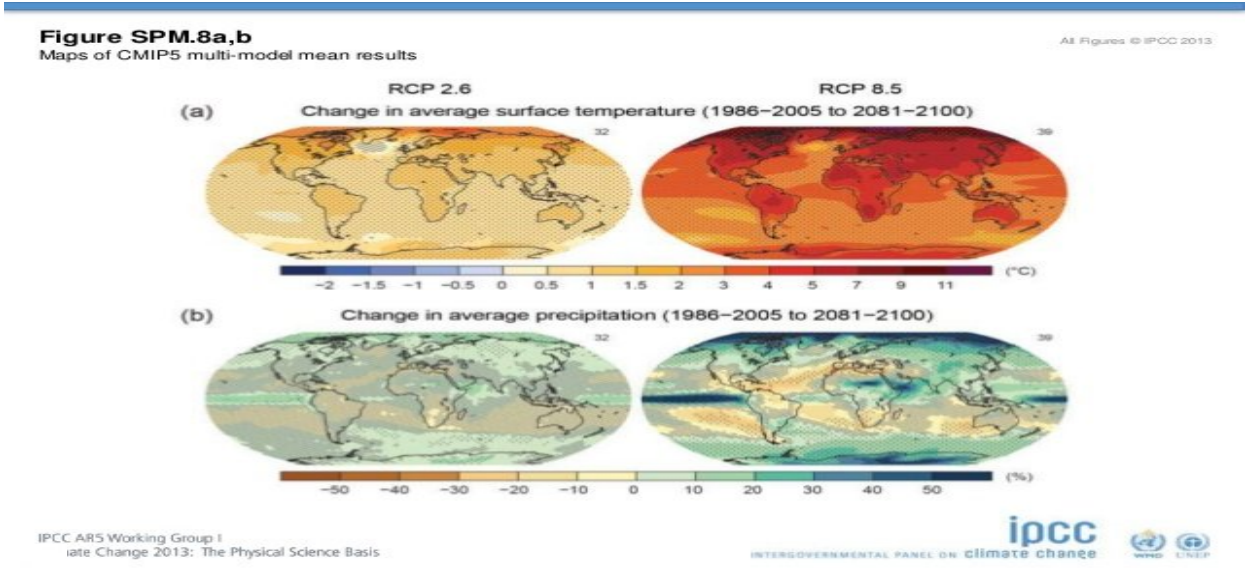
Clima, biodiversità, inquinamento: trappole globali da evitare

Luca Mercalli – Società Meteorologica Italiana - www.nimbus.it



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Article Contents

World Scientists' Warning of a Climate Emergency

FREE

William J Ripple ✉, Christopher Wolf ✉, Thomas M Newsome, Phoebe Barnard, William R Moomaw Author Notes

BioScience, biz088, https://doi.org/10.1093/biosci/biz088
Published: 05 November 2019

Issue Section: Viewpoint

Scientists have a moral obligation to clearly warn humanity of any catastrophic threat and to "tell it like it is." On the basis of this obligation and the graphical indicators presented below, we declare, with more than 11,000 scientist signatories from around the world, clearly and unequivocally that planet Earth is facing a

Il monito di 11.000 scienziati

Environment

This article is more than 2 months old

Humanity is waging war on nature, says UN secretary general

António Guterres lists human-inflicted wounds on natural world in stark message

- World is 'doubling down' on fossil fuels despite climate crisis – UN report

Fiona Harvey
Environment correspondent

Wed 2 Dec 2020
14.24 GMT

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The age of extinction
Environment

Top scientists warn of 'ghastly future of mass extinction' and climate disruption

Sobering new report says world is failing to grasp the extent of threats posed by biodiversity loss and the climate crisis

Phoebe Weston
@phoeb0

Wed 13 Jan 2021 05.01 GMT

Vol 461|24 September 2009

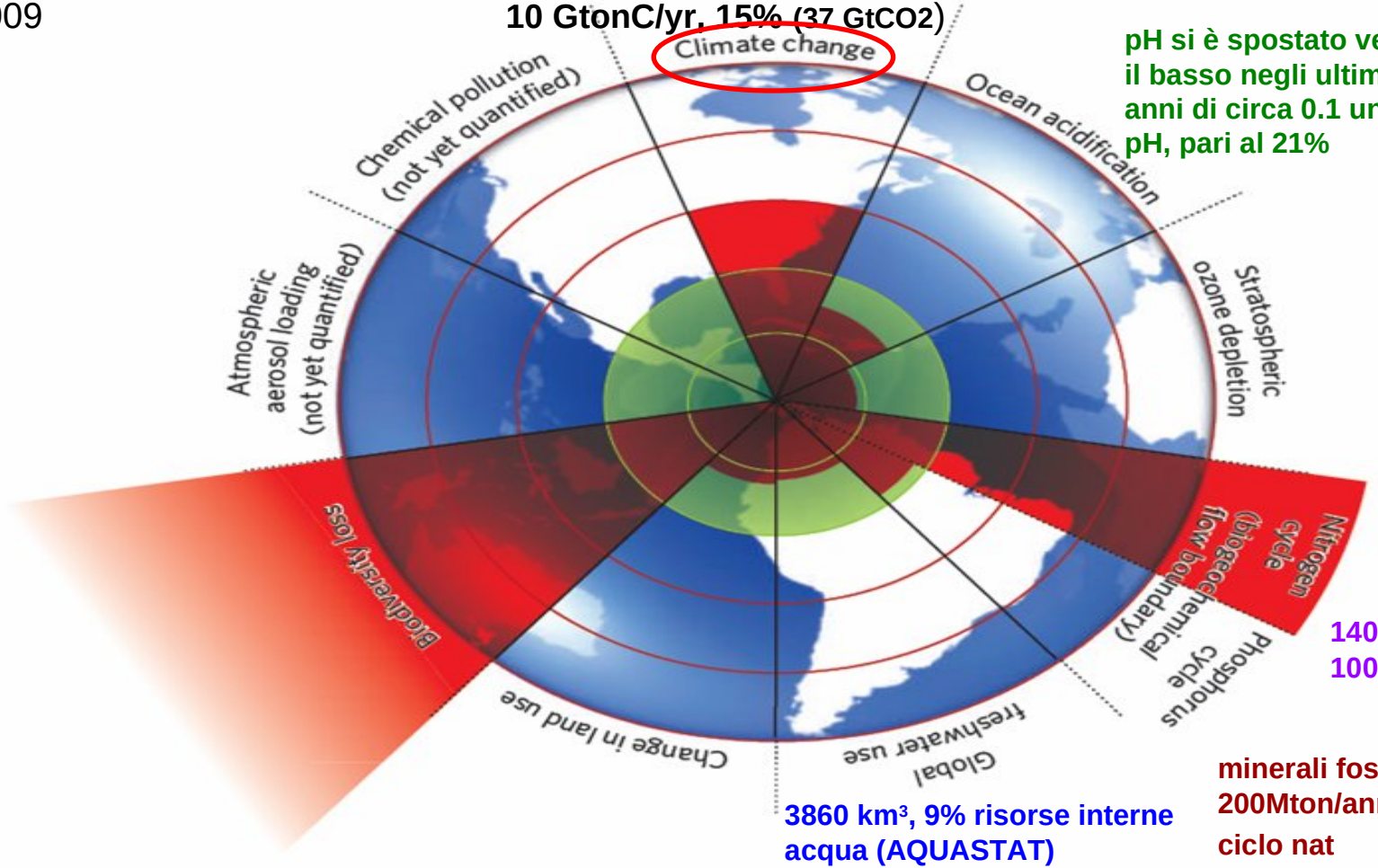
Rockstrom et al., 2009

10 GtonC/yr, 15% (37 GtCO2)

FEATURE

A safe operating space for humanity

Identifying and quantifying planetary boundaries that must not be transgressed could help prevent human activities from causing unacceptable environmental change, argue **Johan Rockström** and colleagues.



pH si è spostato verso il basso negli ultimi 250 anni di circa 0.1 unità di pH, pari al 21%

140Mton N, 100%

minerali fosfatici 200Mton/anno; 1/7 ciclo nat

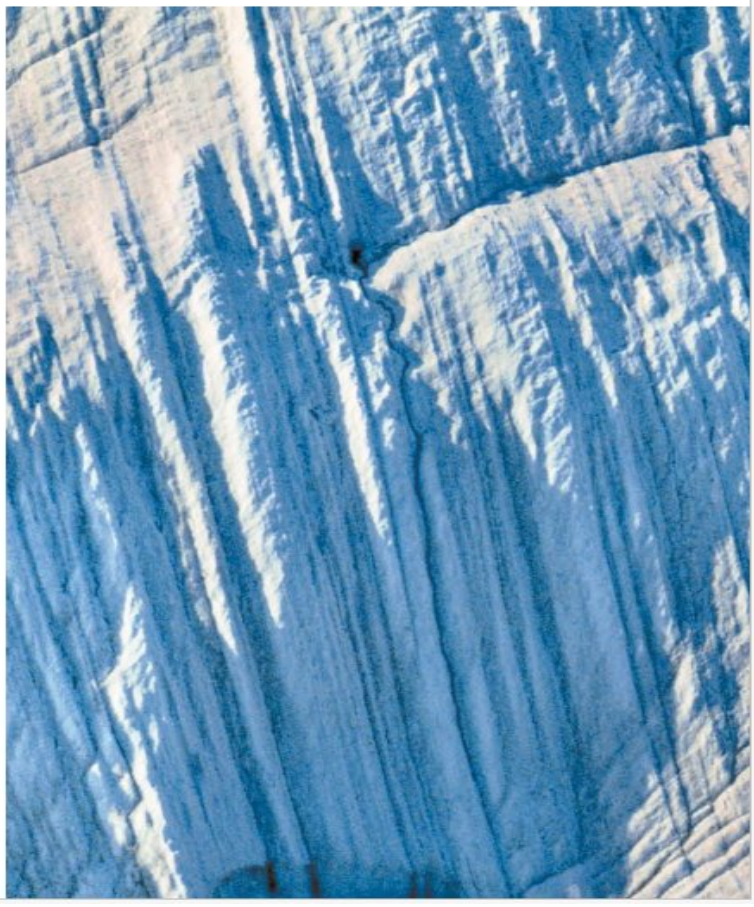
3860 km³, 9% risorse interne acqua (AQUASTAT)

Figure 1 | Beyond the boundary. The inner green shading represents the proposed safe operating space for nine planetary systems. The red wedges represent an estimate of the current position for each variable. The boundaries in three systems (rate of biodiversity loss, climate change and human interference with the nitrogen cycle), have already been exceeded.

nature

Climate tipping points — too risky to bet against

Timothy M. Lenton, Johan Rockström, Owen Gaffney, Stefan Rahmstorf, Katherine Richardson, Will Steffen & Hans Joachim Schellnhuber



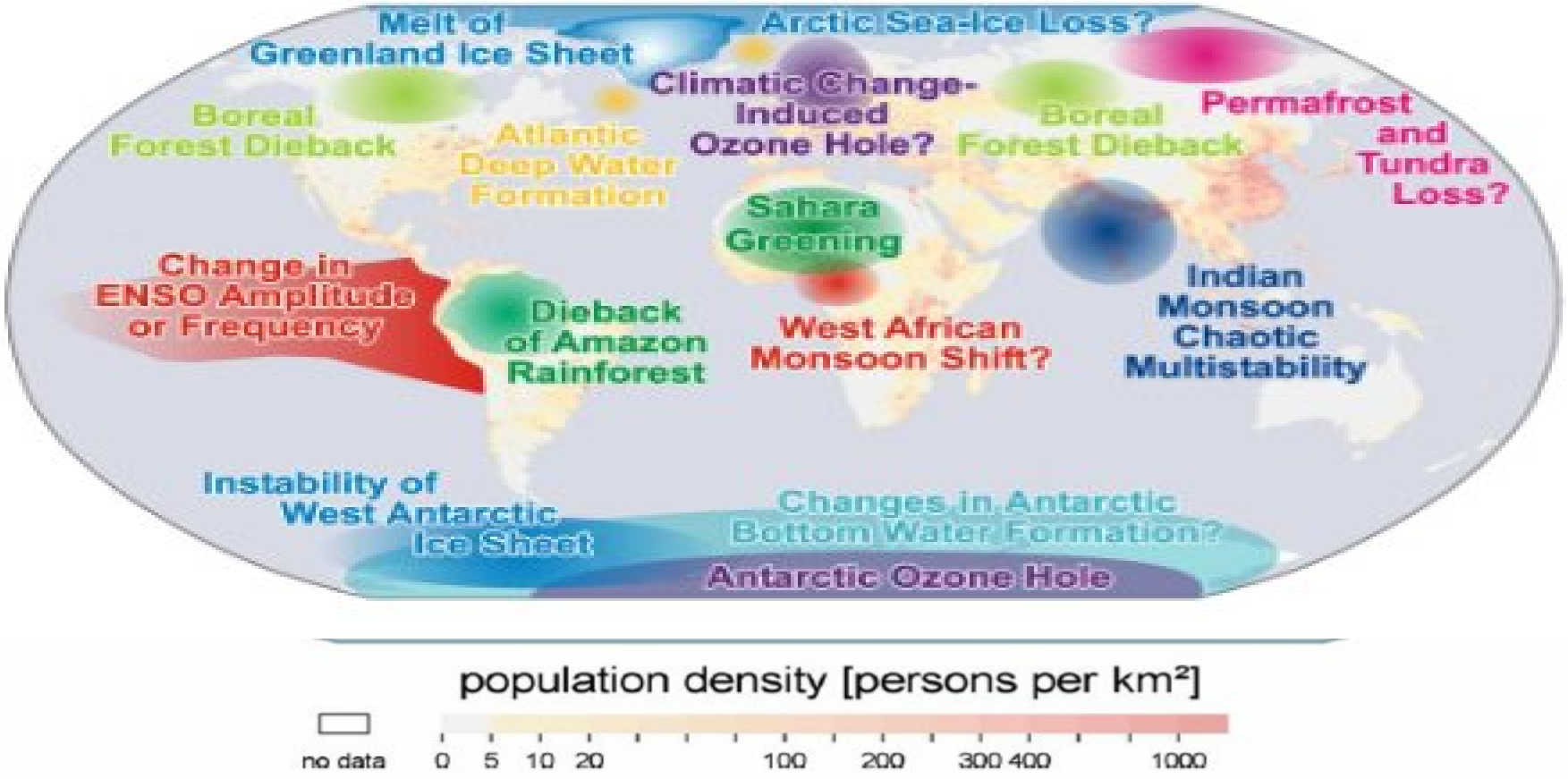
The growing threat of abrupt and irreversible climate changes must compel political and economic action on emissions.

Politicians, economists and even some natural scientists have tended to assume that tipping points[1] in the Earth system — such as the loss of the Amazon rainforest or the West assuming that climate tipping points are of very low probability (even if they would be catastrophic), have suggested that 3 °C warming is optimal from a cost–benefit perspective. However, if tipping points are looking more likely, then the 'optimal policy' recommendation of simple cost–benefit climate-economy models[4] aligns with those of the recent IPCC report[2]. In other words, warming must be limited to 1.5 °C. This requires an emergency response.

Ice collapse

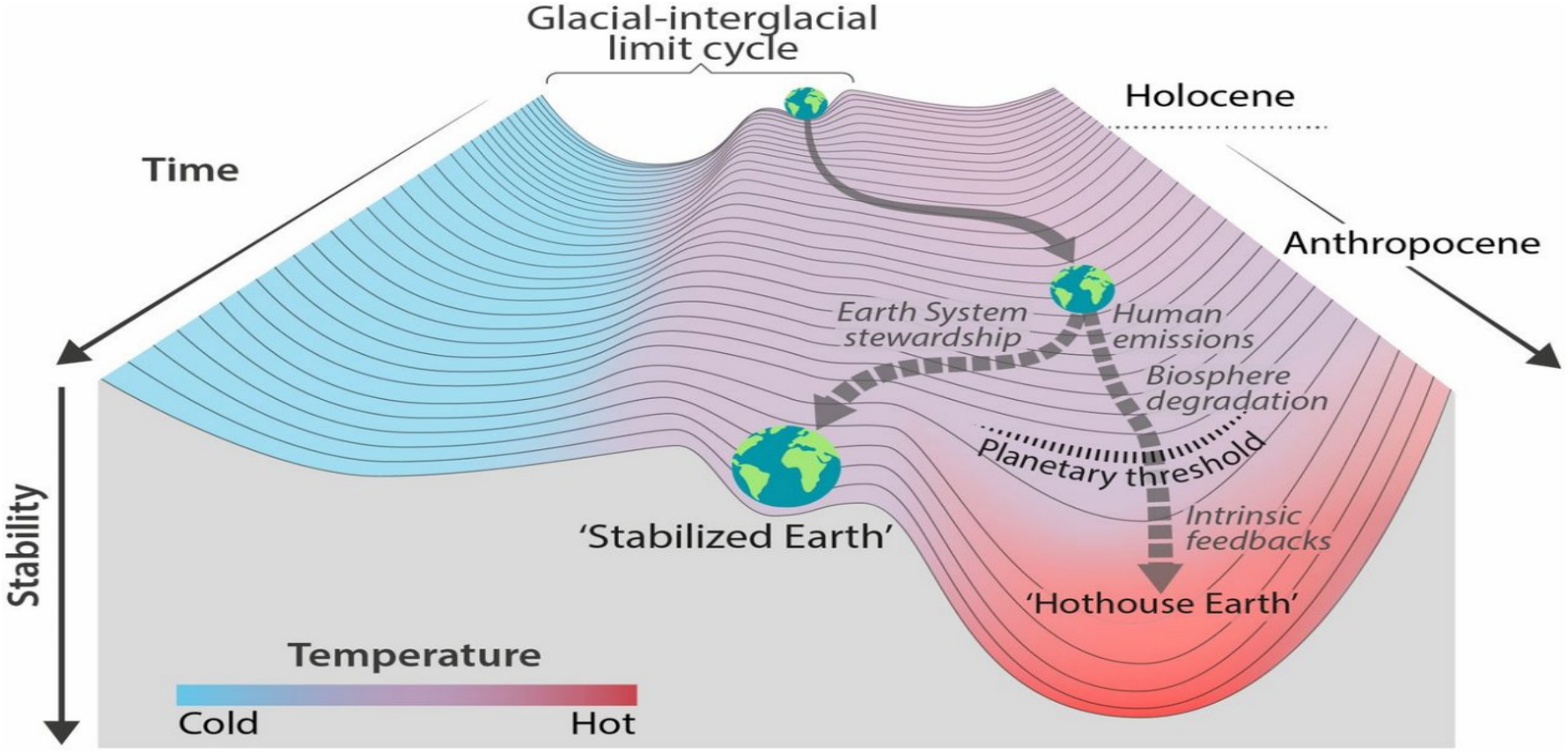
We think that several cryosphere tipping points are dangerously close, but mitigating

Mappa dei potenziali “tipping elements” nel sistema climatico



da Lenton (2008) - Tipping elements in the Earth’s climate system, in PNAS-Proceedings of US National Academy of Sciences, 105

Stability landscape showing the pathway of the Earth System out of the Holocene and thus, out of the glacial–interglacial limit cycle to its present position in the hotter Anthropocene.



Will Steffen et al. 2018 - PNAS
doi:10.1073/pnas.1810141115

PNAS

A 23 m.y. record of low atmospheric CO2 - **Ying Cui**; Brian A. Schubert;
A. Hope Jahren Geology (2020) https://doi.org/10.1130/G47681.1

fonte: progetto EPICA

LIVELLO CO_2 NEL TEMPO

417 ppm

massimo ultimi 800.000 anni

e 23 M anni da fossili vegetali

massimo era preindustriale 300 ppm

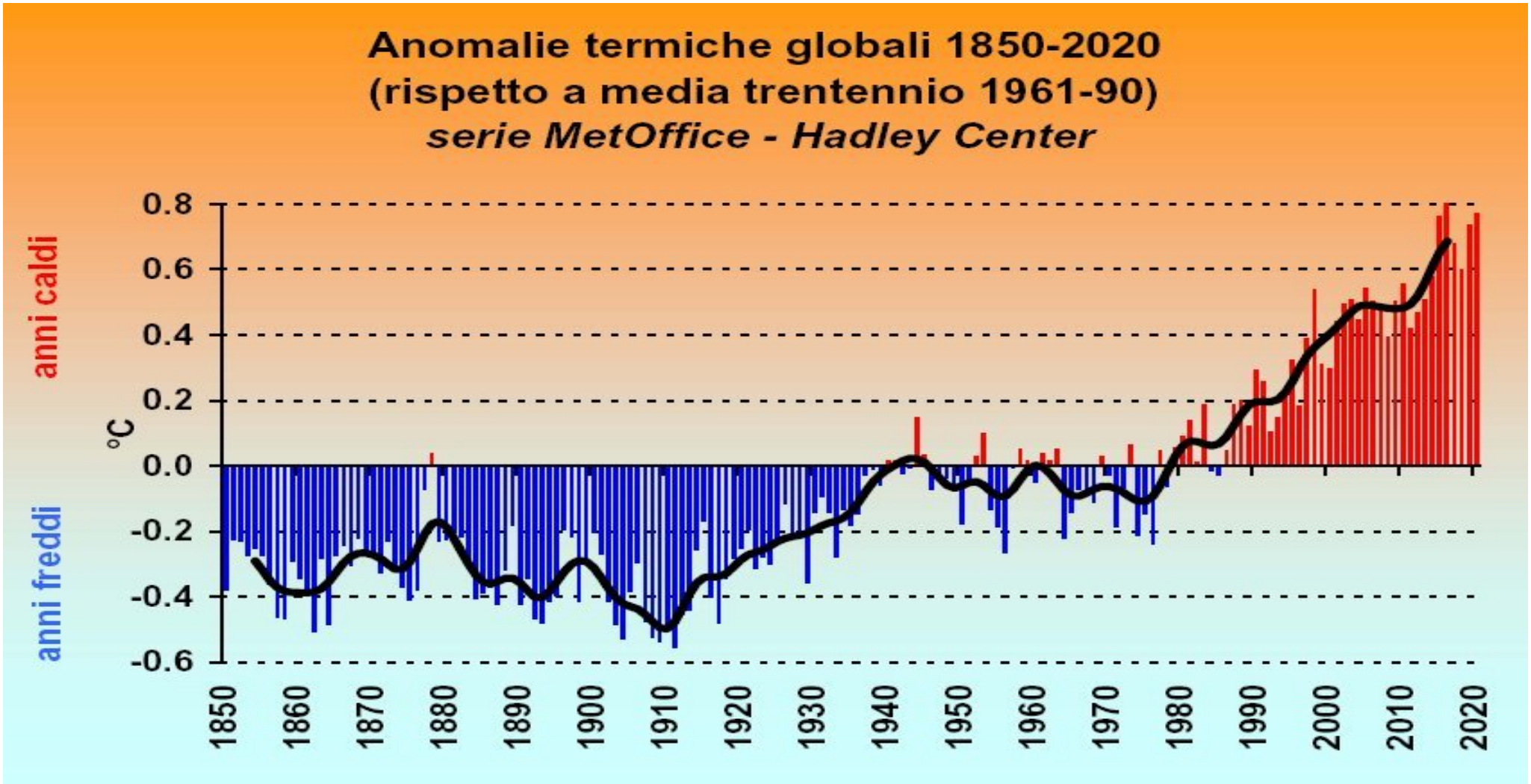
CONCENTRAZIONE DI CO_2

400
380
360
340
320
300
280
260
240
220
200
180

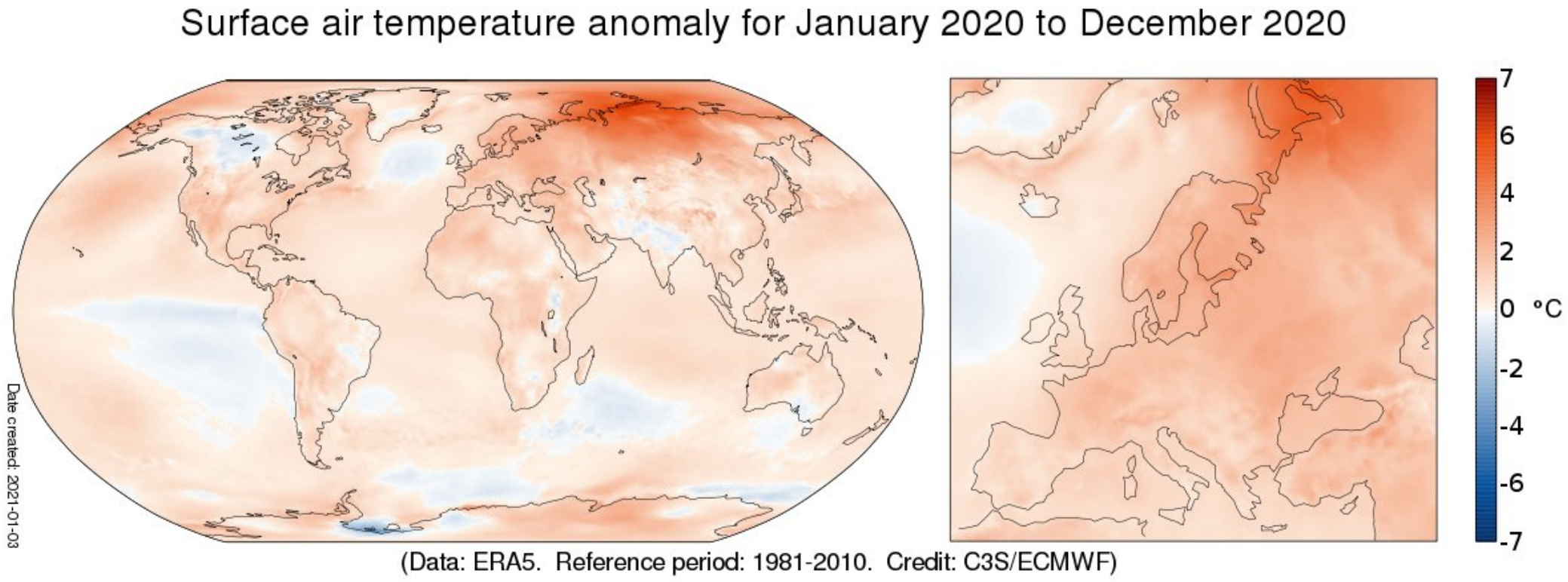
800.000 700.000 600.000 500.000 400.000 300.000 200.000 100.000 0

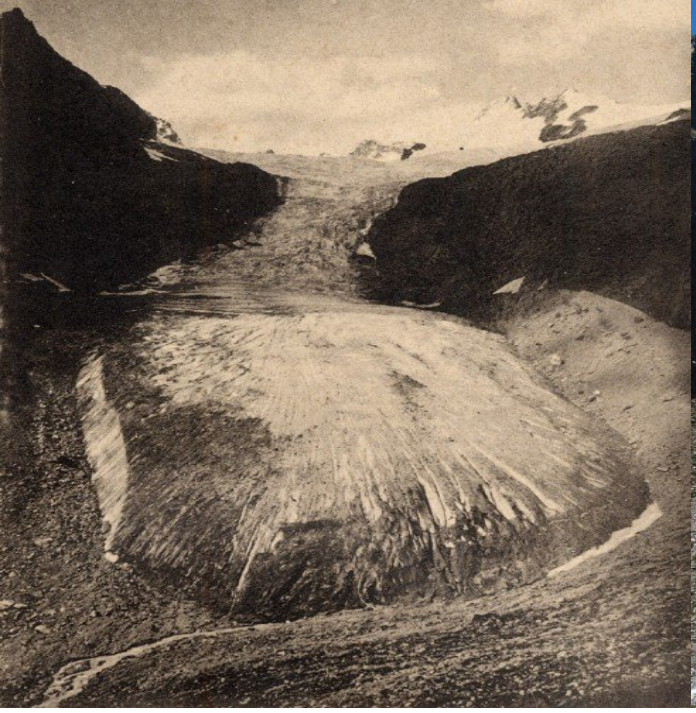
ANNI DAL PRESENTE

Temperatura media globale: +1,2°C in più nell'ultimo secolo



2020 anno più caldo della storia delle osservazioni meteo globali





1897
(f. Druetti)

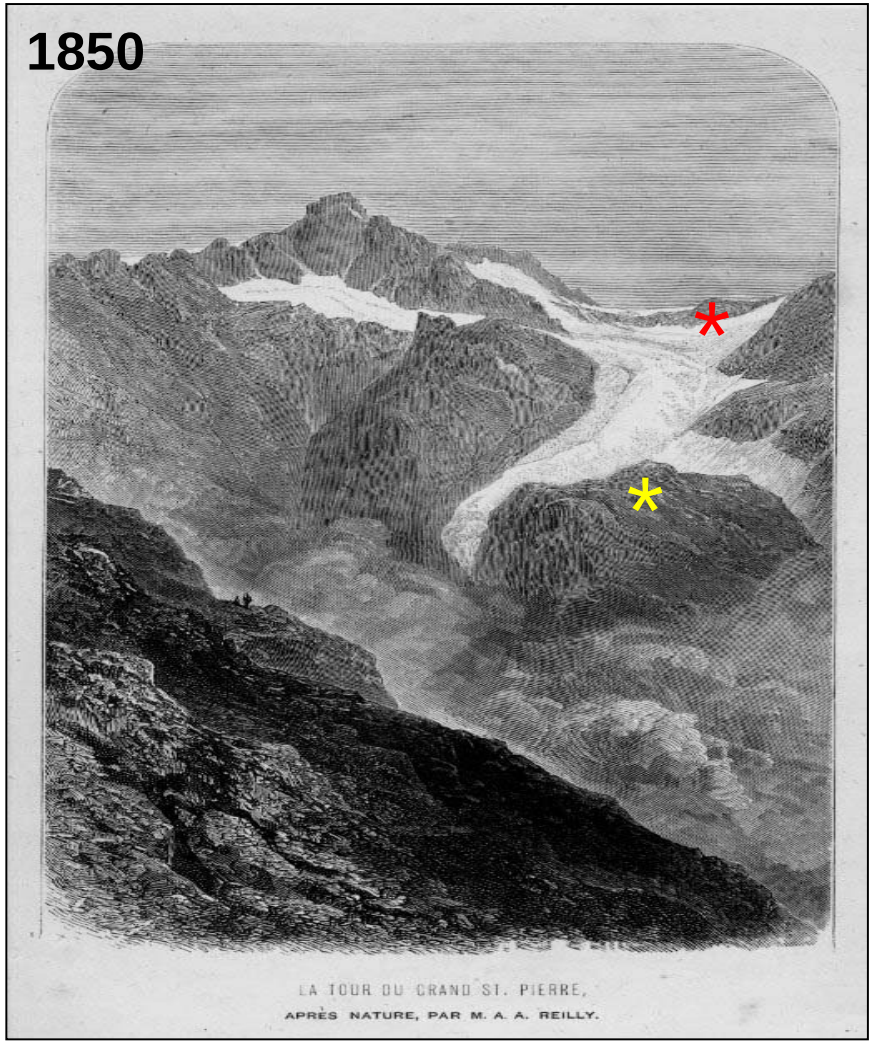
2005
(f. L. Mercalli)

2015
(f. S. Jobard)

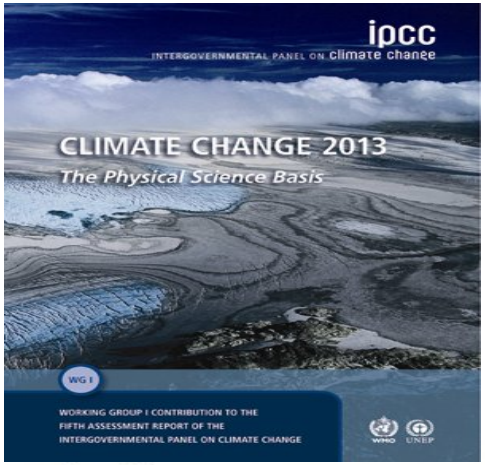
Ghiacciaio Pré de Bar (Monte Bianco):

ritiro della fronte di oltre 800 m dal 1897 al 2015

I ghiacciai alpini si sono ridotti di oltre il 50% in un secolo



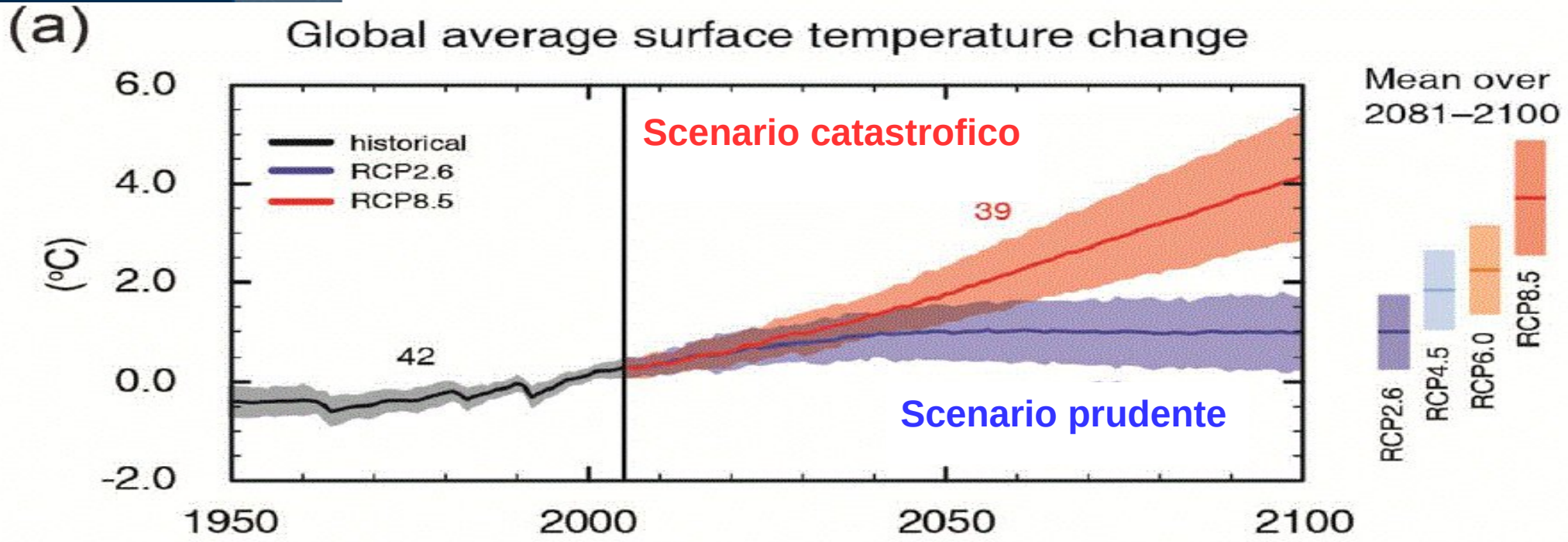
Ghiacciai piccoli estinti: Gh. di Teleccio (Gran Paradiso)



ipcc
INTERGOVERNMENTAL PANEL ON climate change

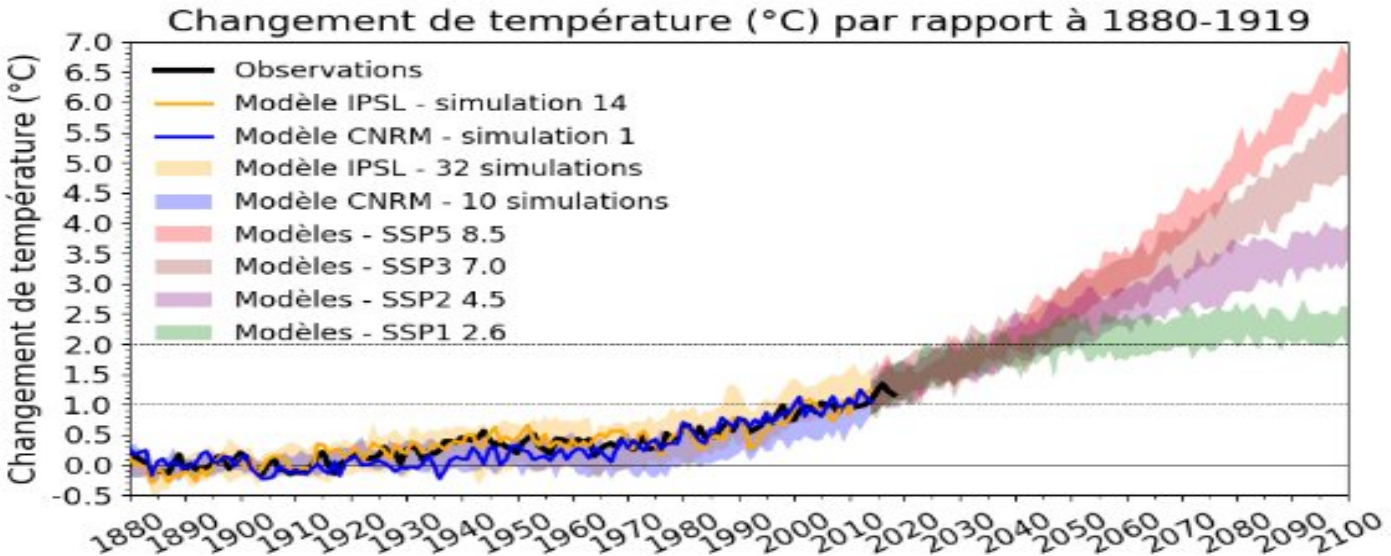
Scenari 5° rapporto IPCC (AR5 2013):

+2°C al 2100 se si applica **Accordo Parigi 2015** (linea azzurra), o fino a **+5°C** in più con business-as-usual (linea rossa)



Caso peggiore: fino a +7 °C al 2100

Figure 8. Comme pour la figure précédente, mais avec la prolongation sur le 21e siècle pour une sélection de quatre scénarios, SSP1 2,6, SSP2 4,5, SSP3 7,0 et SSP5 8,5. Pour chaque scénario, l'enveloppe rassemble l'ensemble des simulations réalisées avec les deux modèles. Période de référence : 1880-1919



cnrs & o

Depuis 80 ans, nos connaissances bâtissent de nouveaux mondes

METEO FRANCE

cea

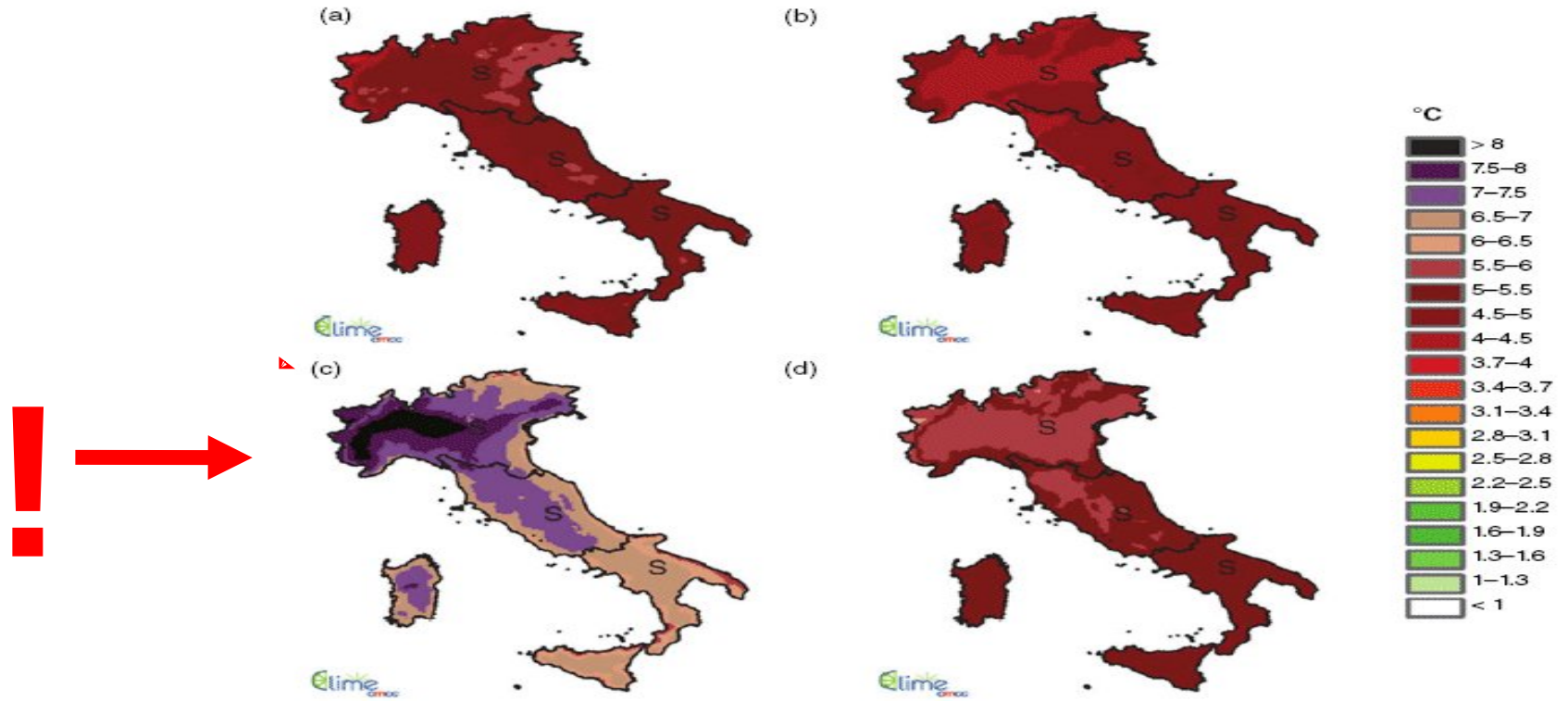
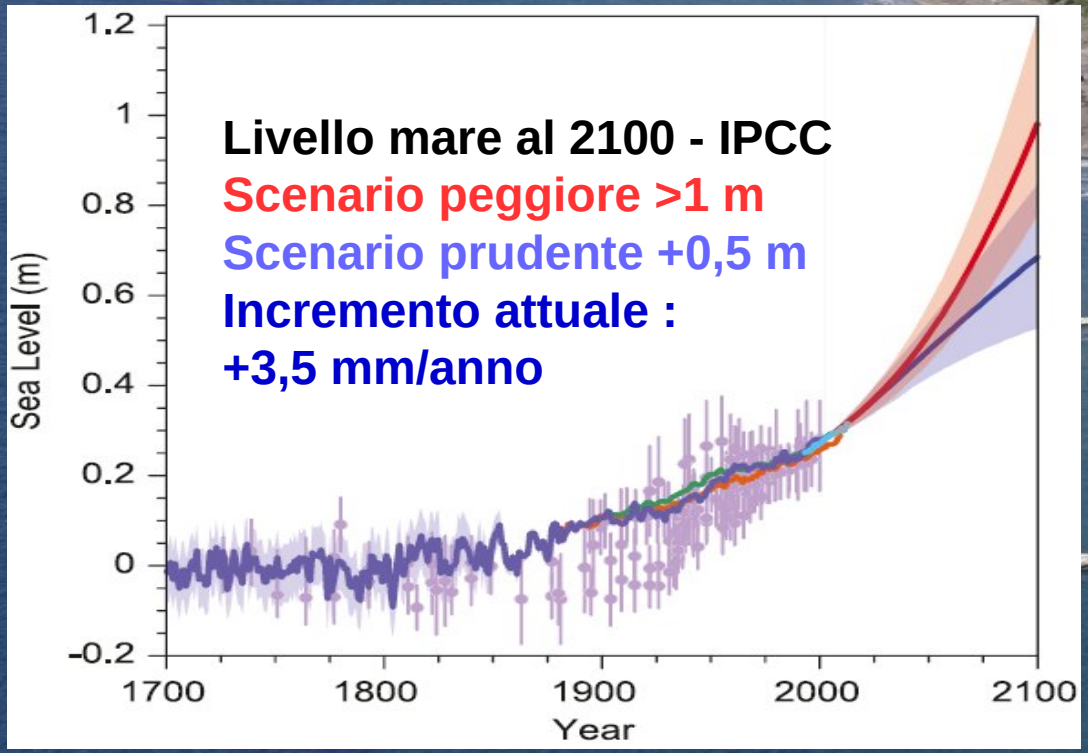


Figure 9. Temperature climate projections, RCP8.5: seasonal differences (°C), between the average value over 2071–2100 and 1971–2000 for (a) DJF, (b) MAM, (c) JJA and (d) SON (S, significant; NS, not significant).

E se non facessimo nulla? NW Italiano + 8 °C in estate nel 2100! Torino come Karachi…

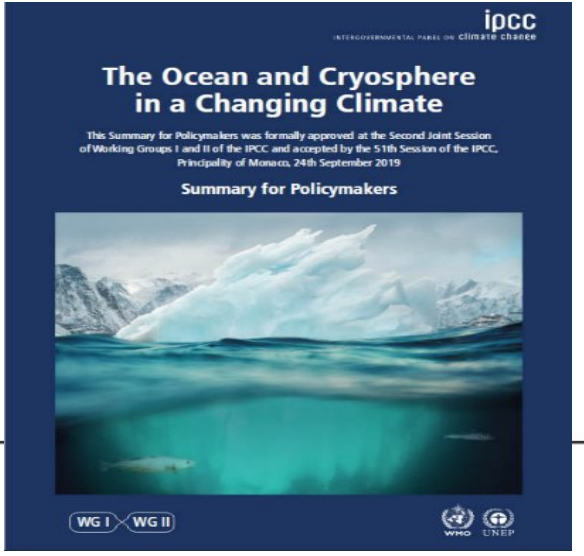
Bucchignani et al. (2015) *High-resolution climate simulations with COSMO-CLM over Italy*, Int. J. Climatol.

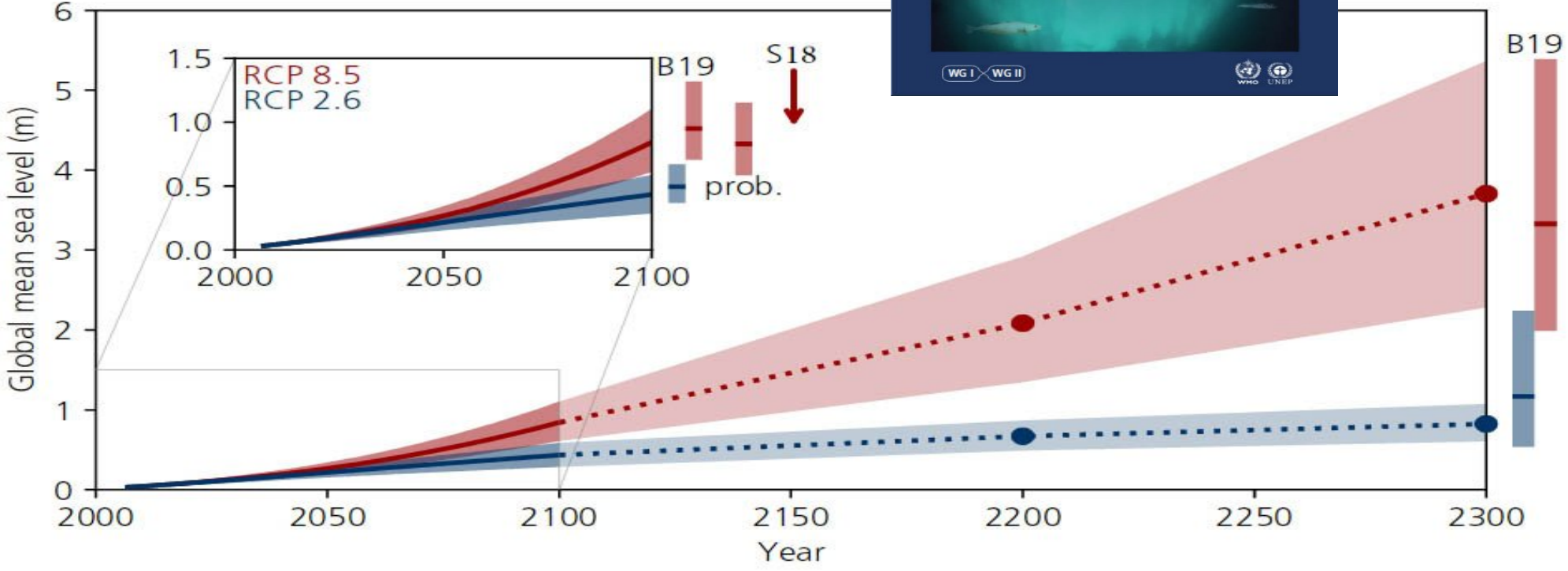
Le zone costiere risentiranno dell'aumento del livello marino, e dovranno essere adeguatamente protette (es: Venezia, delta del Po)



Settembre 2019 –
Rapporto IPCC Oceano e criosfera

Fino a +5 m di livello marino nel 2300





Future of the human climate niche

Chi Xu (徐驰)[a,1], Timothy A. Kohler[b,c,d,e], Timothy M. Lenton[f], Jens-Christian Svenning[g], and Marten Scheffer[c,h,i,1]

[a]School of Life Sciences, Nanjing University, Nanjing 210023, China; [b]Department of Anthropology, Washington State University, Pullman, WA 99164; [c]Santa Fe Institute, Santa Fe, NM 87501; [d]Crow Canyon Archaeological Center, Cortez, CO 81321; [e]Research Institute for Humanity and Nature, Kyoto 603-8047, Japan; [f]Global Systems Institute, University of Exeter, Exeter, EX4 4QE, United Kingdom; [g]Center for Biodiversity Dynamics in a Changing World, Department of Bioscience, Aarhus University, DK-8000 Aarhus C, Denmark; [h]Wageningen University, NL-6700 AA, Wageningen, The Netherlands; and [i]SARAS (South American Institute for Resilience and Sustainability Studies), 10302 Bella Vista, Maldonado, Uruguay

Contributed by Marten Scheffer, October 27, 2019 (sent for review June 12, 2019; reviewed by Victor Galaz and Luke Kemp)

All species have an environmental niche, and despite technological advances, humans are unlikely to be an exception. Here, we demonstrate that for millennia, human populations have resided in the same narrow part of the climatic envelope available on the globe, characterized by a major mode around ∼11 °C to 15 °C mean annual temperature (MAT). Supporting the fundamental nature of this temperature niche, current production of crops and livestock is largely limited to the same conditions, and the same optimum has been found for agricultural and nonagricultural economic output of countries through analyses of year-to-year variation. We show that in a business-as-usual climate change scenario, the geographical position of this temperature niche is projected to shift more over the coming 50 y than it has moved since 6000 BP. Populations will not simply track the shifting climate, as adaptation in situ may address some of the challenges, and many other factors affect decisions to migrate. Nevertheless, in the absence of migration, one third of the global population is projected to experience a MAT >29 °C currently found in only 0.8% of the Earth's land surface, mostly concentrated in the Sahara. As the potentially most affected regions are among the poorest in the world, where adaptive capacity is low, enhancing human development in those areas should be a priority alongside climate mitigation.

climate | migration | societies

Global warming will affect ecosystems as well as human health, livelihoods, food security, water supply, and economic growth in many ways (1, 2). The impacts are projected to increase steeply with the degree of warming. For instance, warming to 2 °C, compared with 1.5 °C, is estimated to increase the number of people exposed to climate-related risks and poverty by up to several hundred million by 2050. It remains difficult, however, to foresee the human impacts of the complex interplay of mechanisms driven by warming (1, 3). Much of the impact on human well-being will depend on societal responses. There are often options for local adaptations that could ameliorate effects, given enough resources (4). At the same time, while some regions may face declining conditions for human thriving, conditions in other places will improve. Therefore, despite the formidable psychological, social, and political barriers to migration, a change in the geographical distribution of human populations and agricultural production is another likely part of the spontaneous or managed adaptive response of humanity to a changing climate (5). Clearly there is a need to understand the climatic conditions needed for human thriving. Despite a long and turbulent history of studies on the role of climate, and environment at large, on society in geography and beyond (6), causal links have remained difficult to establish, and deterministic claims largely refuted, given the complexities of the relationships in question (7). Rather than reentering the murky waters of environmental determinism (8, 9), here we take a fresh look at this complex and contentious issue. We mine the massive sets of demographic, land use, and climate information that have become available in recent years to ask what the climatic conditions for human life have been across the past millennia, and then examine where those conditions are projected to occur in the future.

Results

Current and Past Human Association to Climate. Our results reveal that today, humans, as well as the production of crops and livestock (Fig. 1 *A*, *D*, and *E*), are concentrated in a strikingly narrow part of the total available climate space (Fig. 1*G*). This is especially true with respect to the mean annual temperature (MAT), where the main mode occurs around ∼11 °C to 15 °C (*SI Appendix*, Fig. S1). By contrast, much of range of precipitation available around that temperature (Fig. 1*G* and *SI Appendix*, Fig. S1) is used, except for the driest end. Soil fertility does not seem to be a major driver of human distribution (Fig. 1*H*), nor can potential productivity be a dominant factor, as net primary productivity shows a quite different geographical distribution (Fig. 1*I*), peaking in tropical rainforests, which have not been the main foci of human settlement.

Strikingly, the apparent conditions for human thriving have remained mostly the same from the mid-Holocene until now (Fig. 1 *A*–*C*). Reconstructions of human distribution and climate are relatively reliable for the past centuries, but uncertainty inevitably increases as we go further back in time. Nonetheless, the two independent sets of available reconstructions we analyzed suggest that as far back as 6000 y BP, humans were concentrated in roughly the same subset of the globally available temperature conditions (Fig. 1*C* and 2*A*), despite people at the time living quite differently from today, mostly in the early phases of

Significance

We show that for thousands of years, humans have concentrated in a surprisingly narrow subset of Earth's available climates, characterized by mean annual temperatures around ∼13 °C. This distribution likely reflects a human temperature niche related to fundamental constraints. We demonstrate that depending on scenarios of population growth and warming, over the coming 50 y, 1 to 3 billion people are projected to be left outside the climate conditions that have served humanity well over the past 6,000 y. Absent climate mitigation or migration, a substantial part of humanity will be exposed to mean annual temperatures warmer than nearly anywhere today.

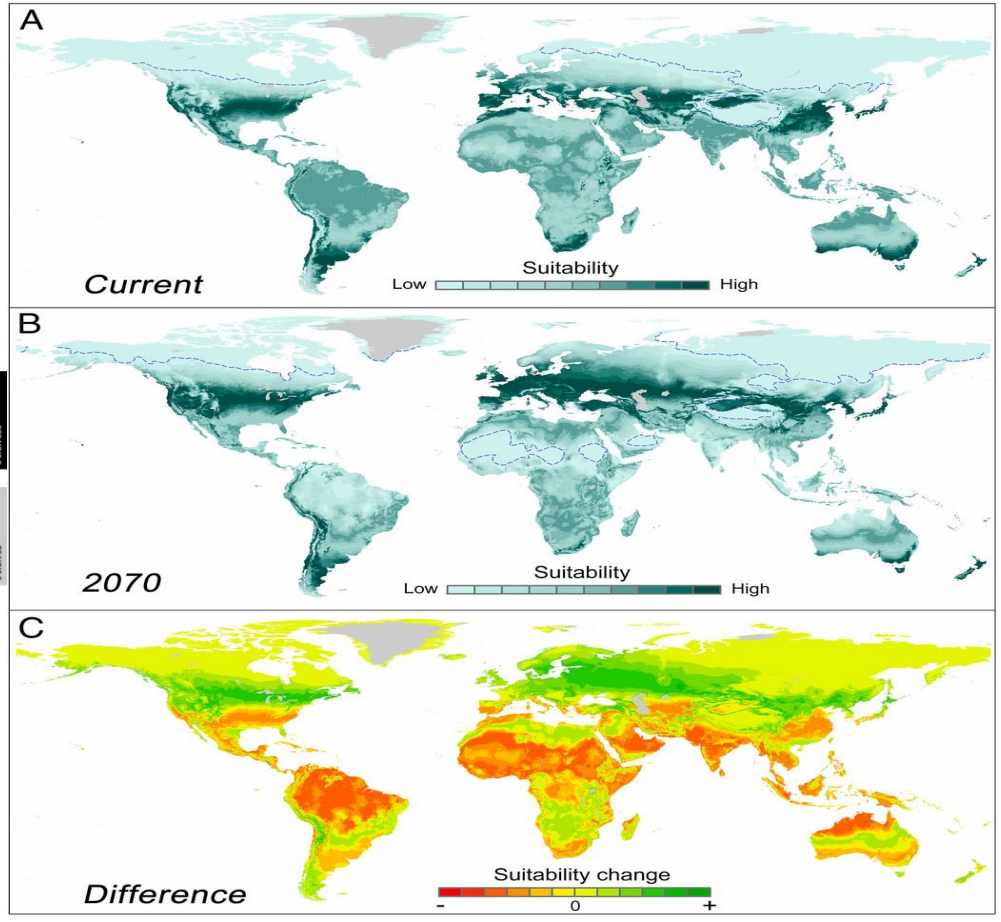
Author contributions: C.X. and M.S. designed research; C.X., T.A.K., T.M.L., and J.-C.S. performed research; C.X. analyzed data; M.S. wrote the paper; T.A.K. analyzed the archaeological data; and T.A.K., T.M.L., and J.-C.S. commented on all versions of the manuscript and contributed by suggesting novel additional analyses and interpretations.

Reviewers: V.G., Stockholm University; and L.K., University of Cambridge.

The authors declare no competing interest.

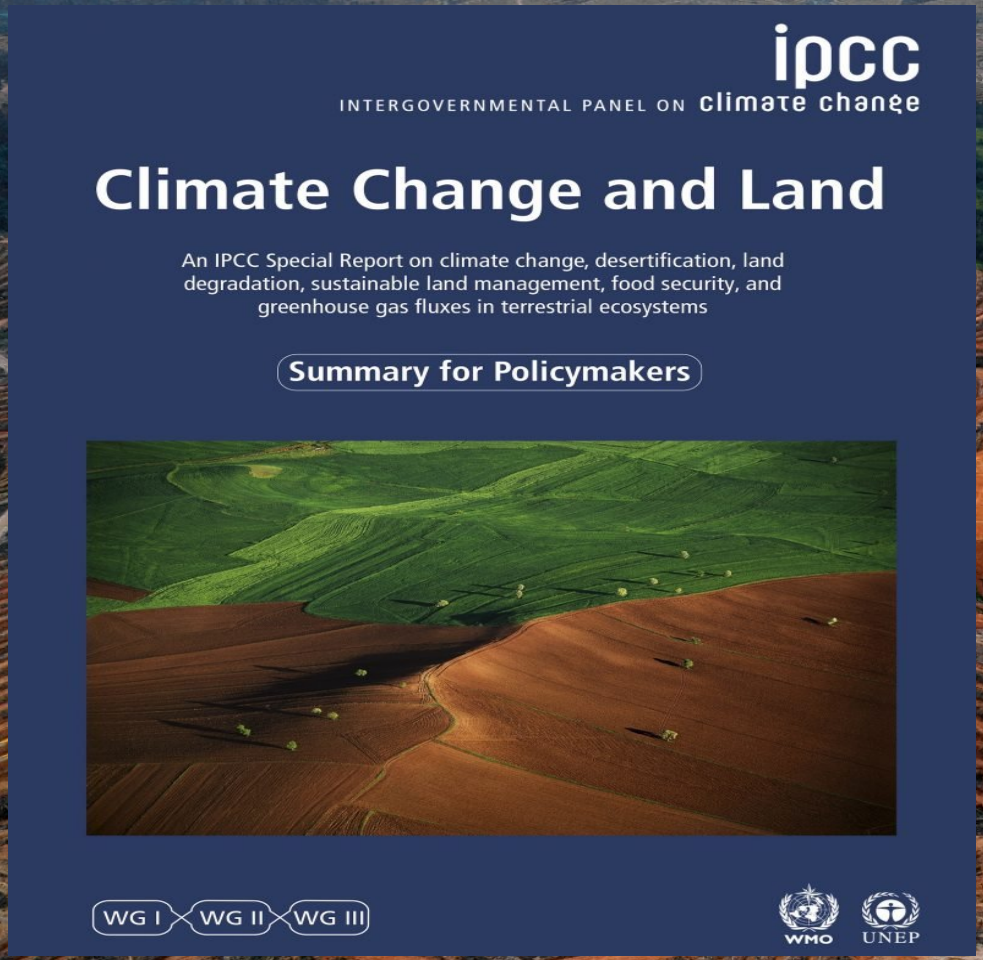
[1]To whom correspondence may be addressed. Email: xuchi@nju.edu.cn or marten.scheffer@wur.nl.

This article contains supporting information online at https://www.pnas.org/lookup/suppl/doi:10.1073/pnas.1910114117/-/DCSupplemental.



Nel 2070 oltre 3,5 miliardi di persone saranno fuori dalla nicchia di sopravvivenza climatica

Cambiamento clima e perdita biodiversità



Vertebrates on the brink as indicators of biological annihilation and the sixth mass extinction

Gerardo Ceballos[a,1], Paul R. Ehrlich[b], and Peter H. Raven[c]

[a]Instituto de Ecología, Universidad Nacional Autónoma de México, 04510 Ciudad de México, México; [b]Center for Conservation Biology, Department of Biology, Stanford University, Stanford, CA 94304; and [c]Plant Science Department, Missouri Botanical Garden, St. Louis, MO 63110

PNAS Proceedings of the National Academy of Sciences of the United States of America

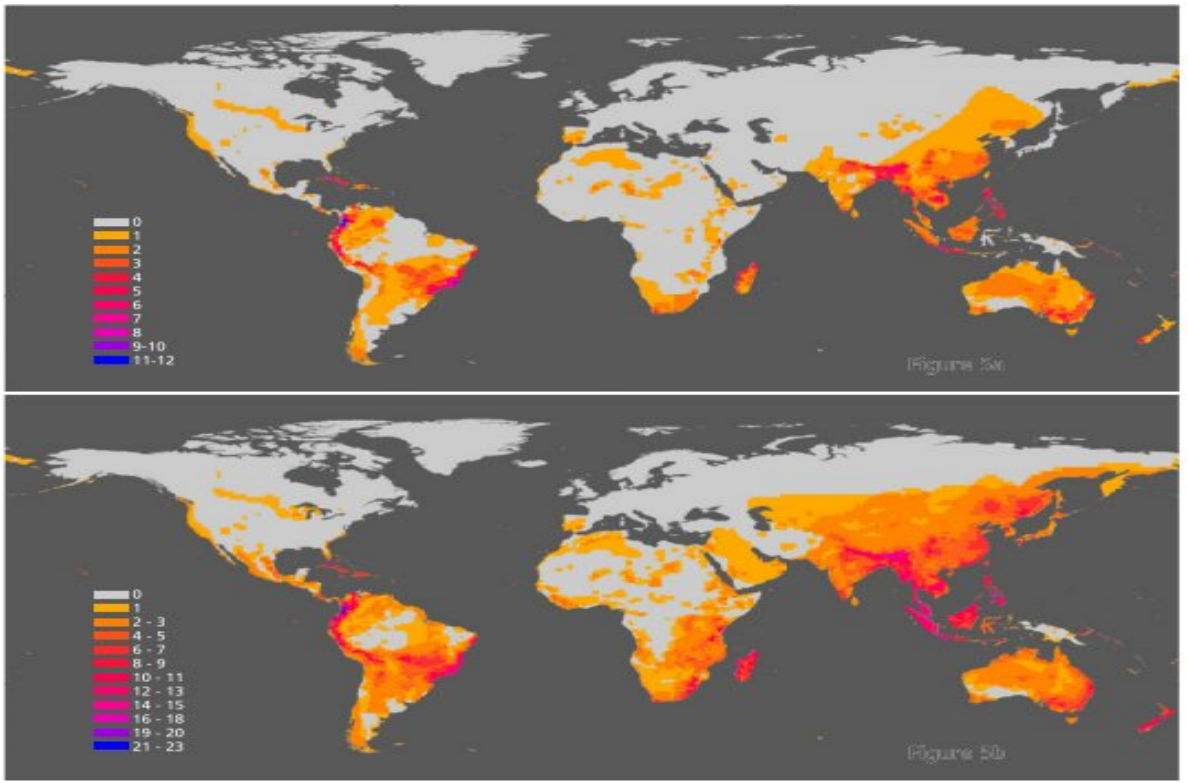
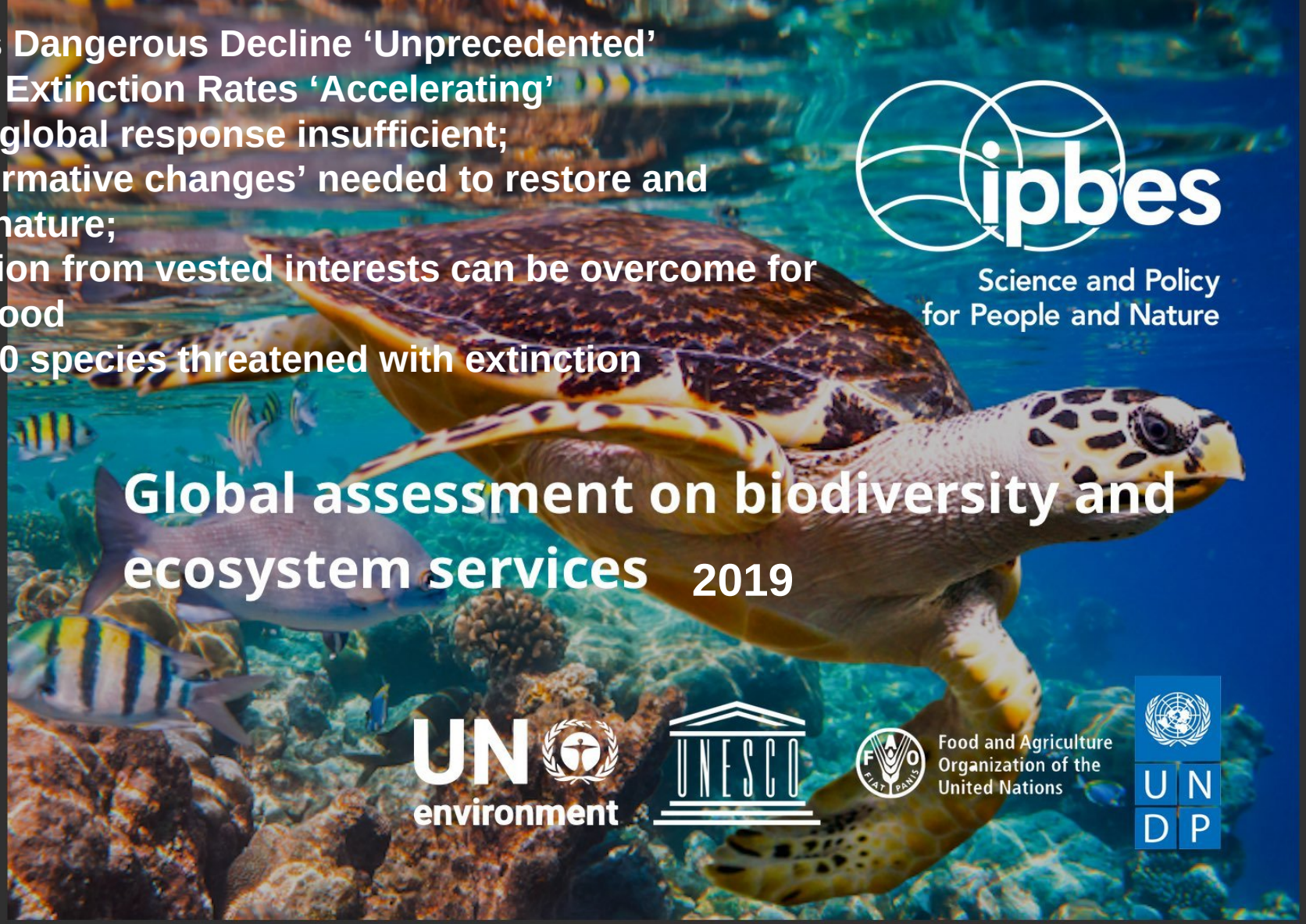


Fig. 5. Current distribution of 515 terrestrial vertebrate species on the brink (i.e., with under 1,000 individuals; *Top*) and 903 species with under 5,000 individuals (*Bottom*). Of the 388 species under 5,000 that have populations larger than 1,000 individuals, 84% have overlapping distributions with the species at the brink (i.e., with under 1,000 individuals), indicating high distribution congruence.

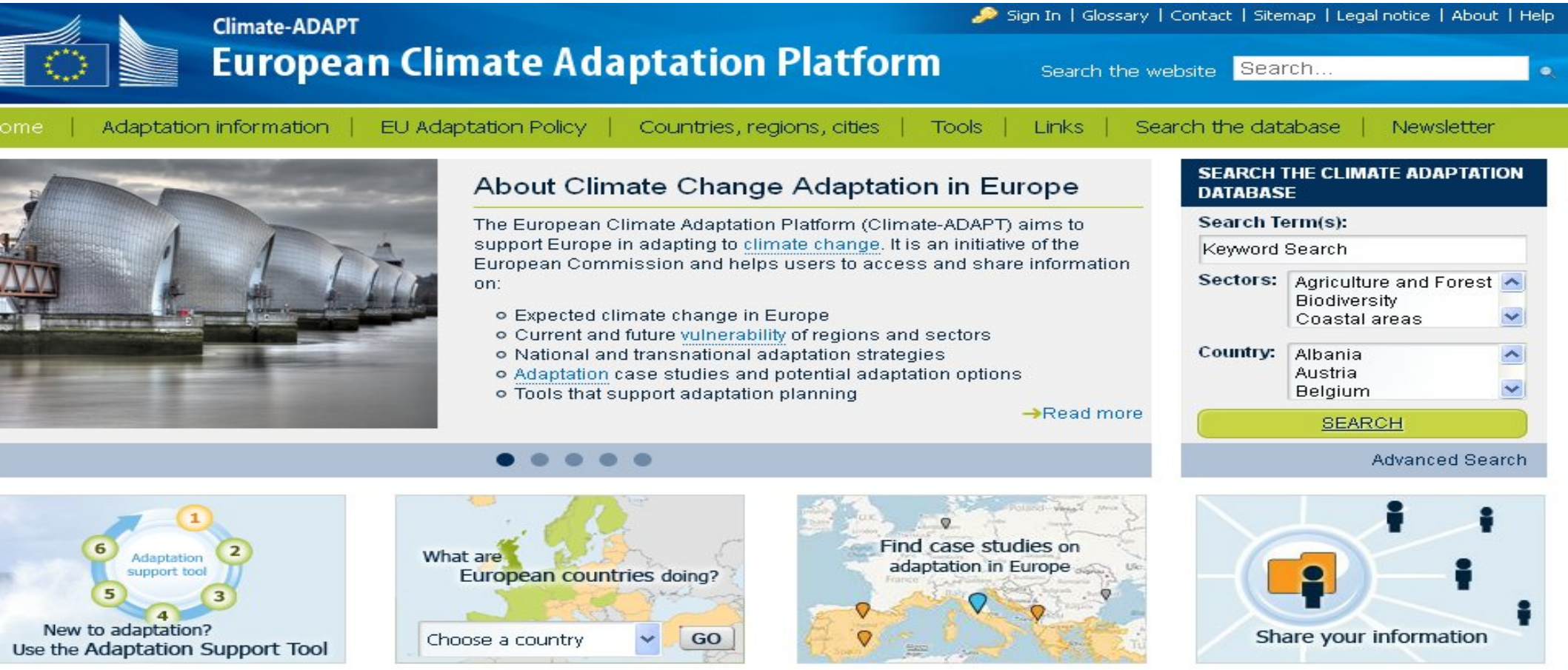
Nature’s Dangerous Decline ‘Unprecedented’
Species Extinction Rates ‘Accelerating’
Current global response insufficient;
‘Transformative changes’ needed to restore and protect nature;
Opposition from vested interests can be overcome for public good
1,000,000 species threatened with extinction



L’inquinamento di aria, acqua e suolo minaccia la nostra salute e quella delle generazioni future

POP Persistent Organic Pollutants + Heavy Metals Toxicity

http://climate-adapt.eea.europa.eu/



European Green Deal

- Transition to a Circular Economy
  - A new Circular Economy Action Plan
- Preserving Europe's natural capital
  - Biodiversity Strategy for 2030
- A zero pollution Europe
  - Strategy on the sustainable use of chemicals
  - Clean Air and Water Action Plans
- Sustainable Transport
  - TBD with the commissioner-designate
- Farm to Fork
  - Farm to Fork Strategy
- Achieving Climate Neutrality
  - Revising 2030 Climate targets
  - Extending ETS
  - Climate Pact
  - Climate Law
  - Carbon Border Tax
- The transformation of agriculture and rural areas
  - Vision for Inclusive Rural Areas
  - Africa Europe agenda
- Clean, Reliable and Affordable energy
  - Review Energy Legislation
  - European Framework for gas
  - Review Energy Taxation directive
- Towards a modernised and simplified CAP
  - CAP reform proposal
- Financing the transition
  - European Investment Bank as European Climate Bank
  - Sustainable Europe Investment Plan
  - Green Financing Strategy
  - Mainstreaming climate transition and sustainability in the MFF
- Leave no one behind (Just Transition)
  - Just Transition Instrument, including the Just Transition Fund
  - Mainstreaming the Just Transition in the MFF

European Environment Agency

Crescita economica e demografica spingono i consumi di risorse e la produzione di scorie!

BRIEFING

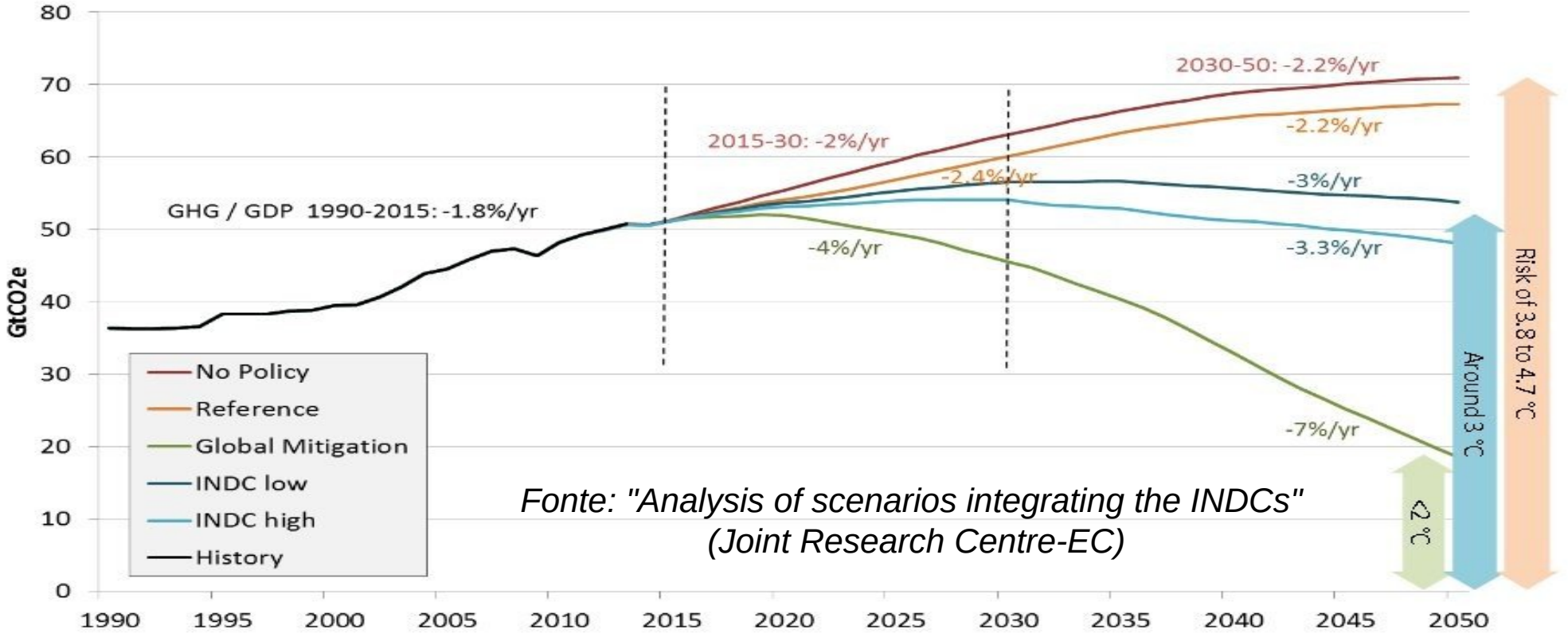
Growth without economic growth

Economic growth is closely linked to increases in production, consumption and resource use and has detrimental effects on the natural environment and human health. It is unlikely that a long-lasting, absolute decoupling of economic growth from environmental pressures and impacts can be achieved at the global scale; therefore, societies need to rethink what is meant by growth and progress and their meaning for global sustainability.

Published 11 Jan 2021 — Last modified 11 Jan 2021 — 14 min read — Photo: © Ricardo Gomez Angel on Unsplash

PDF

Promesse ambiziose di riduzione CO_2, ma non bastano: se applicate, circa +3 °C nel 2100 !



Fonte: "Analysis of scenarios integrating the INDCs" (Joint Research Centre-EC)

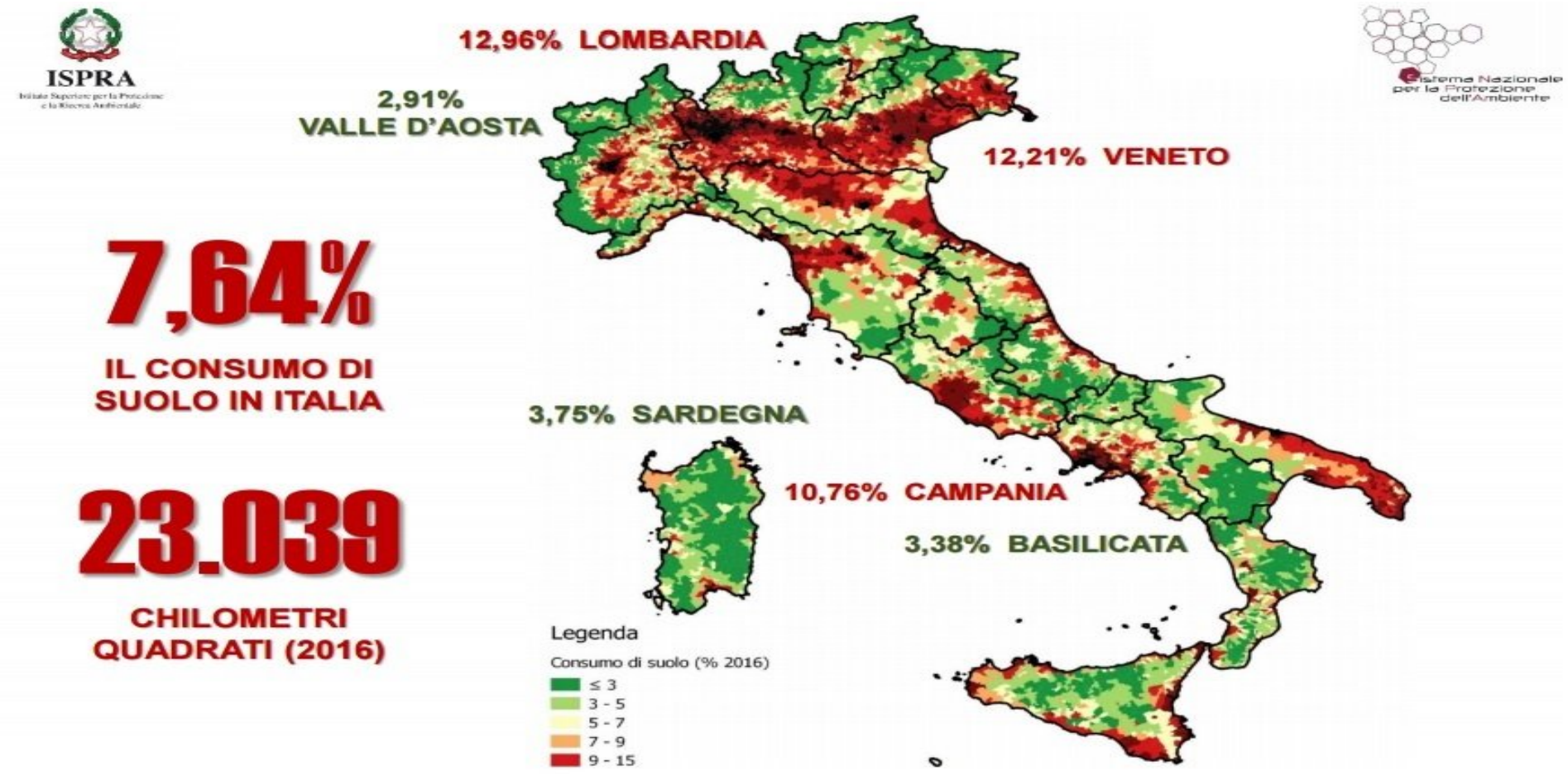

Più energie rinnovabili ed efficienza
energetica abitazioni


Favorire mobilità elettrica a condizione che sia alimentata da elettricità rinnovabile e che sia obbligatorio il riciclo delle batterie
Duferco
Energia

Meno viaggi aerei, meno trasporti in genere, più telelavoro

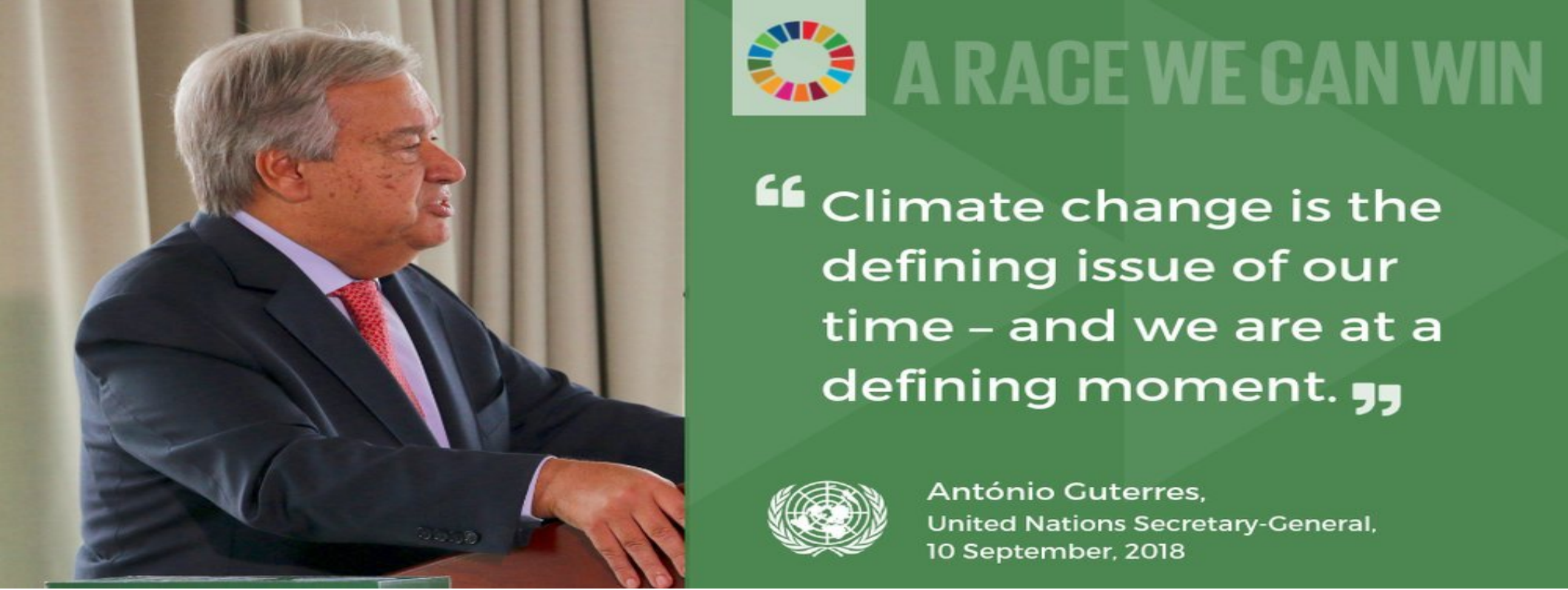
Allevamento: vale 15% delle emissioni globali
Ridurre la quota di carne rossa nella dieta e sostenere agricoltura biologica e a filiera corta locale

Fermare la cementificazione, il suolo non è infinito!



Al lavoro! Gli obiettivi UN dell'Agenda 2030

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

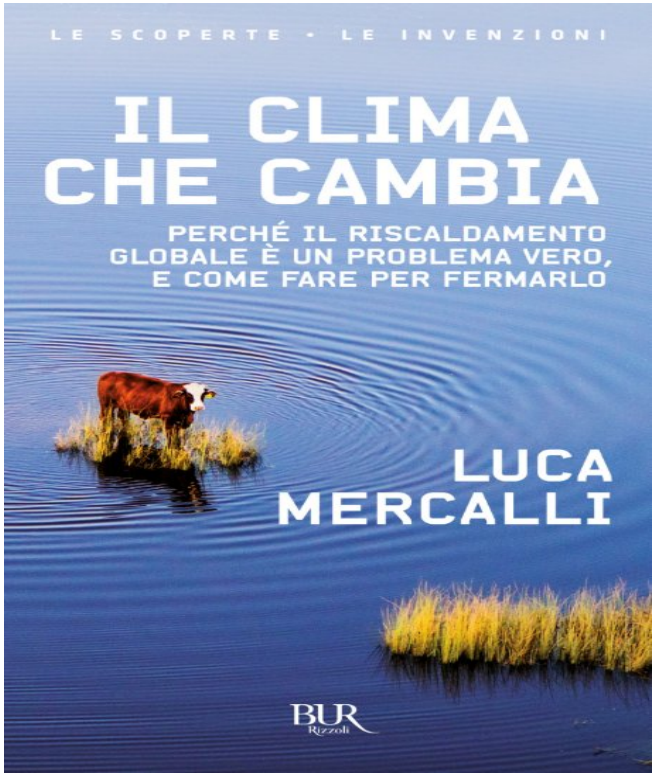


“Climate change is moving faster than we are.”

“If we do not change course by 2020, we risk missing the point where we can avoid runaway climate change, with disastrous consequences for people and all the natural systems that sustain us.”


LUCA
MERCALLI
NON C'È PIÚ TEMPO
COME REAGIRE AGLI ALLARMI AMBIENTALI


LUCA MERCALLI
PREPARIAMOCI
A VIVERE IN UN MONDO
CON MENO RISORSE,
MENO ENERGIA,
MENO ABBONDANZA...
E FORSE PIÙ FELICITÀ
chiarelettere


LE SCOPERTE • LE INVENZIONI
IL CLIMA
CHE CAMBIA
PERCHÉ IL RISCALDAMENTO
GLOBALE È UN PROBLEMA VERO,
E COME FARE PER FERMARLO
LUCA
MERCALLI
BUR
Rizzoli