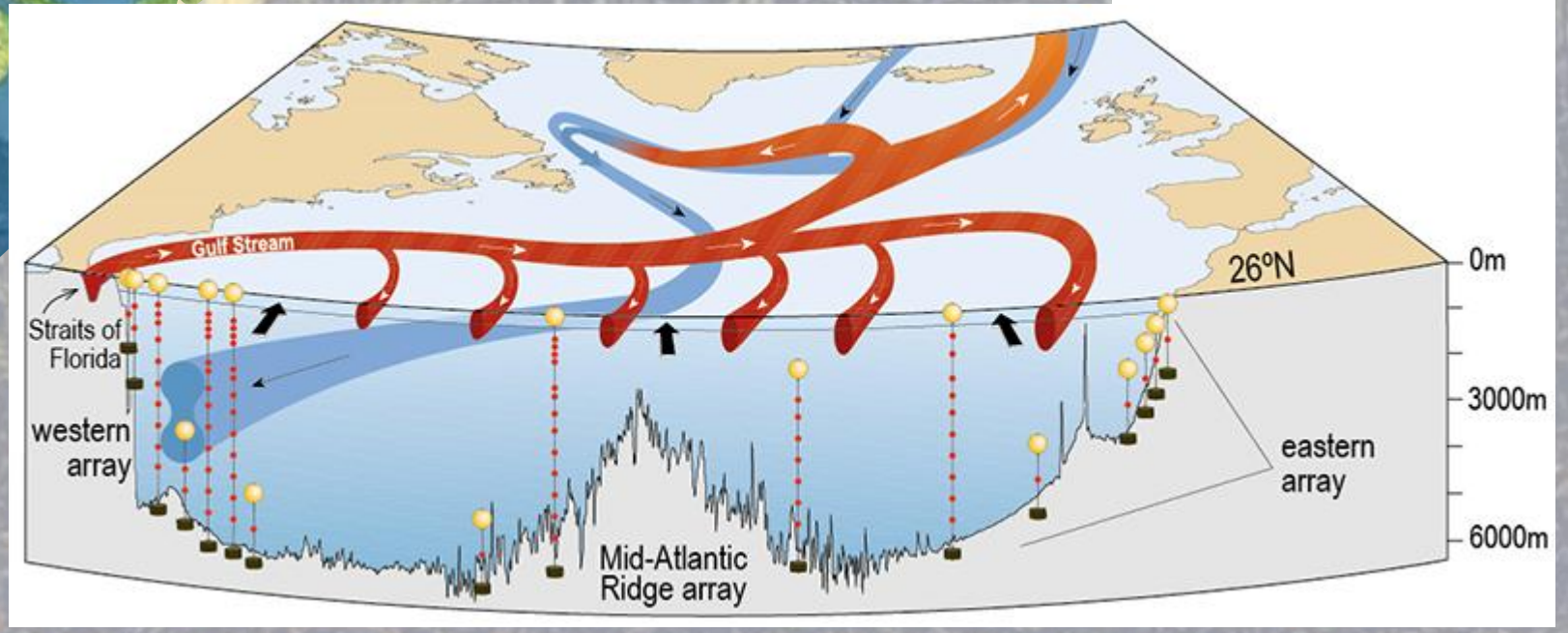
Permafrost- áreas permanentemente congeladas

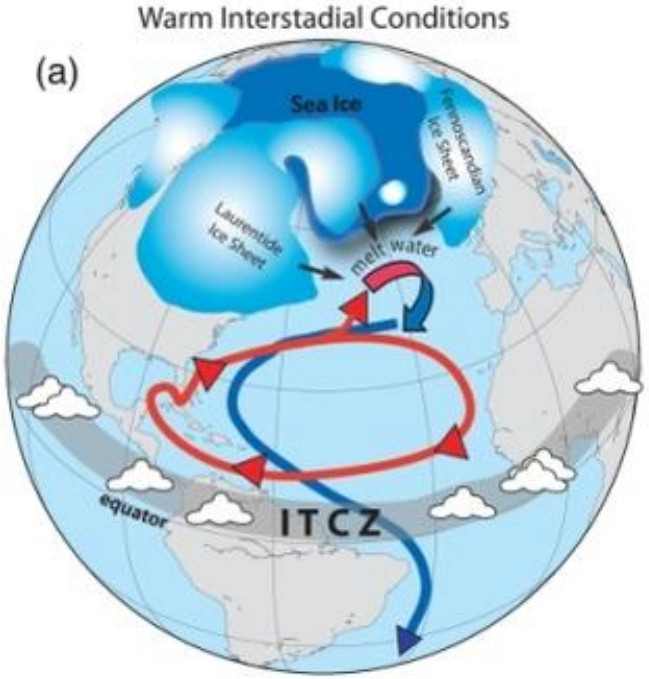
T | Published 2021

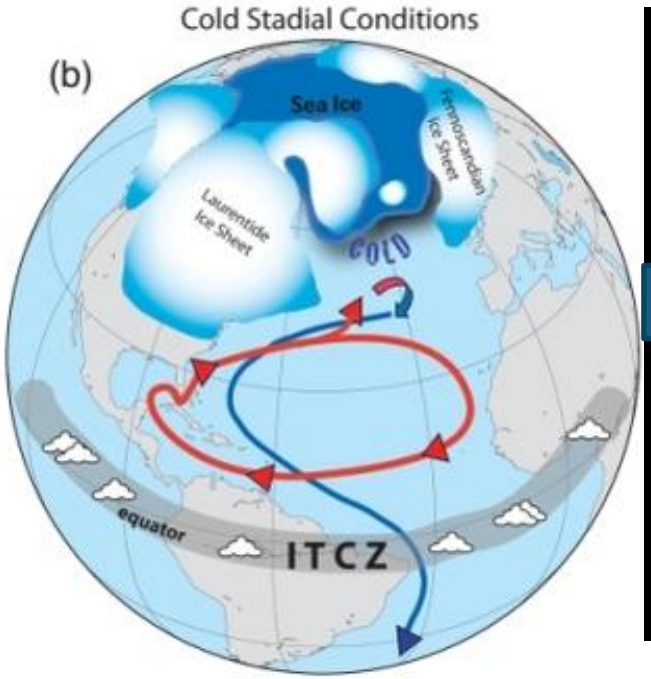
Atlantic meridional overturning circulation

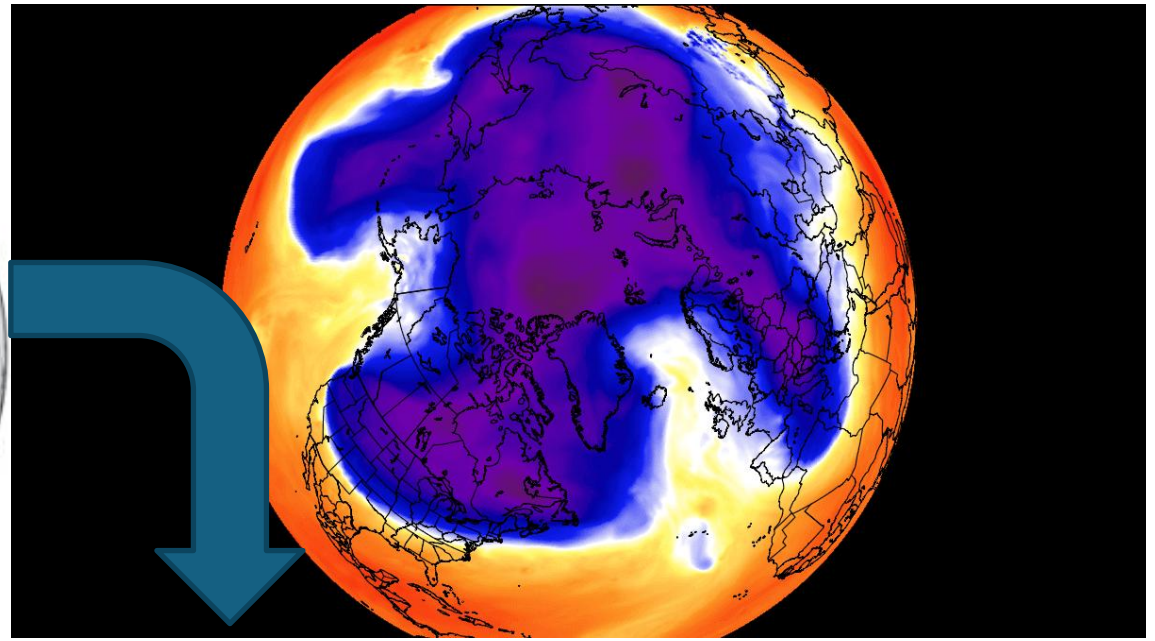


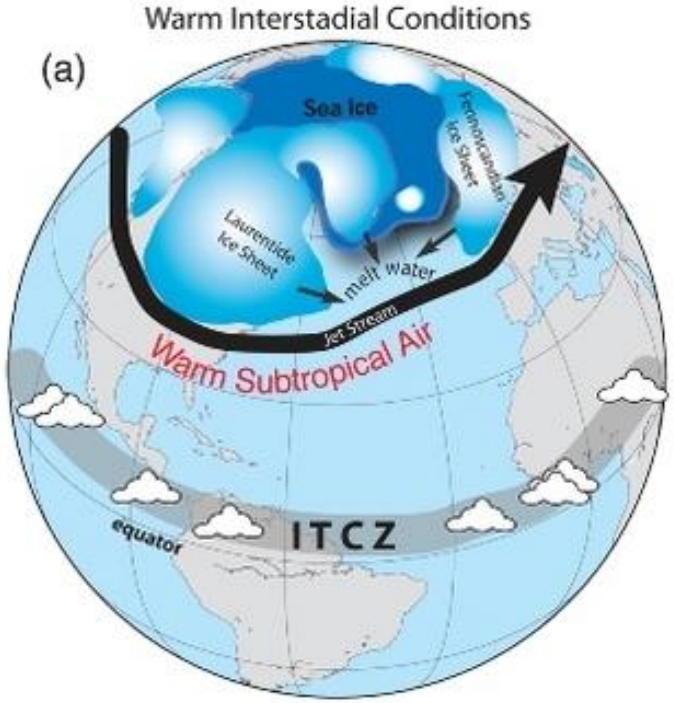


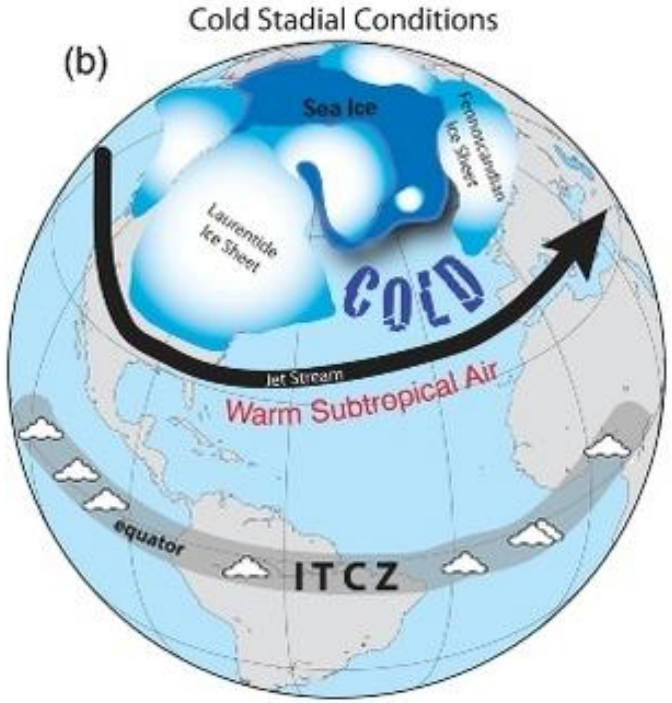



Warm Interstadial Conditions
(a)
Sea Ice
Fennoscandian Ice Sheet
Laurentide Ice Sheet
melt water
equator
ITCZ


Cold Stadial Conditions
(b)
Sea Ice
Fennoscandian Ice Sheet
Laurentide Ice Sheet
COLD
equator
ITCZ

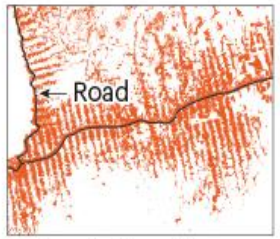



Warm Interstadial Conditions
(a)
Sea Ice
Fennoscandian Ice Sheet
Laurentide Ice Sheet
melt water
Jet Stream
Warm Subtropical Air
equator
ITCZ


Cold Stadial Conditions
(b)
Sea Ice
Fennoscandian Ice Sheet
Laurentide Ice Sheet
COLD
Jet Stream
Warm Subtropical Air
equator
ITCZ

FOREST LOSS

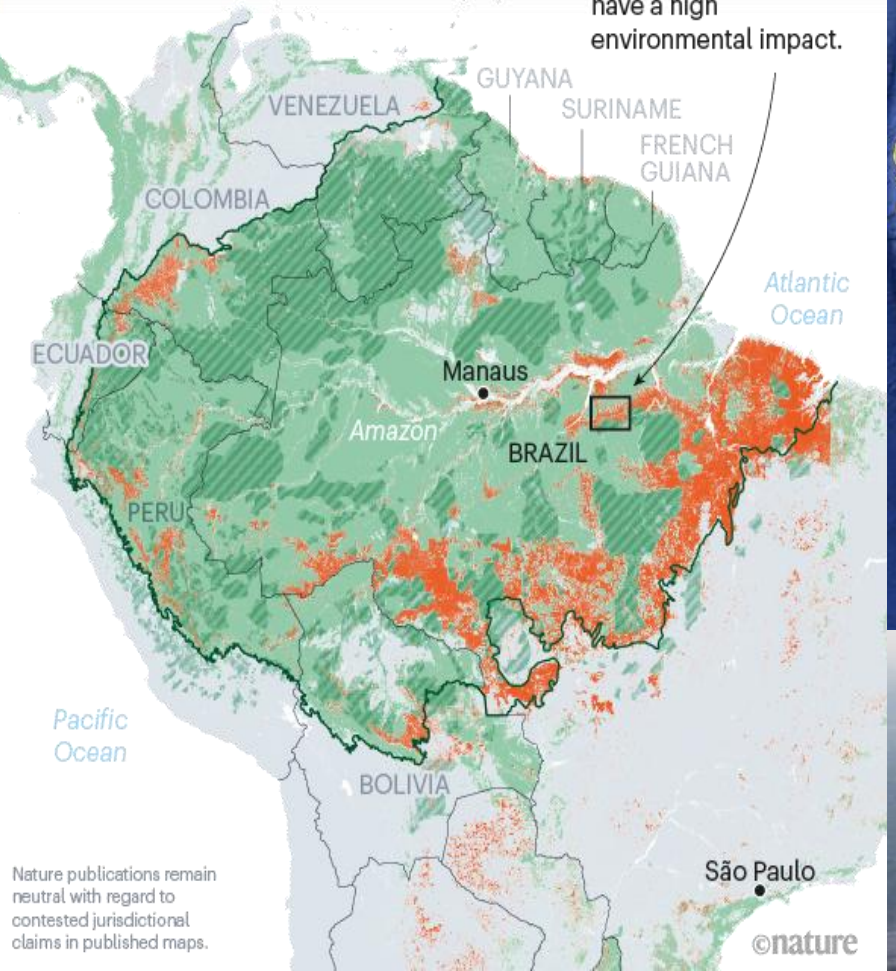
The Amazon rainforest covers some 5 million square kilometres of land across nine countries; more than half is in Brazil, where more than 19% of the forest has been cleared. Brazil reduced deforestation after 2004, but amid political turmoil tree clearing is rising again.



Deforestation often follows a fishbone pattern, as loggers clear trees perpendicular to main roads. Opening a single new road can have a high environmental impact.

Map key

- Deforestation (since 1988)
- Amazon rainforest biome
- Forest cover
- Indigenous territories



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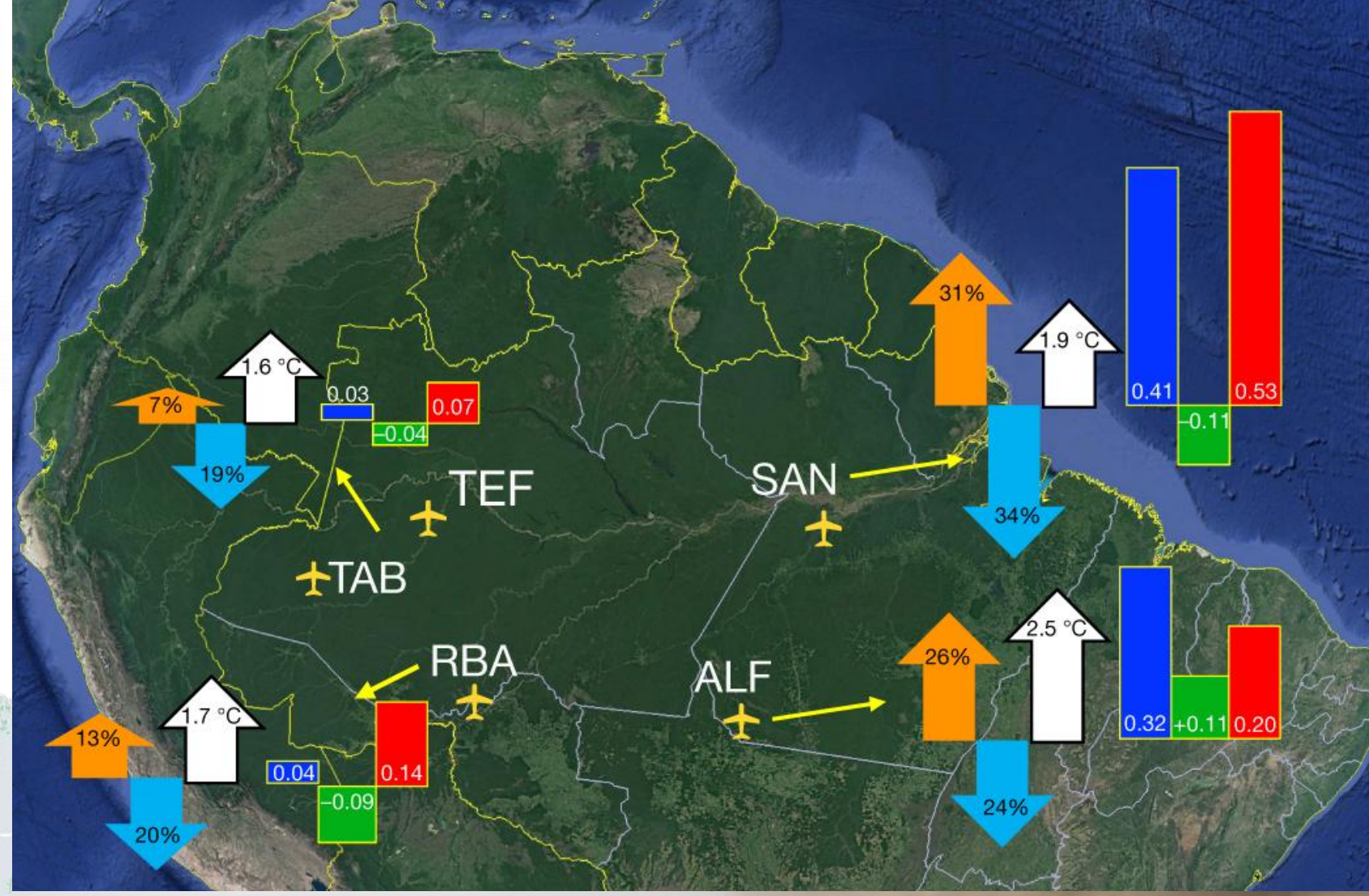


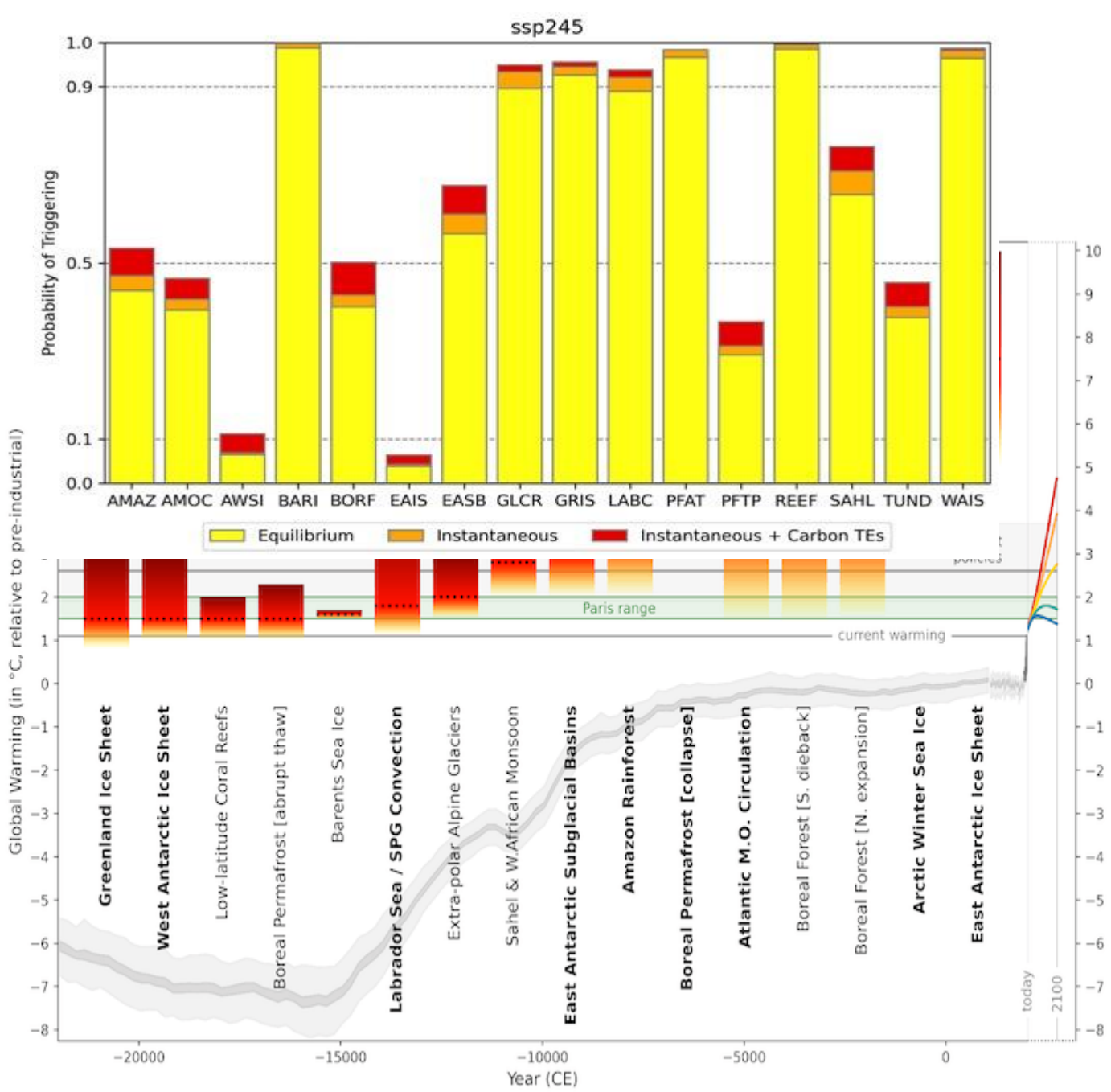
Limites planetários

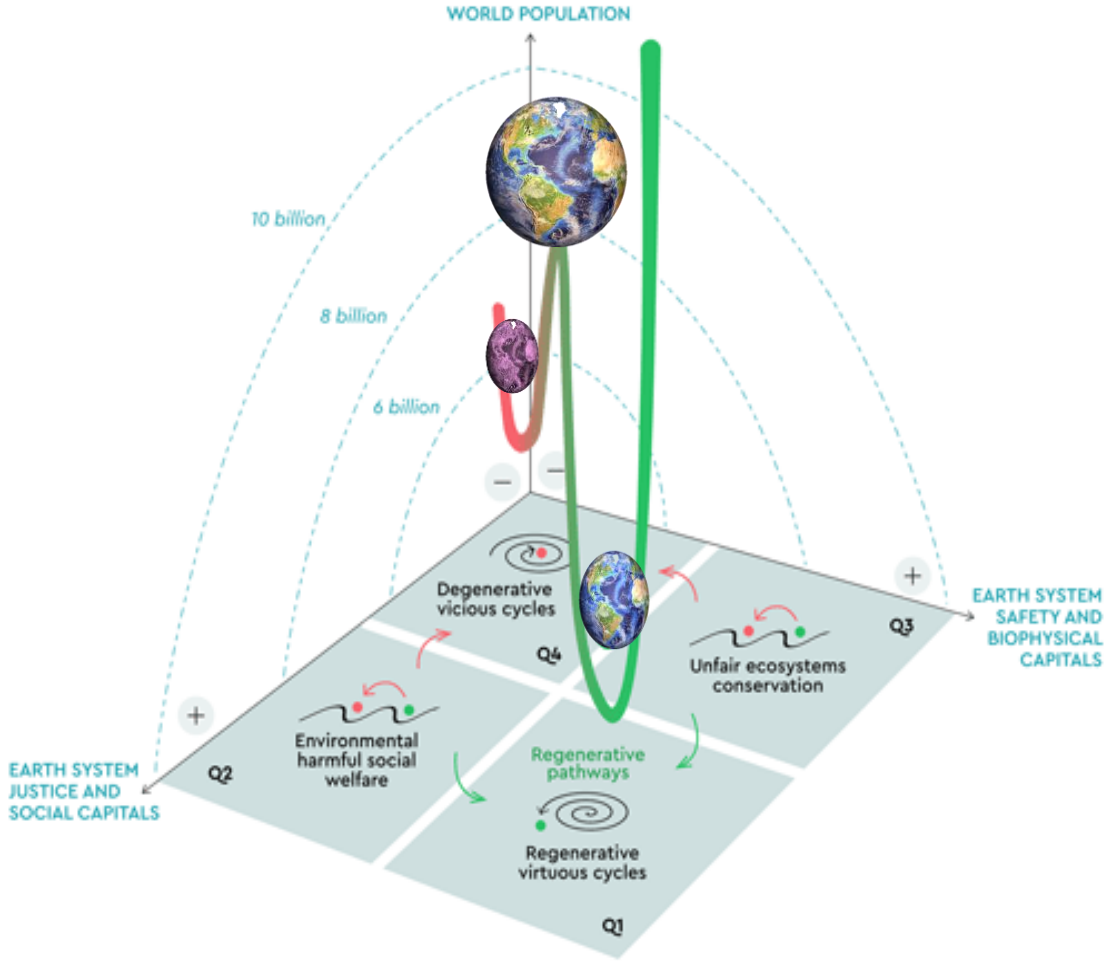
Nossa sociedade, fundada na produção e consumo, transgrediu os limites planetários de segurança e justiça socioambiental

Earth exceeds safe limits: First Planetary Health Check issues red alert

https://www.pik-potsdam.de/en

Pontos de inflexão planetária





DOI: 10.1126/science.abn7950

https://esd.copernicus.org/articles/15/853/2024/

Natural sequestration of carbon dioxide is in decline: climate change will accelerate

James C. Curran and **Samuel A. Curran**
Uddingston, UK

Introduction

Two earlier *Weather* papers (Curran and Curran, 2016a,b) analysed the well-known Keeling Curve for evidence of the impact of natural carbon sequestration on the progress of climate change. Almost 10 years later, it seems an appropriate time to extend the analysis and verify, or otherwise, the earlier findings.

Previous analysis

Figure 1 illustrates a typical excerpt from the Keeling Curve over slightly more than 1 year. Overall, the concentration of CO_2 in the atmosphere, as recorded at the Mauna Loa Observatory in Hawaii, is increasing – but the very noticeable intra-annual dip, with a minimum in the Northern Hemisphere autumn, is the result of the huge uptake of CO_2 from the atmosphere by vegetation across the extensive Northern Hemisphere land mass during its summer. This uptake is known as natural sequestration, and its magnitude is directly related to the health of the global biosphere. A proportion of this absorbed CO_2 is released back into the atmosphere during the winter period, due to natural biodegradation of dead vegetation, but some remains locked up in roots, soils and dormant woody growth. Of course, in the meantime, anthropogenic global CO_2 emissions continue to further augment the atmospheric concentration, so there is a net increase. It should be noted that the seasonal variation of CO_2 generated by the much smaller Southern Hemisphere land mass is very weak, and that the global oceans provide a rather steady sequestration of CO_2 (Jiang and Yung, 2019).

RMetS

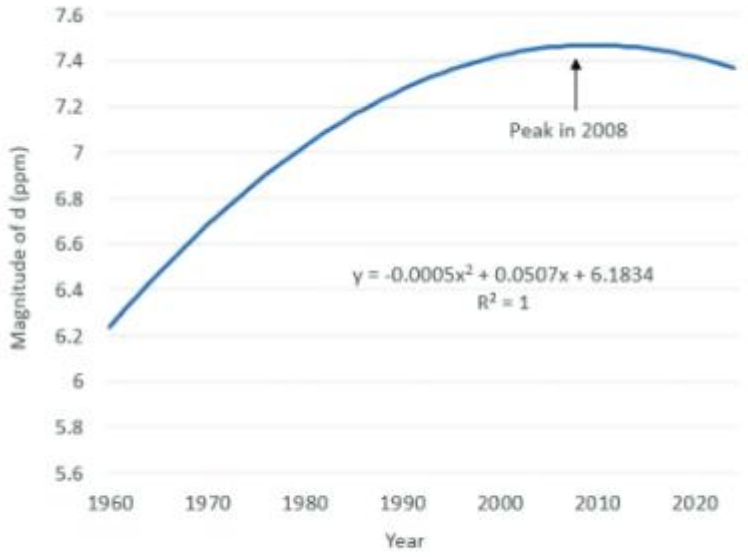


Figure 2. Magnitude of the intra-annual drop in CO_2 (i.e. parameter d in Figure 1) derived from the difference between the upper and lower regression curves shown in Figure 1. For the regression equation, x is the year number since the start of the Mauna Loa record in 1957. So, x=68 in 2024.

PNAS RESEARCH ARTICLE | EARTH, ATMOSPHERIC, AND PLANETARY SCIENCES | OPEN ACCESS

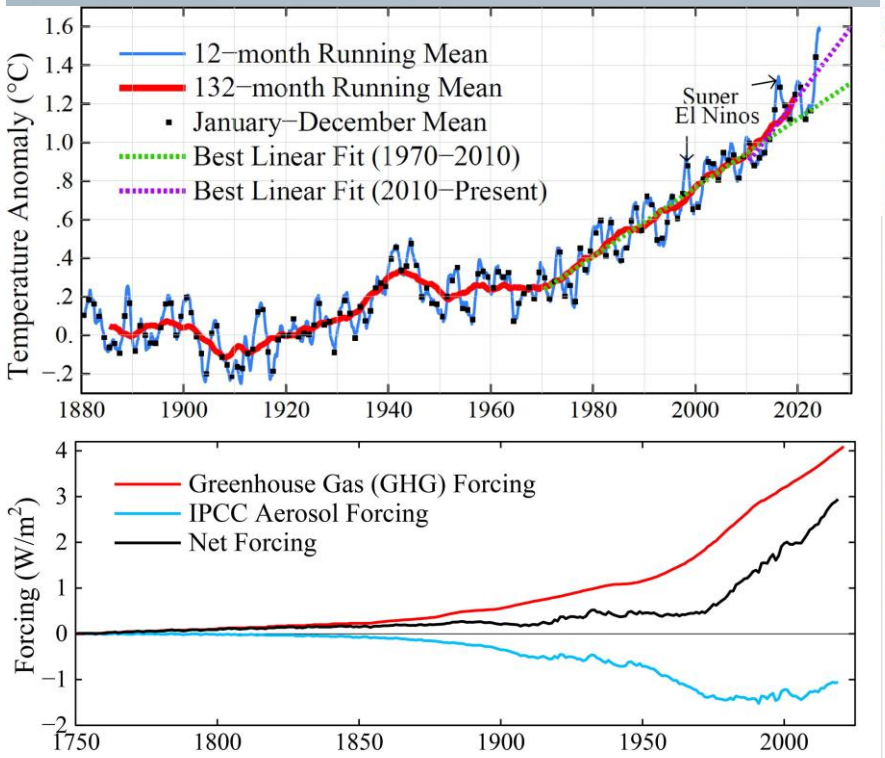
Global emergence of regional heatwave hotspots outpaces climate model simulations

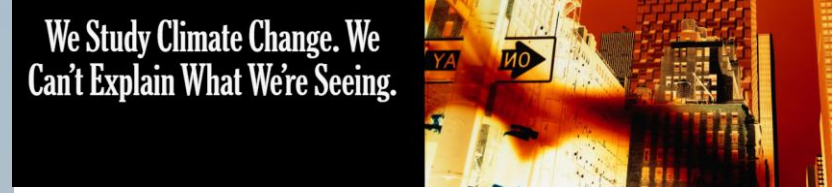
Kai Kornhuber[a,b,c,1], Samuel Bartusek[b,d], Richard Seager[b], Hans Joachim Schellnhuber[a,1], and Mingfang Ting[b,c]

Global Warming Has Accelerated:

Are the United Nations and the Public Well-Informed?

by James E. Hansen, Pushker Kharecha, Makiko Sato, George Tselioudis, Joseph Kelly, Susanne E. Bauer, Reto Ruedy, Eunbi Jeong, Qinjian Jin, Eric Rignot, Isabella Velicogna, Mark R. Schoeberl, Karina von Schuckmann, Joshua Amponsem, Junji Cao, Anton Keskinen, Jing Li, and Anni Pokela





Climate Models Can't Explain What's Happening to Earth

Global warming is moving faster than the best models can keep a handle on.

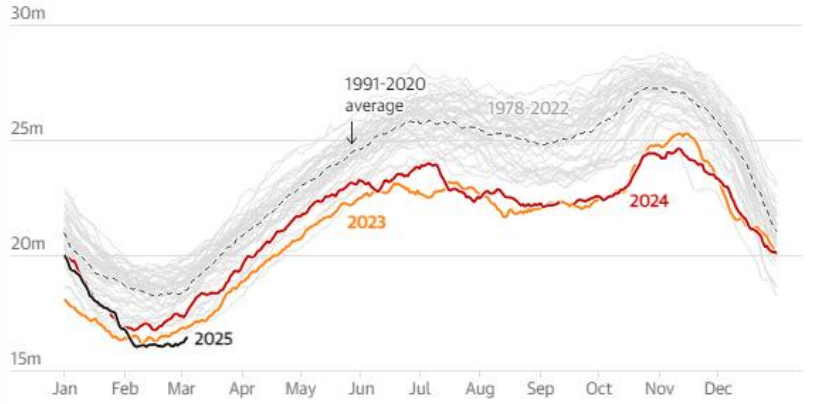
By Zoë Schlanger

Global sea ice hit record low in February, scientists say

Scientists called the news 'particularly worrying' because ice reflects sunlight and cools the planet

Global sea ice cover fell to a record low in February

Million square kilometres



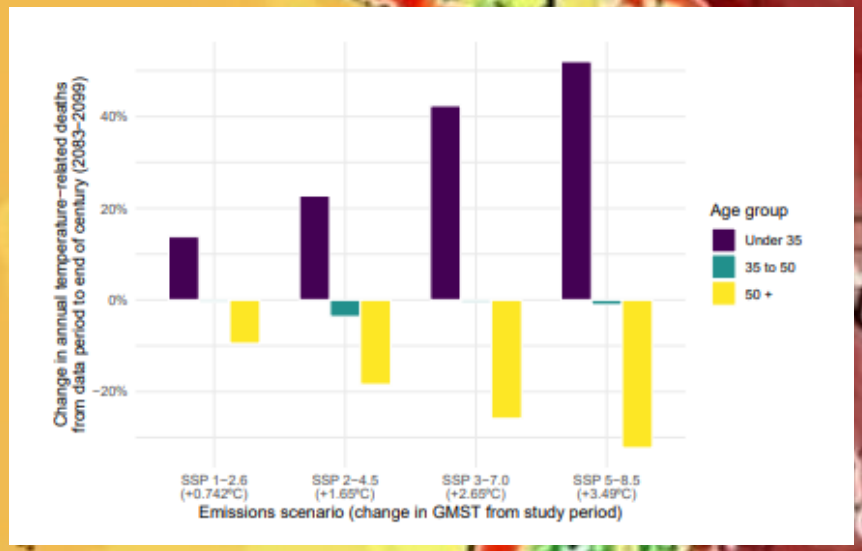
Guardian graphic. Source: Copernicus/EUMETSAT. Notes: Area of ocean with at least 15% ice concentration

MUDANÇAS CLIMÁTICAS

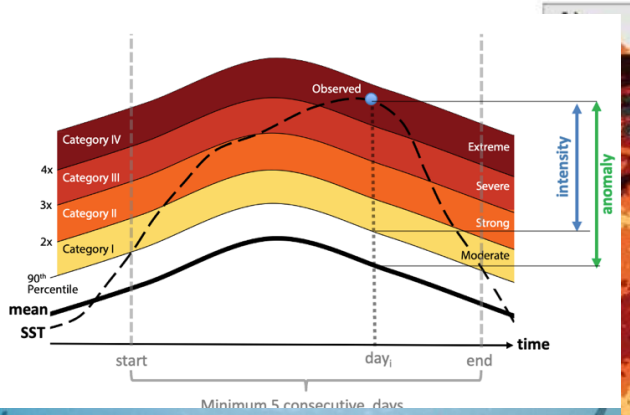
Por que a Nasa listou o Brasil entre as regiões que podem ficar inabitáveis até 2070

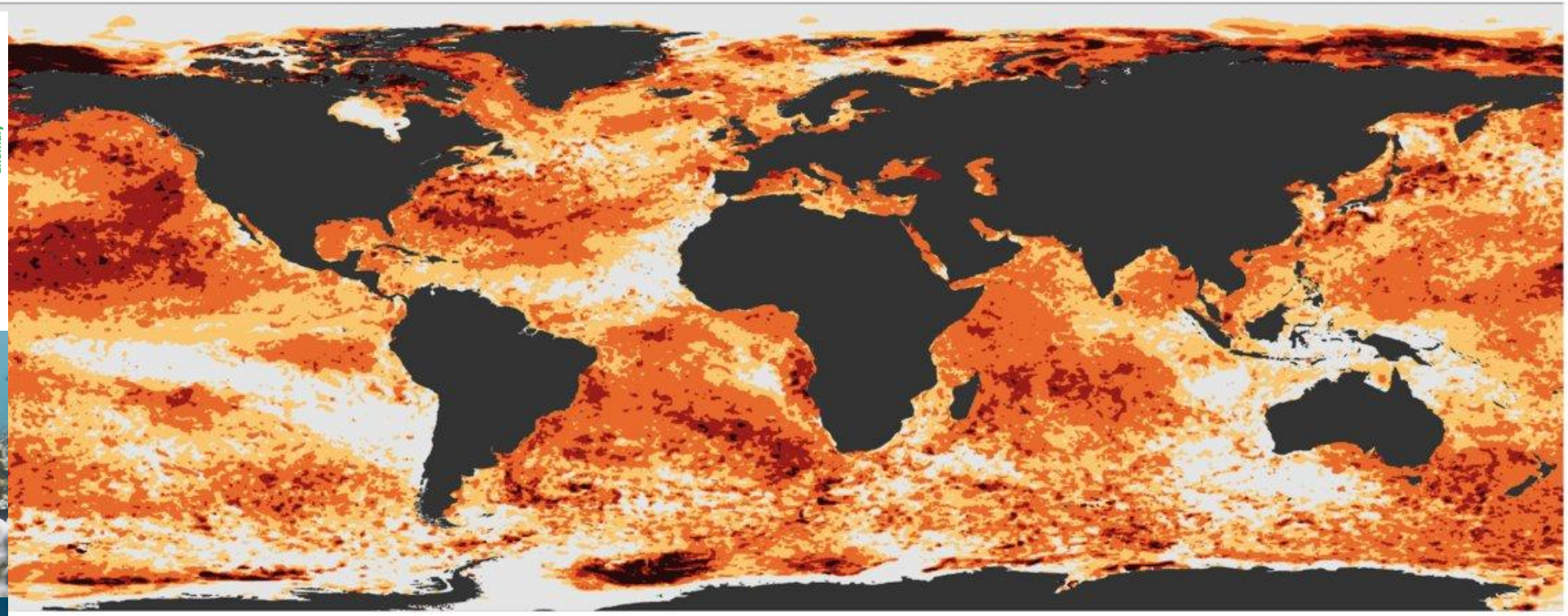
A pesquisa mapeou regiões do planeta onde as mudanças climáticas terão maior impacto nos próximos 50 anos, com ondas de calor severas devido ao efeito estufa

Temperaturas a partir de 37ºC e umidade do ar acima de 70% os seres humanos começam a ter problemas de saúde



Onda de calor - Marine Heatwave Map

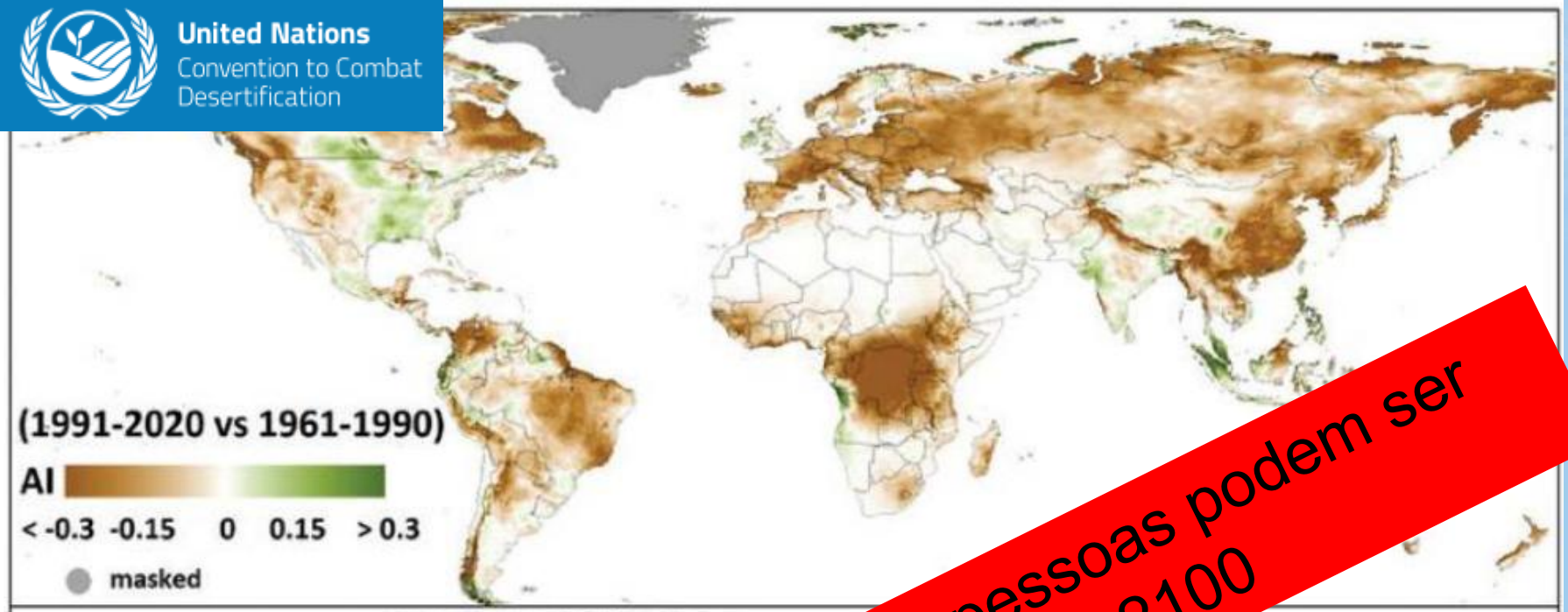




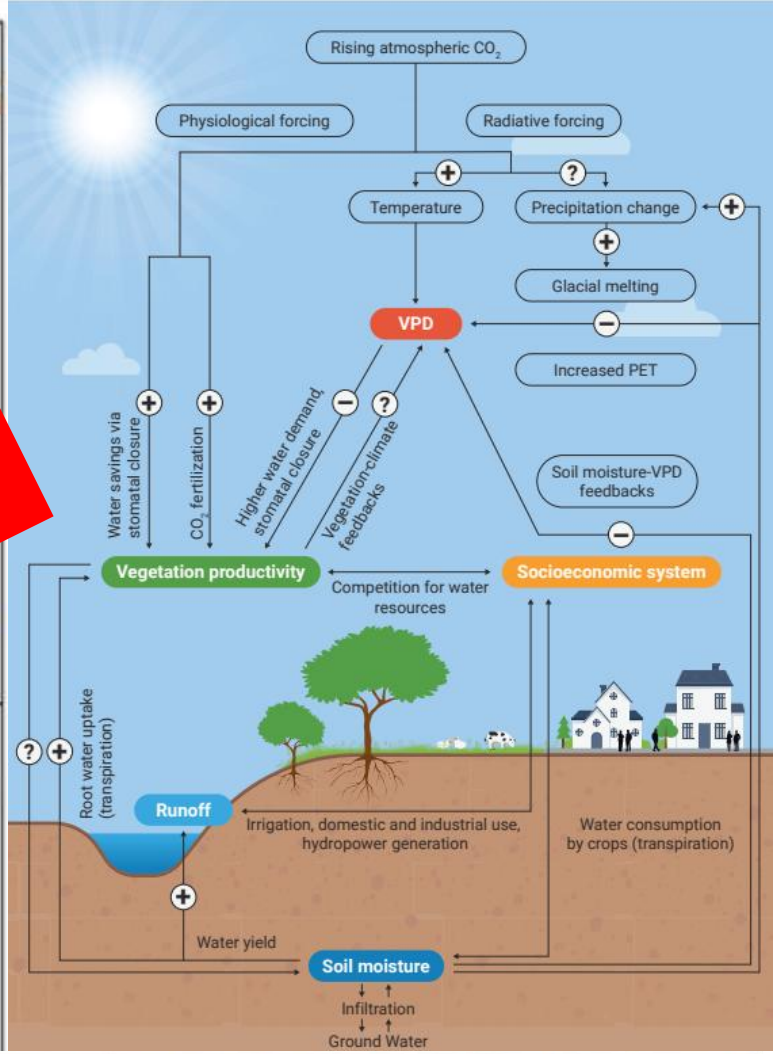
Category I Moderate II Strong III Severe IV Extreme

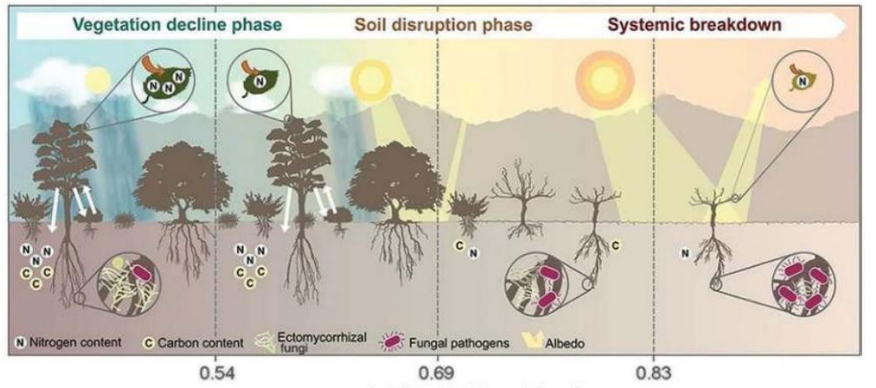
WORLD METEOROLOGICAL ORGANIZATION

United Nations
Convention to Combat Desertification



Cinco bilhões de pessoas podem ser afetadas até 2100





A Antártida está perdendo gelo mais de seis vezes mais rápido do que há três décadas

- A camada de gelo da Antártida Oriental sozinha contém água suficiente para elevar o nível global do mar em aproximadamente 50 metros se derreter completamente

https://aappartnership.org.au/next-generation-of-antarctic-scientists-call-for-collaborative-action/

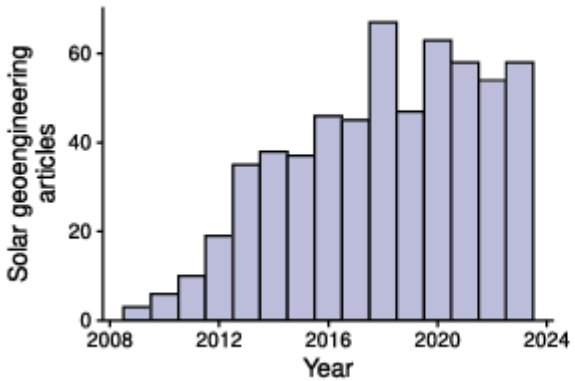
OXFORD

BioScience, 2024, **0**, 1–13
https://doi.org/10.1093/biosci/biae087
Advance access publication date: 0 2024
Special Report

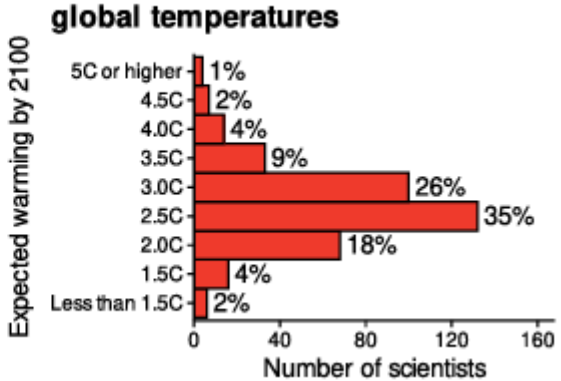
The 2024 state of the climate report: Perilous times on planet Earth

William J. Ripple, Christopher Wolf, Jillian W. Gregg, Johan Rockström, Michael E. Mann, Naomi Oreskes, Timothy M. Lenton, Stefan Rahmstorf, Thomas M. Newsome, Chi Xu, Jens-Christian Svenning, Cássio Cardoso Pereira, Beverly E. Law and Thomas W. Crowther

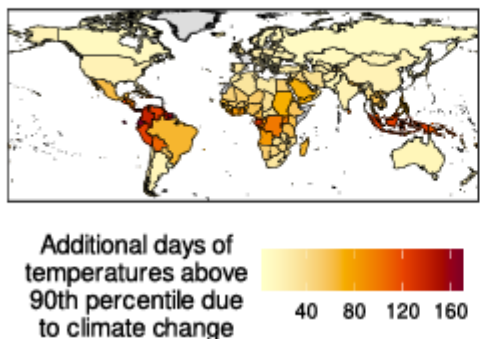
c. Solar Radiation Modification



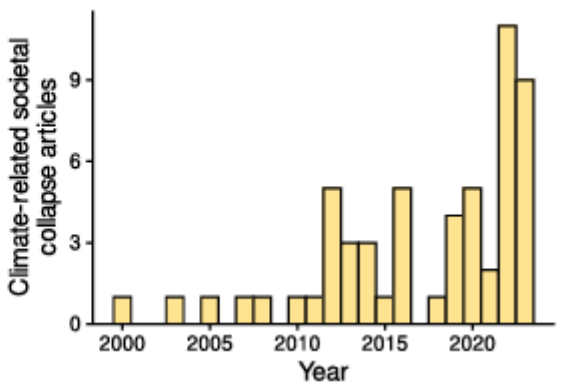
d. Climate scientists' opinion on global temperatures



e. Climate change as a social justice issue

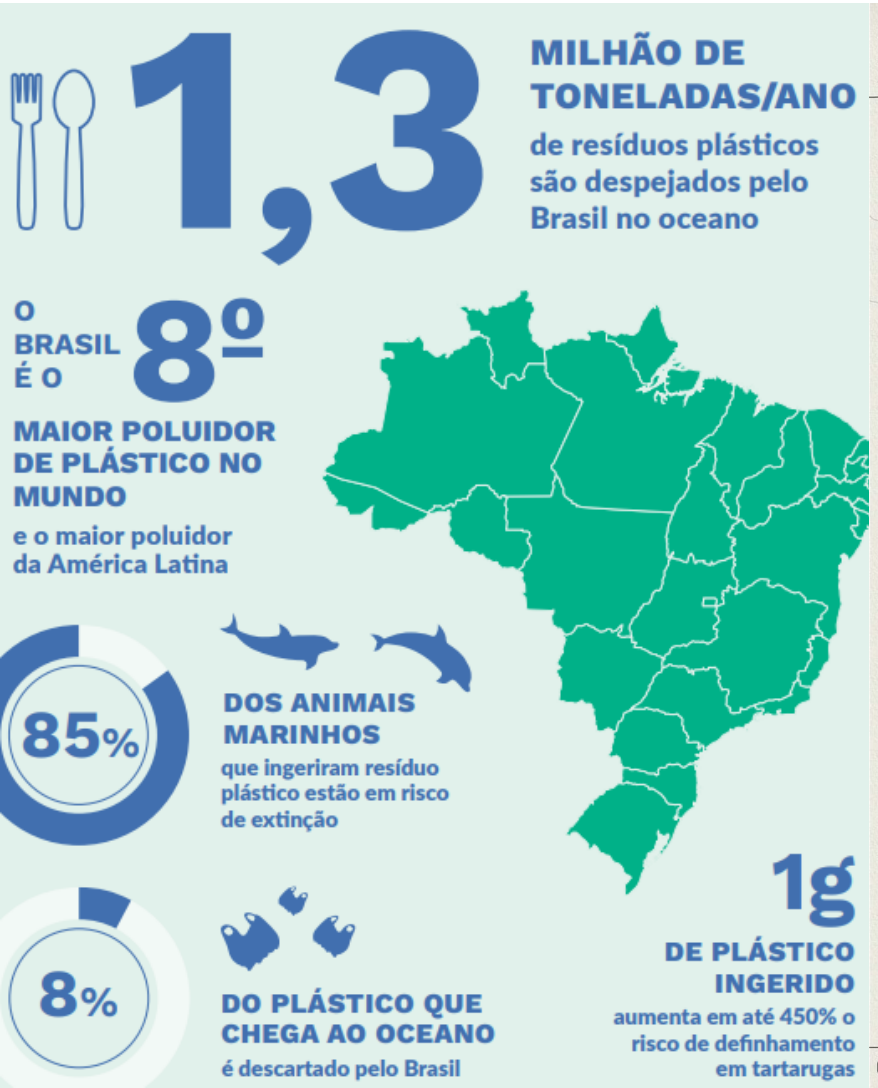


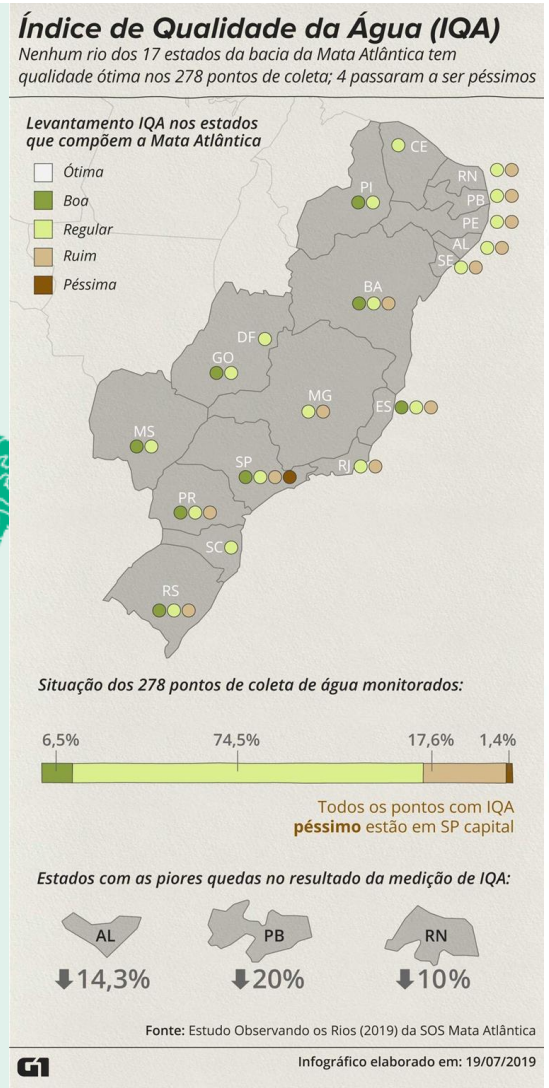
f. Risk of societal collapse

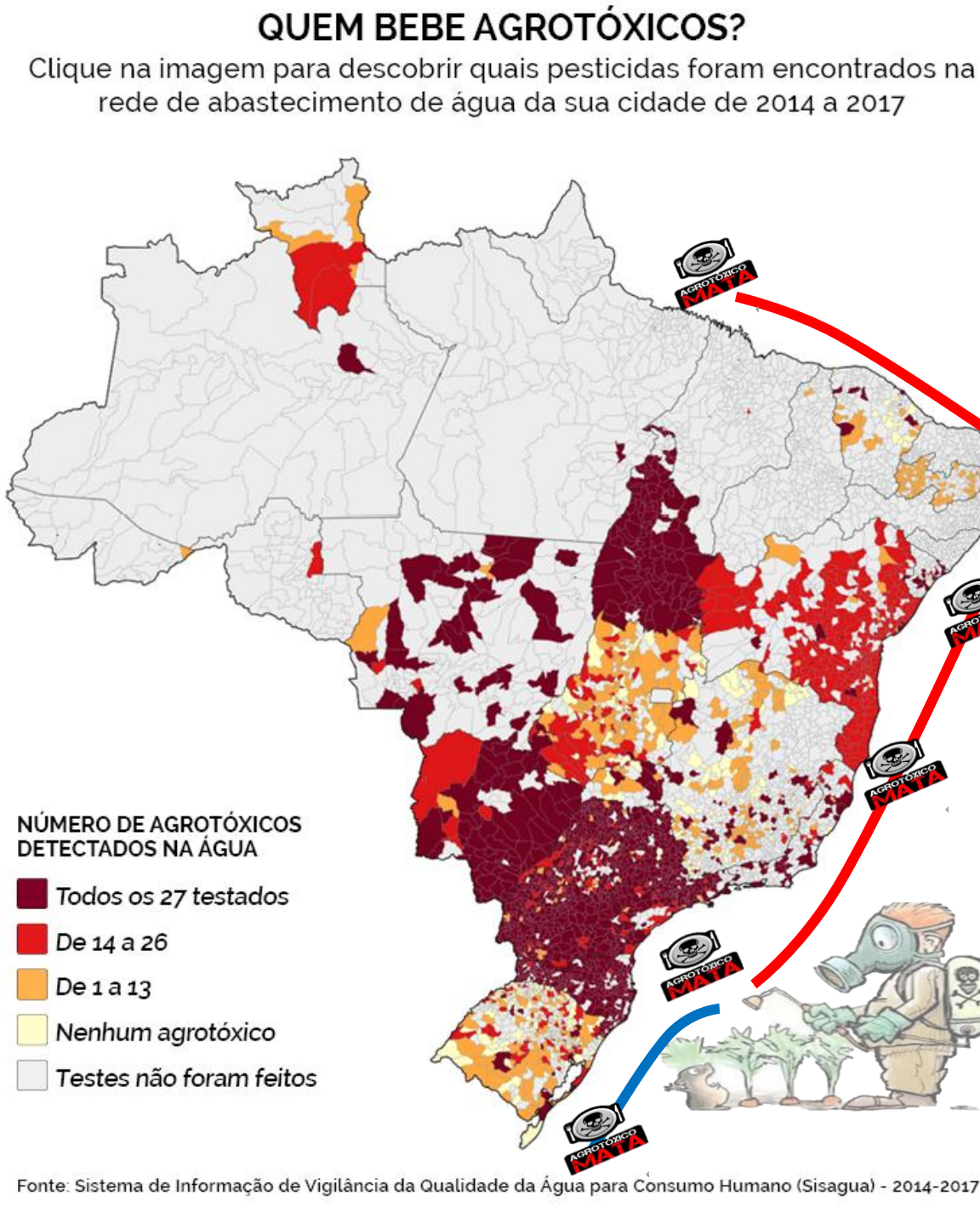


Untold Human Suffering in Pictures

Poluição...um velho e solúvel problemão



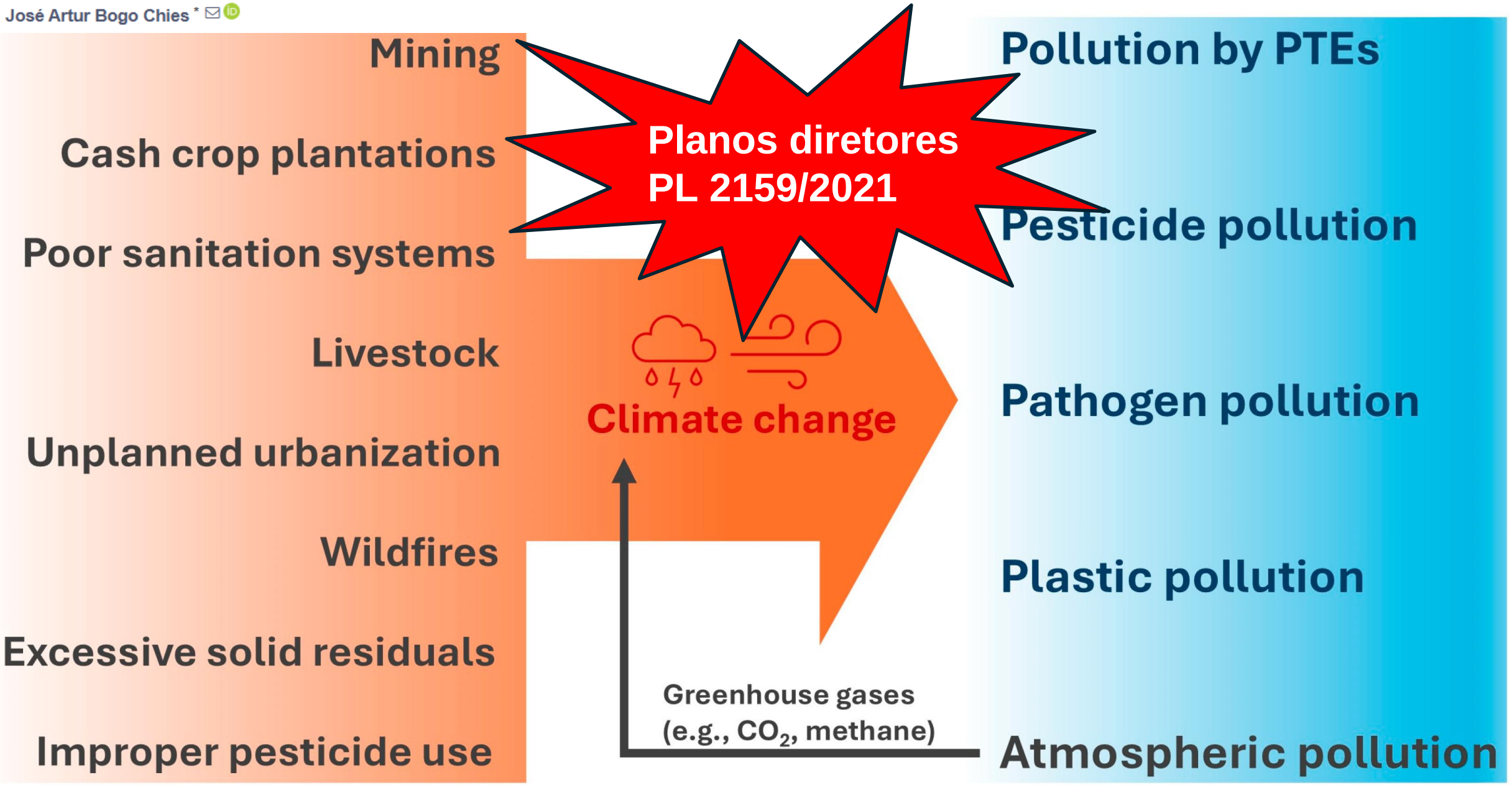




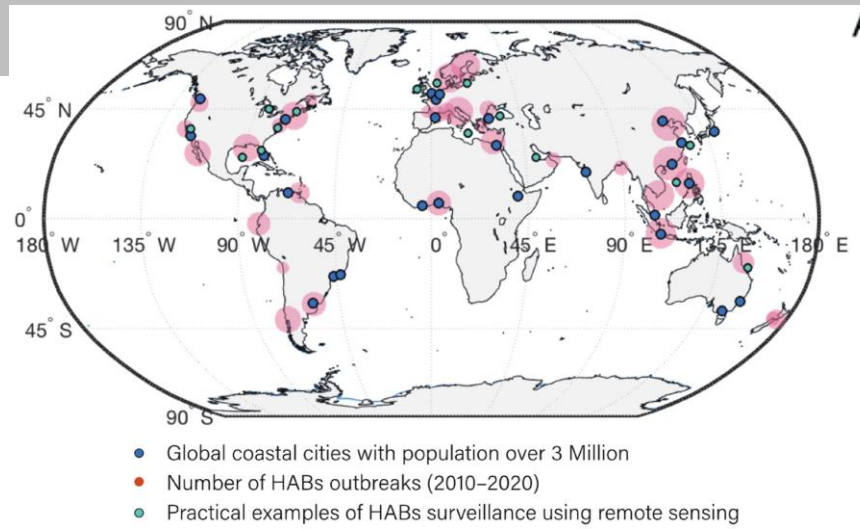
Environmental Challenges in Southern Brazil: Impacts of Pollution and Extreme Weather Events on Biodiversity and Human Health

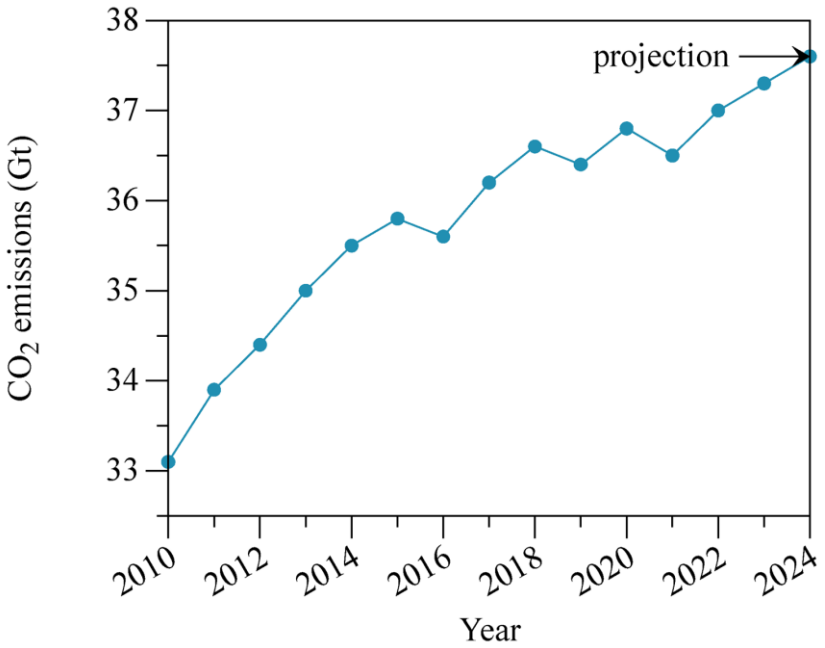
by Joel Henrique Ellwanger †, Marina Ziliotto †, Bruna Kulmann-Leal and José Artur Bogo Chies *

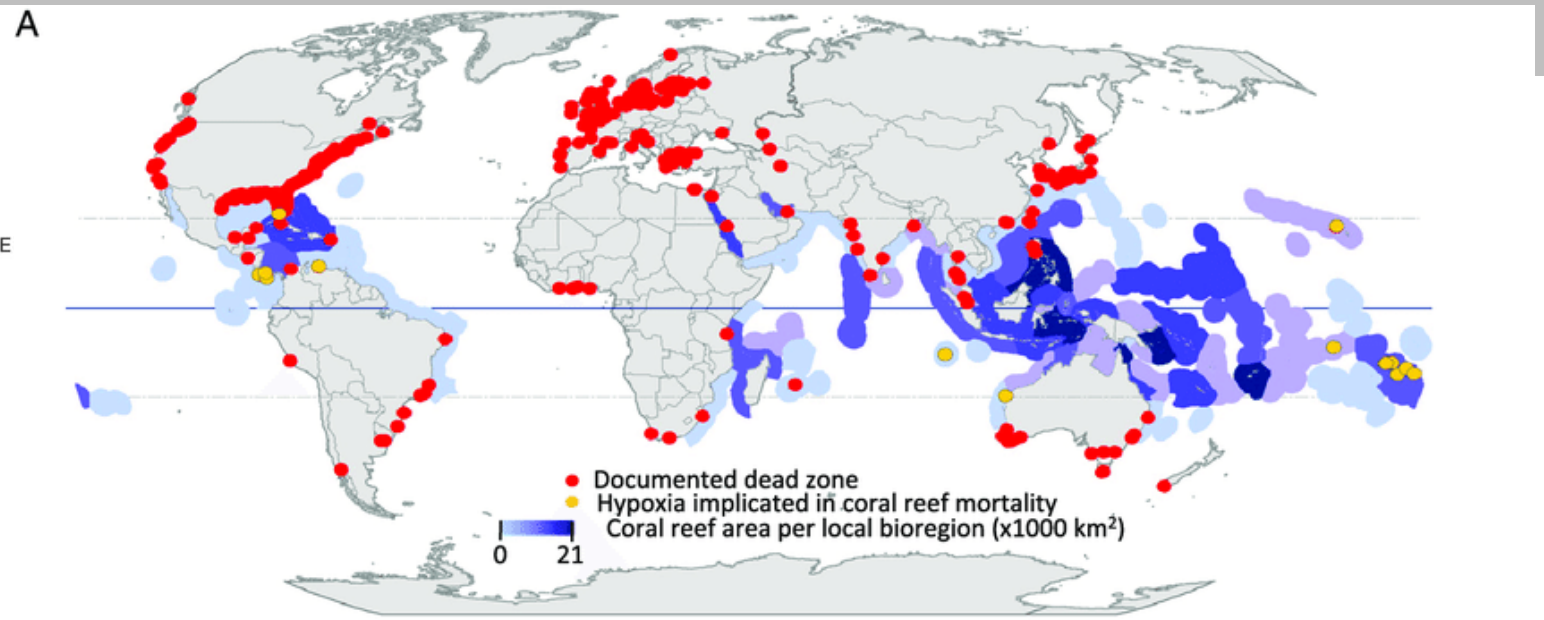
International Journal of Environmental Research and Public Health

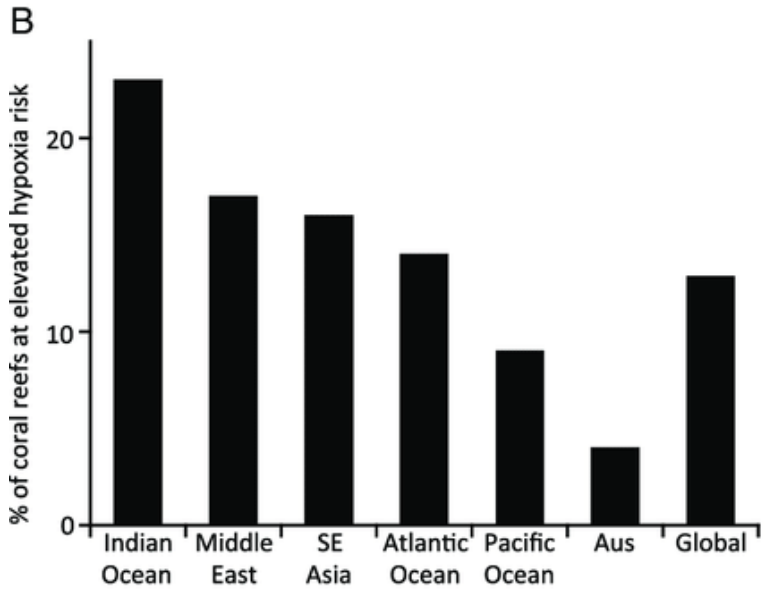


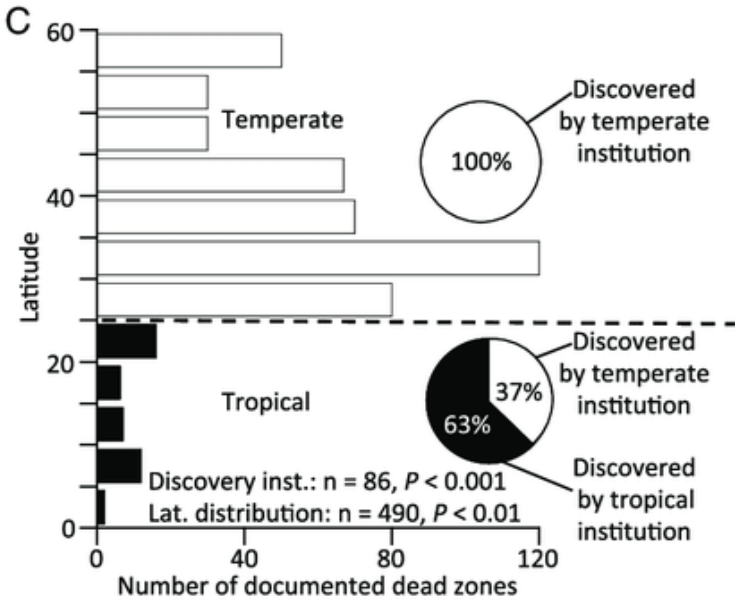
Eutrophication, HAB, Dead Zones











Water **2024**, *16*(17), 2525; https://doi.org/10.3390/w16172525

• DOI: 10.1073/pnas.1621517114

Preparando-se para as superbactérias: Fortalecendo a ação ambiental na resposta da One Health à resistência antimicrobiana

https://www.unep.org/resources/superbugs/environmental-action

Mortes relacionadas à resistência dos micróbios

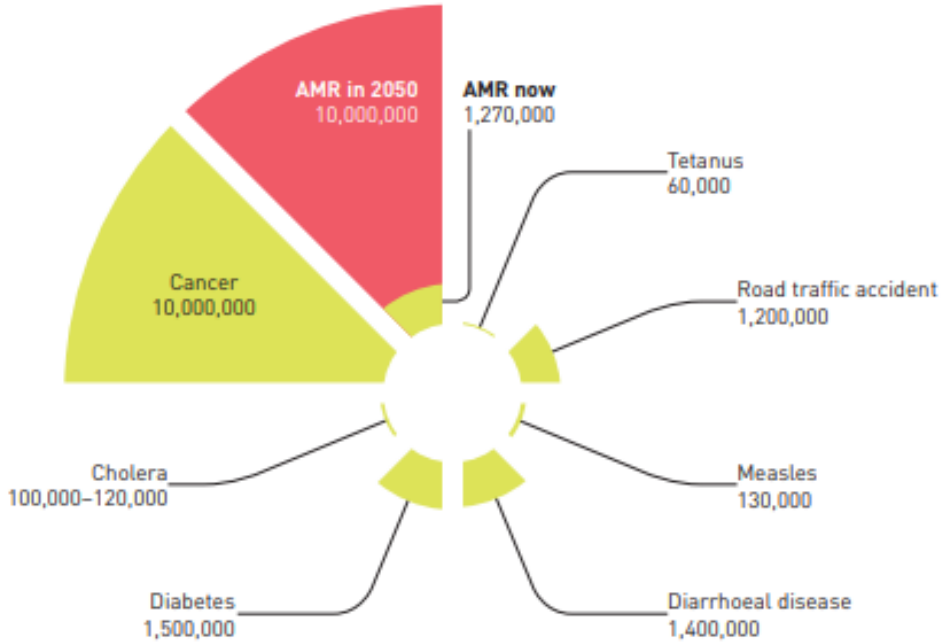
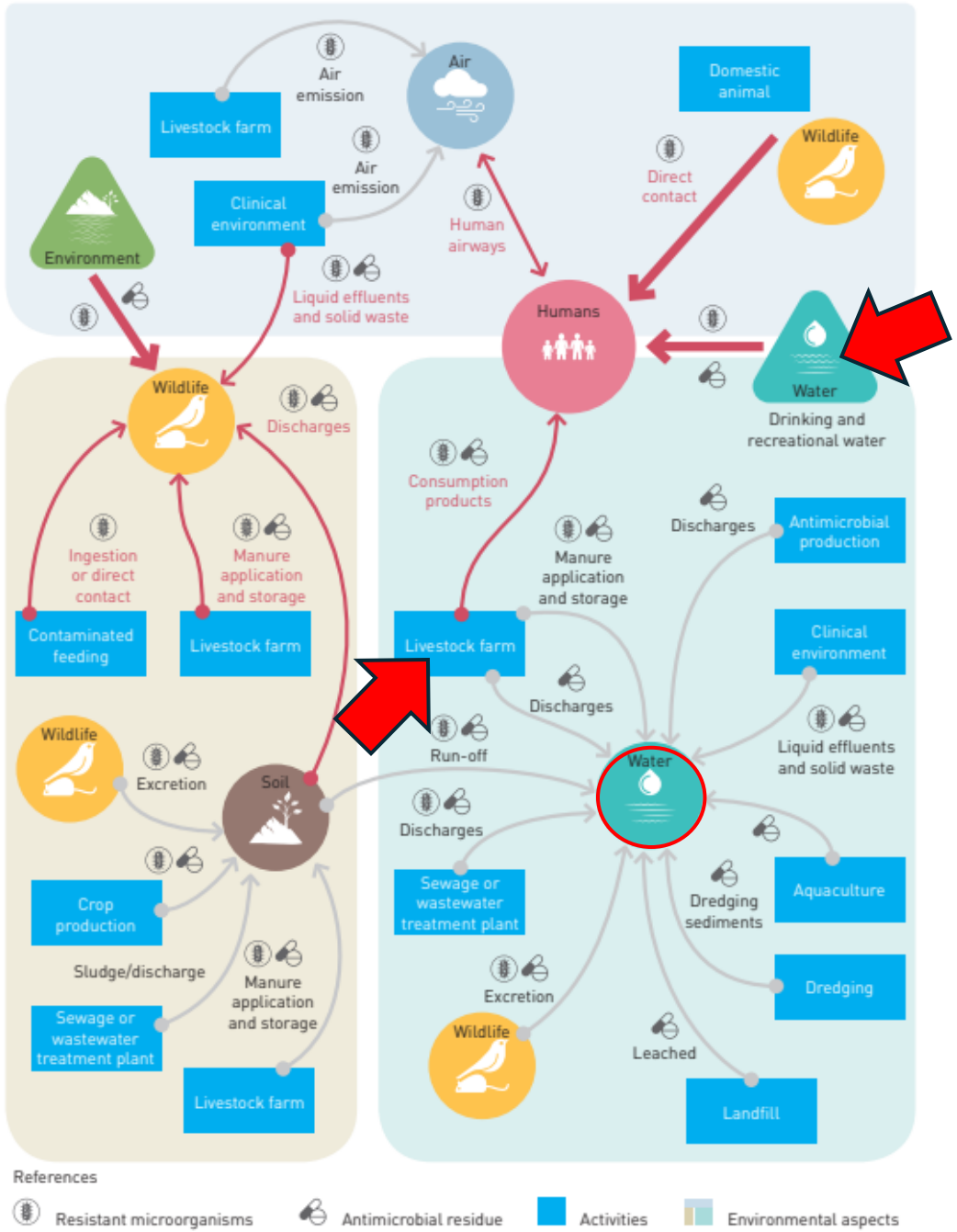


Figure 2

Predicted mortality from AMR compared with common causes of current deaths (adapted from O'Neill 2016; Murray *et al.* 2022)

https://www.unep.org/resources/superbugs/environmental-action

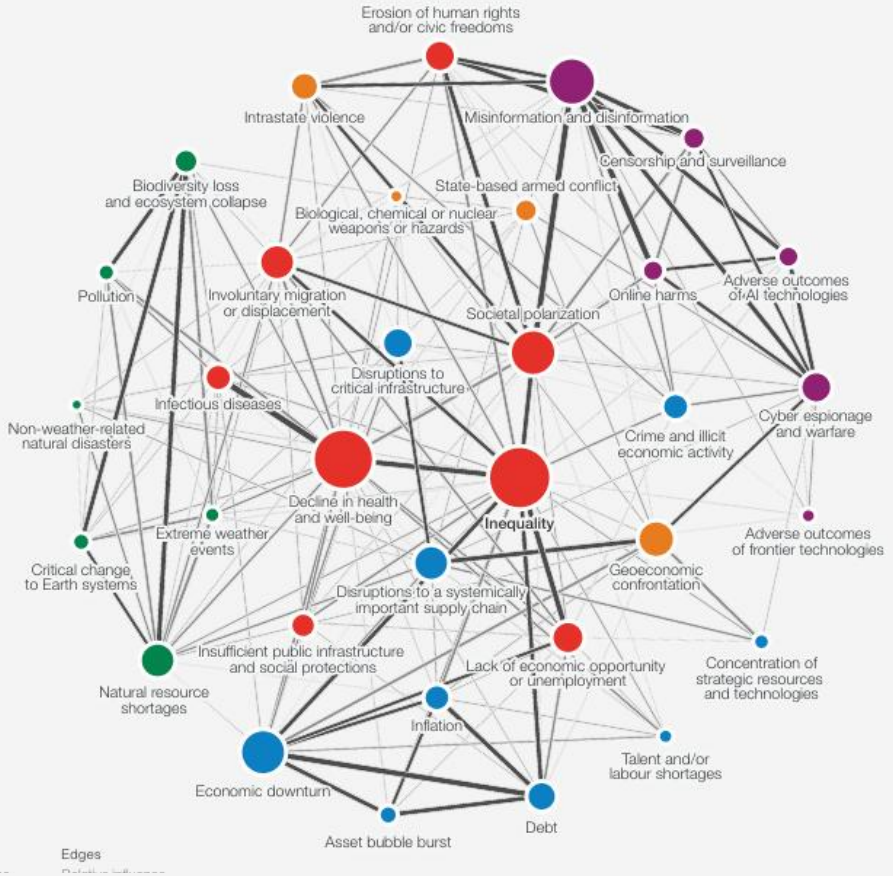


WORLD ECONOMIC FORUM

The Global Risks Report 2025

20th Edition

INSIGHT REPORT



Risk categories

- Economic
- Environmental
- Geopolitical
- Societal
- Technological

2 years

1st	Misinformation and disinformation
2nd	Extreme weather events
3rd	State-based armed conflict
4th	Societal polarization
5th	Cyber espionage and warfare
6th	Pollution
7th	Inequality
8th	Involuntary migration or displacement
9th	Geoeconomic confrontation
10th	Erosion of human rights and/or civic freedoms

10 years

1st	Extreme weather events
2nd	Biodiversity loss and ecosystem collapse
3rd	Critical change to Earth systems
4th	Natural resource shortages
5th	Misinformation and disinformation
6th	Adverse outcomes of AI technologies
7th	Inequality
8th	Societal polarization
9th	Cyber espionage and warfare
10th	Pollution

Institute and Faculty of Actuaries

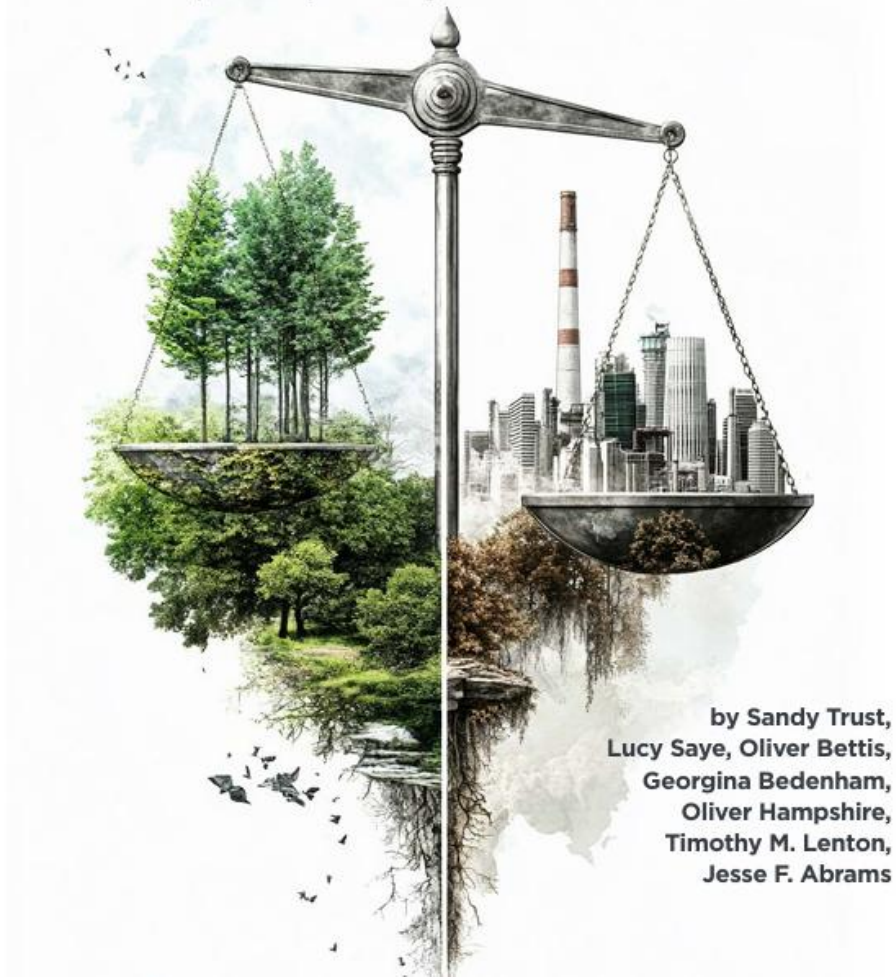
University of Exeter

Collaborative insights in the public interest

January 2025

Planetary Solvency – finding our balance with nature

Global risk management for human prosperity



by Sandy Trust, Lucy Saye, Oliver Bettis, Georgina Bedenham, Oliver Hampshire, Timothy M. Lenton, Jesse F. Abrams

Planetary Solvency dashboard

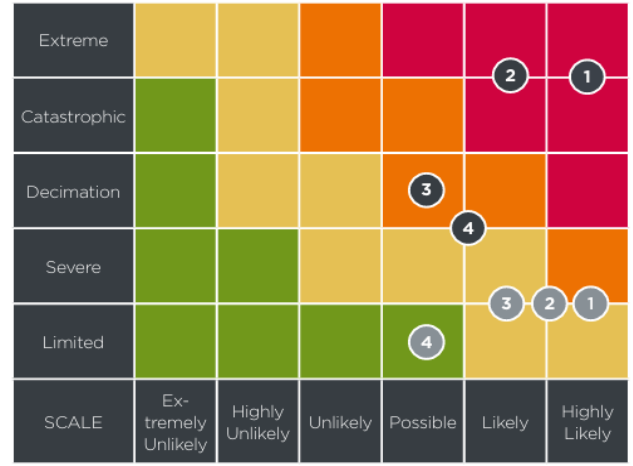
Figure 11: Planetary Solvency Summary Dashboard

Planetary Solvency Risk Rating and Trend	↓	Planetary Solvency Risk Trajectory and Trend	↓

Planetary Solvency Risk position and trajectory

There has been a significant increase in 2025 risk position, with overall position now outside risk appetite. Global climate impacts *Severe*. Nature impacts anticipated *Severe* imminently. Increasing societal fragmentation with active conflicts, heightened geo-political tension and severe stresses on vulnerable states. Economic losses and Mortality still *Limited*.

Risk trajectory pushes all risks further out of appetite soon, with increased breaches of risk tolerances *Likely*. Immediate policy action required to mitigate risks of *Catastrophic* level or greater impacts this century and possibly well before 2050. Cascading and interconnecting nature of risks requires systemic approach and solution.



1 Climate 3 Society # Risk position 2025

2 Nature 4 Economy # Risk position 2050

Rating	Financial impact	Non-financial impact			
	GDP losses	Human mortality	Climate	Nature	Societal
Extreme	≥50%	≥50% > 4 billion deaths	3°C or more by 2050. Multiple climate tipping points triggered, tipping cascade.	Breakdown of several critical ecosystem services and Earth systems. High level of extinction of higher order life on Earth.	Significant socio-political fragmentation worldwide and/or state failure with rapid, enduring, and significant loss of capital and systems identity. Frequent large scale mortality events.
Catastrophic	≥25%	≥25% >2 billion deaths	2°C or more by 2050. High number of climate tipping points triggered, partial tipping cascade.	Breakdown of some critical ecosystem services and Earth systems. Major extinction events in multiple geographies. Ocean circulation severely impacted.	Severe socio-political fragmentation in many regions, low lying regions lost. Heat and water stress drive involuntary mass migration of billions. Catastrophic mortality events from disease, malnutrition, thirst and conflict.
Decimation	≥10% >$10 trillion annual losses	≥10% > 800 million deaths	Global warming limited to 2°C by 2050. Several climate tipping points triggered.	Severe reduction in several critical ecosystem services. Major extinction events in some geographies. Frequent global food and water crises.	Severe socio-political fragmentation in regions exposed to climate and/or nature impacts. Failure of vulnerable states and mass mortality events in impacted areas.

Calor e seca

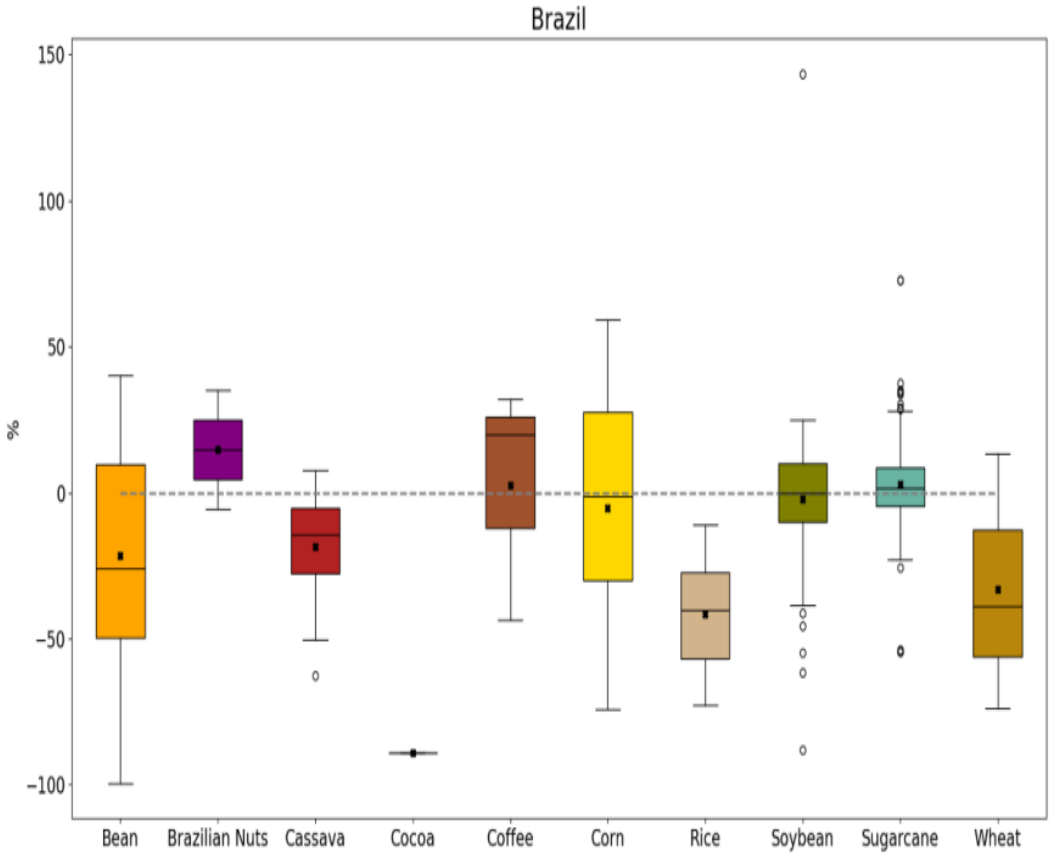
Environ. Res. Lett. **19** (2024) 083001 https://doi.org/10.1088/1748-9326/ad5f42

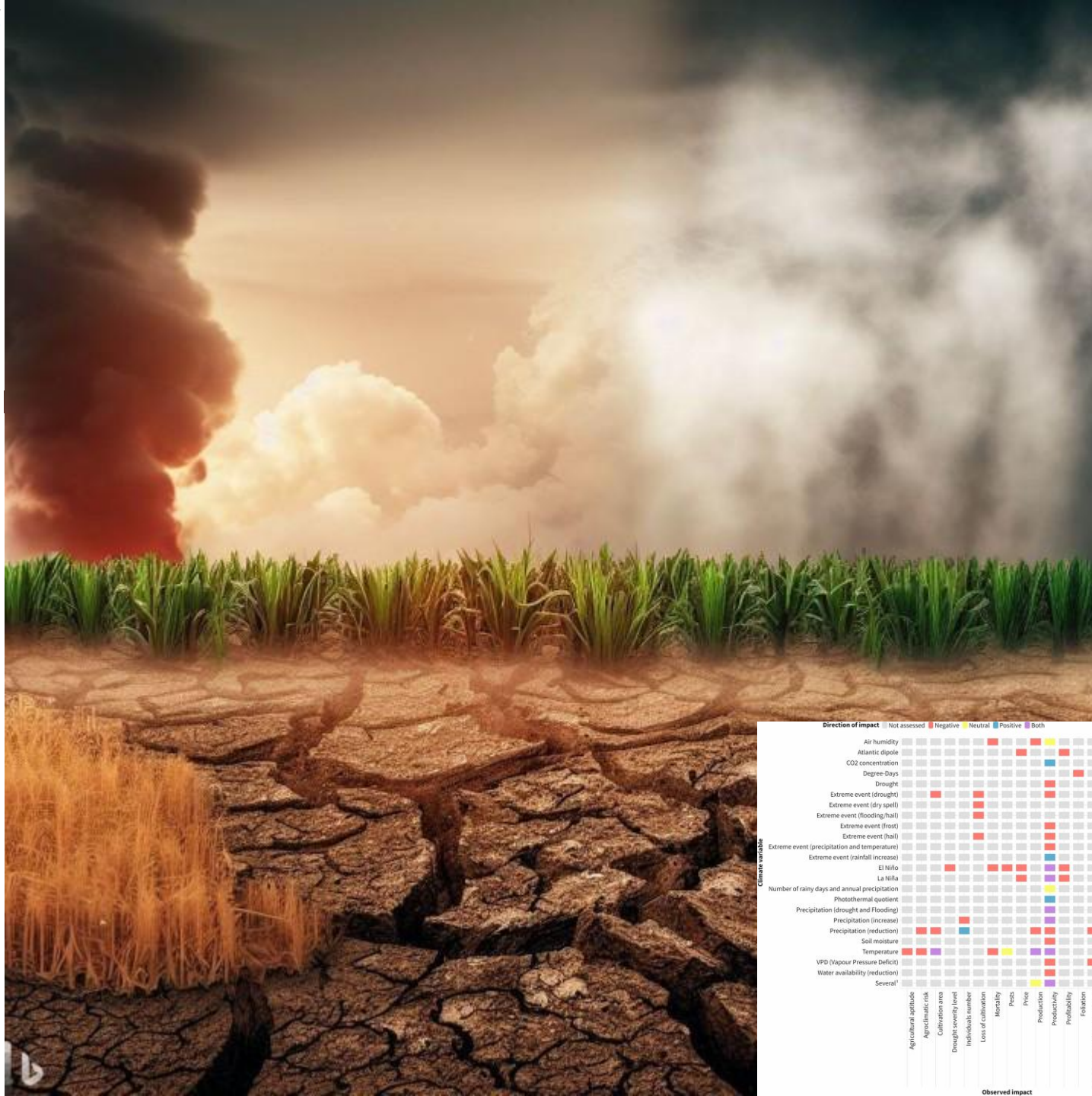
ENVIRONMENTAL RESEARCH
LETTERS

TOPICAL REVIEW

How climate change is impacting the Brazilian agricultural sector: evidence from a systematic literature review

Ana Carolina Oliveira Fiorini[1,*], Gerd Angelkorte[1], Tamar Bakman[1], Luiz Bernardo Baptista[1], Talita Cruz[1], Fabio A Diuana[1], Taísa Nogueira Morais[1], Régis Rathmann[1], Fábio T F da Silva[1], Isabela Tagomori[2], Marianne Zanon-Zotin[1,3], André F P Lucena[1], Alexandre Szklo[1], Roberto Schaeffer[1] and Joana Portugal-Pereira[1,4]

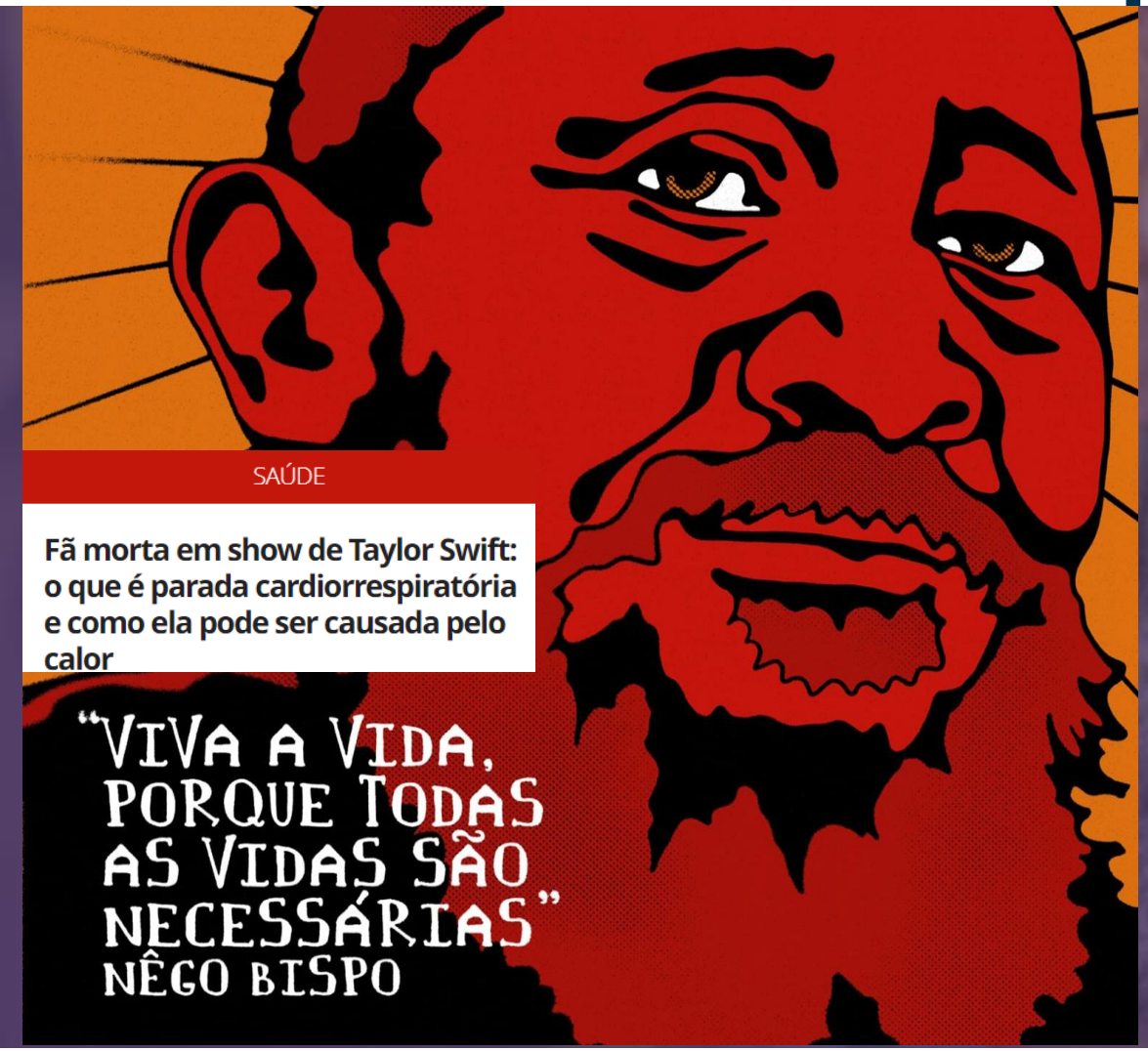


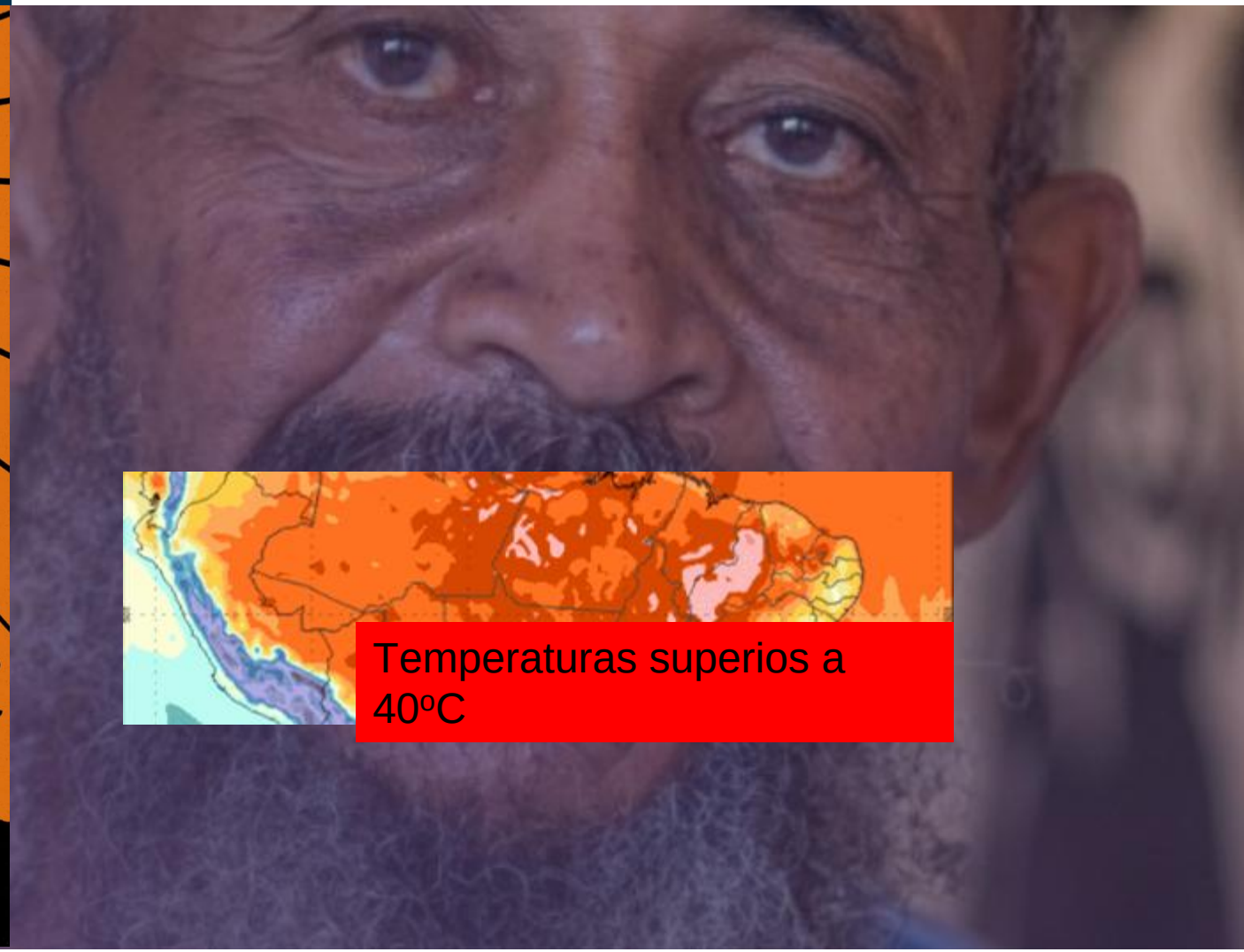


Quem matou Nêgo Bispo?

- Arq. Bras. Cardiol. 116 https://doi.org/10.36660/abc.20200547

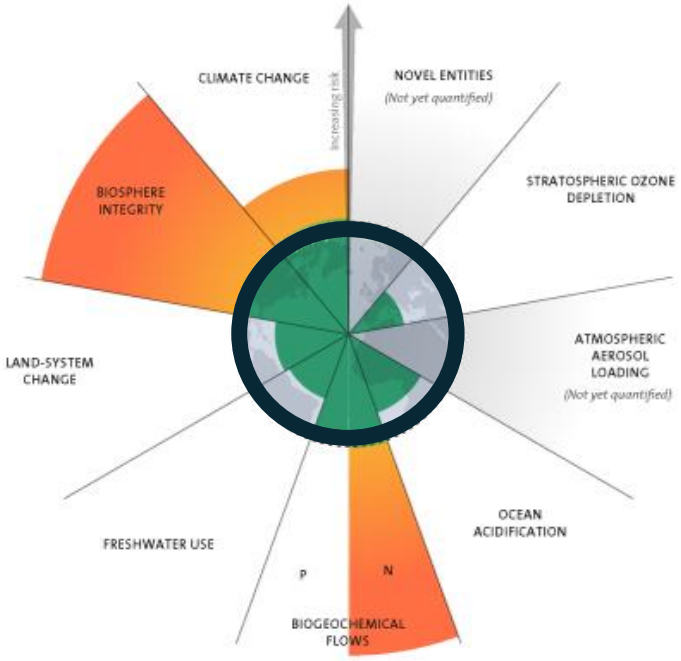
Aumento de Óbitos Domiciliares devido a Parada Cardiorrespiratória- Onda de Calor





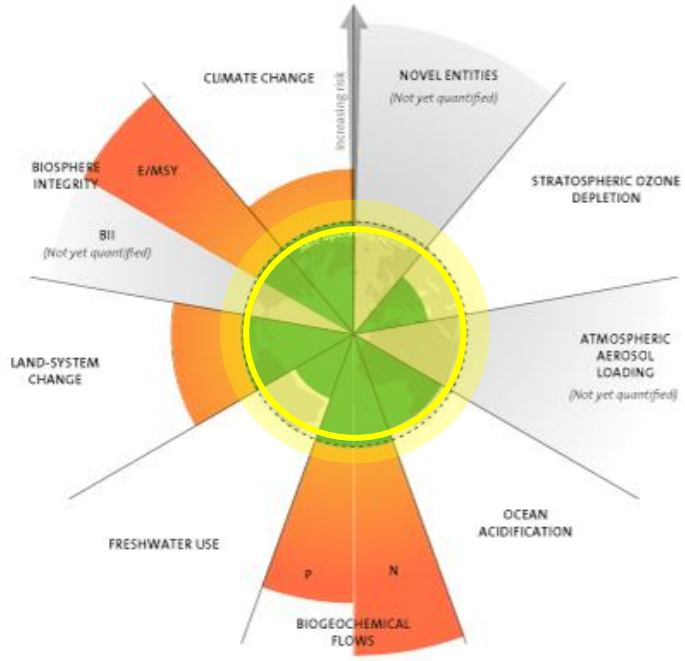
- Arq. Bras. Cardiol. 116 https://doi.org/10.36660/abc.20200547

2009



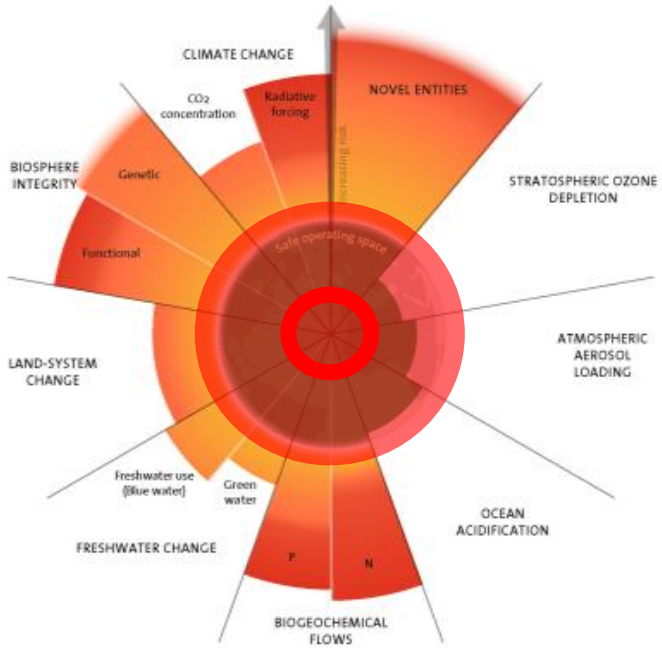
3 limites ultrapassados

2015



4 limites ultrapassados

2023

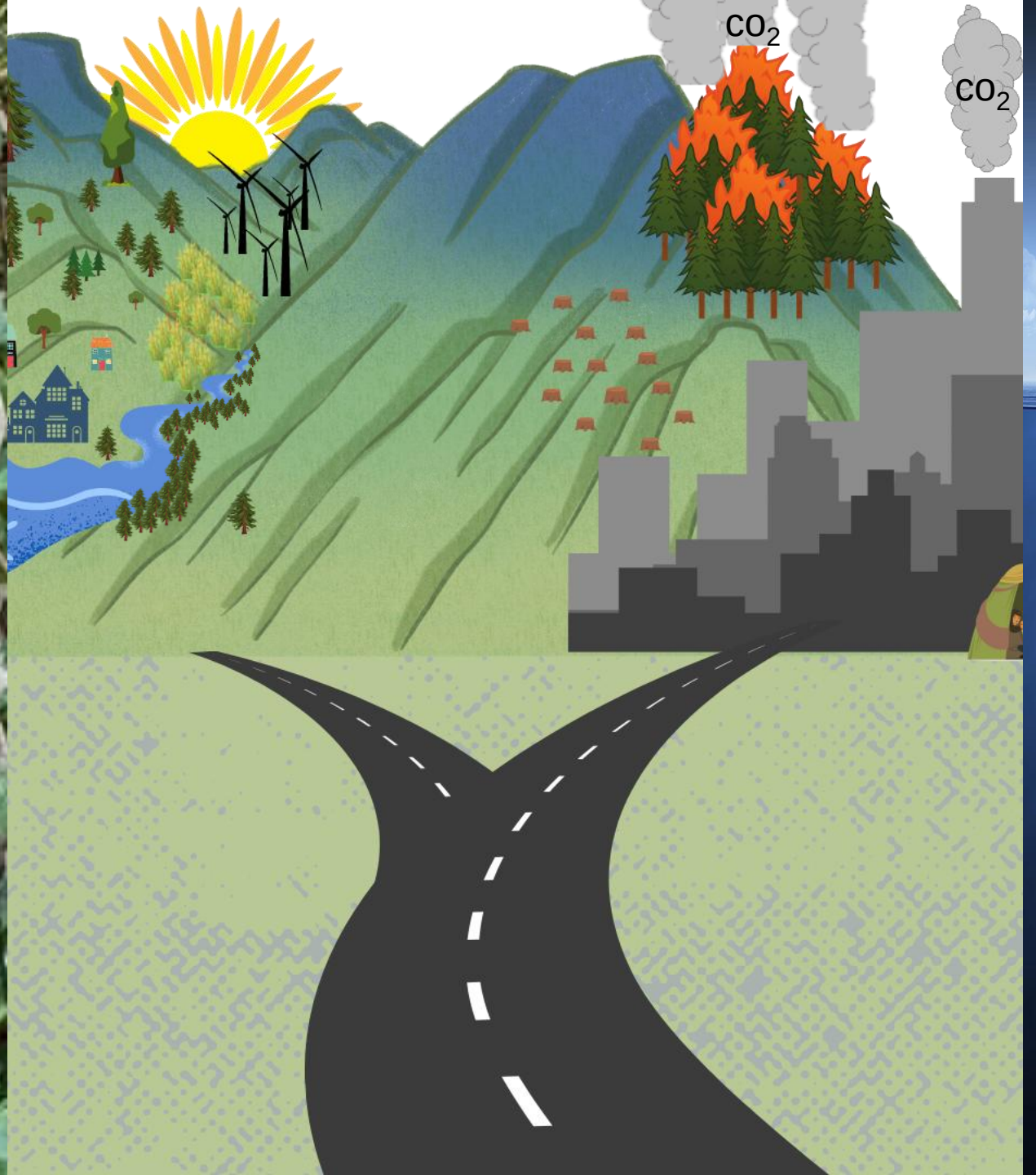


6 limites ultrapassados

Credit: Azote for Stockholm Resilience Centre, Stockholm University. Based on Richardson et al. 2023, Steffen et al. 2015, and Rockström et al. 2009


Ciclo vicioso dos desastres e suas relações perversas com o sistema financeiro...
Sociedade do Risco
Eventos climáticos /estressores
Prejuízos socioambientais e econômicos
Aumento do endividamento para financiar a resposta e recuperação a desastres
Aumento do endividamento para custear reconstrução da infraestrutura
Juros elevados atribuídos ao aumento dos riscos relacionados a crise climática clima e ambiental
Lobbies e custos reduzem a viabilidade de medidas inteligentes em termos de clima e natureza,
O aumento dos riscos e custos das dívidas reduz investimentos adaptação e mitigação
Países endividados e mais pobre aumentam a vulnerabilidade de sua população, explorando mais a natureza e as pessoas
Pobreza
Riscos
Empréstimos e Dívidas...
Vulnerabilidade
Mudanças climática

Precisamos de soluções


CO_2
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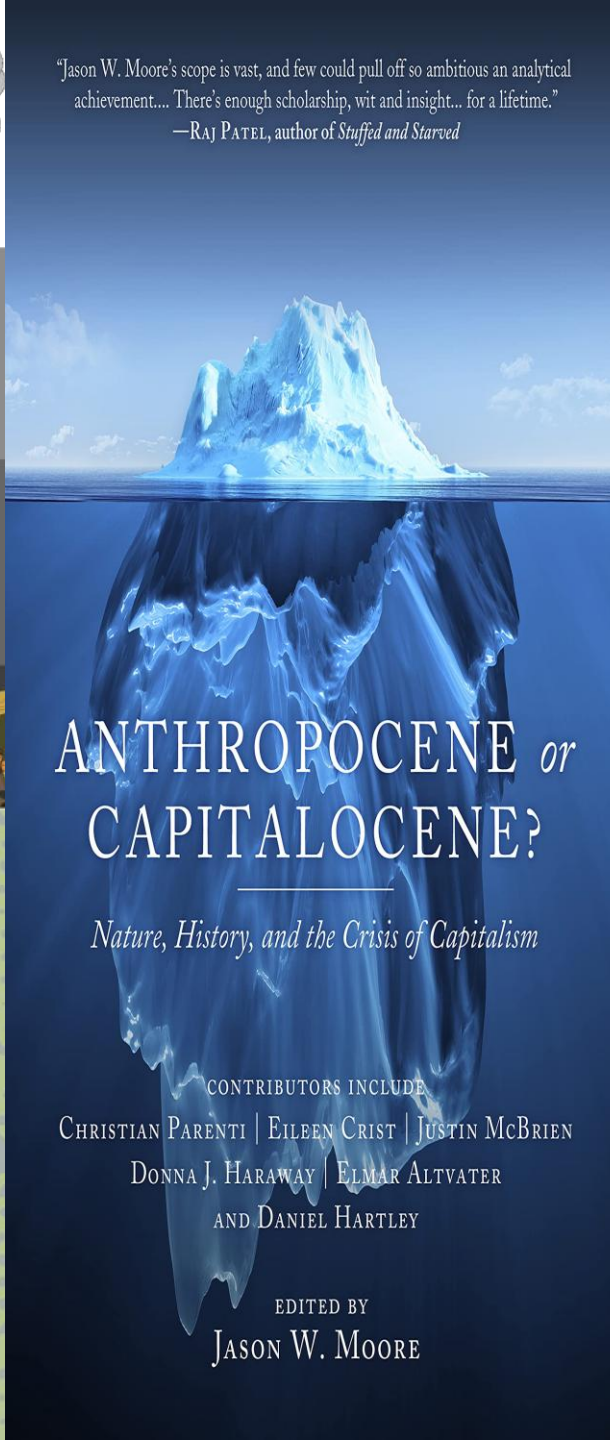

"Jason W. Moore's scope is vast, and few could pull off so ambitious an analytical achievement.... There's enough scholarship, wit and insight... for a lifetime."
—Raj Patel, author of *Stuffed and Starved*
ANTHROPOCENE *or* CAPITALOCENE?
Nature, History, and the Crisis of Capitalism
CONTRIBUTORS INCLUDE
Christian Parenti | Eileen Crist | Justin McBrien
Donna J. Haraway | Elmar Altvater
and Daniel Hartley
EDITED BY
Jason W. Moore

EDITORIAL | 25 October 2022

There's only one choice in Brazil's election — for the country and the world

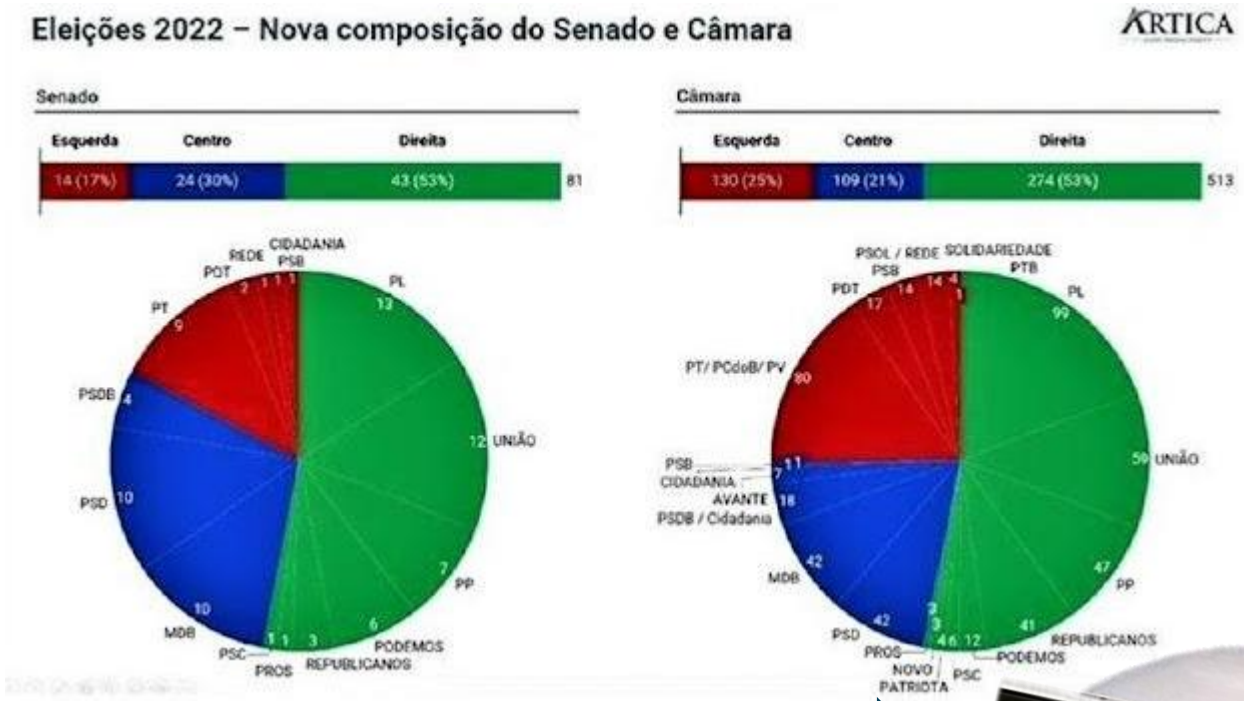
A second term for Jair Bolsonaro would represent a threat to science, democracy and th environment.

In Brazil's presidential race, the stakes for science and the environment are huge

A second term for right-wing populist Jair Bolsonaro could further erode research and accelerate deforestation in the Amazon

19 OCT 2022 • 3:35 PM • BY SOFIA MOUTINHO

Composição do Congresso



Executivo

Senado - Damares Alves (Rep-DF), Marcos Pontes (PL-SP), Tereza Cristina (PP-MS), Rogério Marinho (PL-RN) e Sergio Moro (União-PR).

Câmara dos Deputados - Ricardo Salles (PL-SP) e Eduardo Pazuello (PL-RJ).

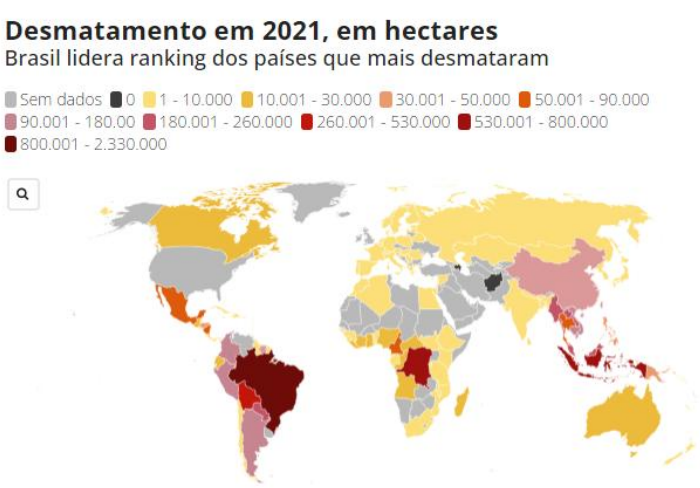
Judiciário

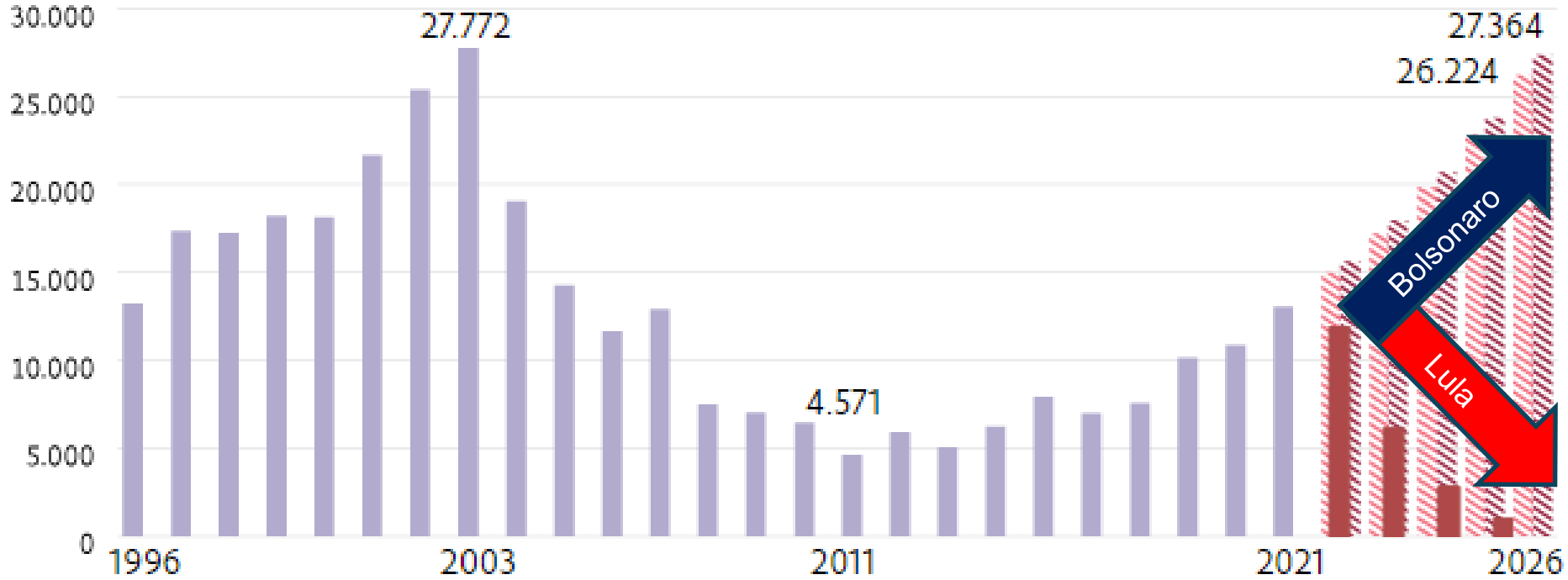
Desmatamento

Em km²

Projeção no cenário de aumento de 15% ao ano

Projeção no cenário de aumento de 20% ao ano





FOLHA DE S.PAULO

24.out.2022 às 23h15

Reeleição de Bolsonaro pode levar a desmatamento de mais de 27 mil km2 em 2026

Para mais informações acesse **mapbiomas.org** MAPBIOMAS 9.0 BRASIL

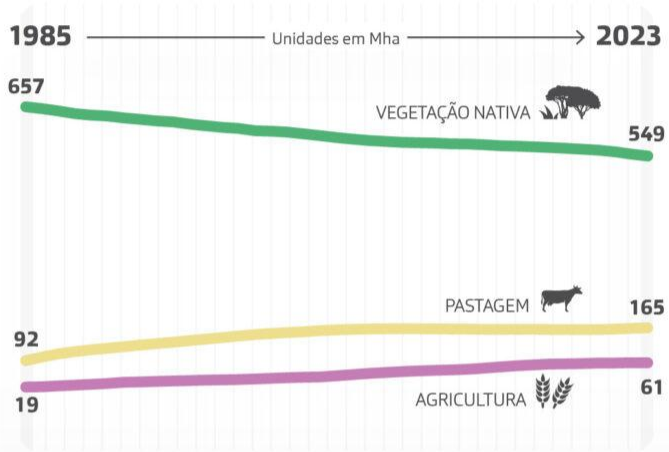
Brasil

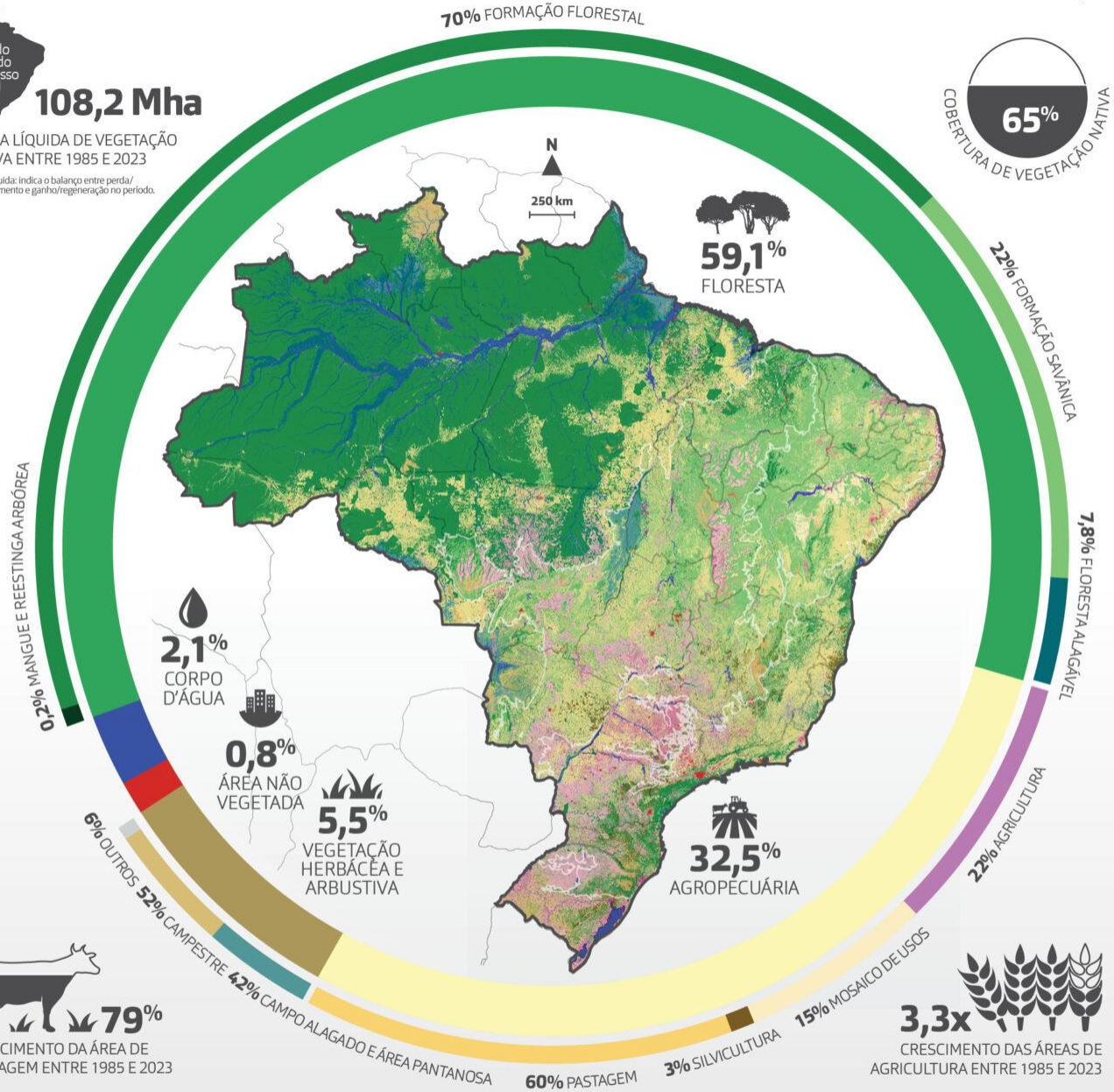
Evolução anual da cobertura e uso da terra **(1985-2023)**

108,2 Mha

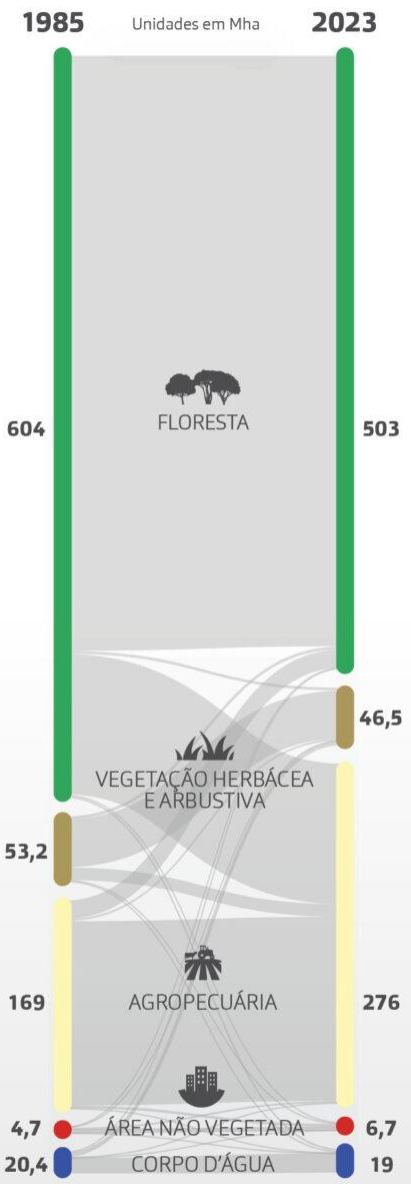
PERDA LÍQUIDA DE VEGETAÇÃO NATIVA ENTRE 1985 E 2023

Perda líquida: indica o balanço entre perda/desmatamento e ganho/regeneração no período.





65%
COBERTURA DE VEGETAÇÃO NATIVA



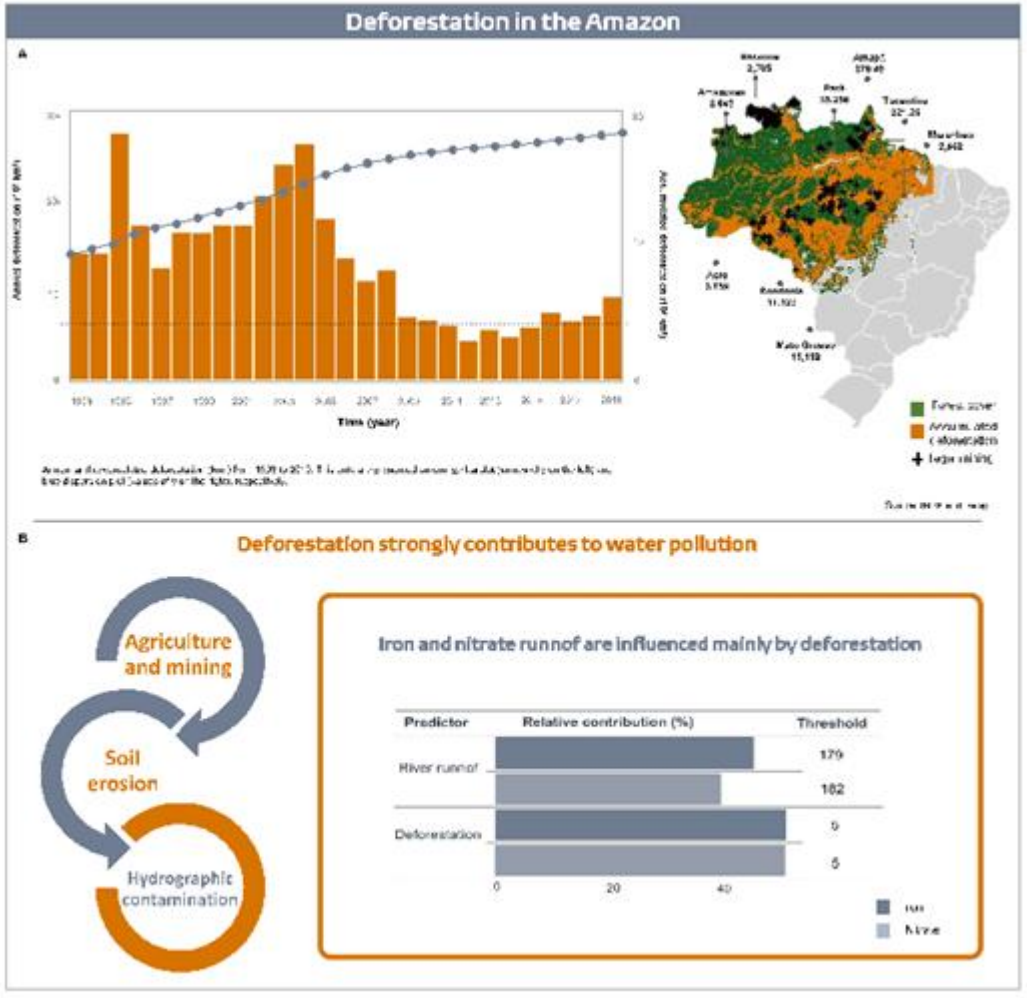
79%
CRESCIMENTO DA ÁREA DE PASTAGEM ENTRE 1985 E 2023

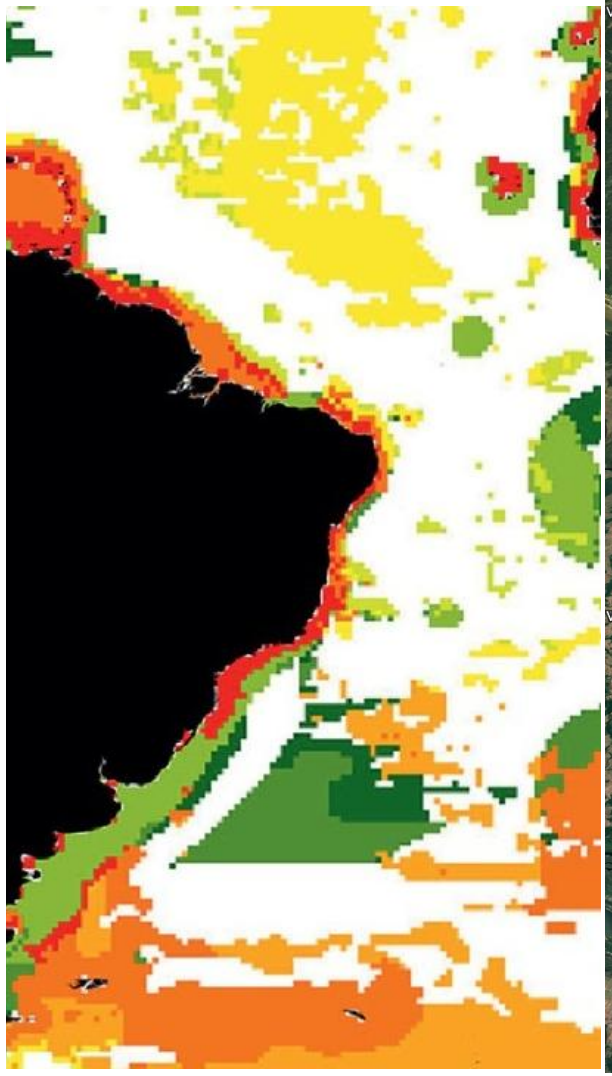
3,3x
CRESCIMENTO DAS ÁREAS DE AGRICULTURA ENTRE 1985 E 2023

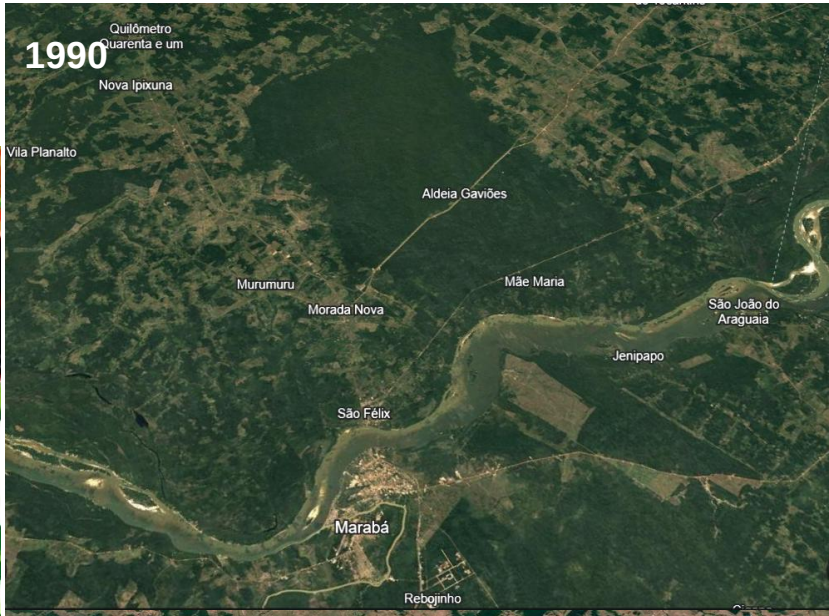
FONTE: MapBiomas, Coleção 9.0. O Projeto MapBiomas disponibiliza mapas anuais de cobertura e uso da terra, bem como mapas com as mudanças ocorridas ao longo do tempo para todo o período entre 1985 e 2023. Todos os dados, bem como o método e avaliação de acurácia das Coleções do MapBiomas podem ser acessados no site do projeto www.mapbiomas.org.

FLORESTA | FORMAÇÃO FLORESTAL | FORMAÇÃO SAVÂNICA | MANGUE | FLORESTA ALAGÁVEL | **AGROPECUÁRIA** | AGRICULTURA | PASTAGEM | MOSAICO DE USOS | SILVICULTURA | **VEGETAÇÃO HERBÁCEA E ARBUSTIVA** | FORMAÇÃO CAMPESTRE | CAMPO ALAGADO E ÁREA PANTANOSA | **ÁREA NÃO VEGETADA** | ÁREA URBANIZADA | **CORPO D'ÁGUA**

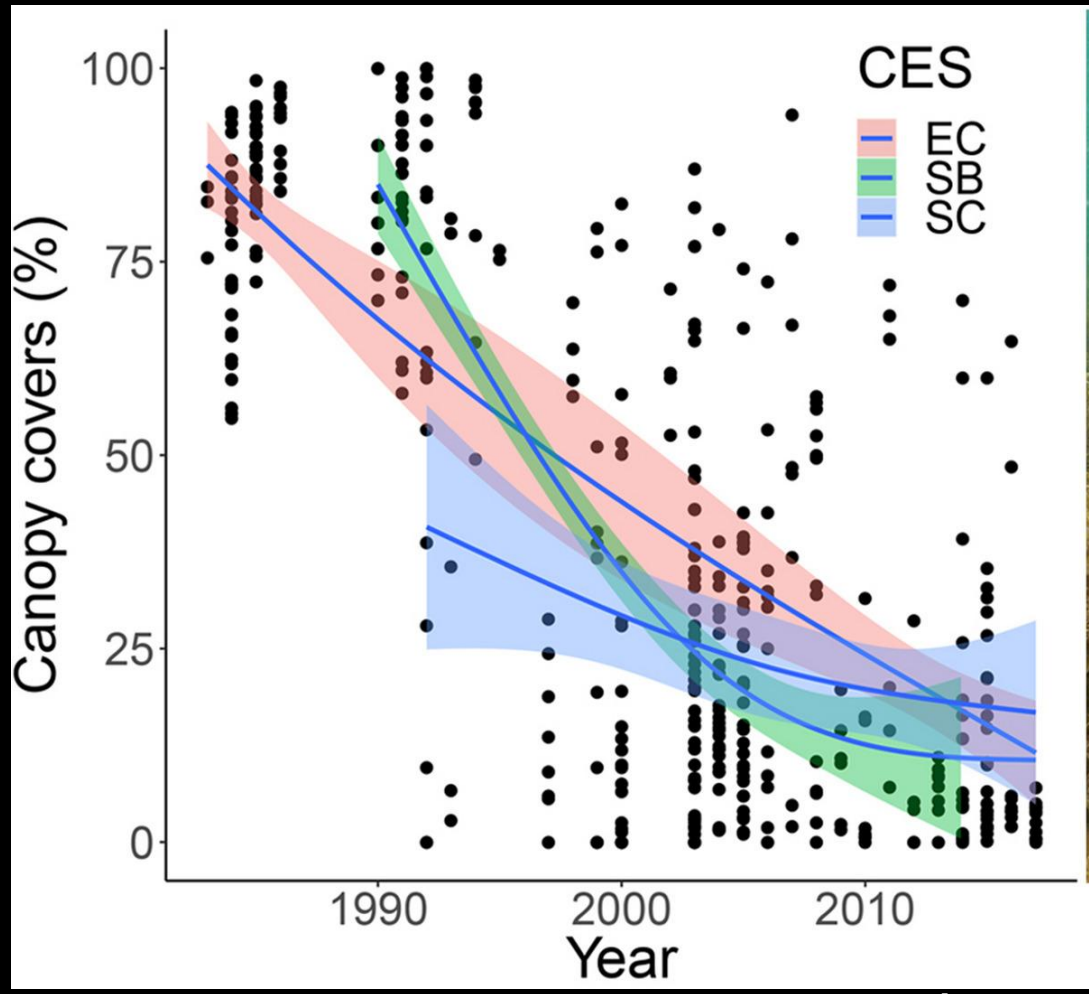
Conexões – Terra + Mar

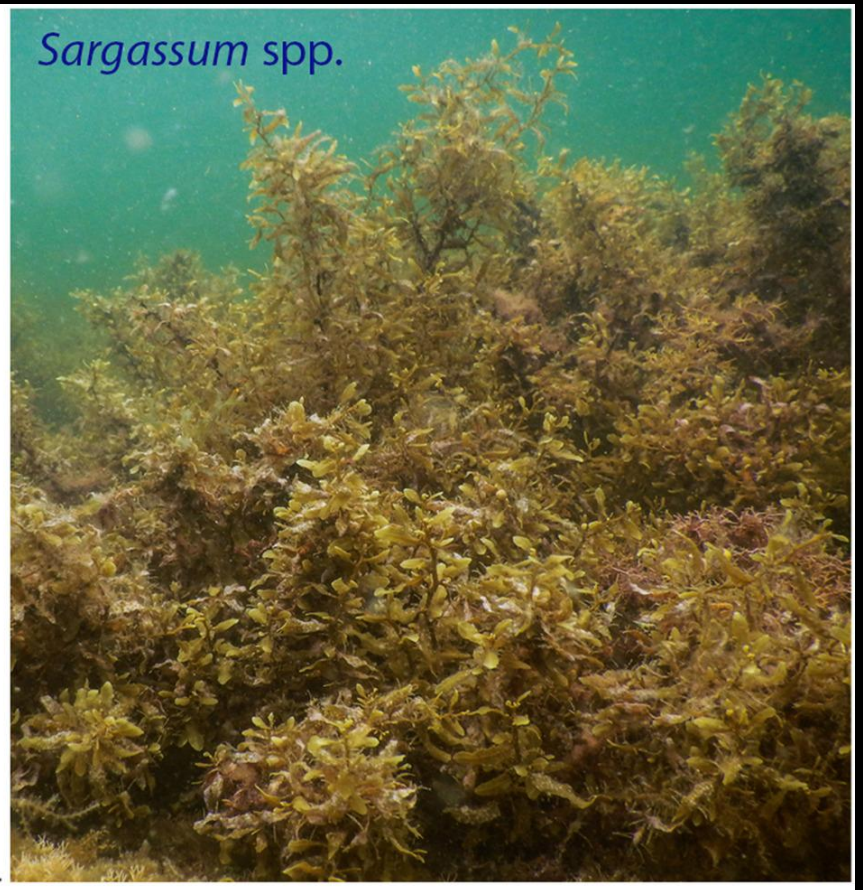






Perdas das Florestas Marinhas





Gorman et al. 2019 Global Change Biology **https://doi.org/10.1111/gcb.14956**

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Collaborative insights in the public interest

January 2025

Planetary Solvency – finding our balance with nature

Global risk management for human prosperity

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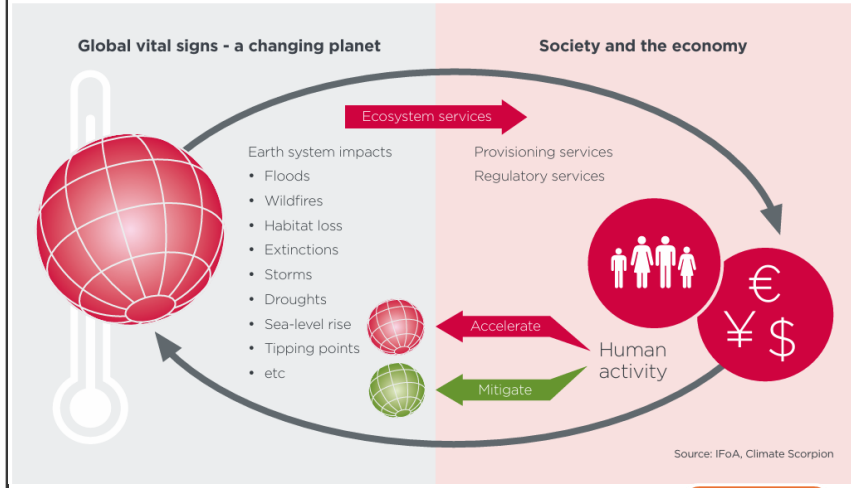
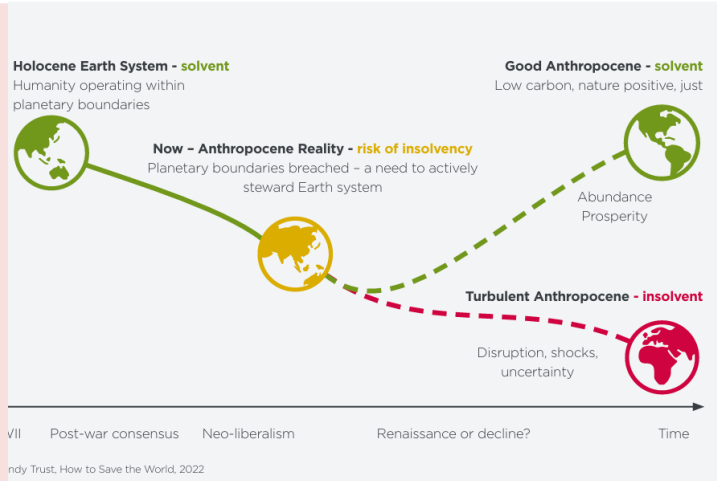
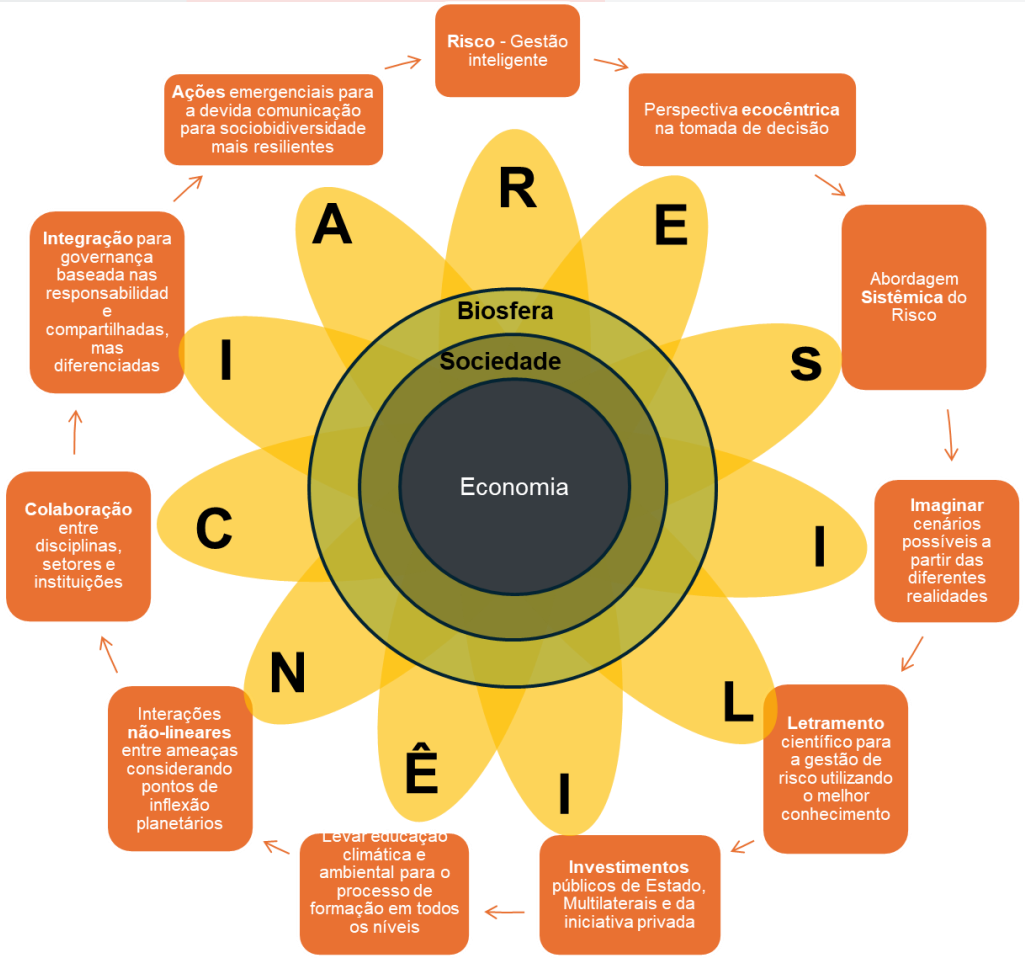
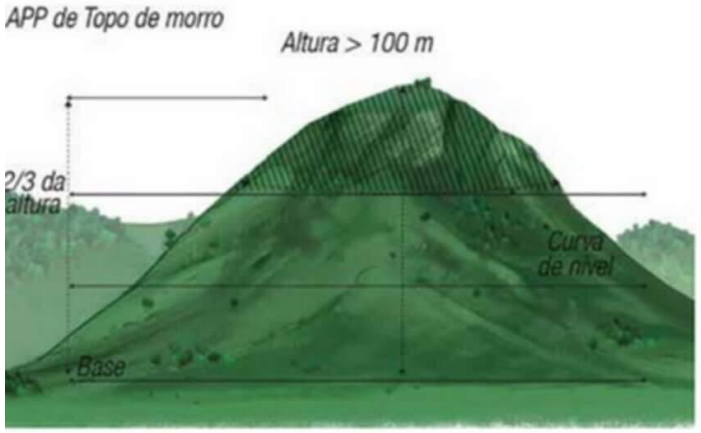
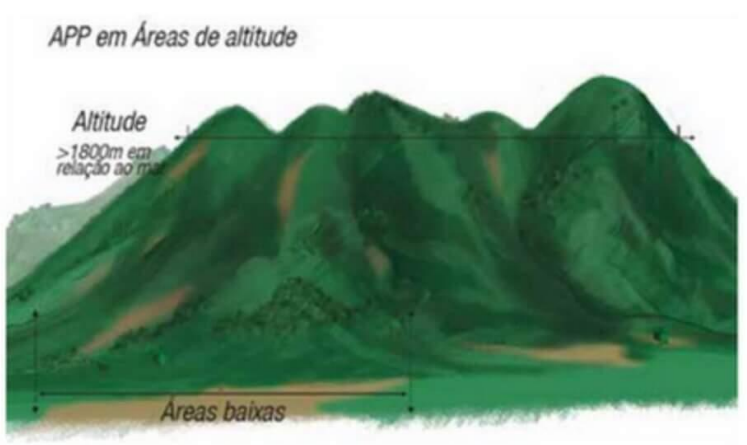


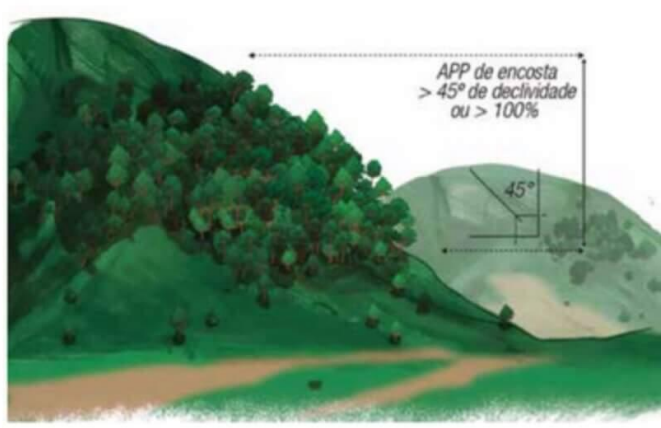


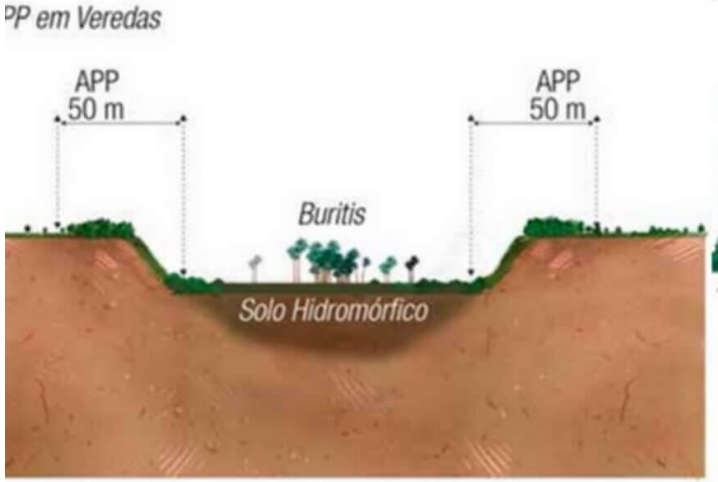


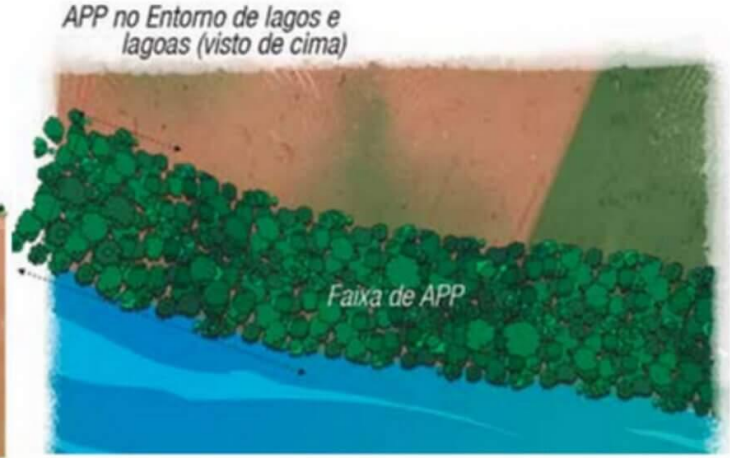
Área de Preservação Permanentes (APP)

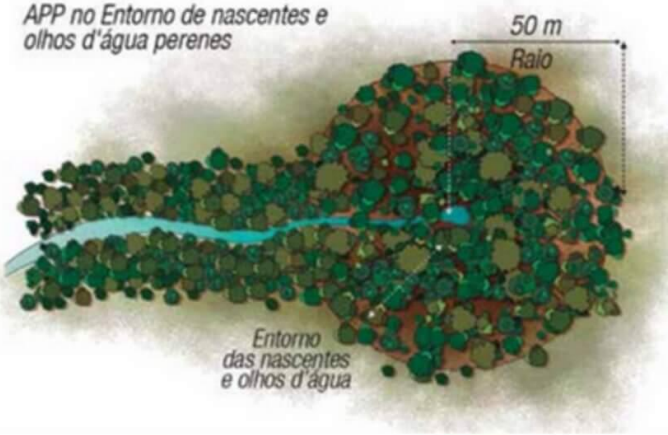








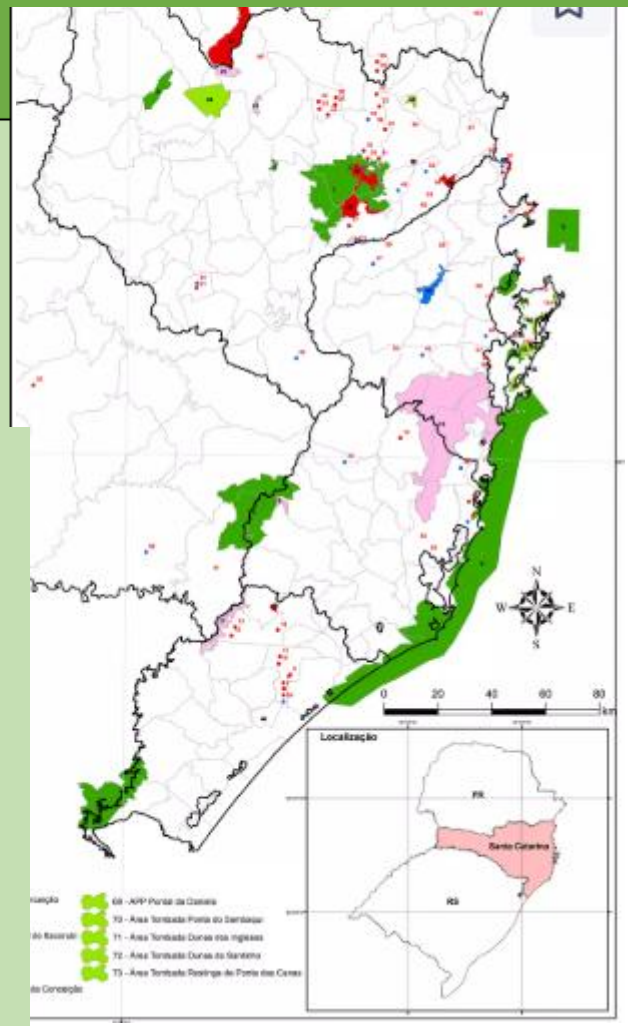




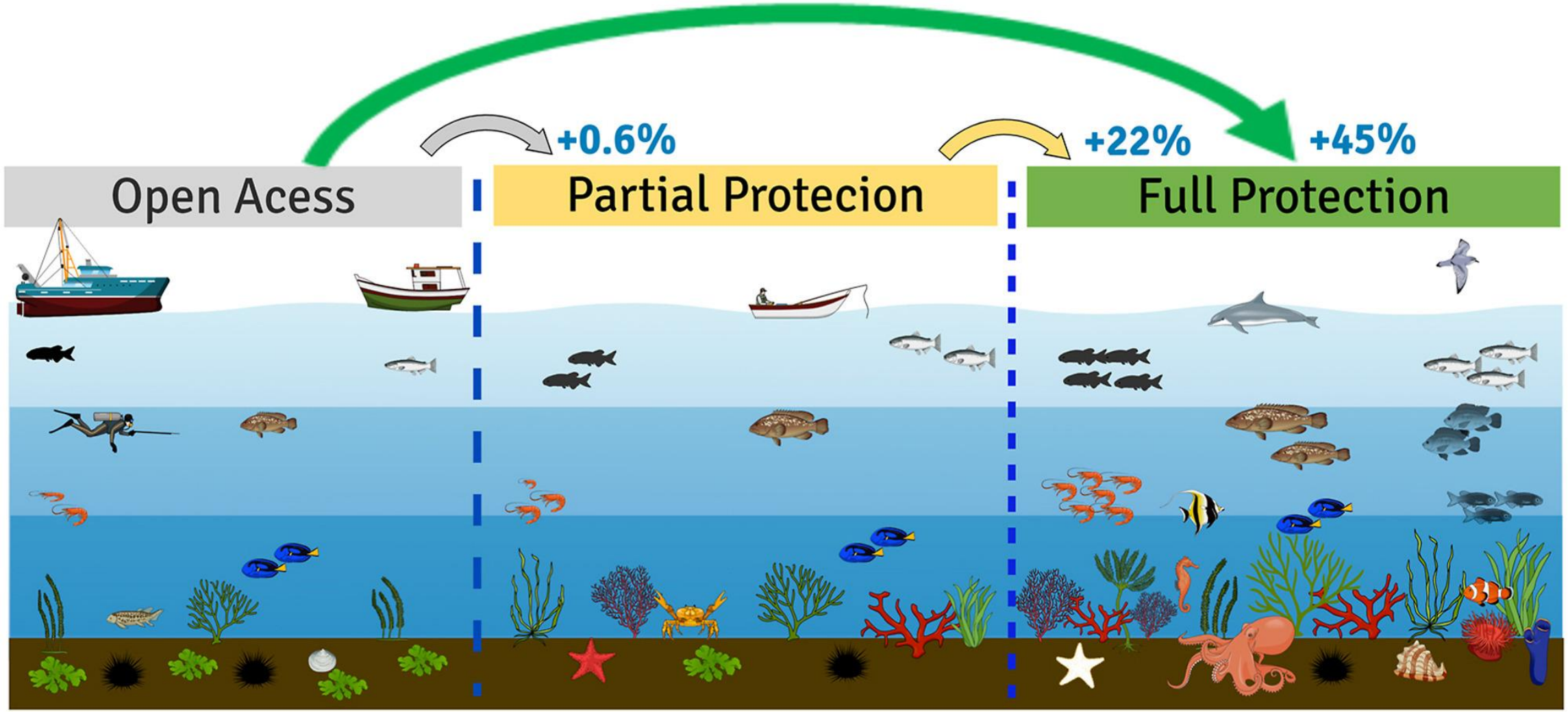
Unidades de Conservação e o Manejo Eficiente
Zoneamento Econômico Ecológico

MEIO AMBIENTE

O município apresenta situações de avanço da ocupação urbana sobre áreas ambientalmente frágeis, como mananciais, matas, dunas, morros e APPs, entre outras.



Para combater o especismo, o acordo de Kunming-Montreal prevê proteger 30% dos ecossistemas (estudos indicam 40%)

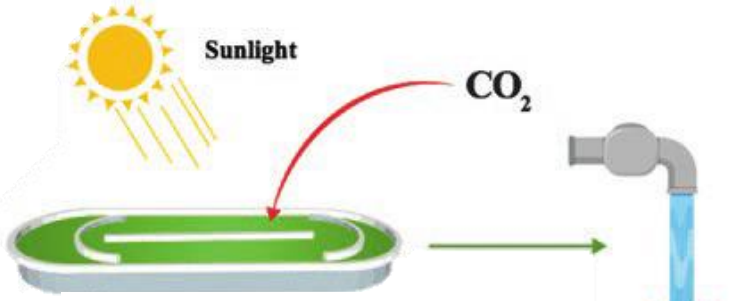

+0.6%
+22%
+45%
Open Acess
Partial Protecion
Full Protection

Restauração e Recuperação

ETeT

Reciclagem,
Complementação
Redundância

Inorganic Nutrients → Organic Matters



Algae Culture

Treated water

Different Effluents

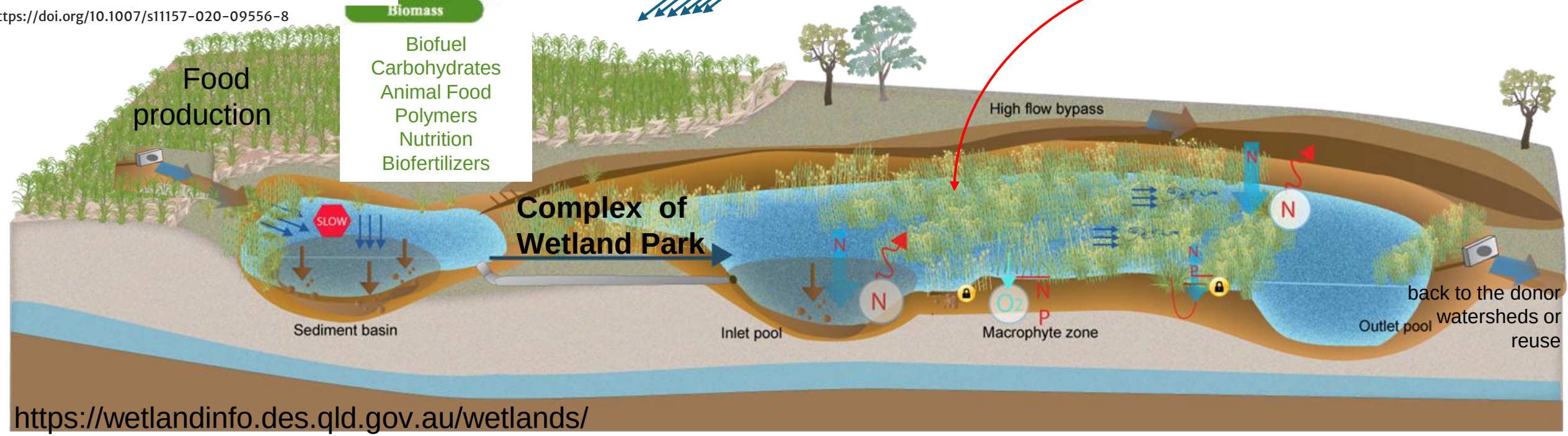
https://doi.org/10.1007/s11157-020-09556-8

Harvest Biomass

Biofuel
Carbohydrates
Animal Food
Polymers
Nutrition
Biofertilizers

Food production

CO_2



https://wetlandinfo.des.qld.gov.au/wetlands/

Water run-off, carrying sediment particles (coarse and fine) and dissolved pollutants (nutrients and pesticides)

Vegetation slows water and promotes even flow

Wetting and drying of sediments leads to fixation of pollutants in sediments

Processing of nutrients into wetland vegetation and biofilms

Water leaving treatment system with reduced sediment, nutrient and pesticide loads

Slowing of run-off increases sediment deposition rate.

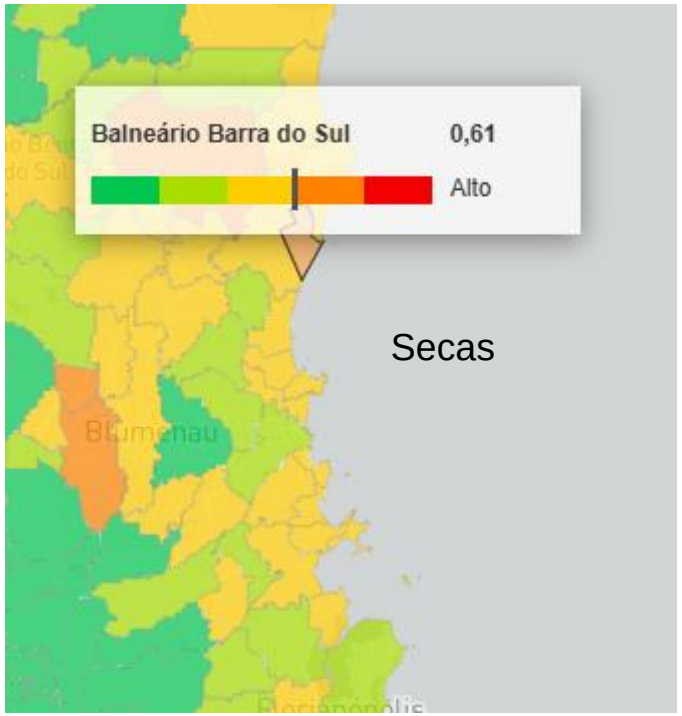
Deposition of coarse (and medium sized) sediment particles

Wetland vegetation inhibits the release of deposited nutrients by pumping oxygen into the soil.

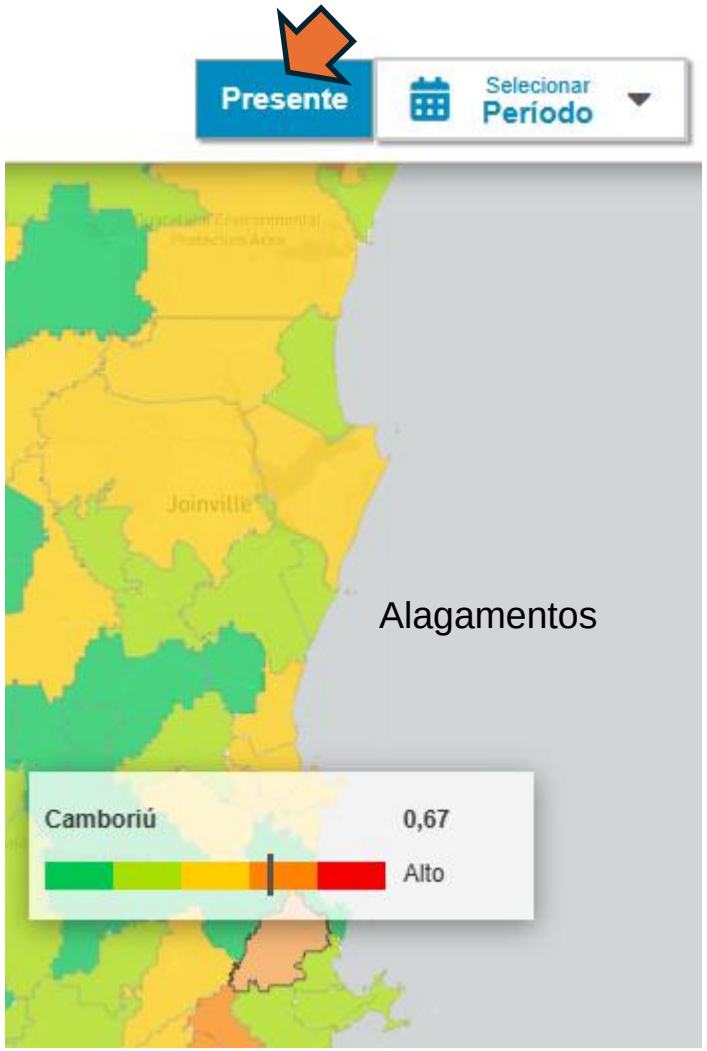
Vegetation provides a surface for biofilms plus contributes carbon and oxygen to the soils, providing conditions that promote nitrification-denitrification, leading to nitrogen removal

Adaptação e preparação para desastres

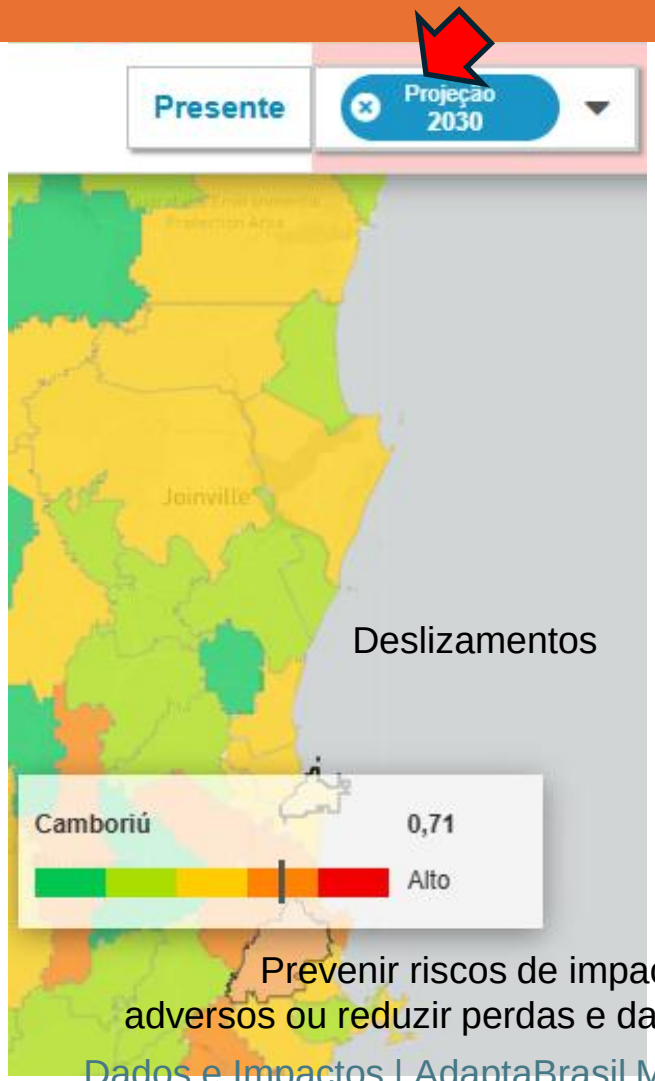
riscos, vulnerabilidade e capacidade adaptativa?



Secas



Alagamentos



Deslizamentos

Prevenir riscos de impactos adversos ou reduzir perdas e danos

[Dados e Impactos | AdaptaBrasil MCTI]

Aumento da resiliência à mudança climática

- Recuperação e a expansão das áreas verdes urbanas (OASIS)
- Tecnologias e práticas sociais para armazenar água das chuvas.
- O aumento da frequência e intensificação das ondas de calor
- Restauração ou recuperação dos ecossistemas costeiros

Estamos caminhando...mas precisamos correr!

- Plano de Aceleração do Crescimento (PAC) previu investimentos de R$ 10,5 bilhões até 2026 para a prevenção de desastres.

JUSTIÇA CLIMÁTICA

- Racismo ambiental
- Especismo

As mudanças climáticas são um fator de aumento das desigualdades sociais. Em um cenário em que a temperatura aumente 1,5˚C, do qual já estamos bem próximos, há uma grande probabilidade de populações mais pobres e desfavorecidas serem mais afetadas por eventos extremos e se tornarem ainda mais vulneráveis social e ambientalmente, segundo o painel de cientistas do IPCC[11].

...a população pobre, periférica, negra, as mulheres...pescadores, maricultores, indígenas, quilombolas, extrativistas e agricultores são os que mais sofrem as consequências do aquecimento global.

... mudanças climáticas são racistas, machistas, classistas...

Pagamento por serviços ambientais

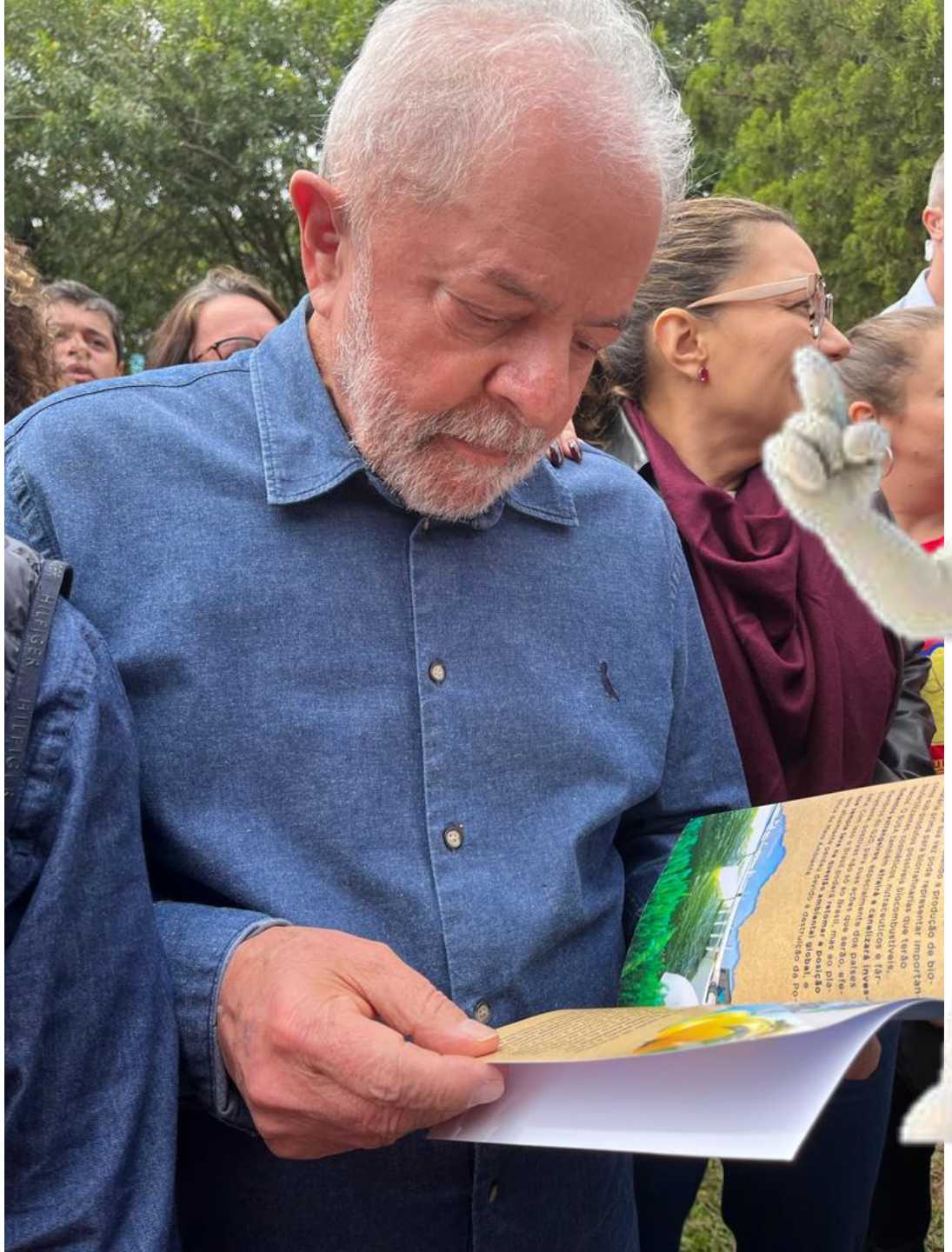
Território	Serviços ambientais
Unidade de Conservação Terra indígena **Propriedade privada** Reserva legal **Excedente de RL** Área de Preservação Permanente **Área de Uso Restrito**	**Monitoramento** Vigilância **Combate a incêndio** Pesquisa **Plantio árvores** Atividades Integradas Sistema Agroflorestal

Benefícios	Mercado
Disponibilidade e conservação da água Remoção e estoque de carbono **Conservação da biodiversidade** Observação de Fauna **Polinização** Proteção do Solo	**Financeiro** Bens de consumo **Tecnologia** Transporte **Alimentos & Bebidas** Farmacêuticos **Energia elétrica** Tratamento de Água **Pessoas físicas**

Política Nacional de Pagamento por Serviços Ambientais - FPA

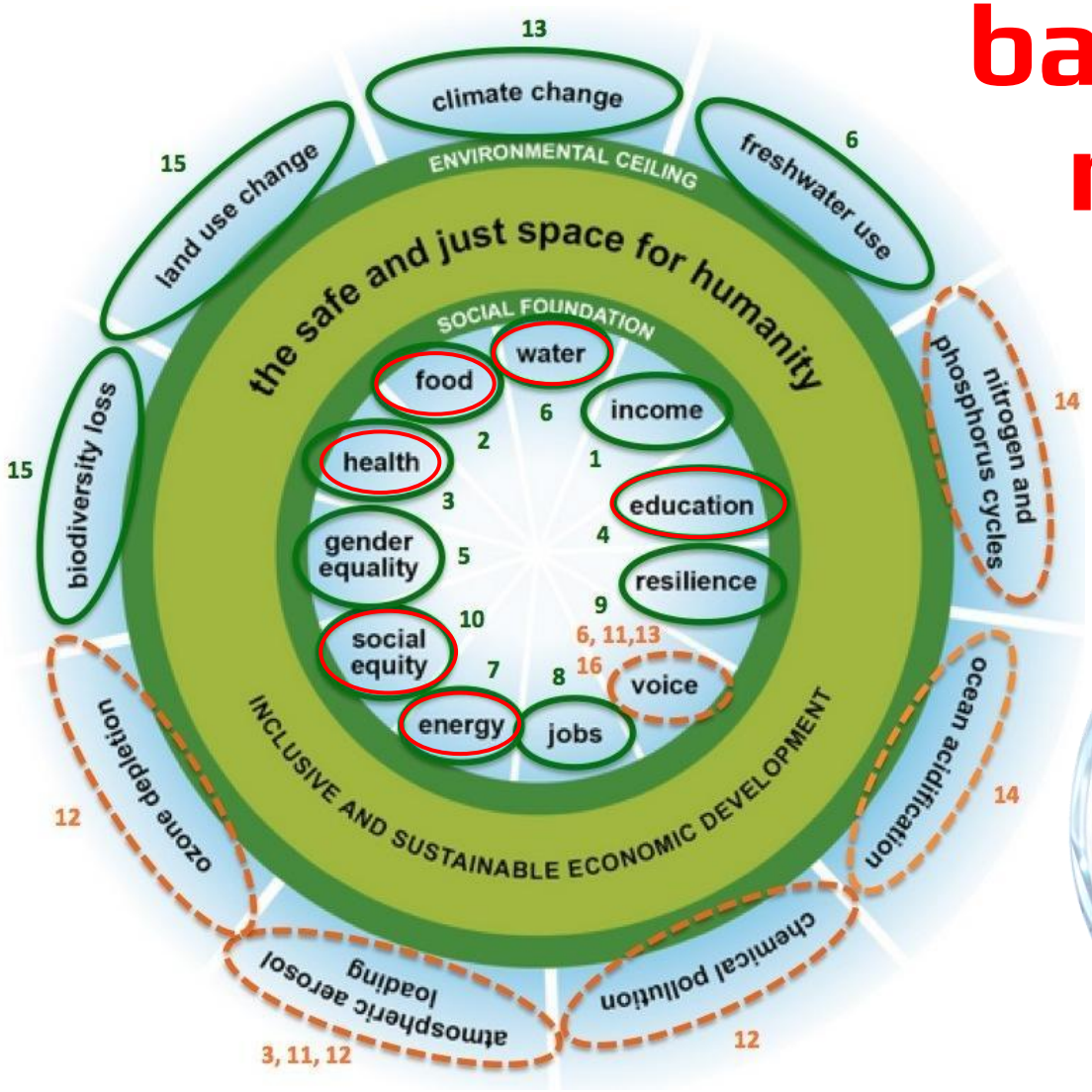
SUS
A
Sistema Único de Saúde Ambiental

- Monitoramento, Combate e solução de problemas relacionados à degradação ambiental e às mudanças climáticas.
- Fortalecimento do sistema de instituições federais ligadas direta ou indiretamente ao meio ambiente.
- Fortalecimento do SISNAMA, viabilizando a execução de ações integradas entre as fundações municipais, estaduais e as respectivas instâncias federais.
- Valorização das instituições de ensino e pesquisa, potencializando os investimentos públicos.
- Fomento ao desenvolvimento de práticas econômicas regenerativas e distributivas.



Florestas marinhas para sempre

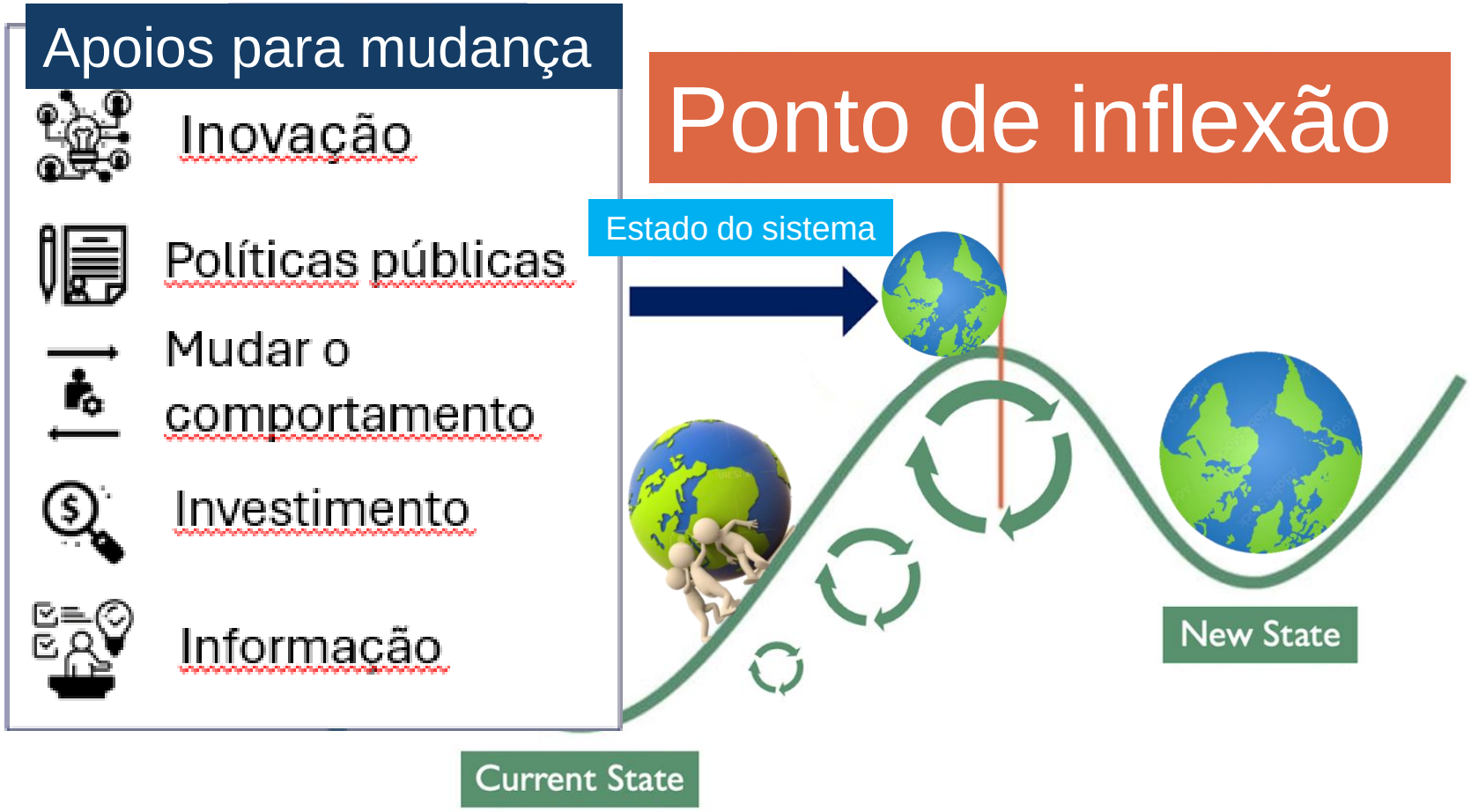
Soluções baseadas na natureza



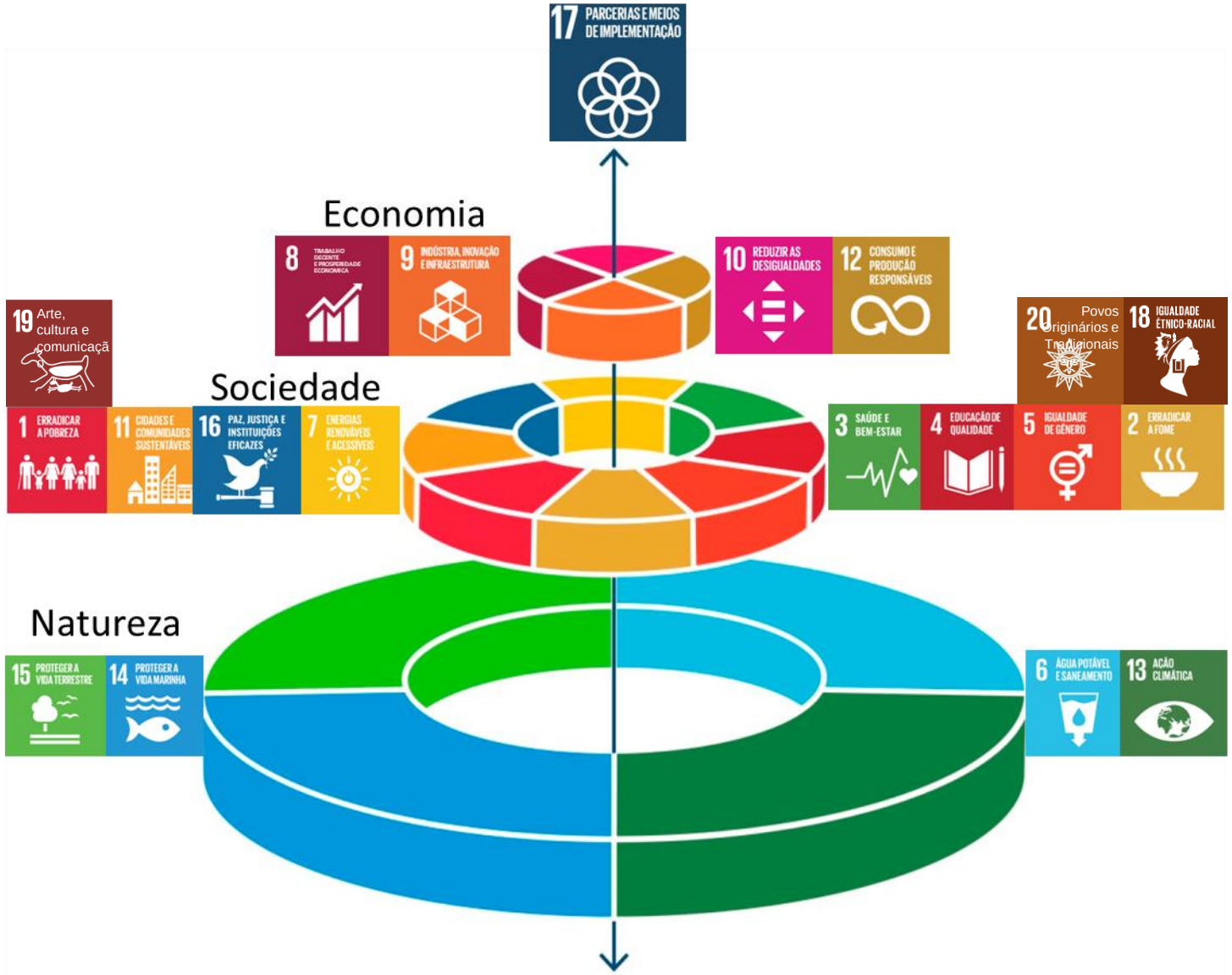
SUSA- Sistema Único de Saúde Ambiental

Saúde Planetária

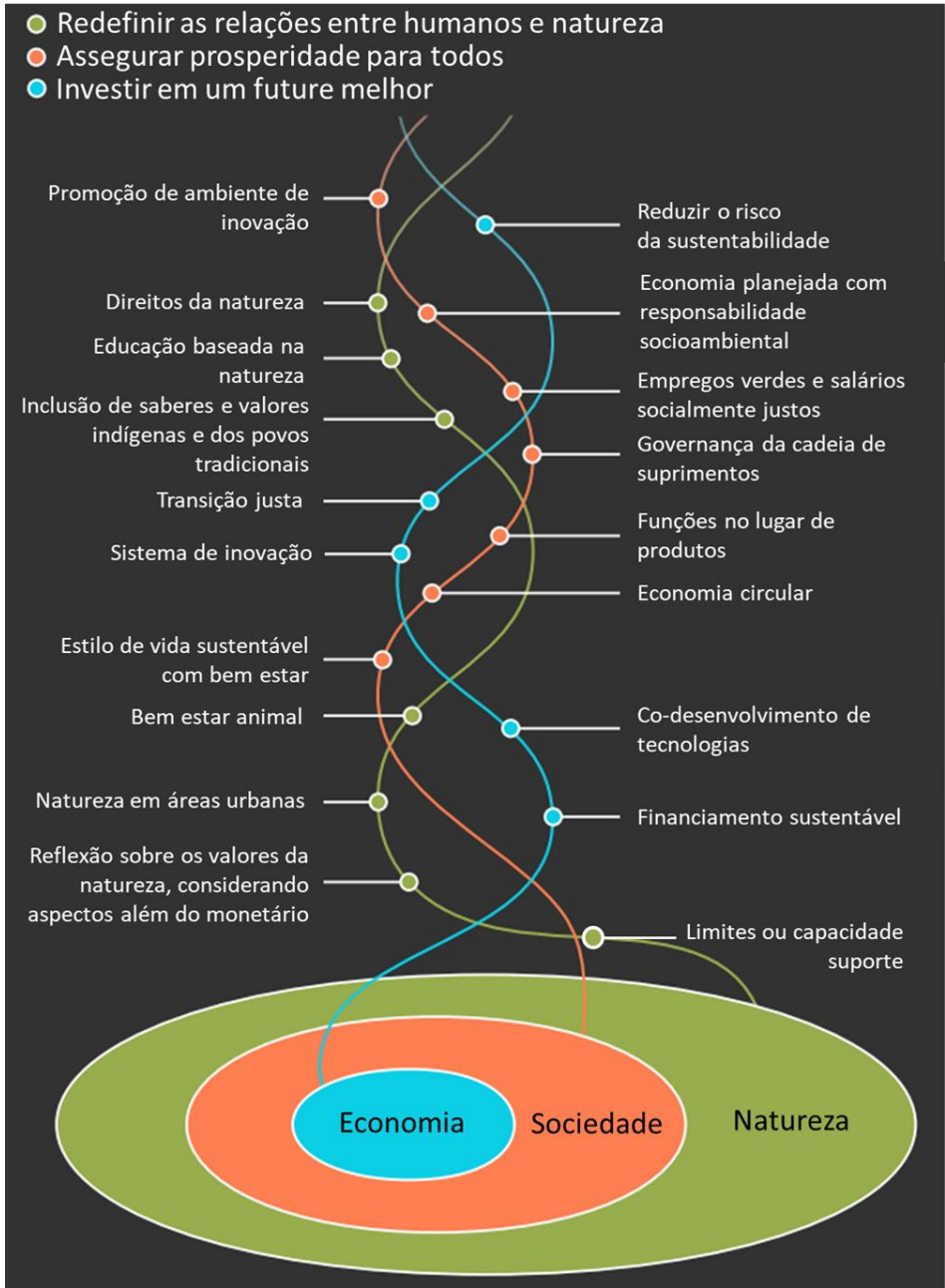
O que precisamos fazer para produzir pontos de inflexão positivos



Relações hierárquicas para um planejamento sustentável dos nossos bairros



Construindo bairros para um presente e um future melhores

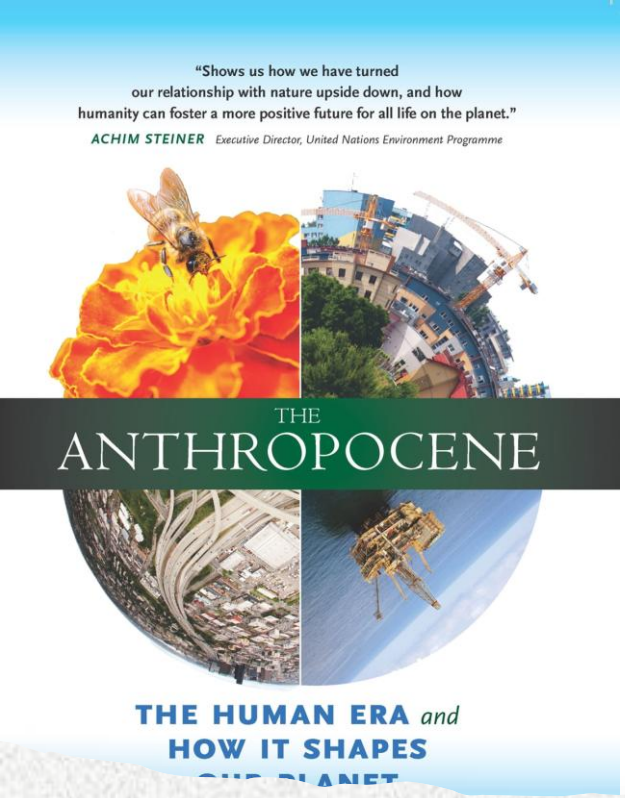


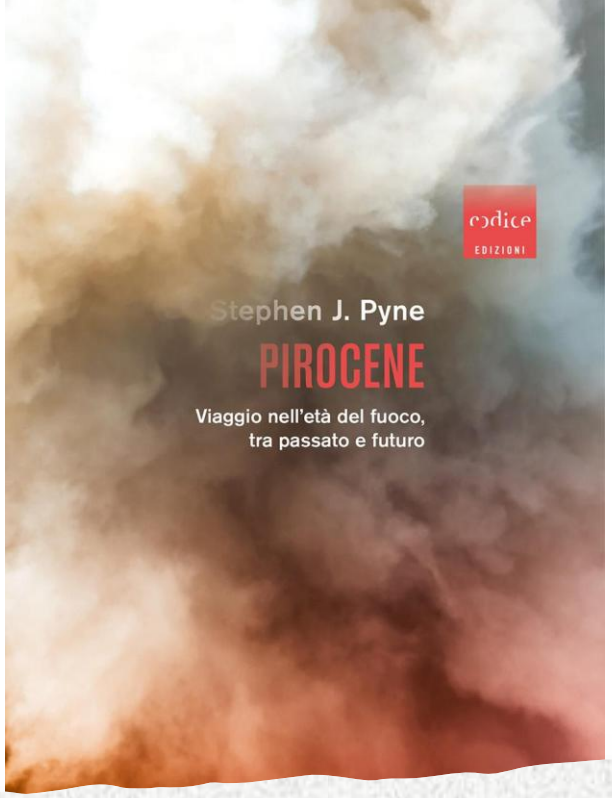
LEI Nº 14.904, DE 27 DE JUNHO DE 2024

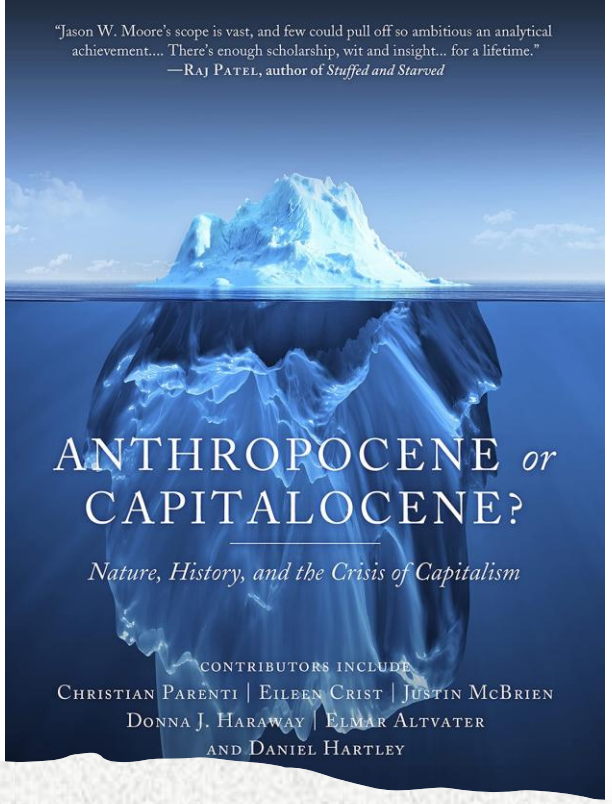
- *Estabelece diretrizes para a elaboração de planos de adaptação à mudança do clima; altera a Lei nº 12.114, de 9 de dezembro de 2009; e dá outras providências.*
- **Art. 2º** São diretrizes dos planos de adaptação à mudança do clima:
  - I – a identificação, a avaliação e a priorização de medidas para enfrentar os desastres naturais recorrentes e diminuir a vulnerabilidade e a exposição dos sistemas ambiental, social, econômico e de infraestrutura, em áreas rurais e urbanas, bem como os efeitos adversos atuais e esperados das mudanças do clima nos âmbitos local, municipal...;
  - II – a gestão e a redução do risco climático diante dos efeitos adversos da mudança do clima, de modo a estimar, minimizar ou evitar perdas e danos e planejar e priorizar a gestão coordenada de investimentos, com base no grau de vulnerabilidade, conforme definido pela PNMC;
- **Art. 3º** Os planos de adaptação à mudança do clima assegurarão a adequada implementação das estratégias traçadas, prioritariamente nas áreas de:
  - I – infraestrutura urbana e direito à cidade, incluídos habitação, áreas verdes, transportes, equipamentos de saúde e educação, saneamento, segurança alimentar e nutricional, segurança hídrica e transição energética justa, entre outros elementos com vistas ao desenvolvimento socioeconômico resiliente à mudança do clima e alinhados à redução das desigualdades sociais;

-Desenvolvimento Sustentável

+Envolvimento Regenerativo







VAMOS CONSTRUER SIMBIOCENO

SIMBIOCENO POR UM FUTURO JUSTO

Contribuição de todos
Editado de forma colaborativa

Pela vida em todas as duas formas


DE VOLTA
PARA O FUTURO

Obrigado!!!

pauloantuneshorta@gmail.com
@profpaulohorta

Pacto por cidades e governos comprometidos com a promoção da saúde dos territórios para cuidarmos de todas as formas de vida, hoje e sempre

Nada nos detiene

... ou quase

Contato: pauloantuneshorta@gmail.com

Ecoando Sustentabilidade

CNPq
Conselho Nacional de Desenvolvimento Científico e Tecnológico

CAPES

Projeto Coral Vivo

SISBIOTA MAR
REDE NACIONAL DE PESQUISA EM BIODIVERSIDADE MARINHA

REBENTOS
Rede de Monitoramento de Habitats Bentônicos Costeiros

fapesc
Fundação de Amparo à Pesquisa e Inovação do Estado de Santa Catarina

RESTORESEAS

Nature-based tools to protect and restore biodiversity

UNIVERSIDADE FEDERAL DE SANTA CATARINA

Print UFSC
Programa Institucional de Internacionalização
Universidade Federal de Santa Catarina

biodiversa

European co-funded Partnership on biodiversity