Parte 1 – La Questione

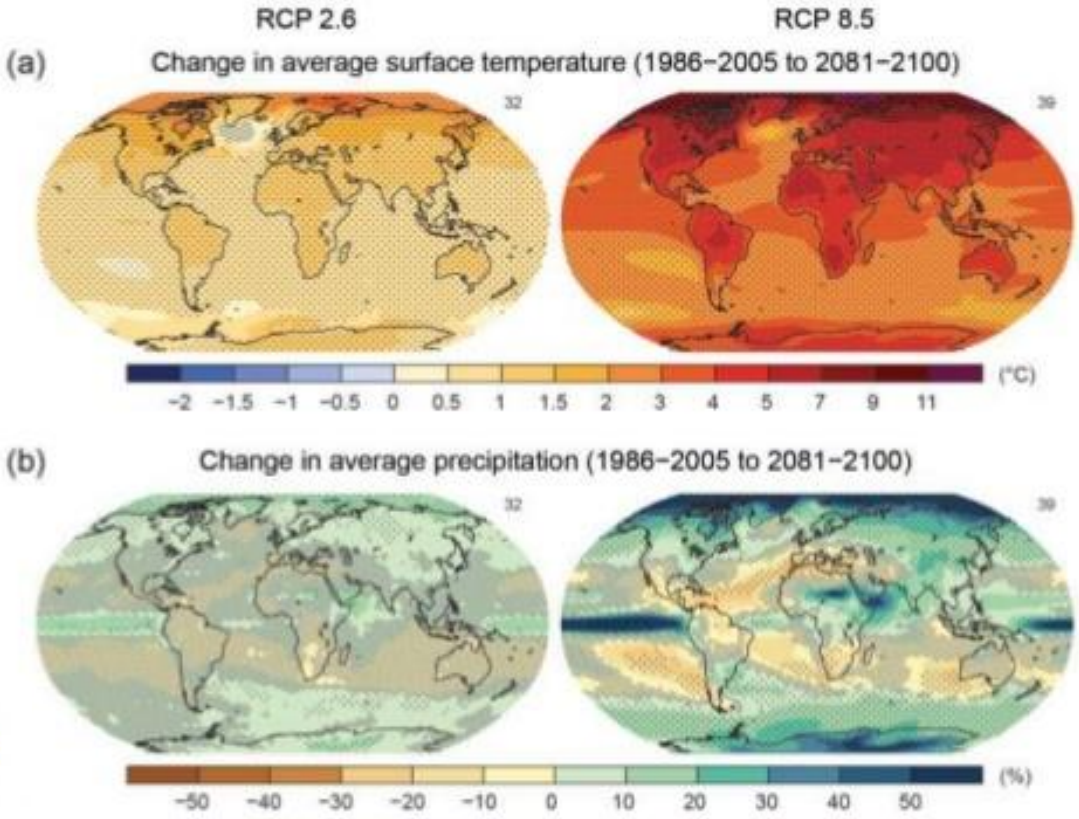
Luca Mercalli
Presidente della Società
Metereologica Italiana

Gli scenari climatici del futuro

Gli scenari climatici del futuro

Luca Mercalli – Società Meteorologica Italiana
www.nimbus.it

Figure SPM.8a,b
Maps of CMIP5 multi-model mean results



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ipcc
INTERGOVERNMENTAL PANEL ON climate change

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

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

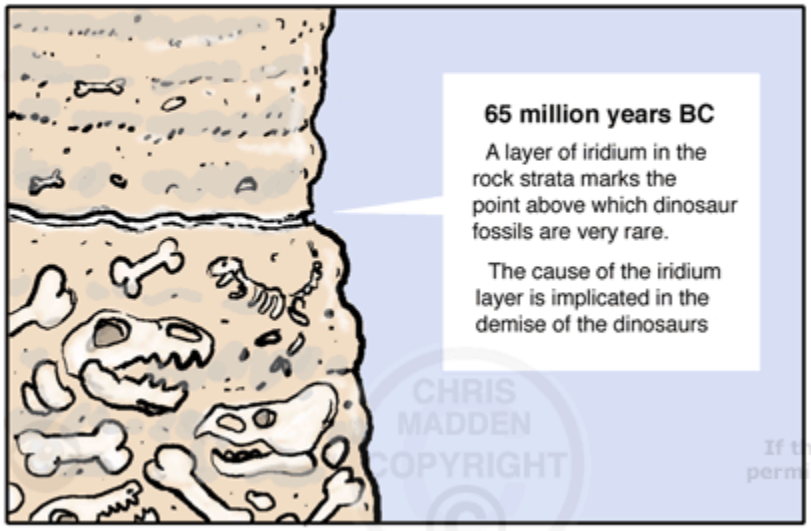
We think that several cryosphere tipping points are dangerously close, but mitigating

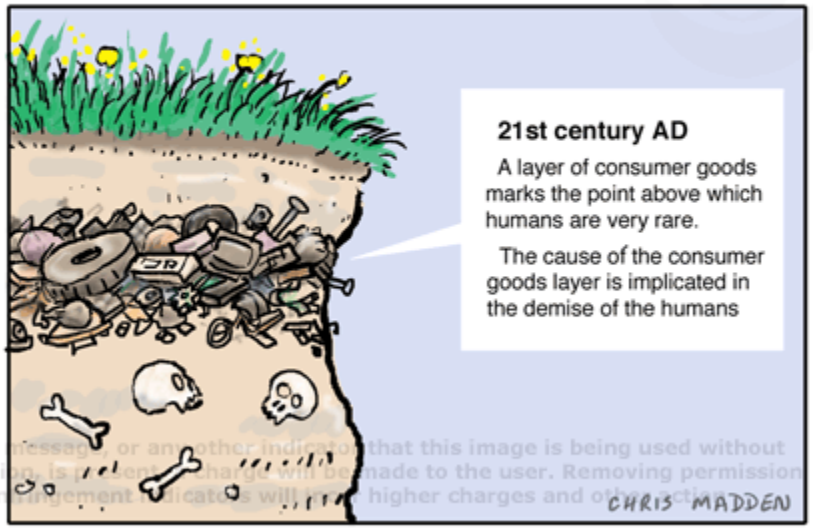
ANTHROPOCENE

approx. 1945 A.D. - present

A new geologic era with no precise start date. Marked by significant human impact on climate and ecosystems. Coined by Paul Crutzen. Rise of agriculture. Deforestation. Cement. Combustion of fossil fuels. Coal, oil and gas roused from the earth. Extraction and emission. Operation Crossroads vaporizes 70 acres of Bikini Atoll. Deep geologic repositories. Pacific Trash Vortex, a swirling gyre of marine litter and plastic. 6.7 billion humans + growing. Palo Verde Nuclear Power Plant. Hull-Rust-Mahoning open pit mine. Three Gorges Dam. Fresh Kills Landfill. Las Vegas. Dubai.

LESSONS FROM THE FOSSIL RECORD





3.0
2.5
2.0
1.5
1.0
0.5
0.0
1960-2008
Ecological Footprint
2008-2050, Scenarios
Moderate business-as-usual
Rapid reduction
EARTH OVER SHOOT DAY 2012
0%
100%
Above this line is 100% of the natural resources the earth has the capacity to create in 2010.
In 2010, the worldwide human population is projected to use 150 percent of the resources the earth can generate in a year.
150%
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
y-axis: number of planet earths, x-axis: years

Rockstrom et al., 2009

9.4GtonC/yr, 15% (34 GtCO2)

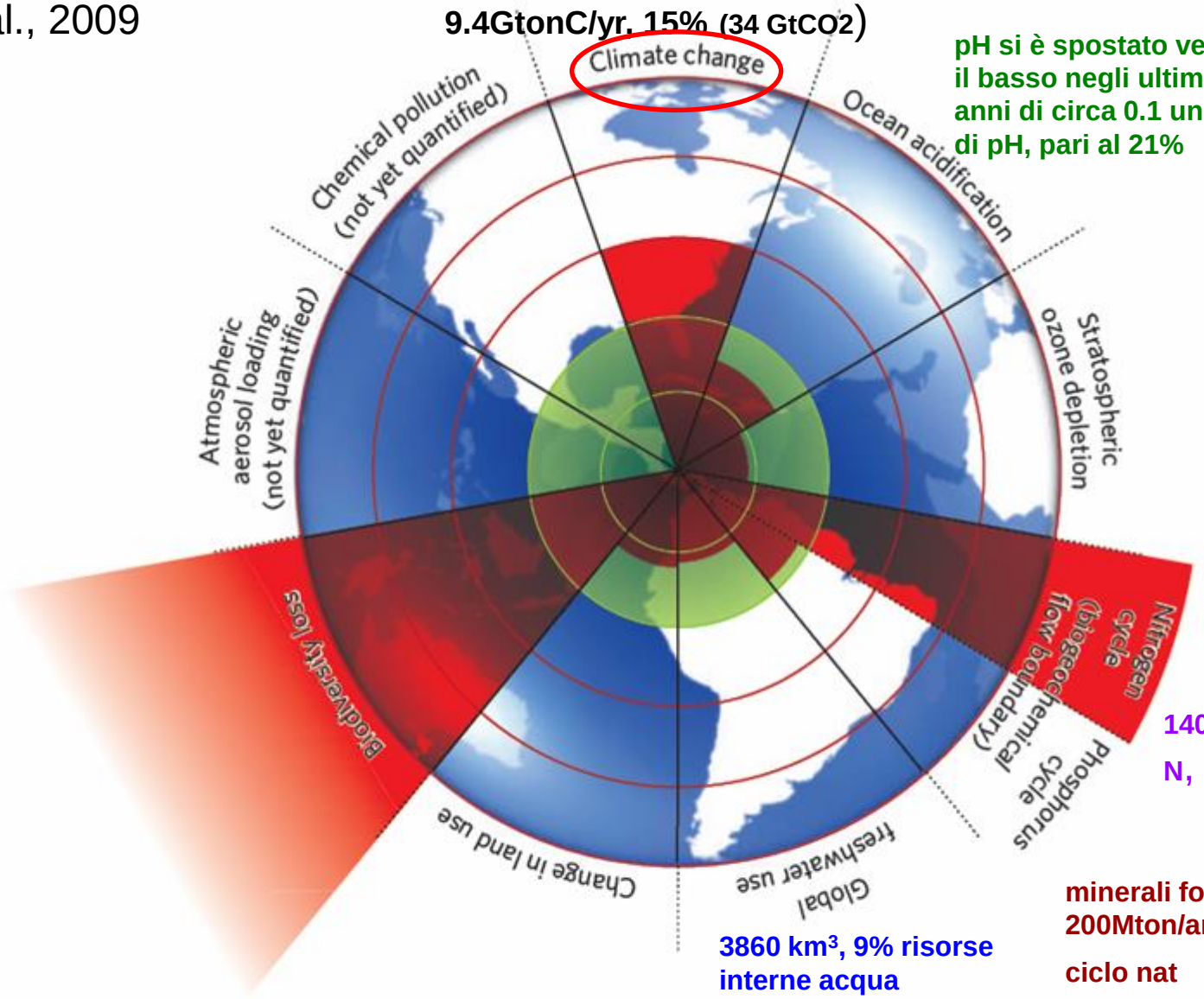
pH si è spostato verso il basso negli ultimi 250 anni di circa 0.1 unità di pH, pari al 21%

Vol 461|24 September 2009

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.



140Mton N, 100%

minerali fosfatici 200Mton/anno; 1/7

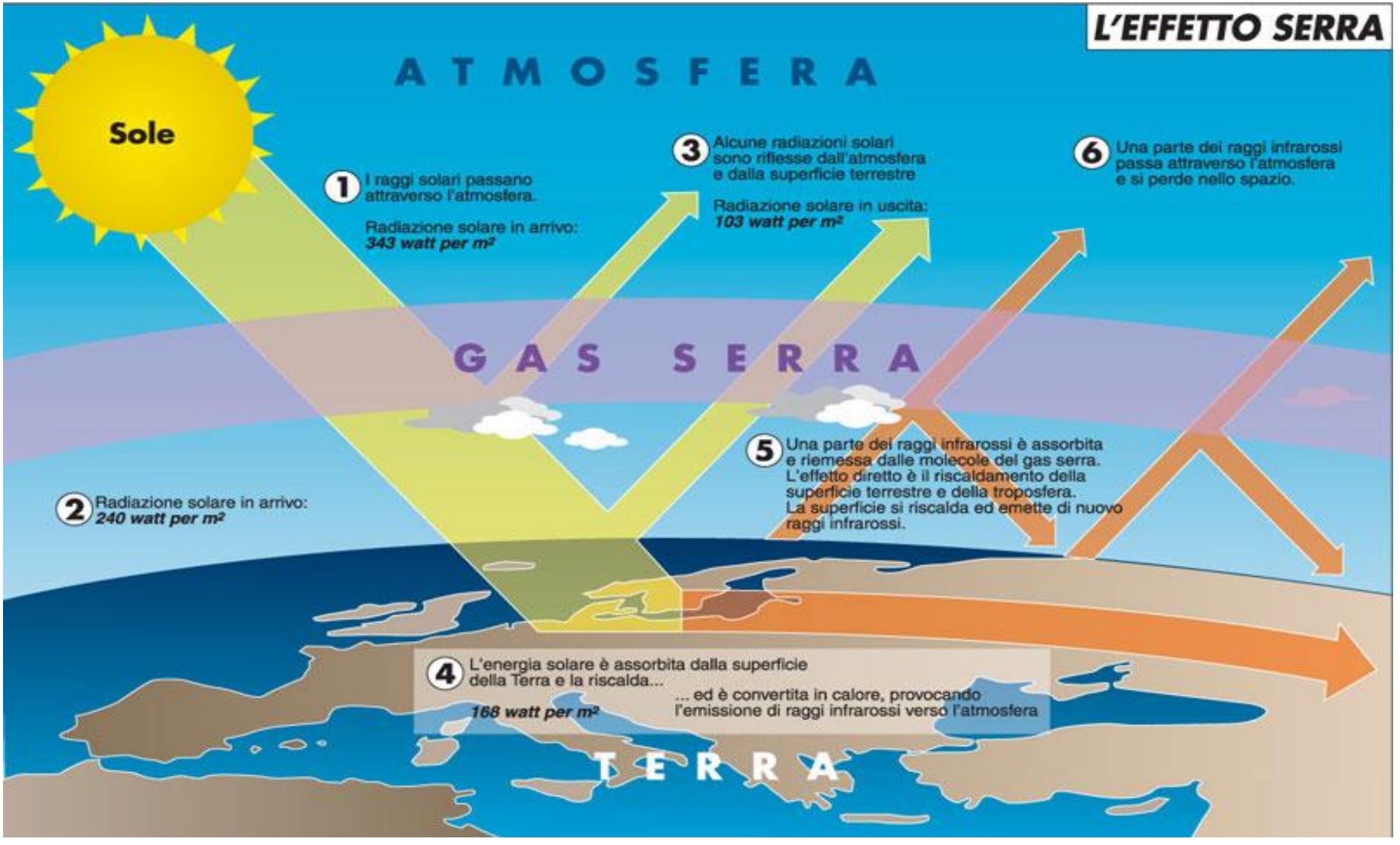
ciclo nat

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

Terra senza effetto serra -18 °C
Con effetto serra naturale +15 °C



PHILOSOPHICAL MAGAZINE
AND
JOURNAL OF SCIENCE.
[FIFTH SERIES.]
APRIL 1896.

XXXI. *On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground.* By Prof. SVANTE ARRHENIUS *.

Svante August Arrhenius
(Nobel prize, Chemistry,1903)

Developed the hothouse theory for CO_2 in 1896, and in 1905 predicted that raising CO_2 content of the atmosphere would cause an increase in mean global temperature similar in magnitude to modern predictions

ELSEVIER
Endeavour Vol. xxx No. x
Full text provided by www.sciencedirect.com
ScienceDirect

CO_2, the greenhouse effect and global warming: from the pioneering work of Arrhenius and Callendar to today's Earth System Models

Thomas R. Anderson[a,*], Ed Hawkins[b] and Philip D. Jones[c,d]

[a] National Oceanography Centre, European Way, Southampton SO14 3ZH, UK
[b] NCAS-Climate, Department of Meteorology, University of Reading, Reading RG6 6BB, UK
[c] Climatic Research Unit, University of East Anglia, School of Environmental Sciences, Norwich NR4 7TJ, UK
[d] Center of Excellence for Climate Change Research/Dept of Meteorology, King Abdulaziz University, Jeddah, Saudi Arabia

Climate warming during the course of the twenty-first century is projected to be between 1.0 and 3.7 °C depending on future greenhouse gas emissions, based on the ensemble-mean results of state-of-the-art Earth System Models (ESMs). Just how reliable are these projections, given the complexity of the climate system? The early history of climate research provides insight into the understanding and science needed to answer this question. We examine the mathematical quantifications of planetary energy budget developed by Svante Arrhenius (1859–1927) and Guy Stewart Callendar (1898–1964) and construct an empirical approximation of the latter, which we show to be successful at retrospectively predicting global warming over the course of the twentieth century. This approximation is then used to calculate warming in response to increasing atmospheric greenhouse gases during the twenty-first century, projecting a temperature increase at the lower bound of results generated by an ensemble of ESMs (as presented in the latest assessment by the Intergovernmental Panel on Climate Change). This result can be interpreted as follows. The climate system is conceptually complex but has at its heart the physical laws of radiative transfer. This basic, or "core" physics is relatively straightforward to compute mathematically, as exemplified by Callendar's calculations, leading to quantitatively robust projections of baseline warming. The ESMs include not only the physical core but also climate feedbacks that introduce uncertainty into the projections in terms of magnitude, but not sign: positive (amplification of warming). As such, the projections of end-of-century global warming by ESMs are fundamentally trustworthy: quantitatively robust baseline warming based on the well-understood physics of radiative transfer, with extra warming due to climate feedbacks. These projections thus provide a compelling case that global climate will continue to undergo significant warming in response to ongoing emissions of CO_2 and other greenhouse gases to the atmosphere.

Introduction

Climate change is a major risk facing mankind. At the United Nations Climate Change Conference held in Paris at the end of last year, 195 countries agreed on a plan to reduce emissions of CO_2 and other greenhouse gases, aiming to limit global temperature increase to well below 2 °C (relative to pre-industrial climate, meaning a future warming of less than 1.4 °C because temperature had already increased by 0.6 °C by the end of the twentieth century). The link between CO_2 and climate warming has caught the attention of scientists and politicians, as well as the general public, via the well-known "greenhouse effect" (Figure 1). Solar radiation passes largely unhindered through the atmosphere, heating the Earth's surface. In turn, energy is re-emitted as infrared, much of which is absorbed by CO_2 and water vapour in the atmosphere, which thus acts as a blanket surrounding the Earth. Without this natural greenhouse effect, the average surface temperature would plummet to about −21 °C,[1] rather less pleasant than the 14 °C experienced today.

The concentration of CO_2 in the atmosphere is increasing year on year as we burn fossil fuels, which enhances the natural greenhouse effect and warms the planet. To what extent, then, must CO_2 emissions be kept under control in order to restrict global temperature rise to within 2 °C? The projections of complex Earth System Models (ESMs) provide quantitative answers to this question. Run on supercomputers, these models integrate the many processes taking place in the atmosphere, on land and in the ocean. According to the Intergovernmental Panel on Climate Change (IPCC), the latest results of these models indicate

*Corresponding author. Anderson, T.R. (tra@noc.ac.uk); Hawkins, E. (e.hawkins@reading.ac.uk); Jones, P.D. (p.jones@uea.ac.uk)
Keywords: Greenhouse effect; Global warming; Earth System Models; Arrhenius; Callendar.

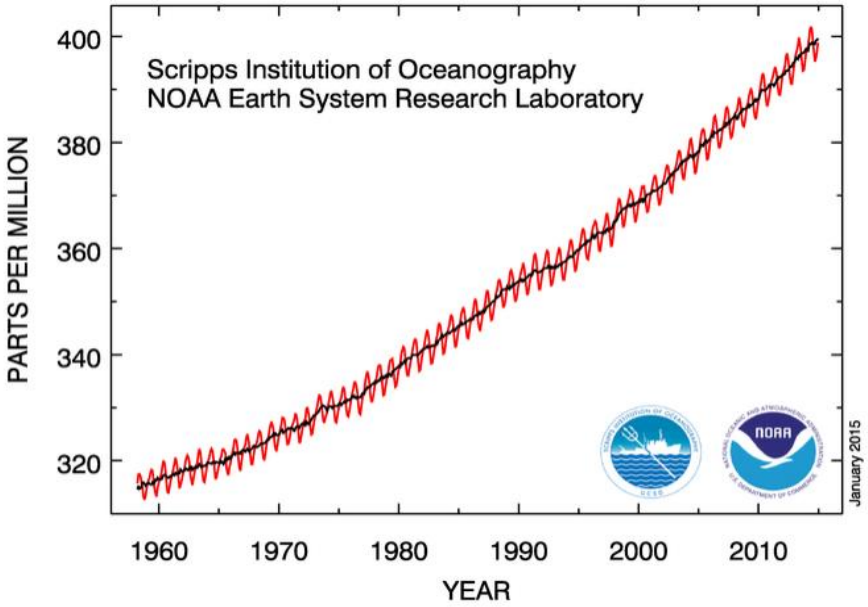
[1] Andrew A. Lacis, Gavin A. Schmidt, David Rind, and Reto A. Ruedy, "Atmospheric CO_2: Principal Control Knob Governing Earth's Temperature," *Science* 330 (2010): 356–59.

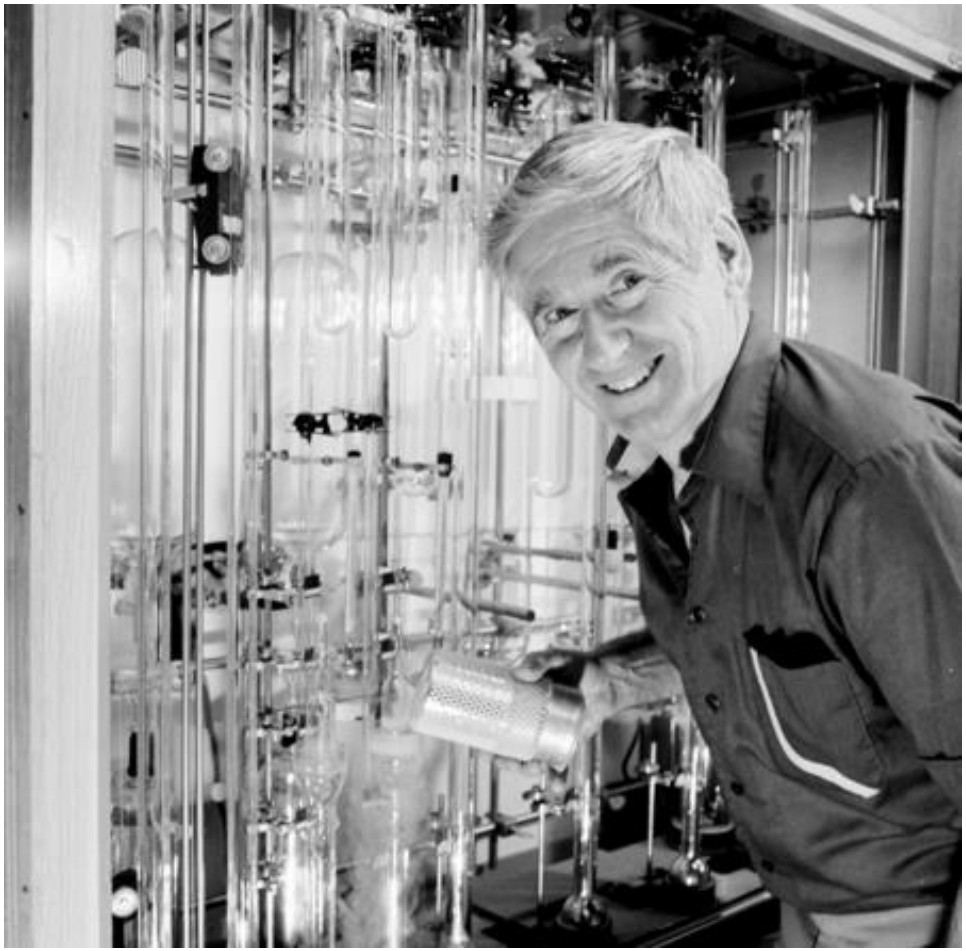
http://dx.doi.org/10.1016/j.endeavour.2016.07.002

Please cite this article in press as: Anderson, T.R., et al., CO_2, the greenhouse effect and global warming: from the pioneering work of Arrhenius and Callendar to today's Earth System Models, Endeavour (2016), http://dx.doi.org/10.1016/j.endeavour.2016.07.002

Charles David Keeling's first observations, 1958-60

- Unequivocal evidence that CO_2 concentrations are rising steadily



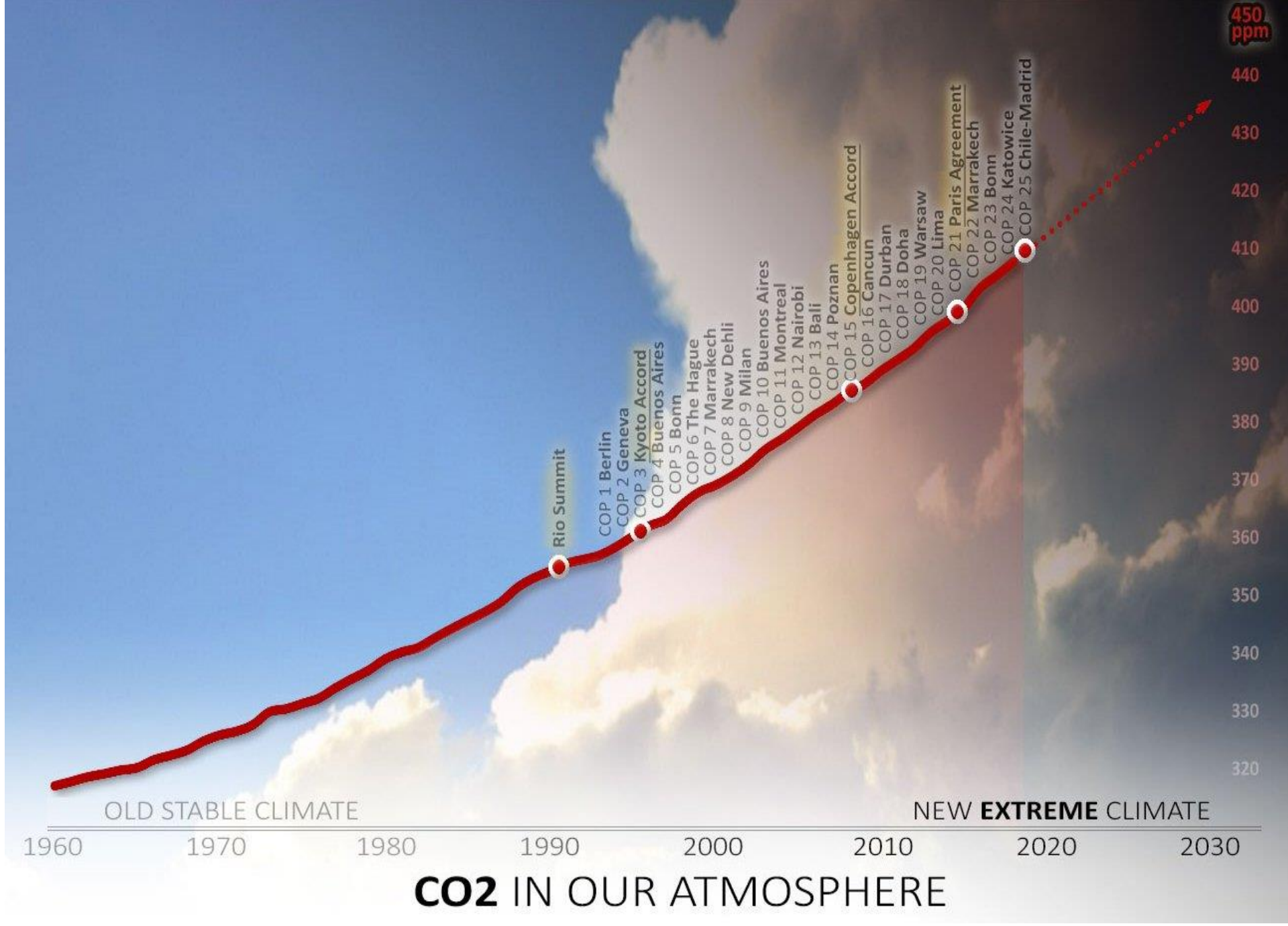


Carbon Dioxide and Climate: A Scientific Assessment

Report to the National Academy of Sciences
Jule G. Charney and co-authors
1979

When it is assumed that the CO2 content of the atmosphere is doubled and statistical thermal equilibrium is achieved, the more realistic of the modeling efforts predict a global surface warming of between 2°C and 3.5 °C, with greater increases at high latitudes.

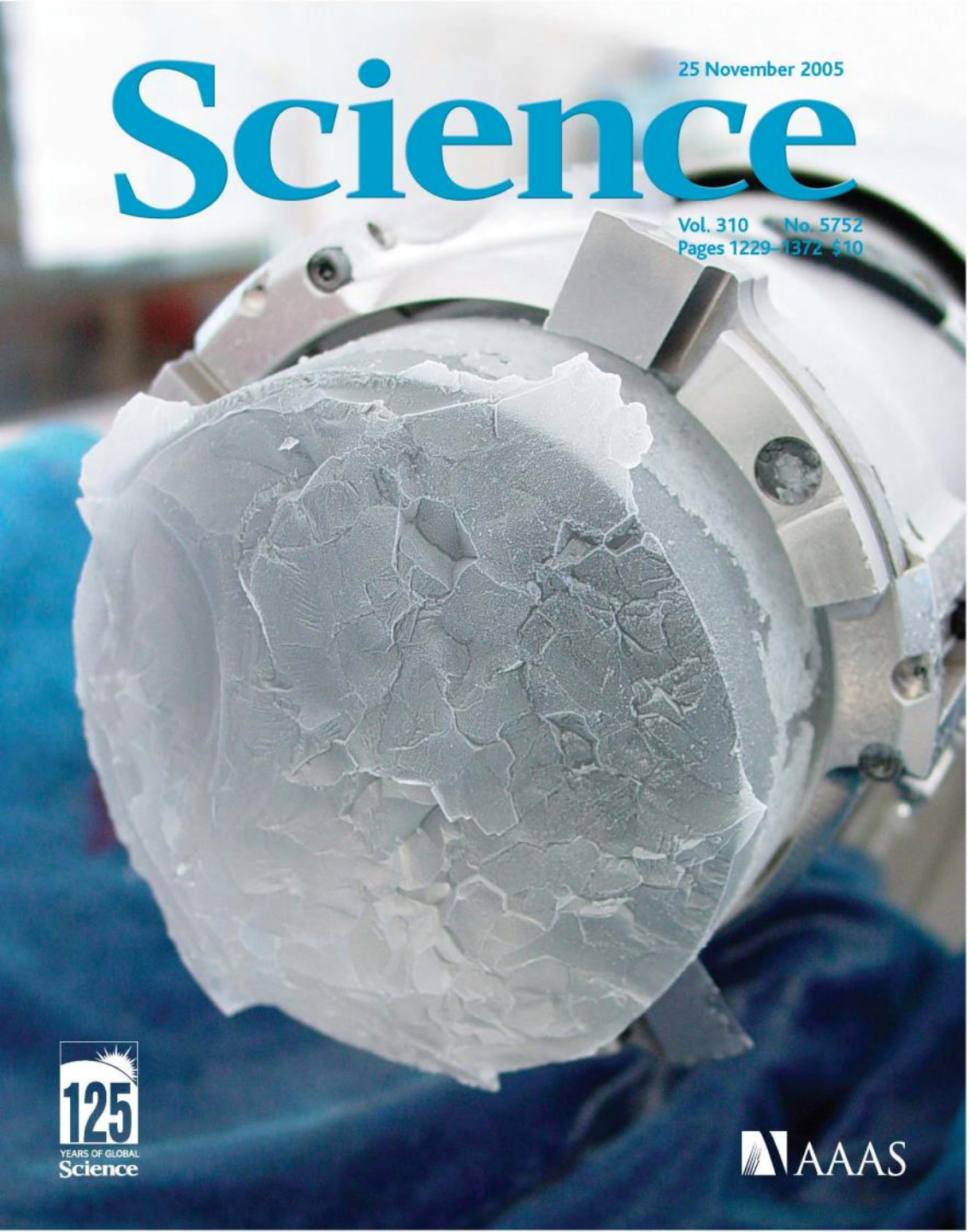
- Oceans "could delay the estimated warming for several decades"
- "We may not be given a warning until the CO_2 loading is such that an appreciable climate change is inevitable."


450 ppm
440
430
420
410
400
390
380
370
360
350
340
330
320
Rio Summit
COP 1 Berlin
COP 2 Geneva
COP 3 Kyoto Accord
COP 4 Buenos Aires
COP 5 Bonn
COP 6 The Hague
COP 7 Marrakech
COP 8 New Dehli
COP 9 Milan
COP 10 Buenos Aires
COP 11 Montreal
COP 12 Nairobi
COP 13 Bali
COP 14 Poznan
COP 15 Copenhagen Accord
COP 16 Cancun
COP 17 Durban
COP 18 Doha
COP 19 Warsaw
COP 20 Lima
COP 21 Paris Agreement
COP 22 Marrakech
COP 23 Bonn
COP 24 Katowice
COP 25 Chile-Madrid
OLD STABLE CLIMATE
NEW EXTREME CLIMATE
1960
1970
1980
1990
2000
2010
2020
2030
CO2 IN OUR ATMOSPHERE

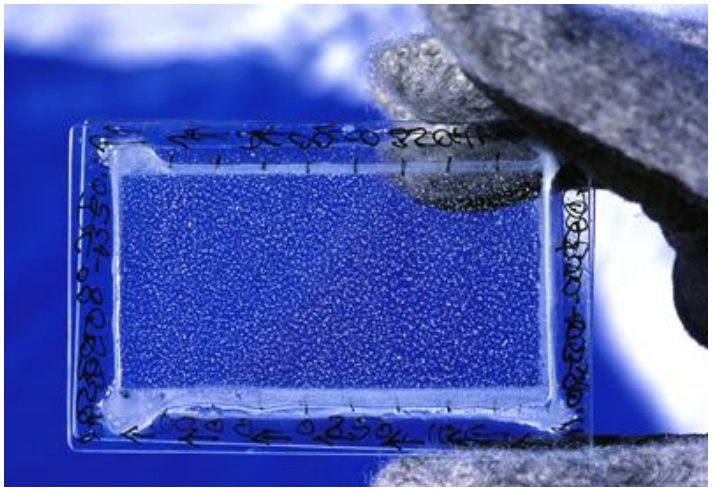
Progetto EPICA

(European Project for Ice Coring in Antarctica)

Stazione italo-francese Concordia, a Dome C - Antartide



L'analisi delle bolle d'aria sigillate nel ghiaccio permette di ricostruire le concentrazioni storiche di CO2 e metano



fonte: progetto EPICA

LIVELLO CO_2 NEL TEMPO

massimo ultimi 800.000 anni

massimo era preindustriale 300 ppm

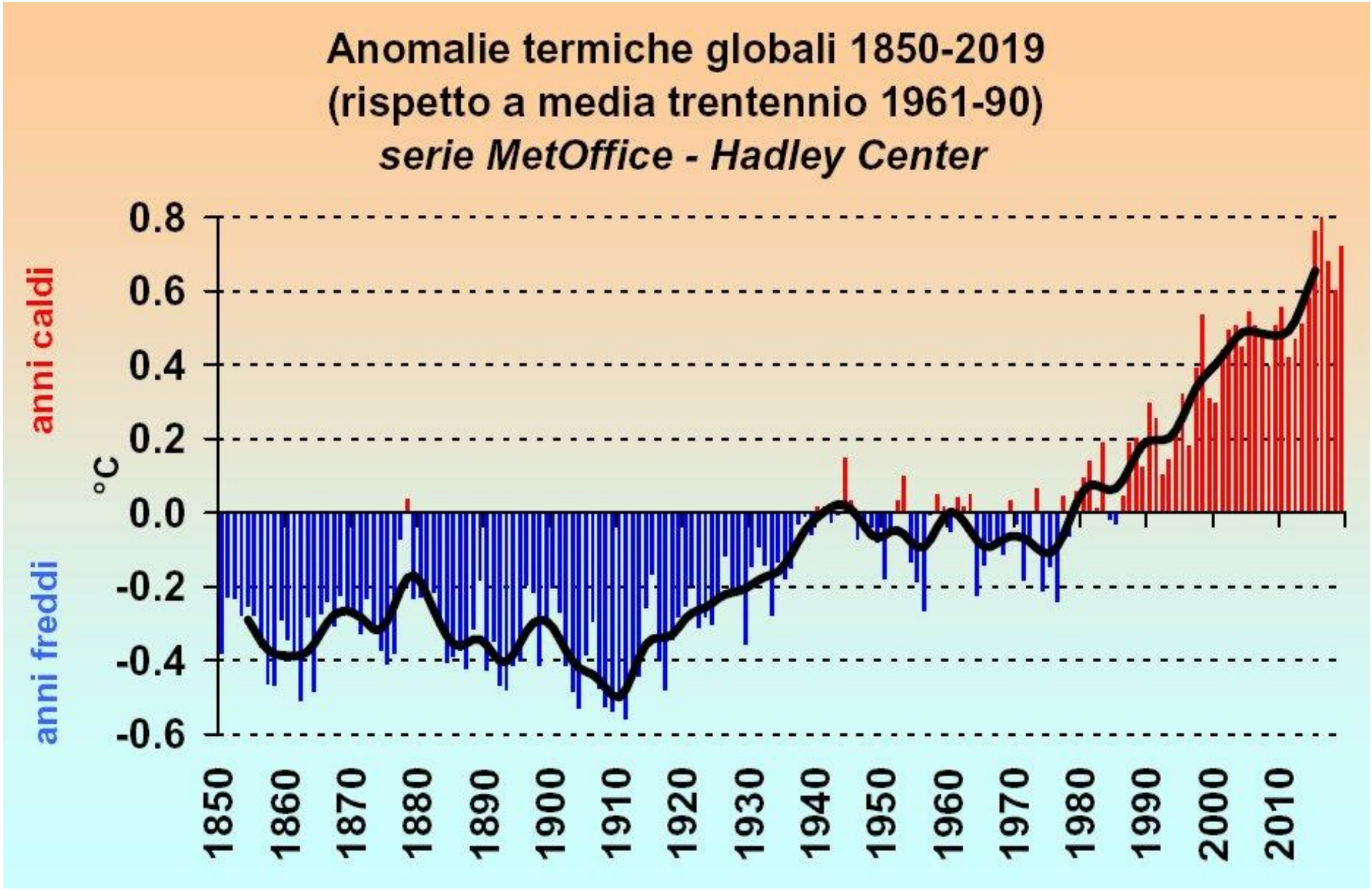
CONCENTRAZIONE DI CO_2

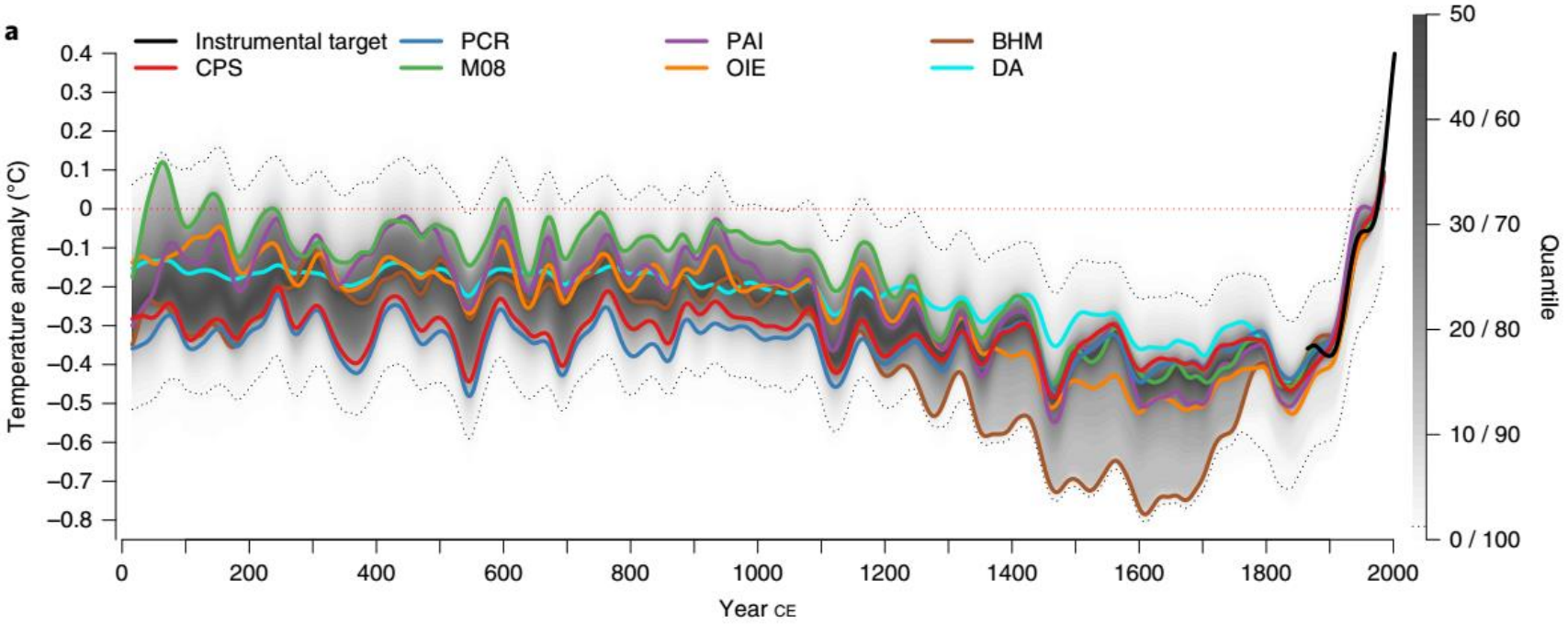
400
380
360
340
320
300
280
260
240
220
200
180

800.000 700.000 600.000 500.000 400.000 300.000 200.000 100.000 0

ANNI DAL PRESENTE

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



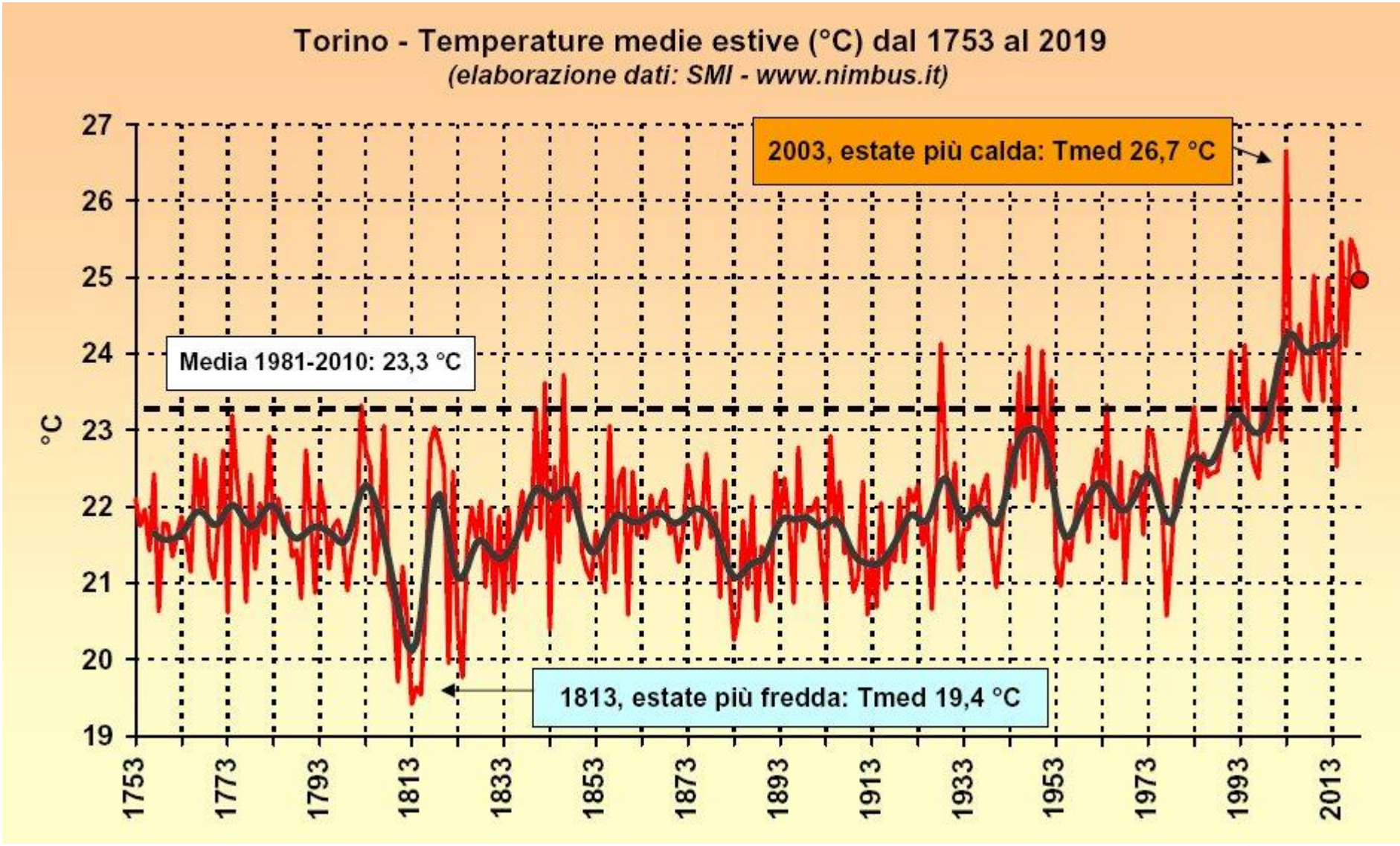


nature geoscience
ARTICLES
https://doi.org/10.1038/s41561-019-0400-0

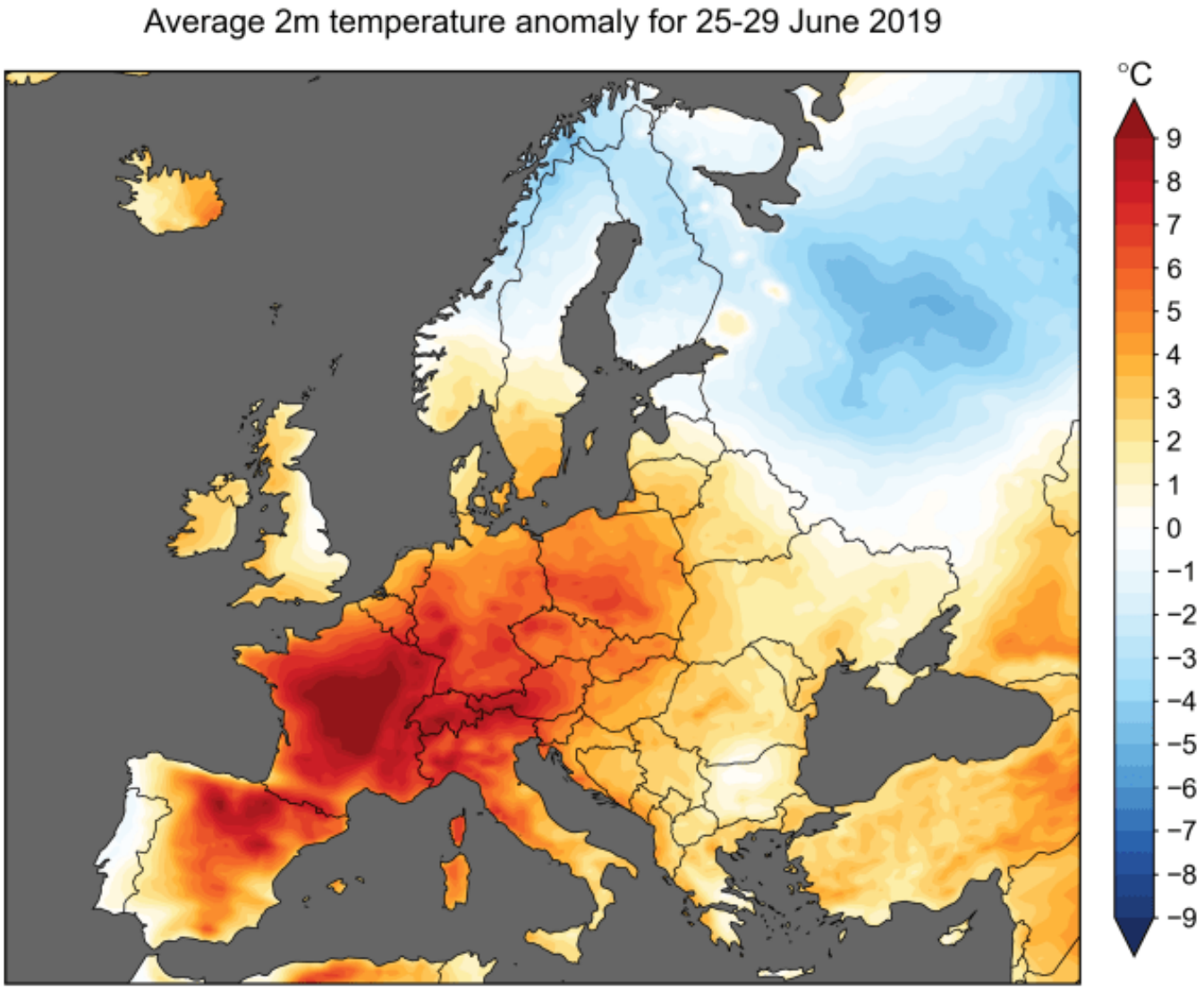
Consistent multidecadal variability in global temperature reconstructions and simulations over the Common Era

PAGES 2k Consortium*

Multidecadal surface temperature changes may be forced by natural as well as anthropogenic factors, or arise unforced from the climate system. Distinguishing these factors is essential for estimating sensitivity to multiple climatic forcings and the amplitude of the unforced variability. Here we present 2,000-year-long global mean temperature reconstructions using seven different statistical methods that draw from a global collection of temperature-sensitive palaeoclimate records. Our reconstructions display synchronous multidecadal temperature fluctuations that are coherent with one another and with fully forced millennial model simulations from the Coupled Model Intercomparison Project Phase 5 across the Common Era. A substantial portion of pre-industrial (1300–1800 CE) variability at multidecadal timescales is attributed to volcanic aerosol forcing. Reconstructions and simulations qualitatively agree on the amplitude of the unforced global mean multidecadal temperature variability, thereby increasing confidence in future projections of climate change on these timescales. The largest warming trends at timescales of 20 years and longer occur during the second half of the twentieth century, highlighting the unusual character of the warming in recent decades.



9 su 10 delle estati più calde sono successive al 2002



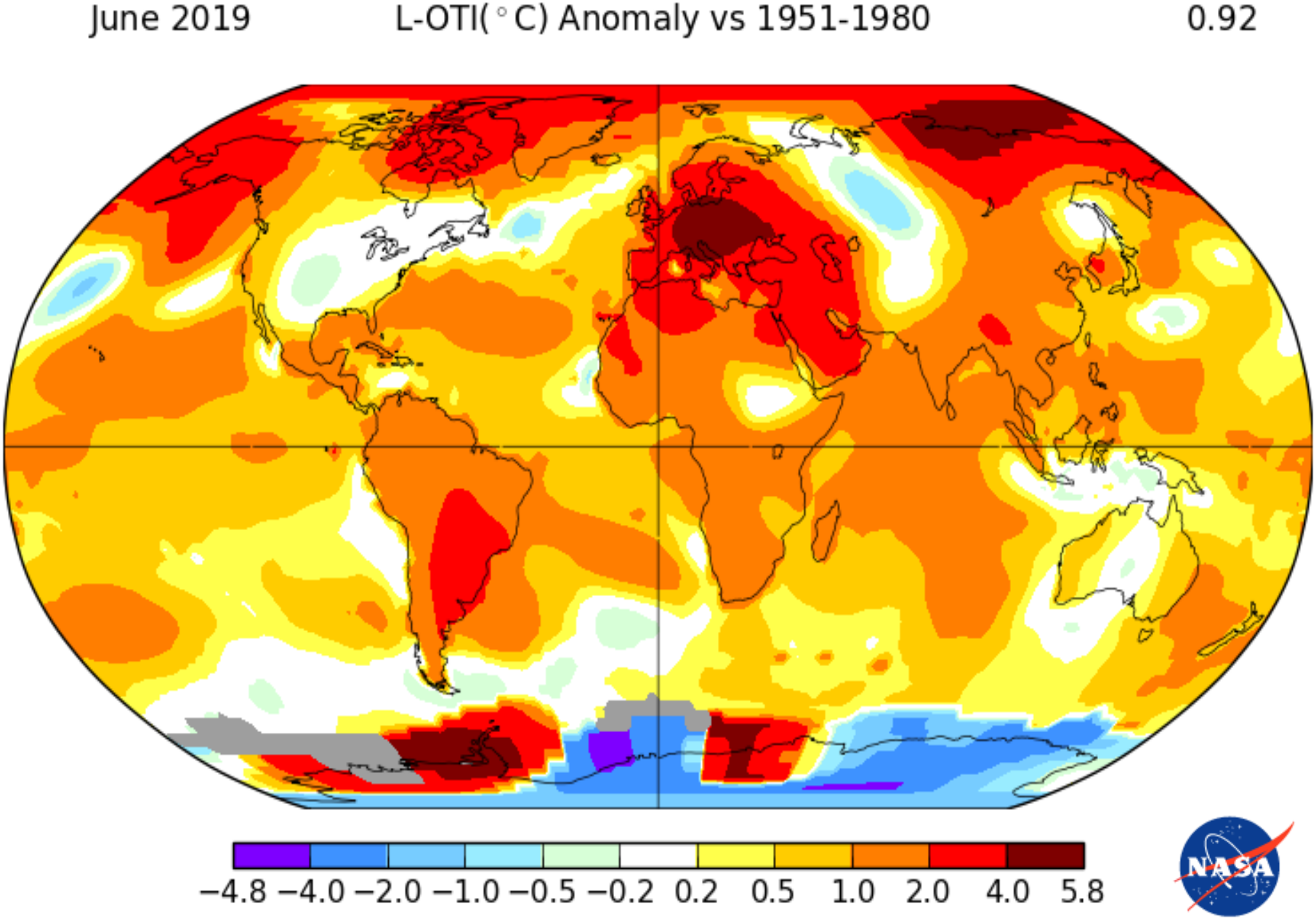
Giugno 2019 è risultato in Europa il **più caldo in assoluto** mai registrato. Mediamente anomalie dell'ordine dei 2°C rispetto al periodo 1981-2010, ma alcune aree, come Francia, Svizzera, Germania e Nord Italia, hanno fatto registrare anomalie anche di 6-10°C nei 5 giorni più caldi dal 25 al 29 giugno.

European Commission

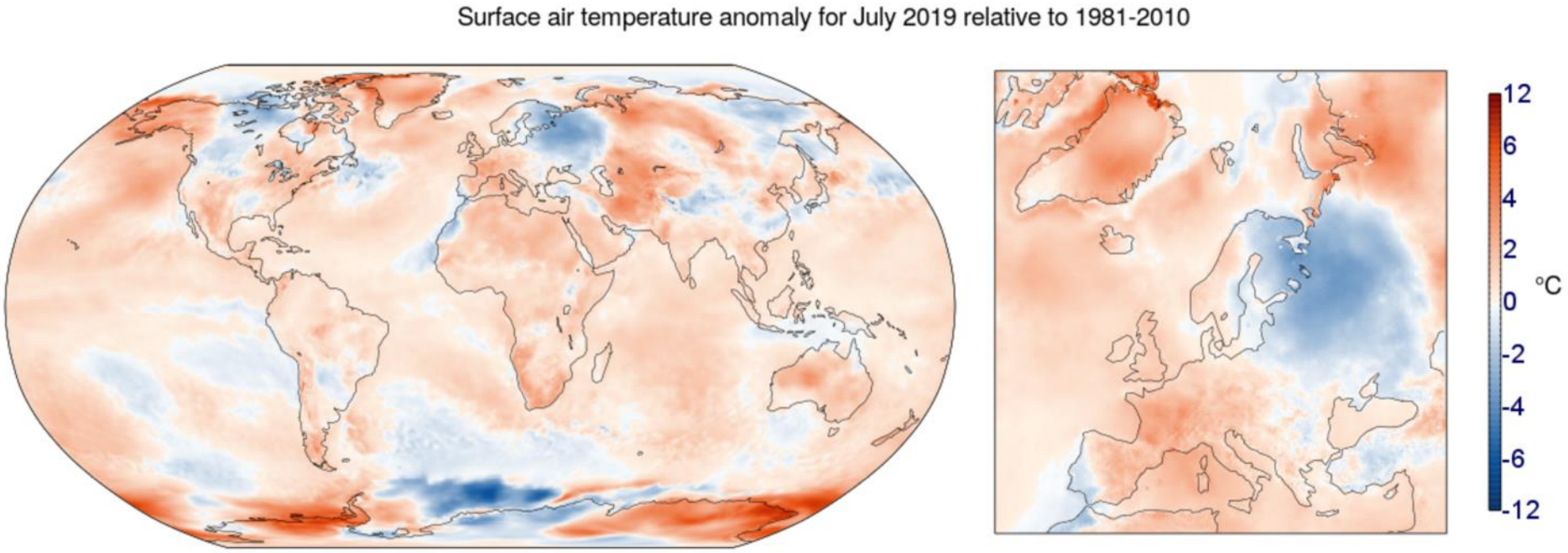
Copernicus Europe's eyes on Earth

Climate Change Service
climate.copernicus.eu

IMPLEMENTED BY ECMWF


June 2019
L-OTI(°C) Anomaly vs 1951-1980
0.92
−4.8 −4.0 −2.0 −1.0 −0.5 −0.2 0.2 0.5 1.0 2.0 4.0 5.8
NASA

Luglio 2019: il mese più caldo della storia meteorologica terrestre



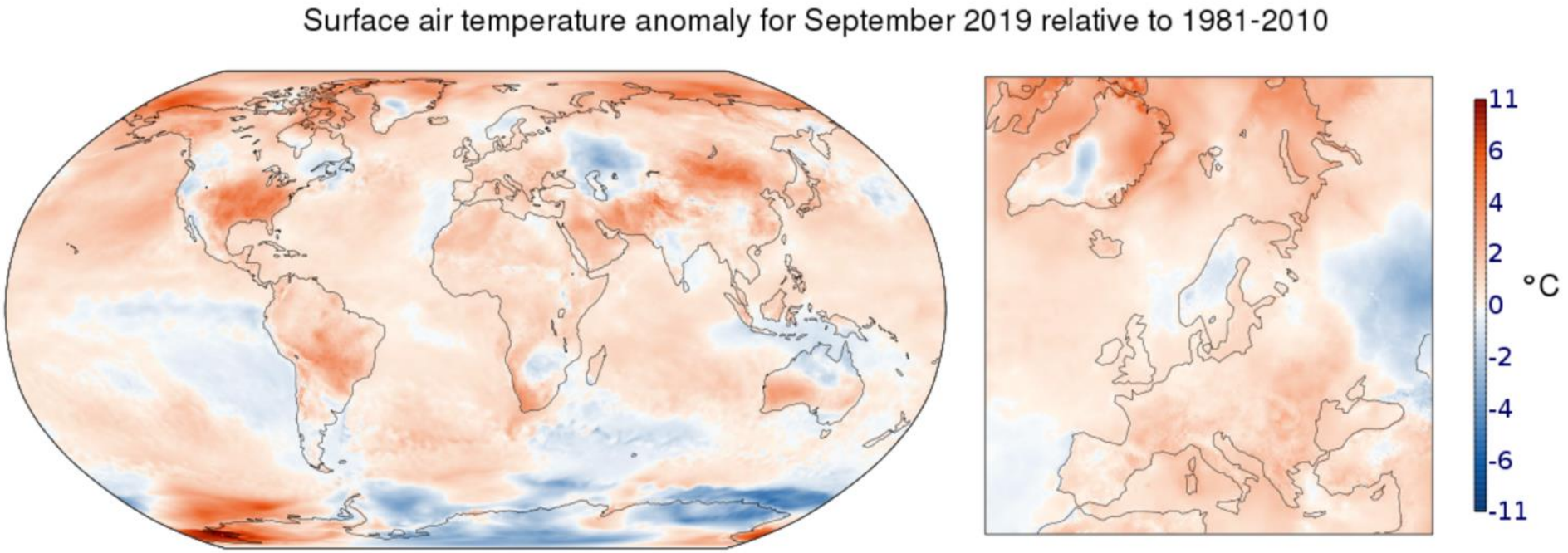
European Commission

Copernicus
Europe's eyes on Earth

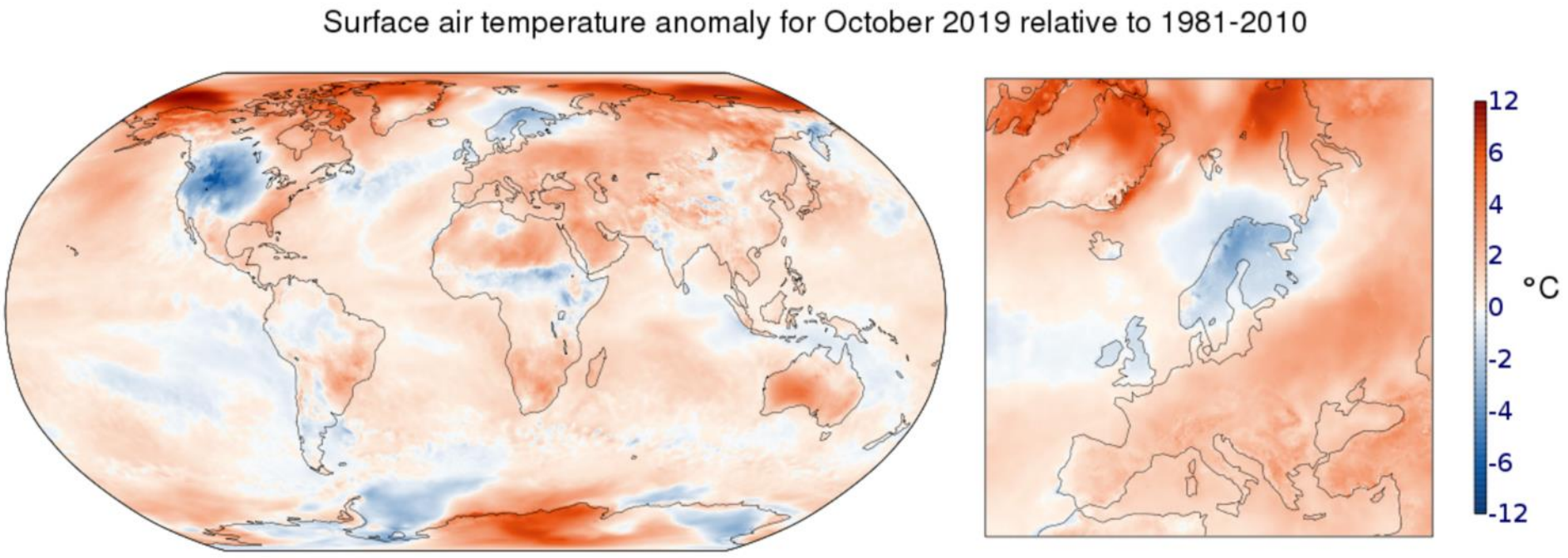
Climate Change Service
climate.copernicus.eu

IMPLEMENTED BY ECMWF

Settembre 2019: anche questo, il più caldo della storia meteo



Ottobre 2019: ancora il più caldo della serie globale



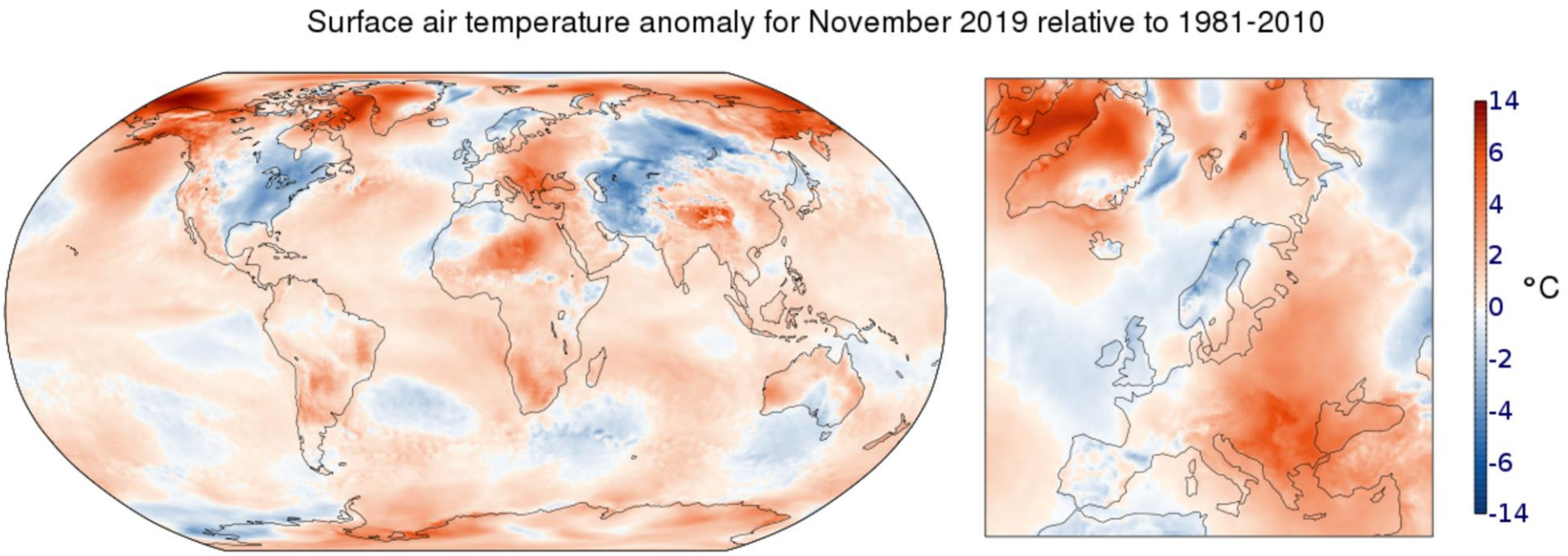
European Commission

Copernicus
Europe's eyes on Earth

Climate Change Service
climate.copernicus.eu

IMPLEMENTED BY ECMWF

Novembre 2019: ancora il più caldo della serie globale, pari con 2016



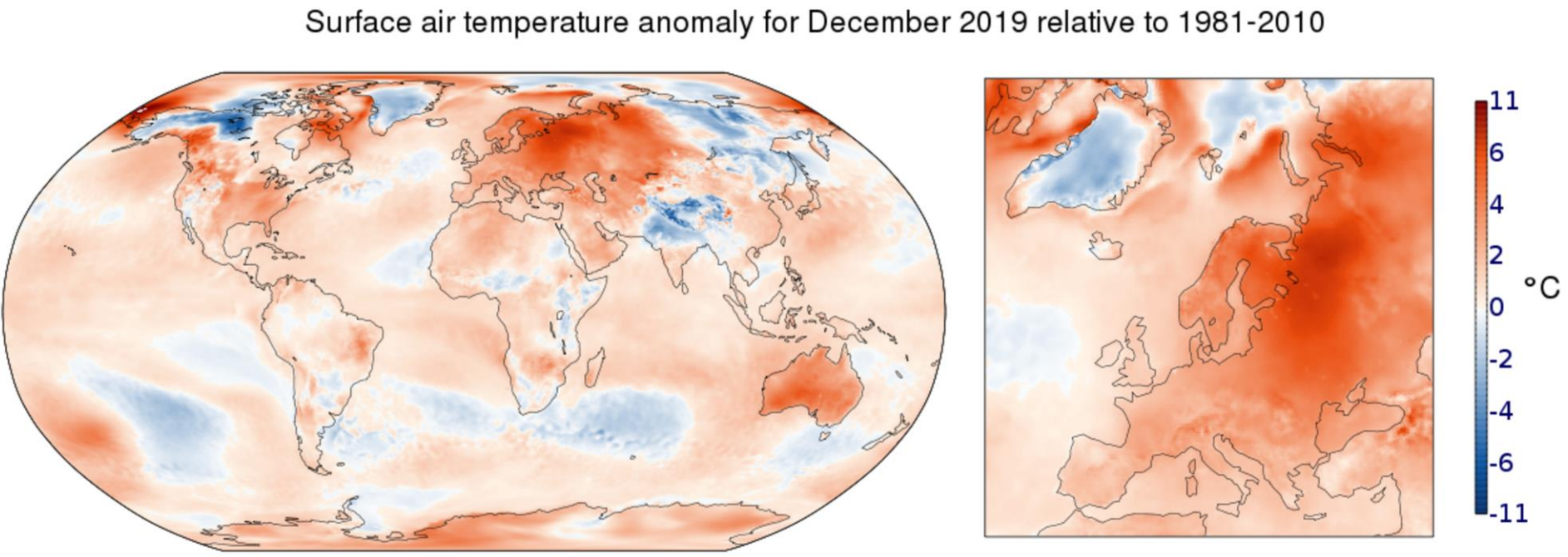
European Commission

Copernicus
Europe's eyes on Earth

Climate Change Service
climate.copernicus.eu

IMPLEMENTED BY ECMWF

Dicembre 2019: ancora il più caldo della serie globale (pari con 2015)



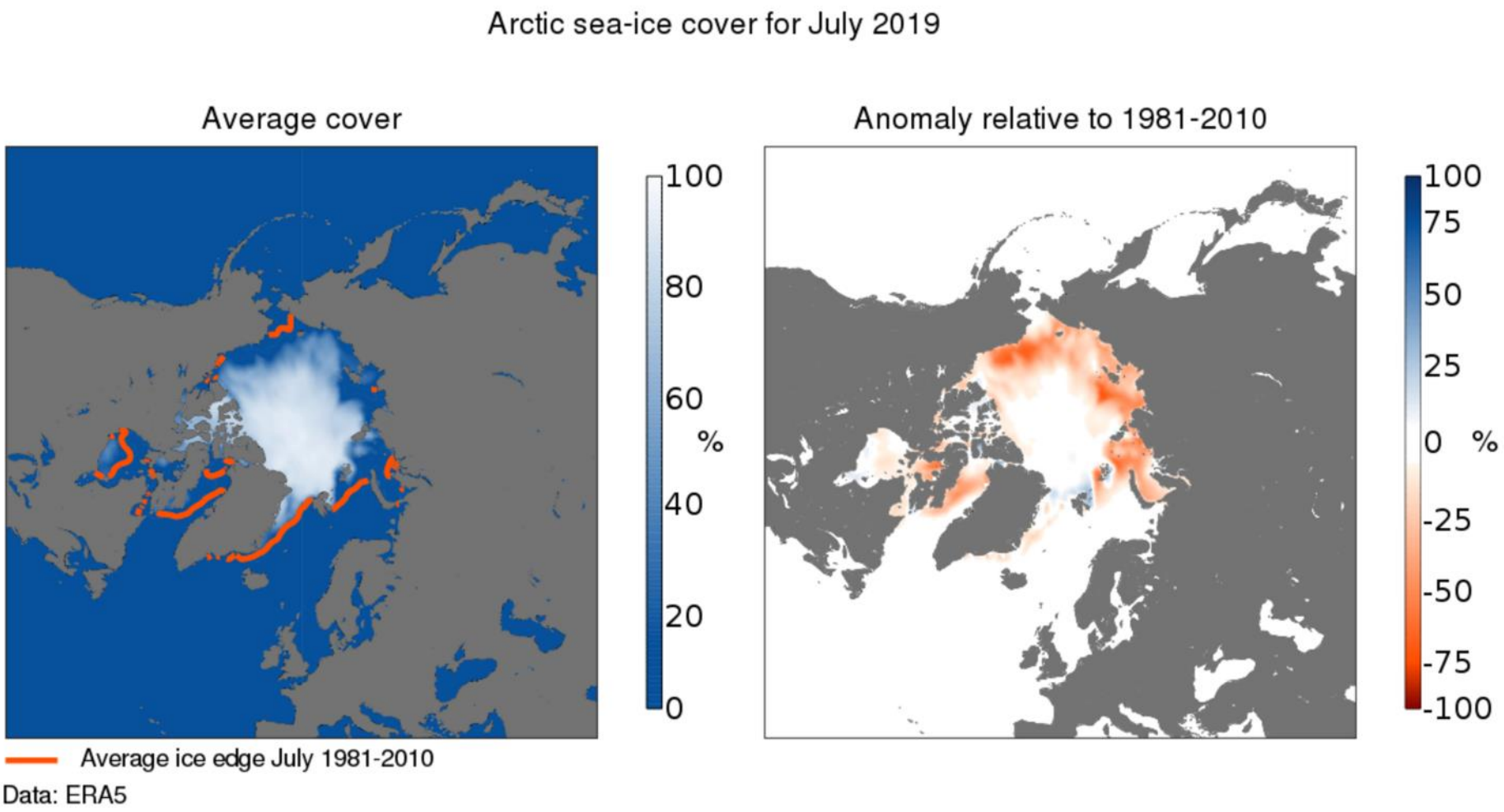
European Commission

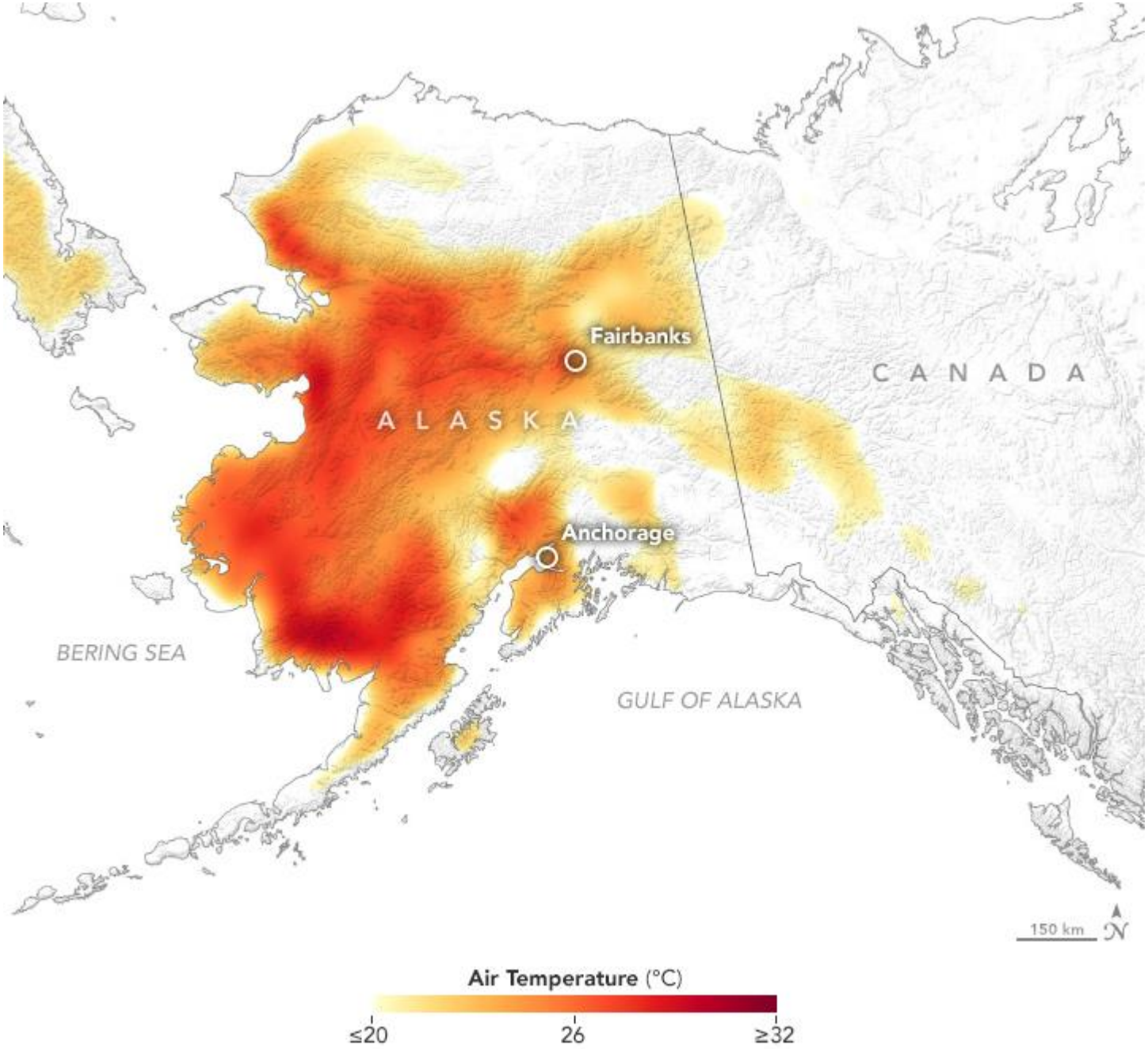
Copernicus
Europe's eyes on Earth

Climate Change Service
climate.copernicus.eu

IMPLEMENTED BY ECMWF

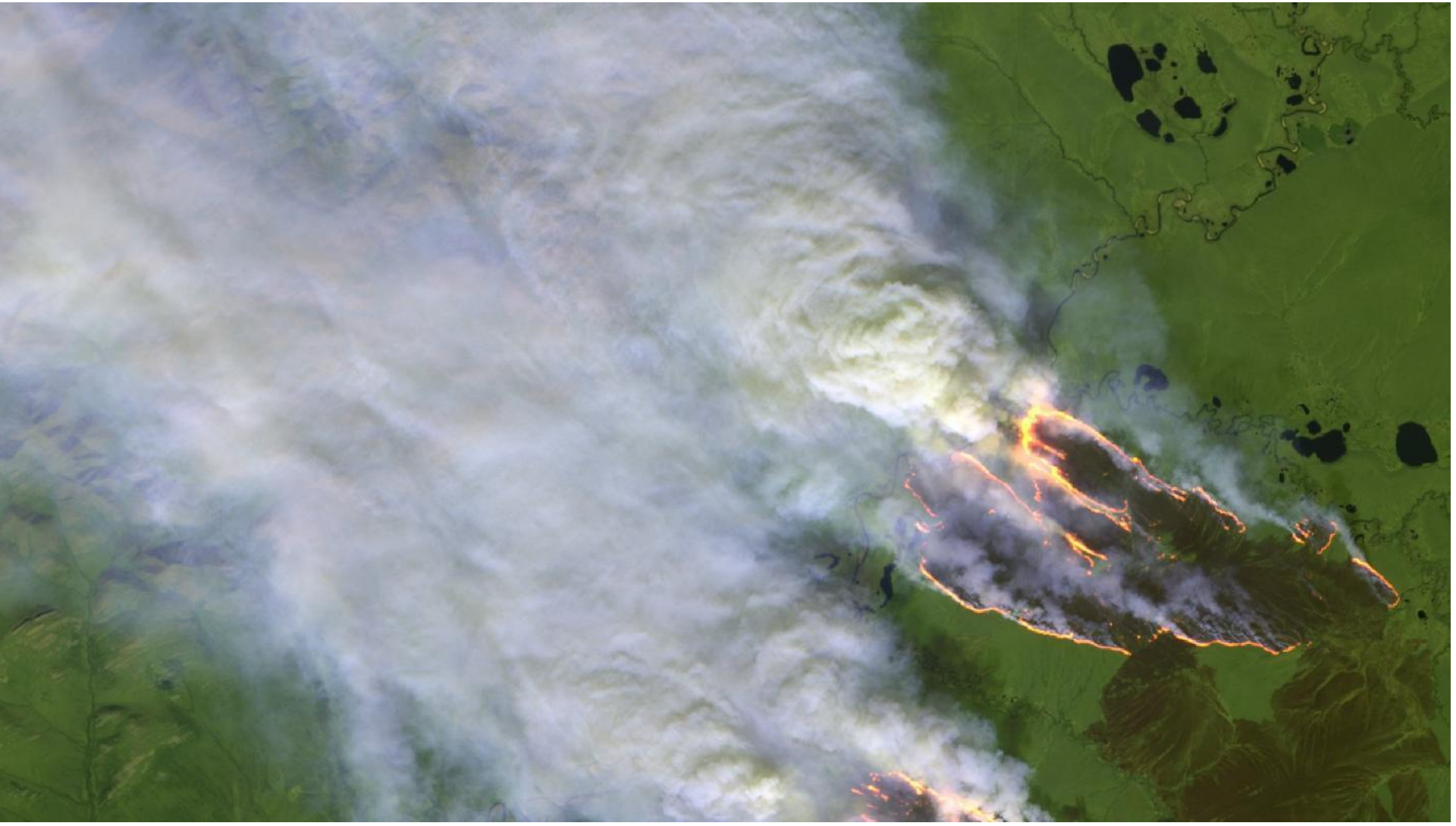
Banchisa polare ai minimi

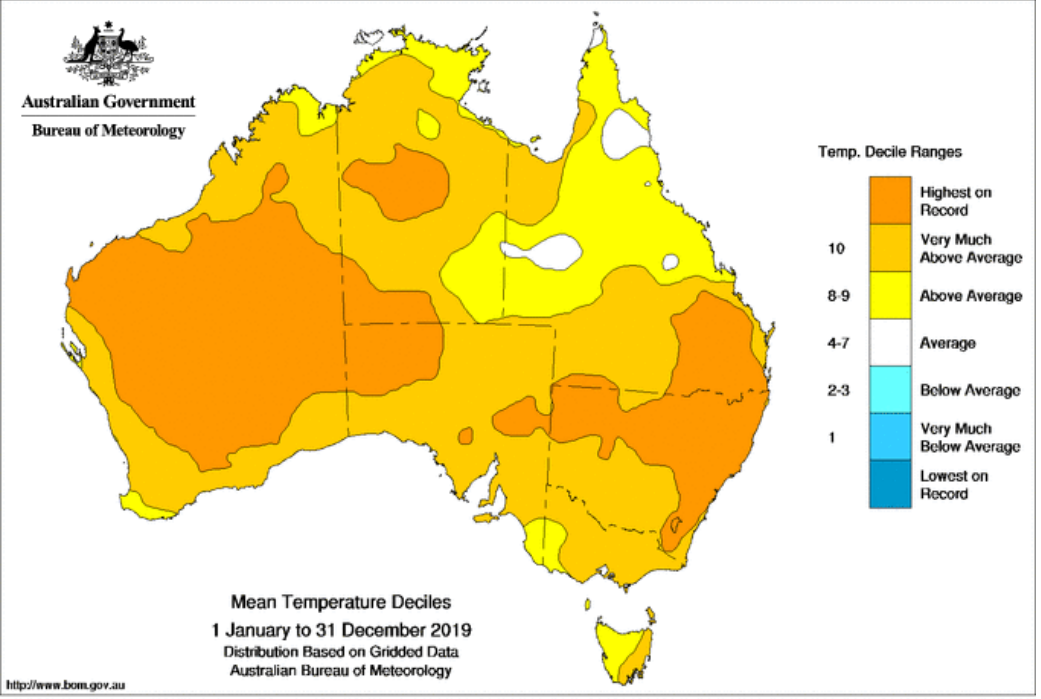


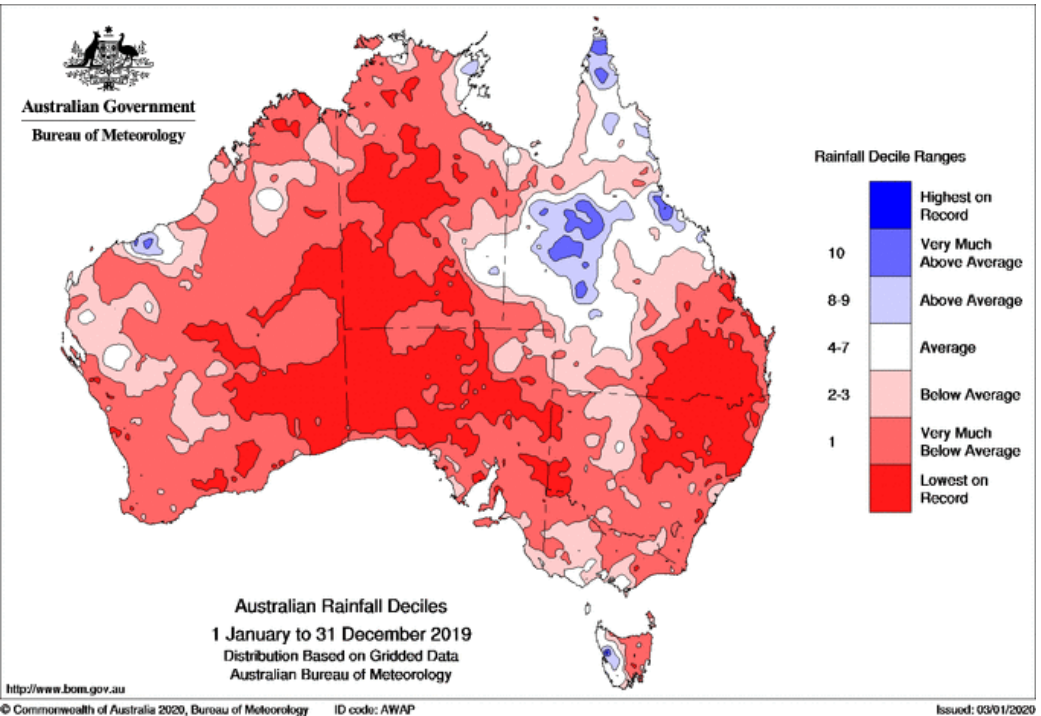


Record
32°C
Alaska
4 lug
2019

Epocali incendi in Siberia







I devastanti incendi australiani dopo un 2019 di caldo e siccità record in 110 anni

(anomalia temperatura +1,5 °C e pioggia -40%)


CLIMATE COUNCIL
BE PREPARED:
CLIMATE CHANGE AND THE AUSTRALIAN BUSHFIRE THREAT

E’ del 2013!

1897
(f. Druetti)

2005
(f. L. Mercalli)

2015
(f. S. Jobard)

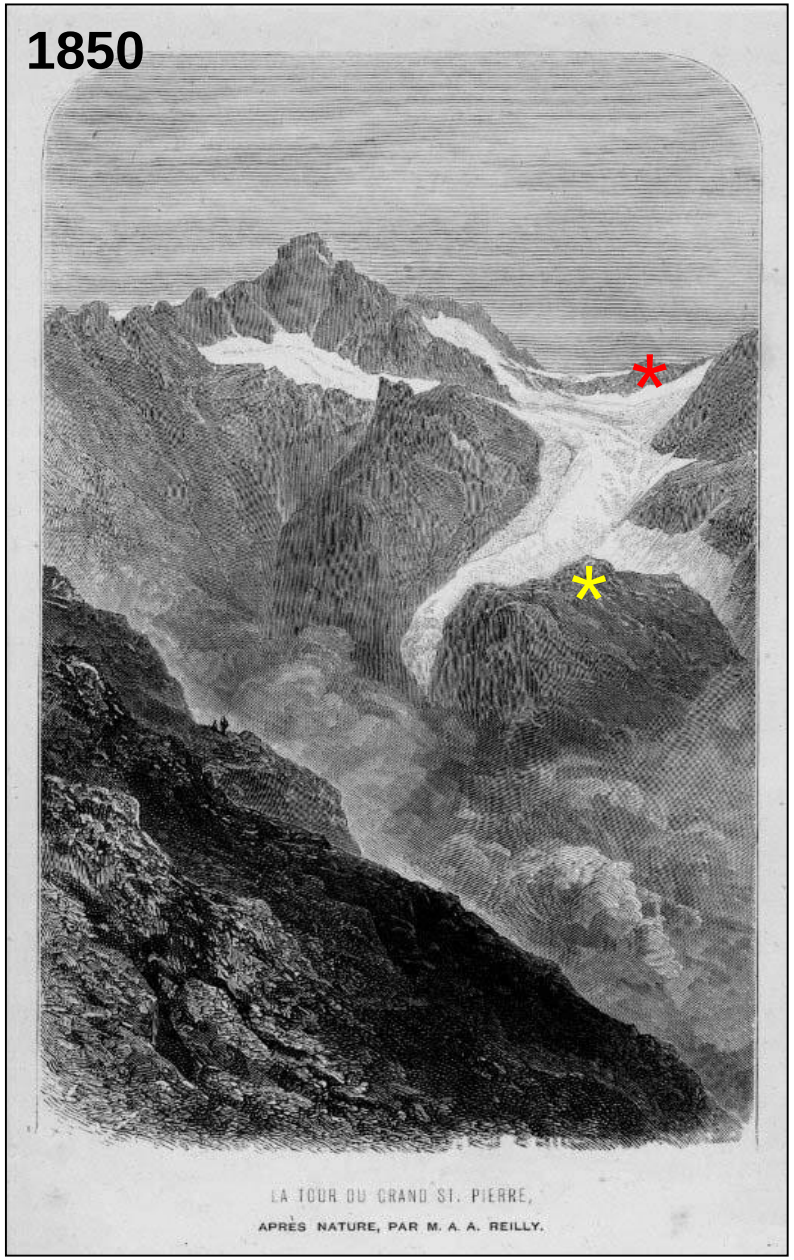
Ghiacciaio Pré de Bar (Monte Bianco):

ritiro della fronte di oltre 800 m dal 1897 al 2015

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

Ghiacciaio Meridionale del Sabbione (Ossola) dalla diga.

Regresso frontale circa 1200 m.



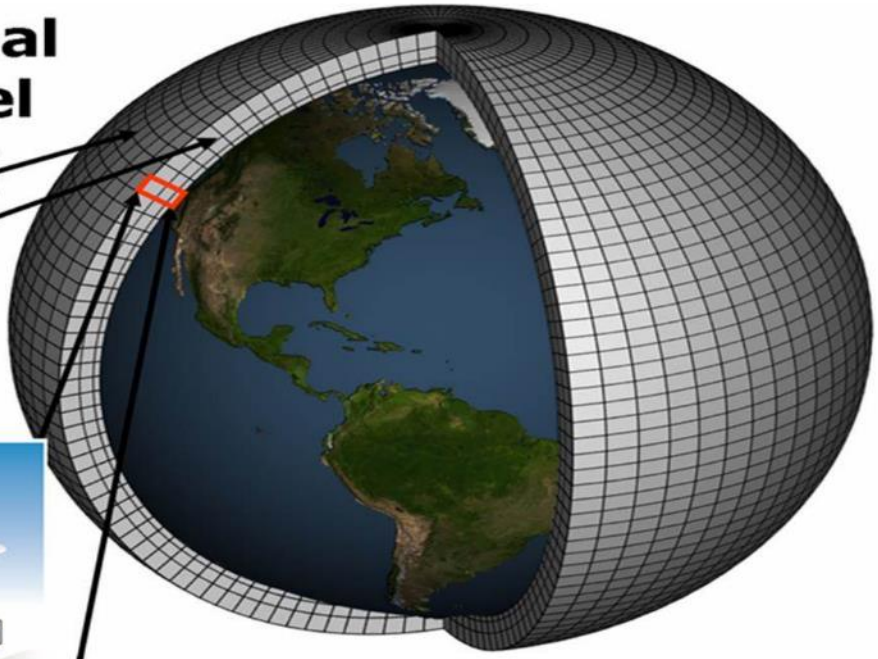
Ghiacciaio di Teleccio (Gran Paradiso)

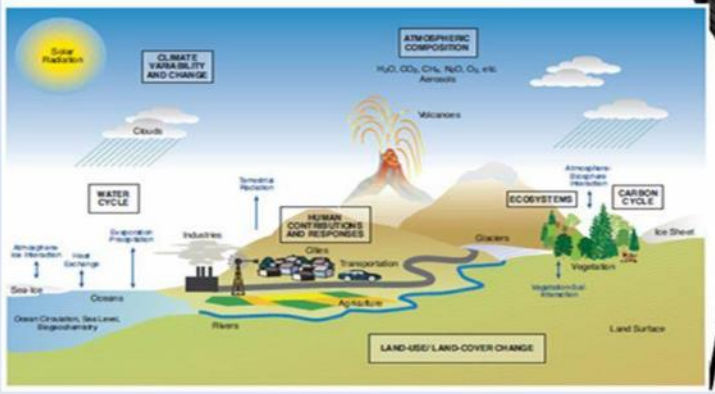
Global Climate Models

Schematic for Global Atmospheric Model

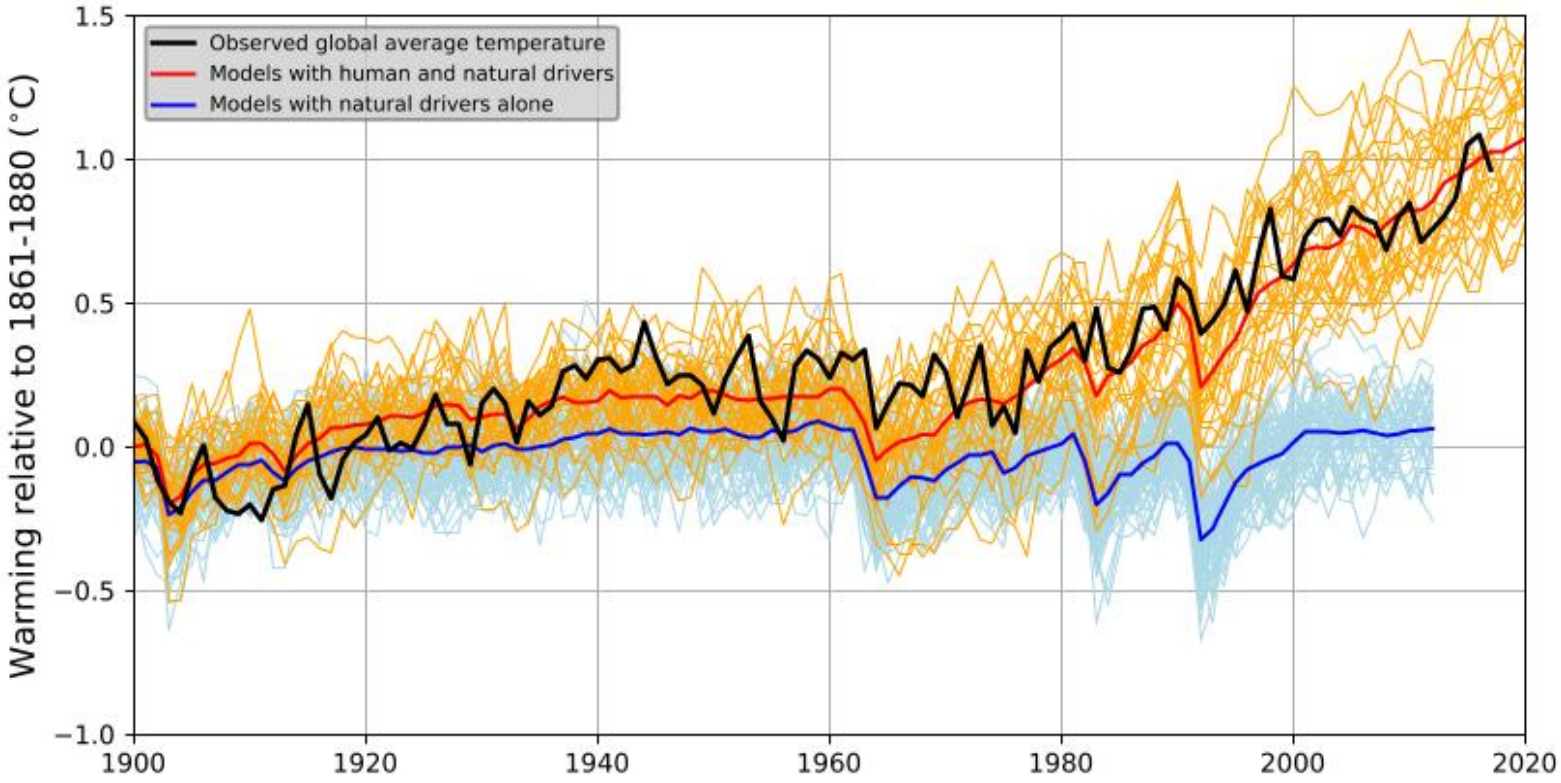
Horizontal Grid (Latitude-Longitude)

Vertical Grid (Height or Pressure)





Climate models reproduce observed warming only when human influences are included

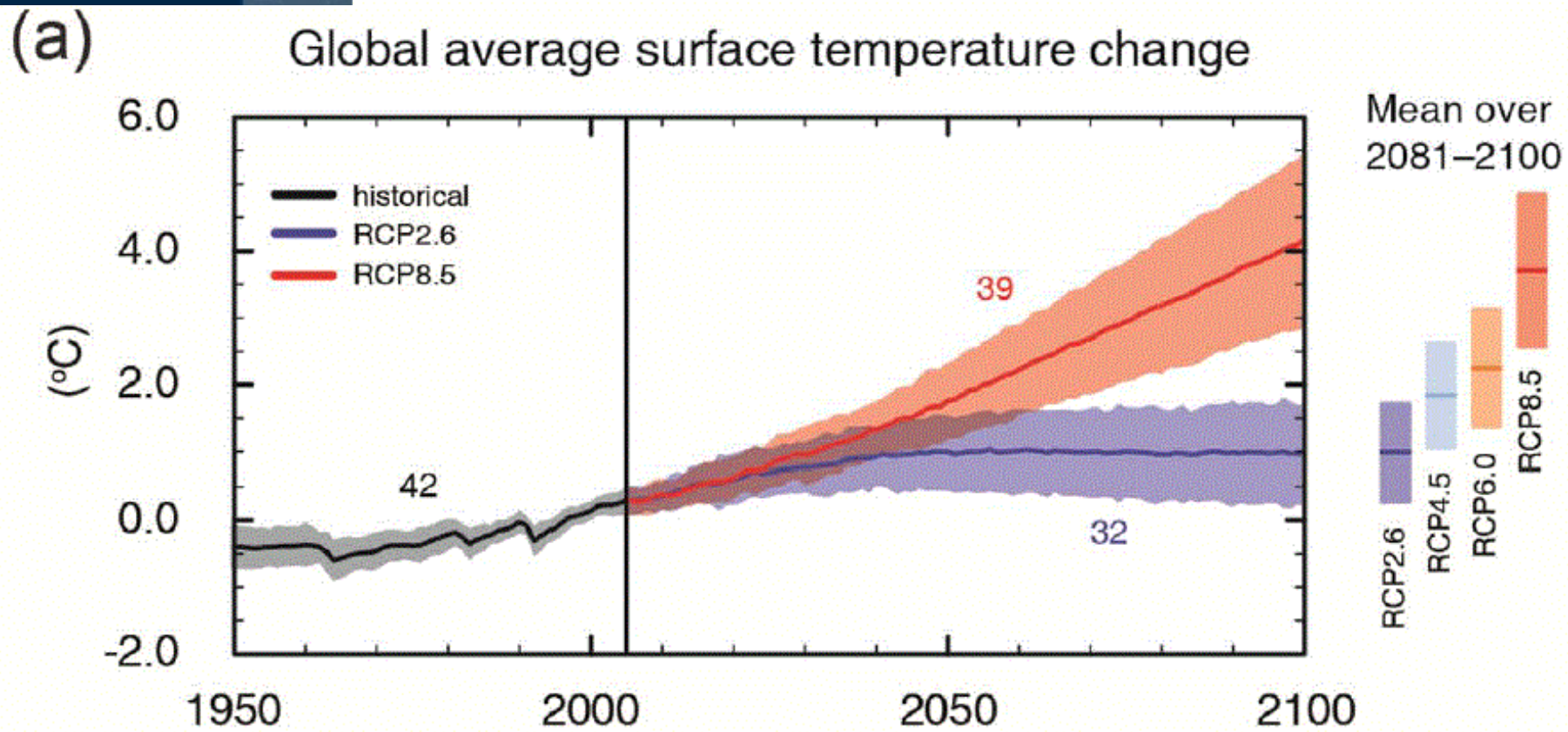


Richardson et al, 2017

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

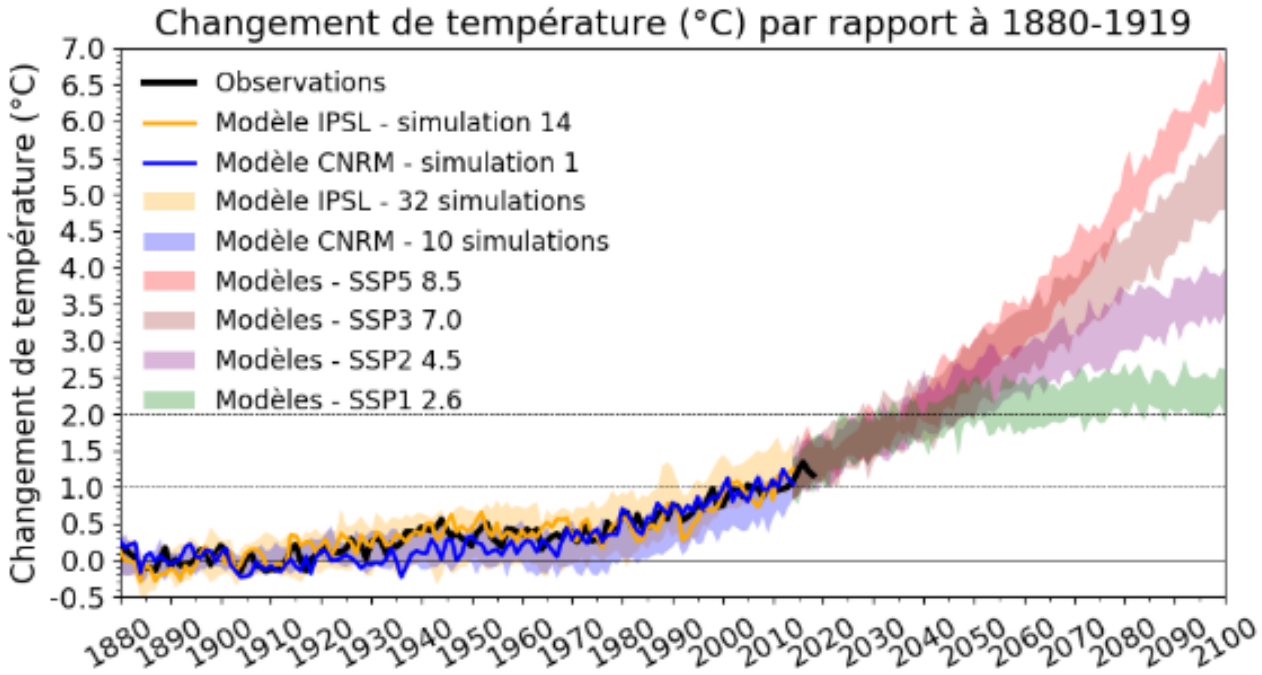
Scenari 5° rapporto IPCC (AR5 2013):

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



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

&

Depuis 80 ans, nos connaissances bâtissent de nouveaux mondes

METEO FRANCE

cea

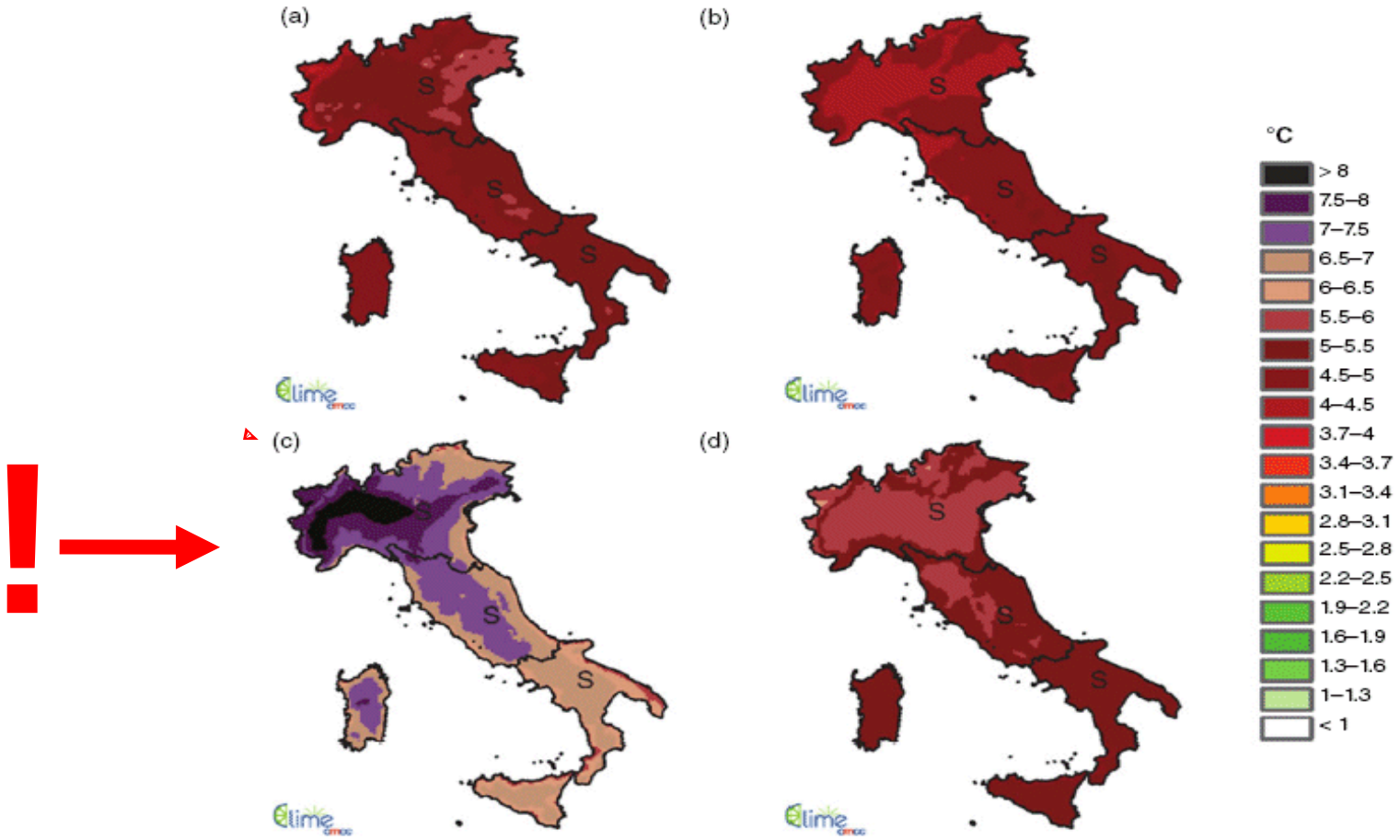


Figure 9. Temperature climate projections, RCP8.5: seasonal differences (°C), between the average value over 2071–2100 and 1971–2000 for (a) DJF, (b) MAM, (c) JJA and (d) SON (S, significant; NS, not significant).

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

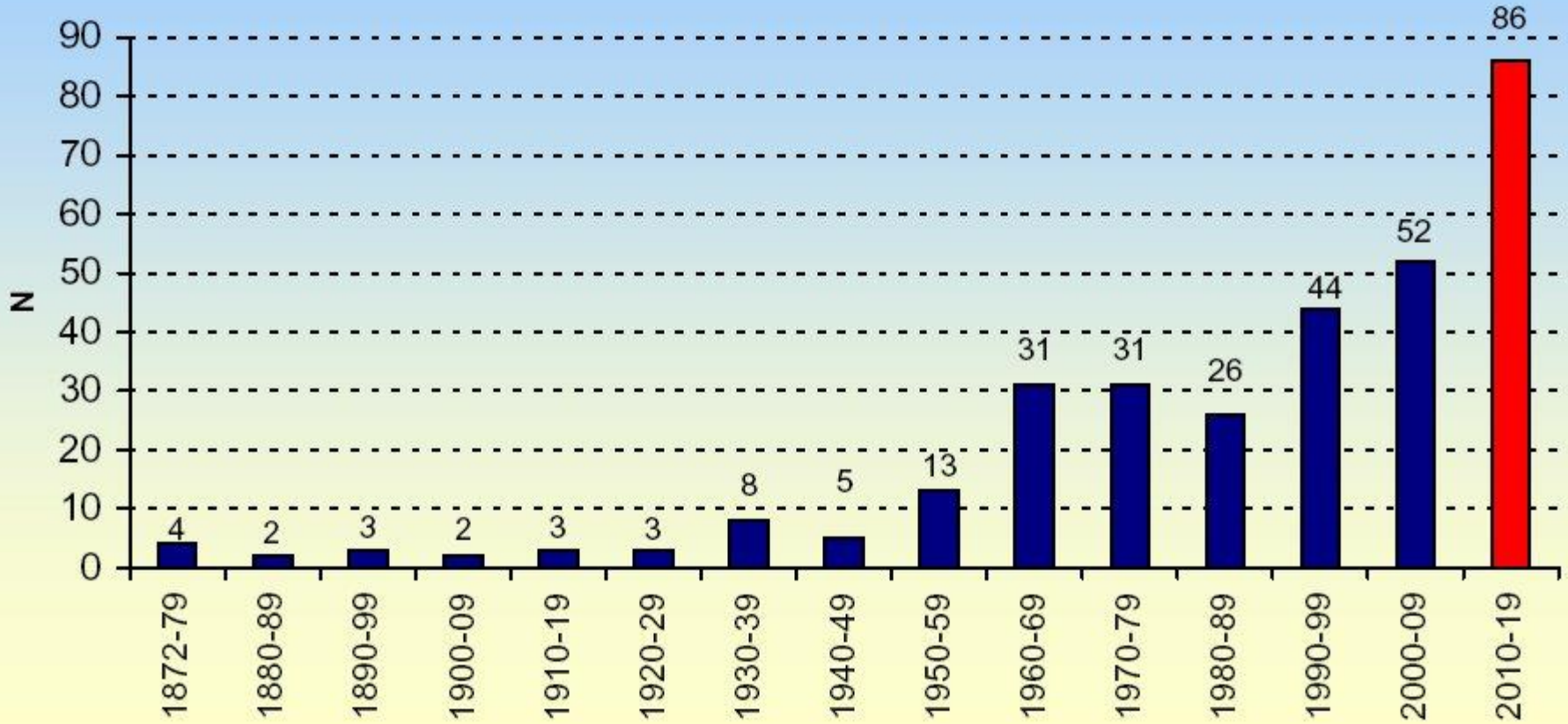
Bucchignani et al. (2015) *High-resolution climate simulations with COSMO-CLM over Italy*, Int. J. Climatol.

Aumento livello marino:
a rischio laguna veneta e delta del Po

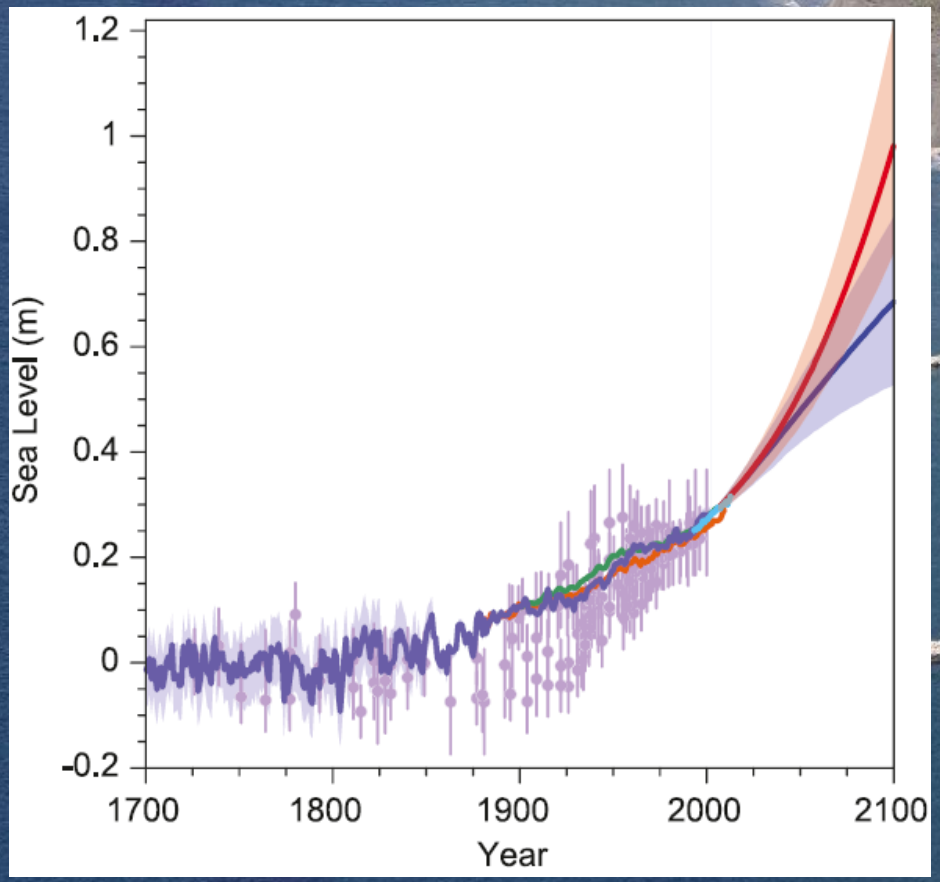

May You
Live In
Interesting
Biennale
Arte 2019
11 Maggio
24 Novembre
Venezia
VE 9318

Distribuzione decennale delle alte maree >= 110 cm a Venezia-Punta della Salute dal 1872 al 2019

(fonte: Centro Previsioni e Segnalazioni Maree, Comune di Venezia)

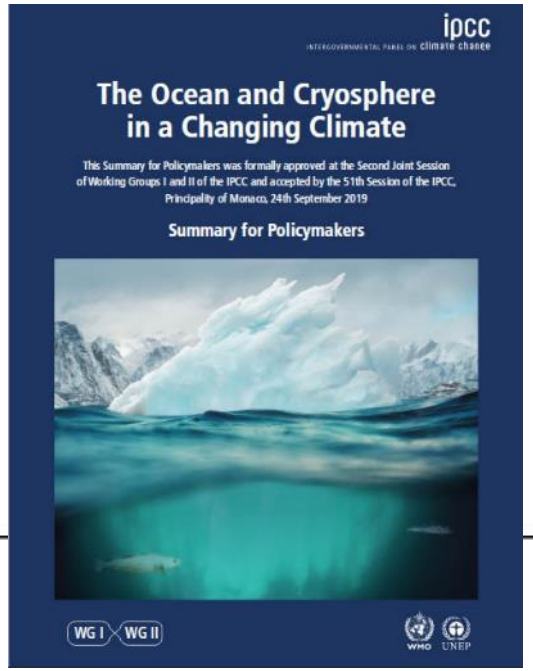


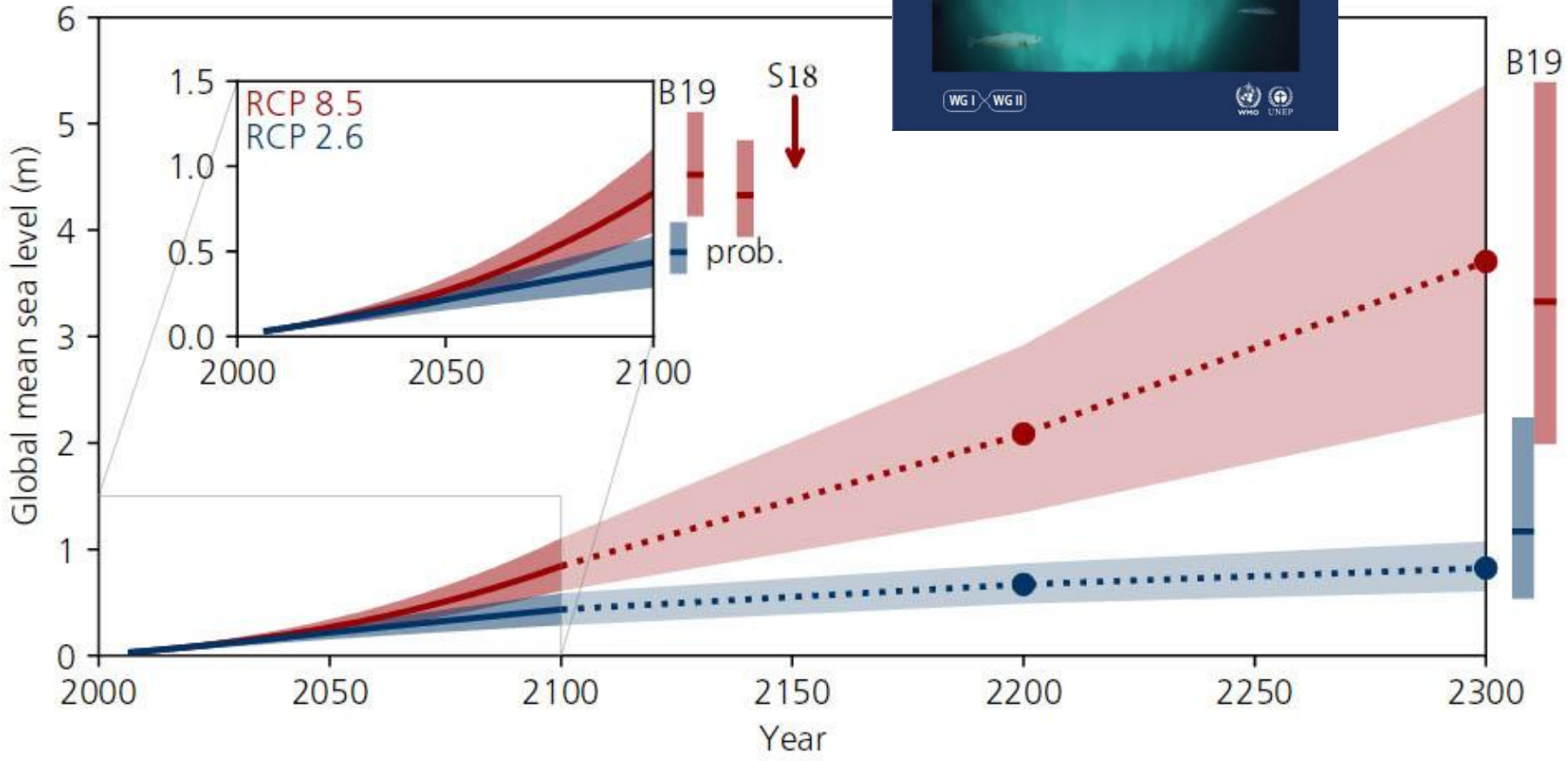
Le zone costiere risentiranno dell'aumento del livello marino, e dovranno essere adeguatamente protette (es: Venezia, delta del Po)



Settembre 2019 –
Rapporto IPCC Oceano e criosfera

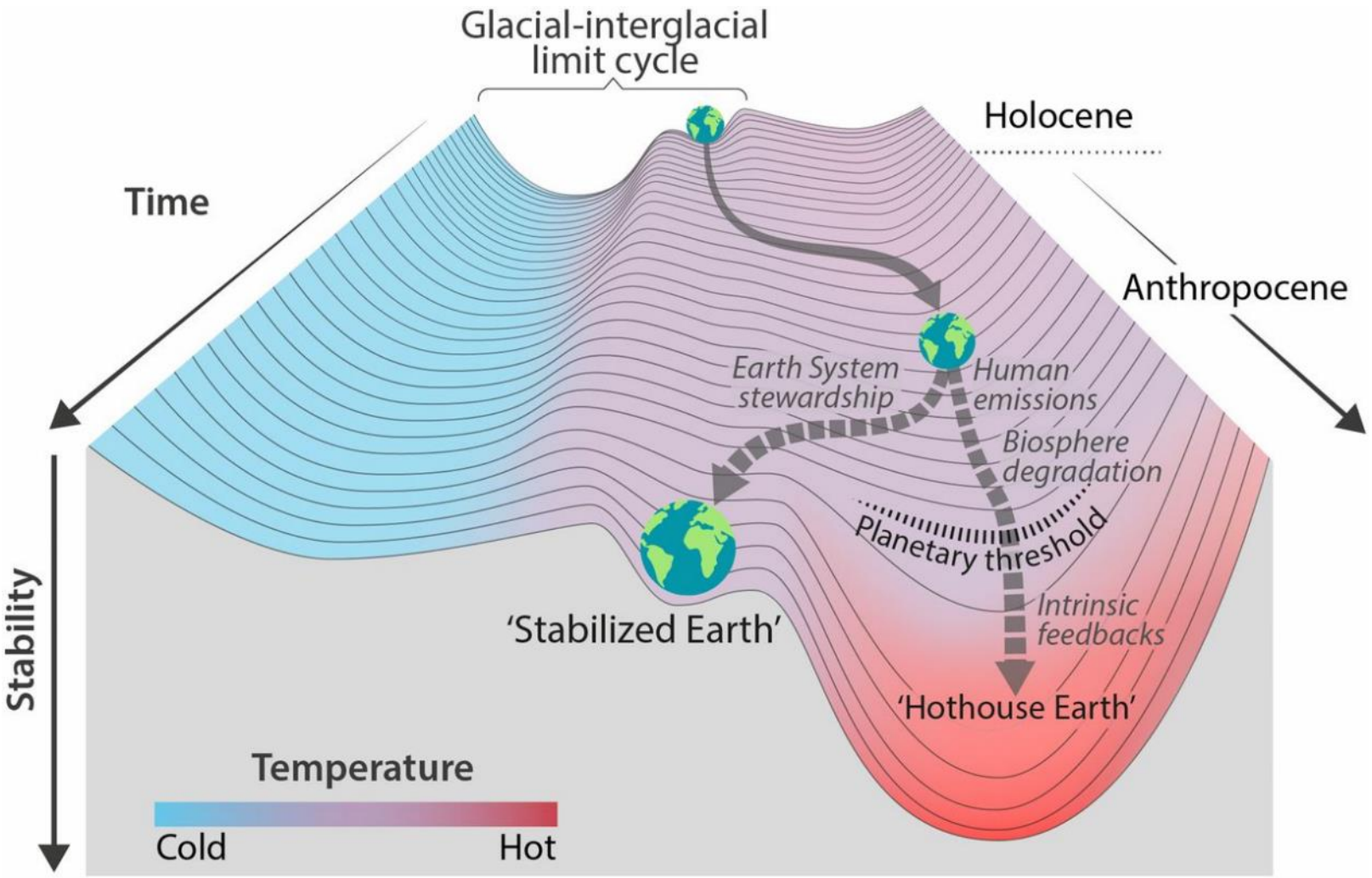
Fino a +5 m di livello marino nel 2300





Dallo studio dell'Enea: nei riquadri, i due valori indicano in millimetri di quanto potrebbe alzarsi il livello del mare sulla base di due scenari (di minore e maggiore gravità) che tengono conto di due fattori: i cambiamenti climatici (l'aumento della temperatura media della Terra e lo scioglimento dei ghiacciai) e le forze geologiche cui è sottoposta l'intera penisola.

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. PNAS doi:10.1073/pnas.1810141115

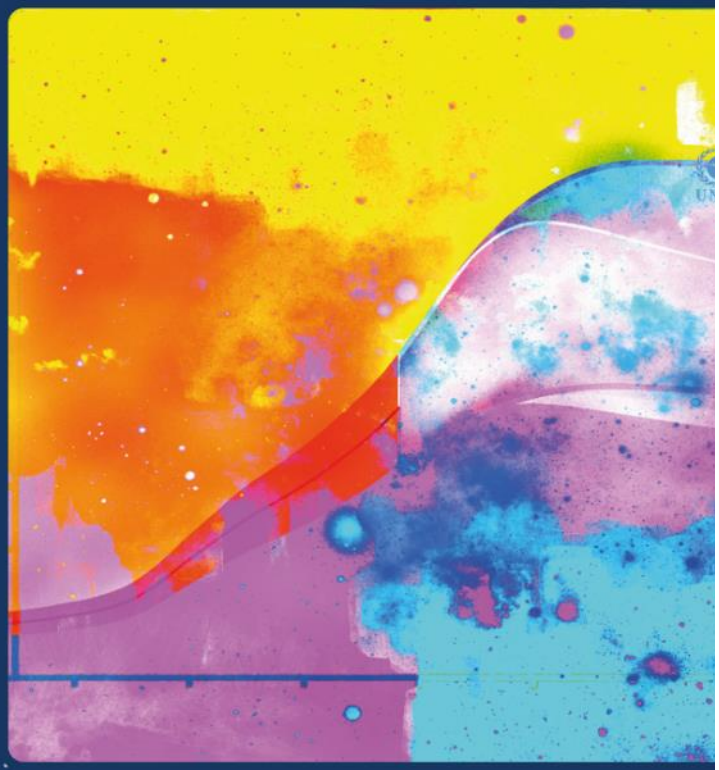
PNAS

ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

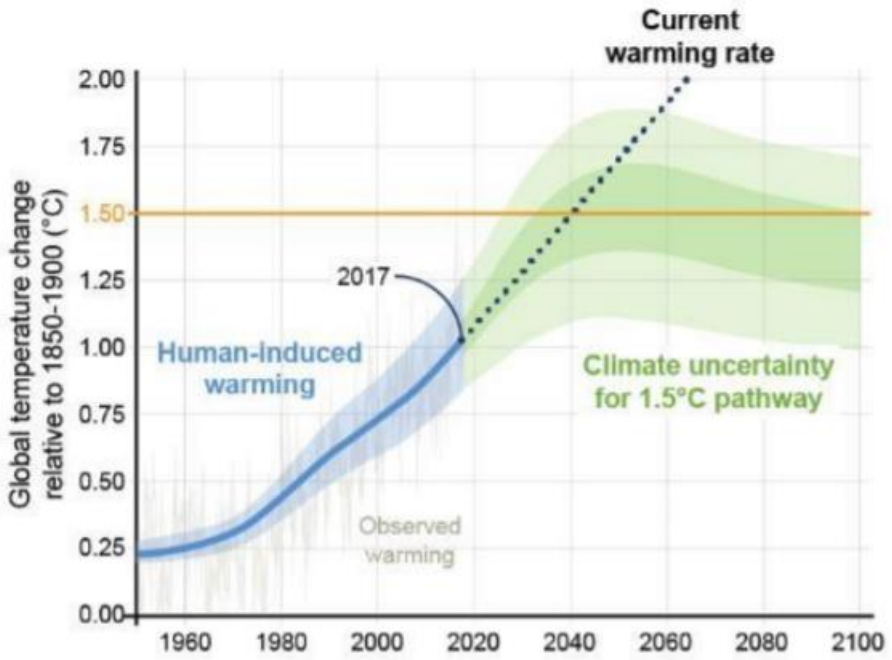
Global Warming of 1.5°C

An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.



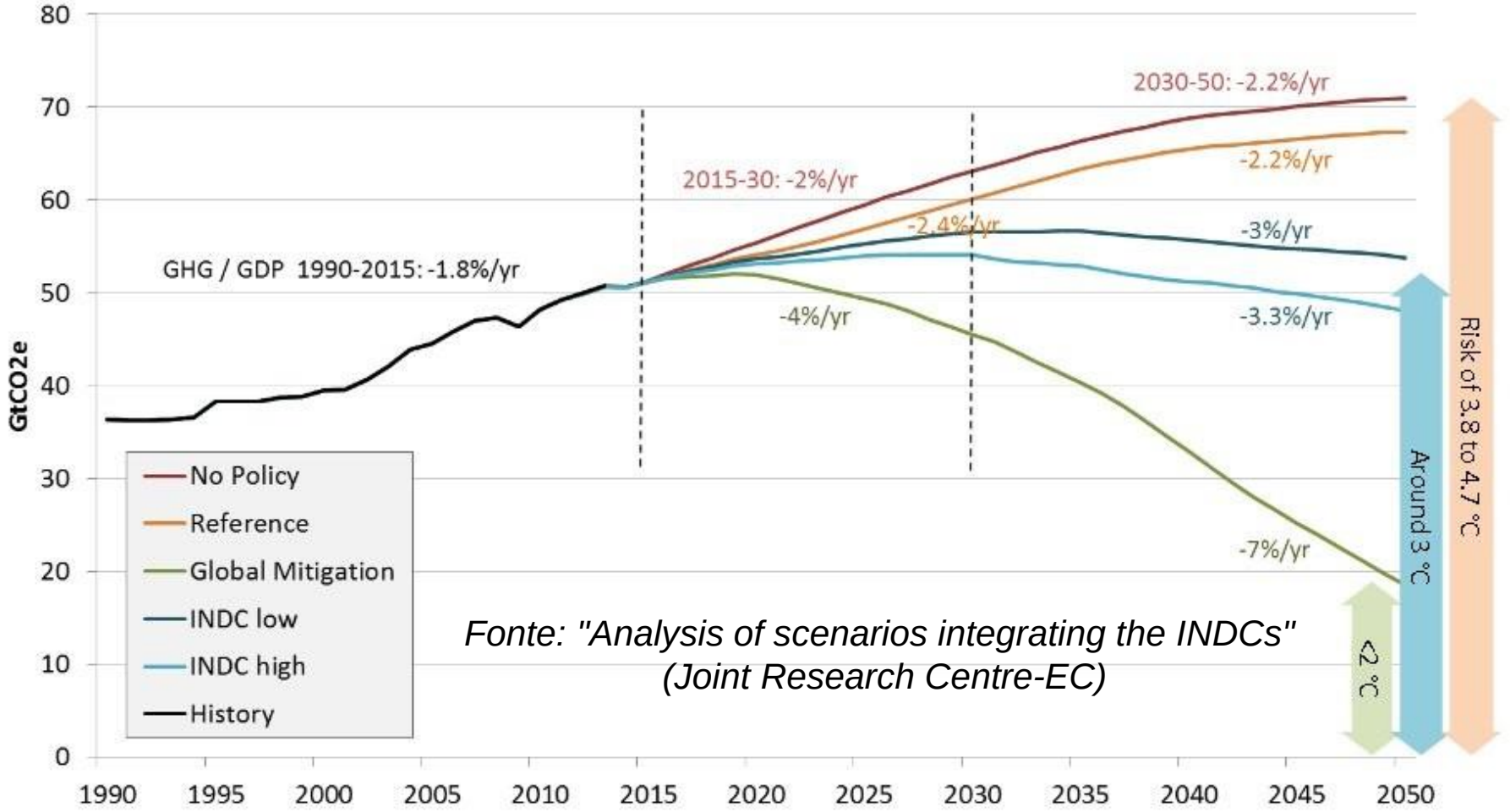
FAQ1.2: How close are we to 1.5°C?

Human-induced warming reached approximately 1°C above pre-industrial levels in 2017

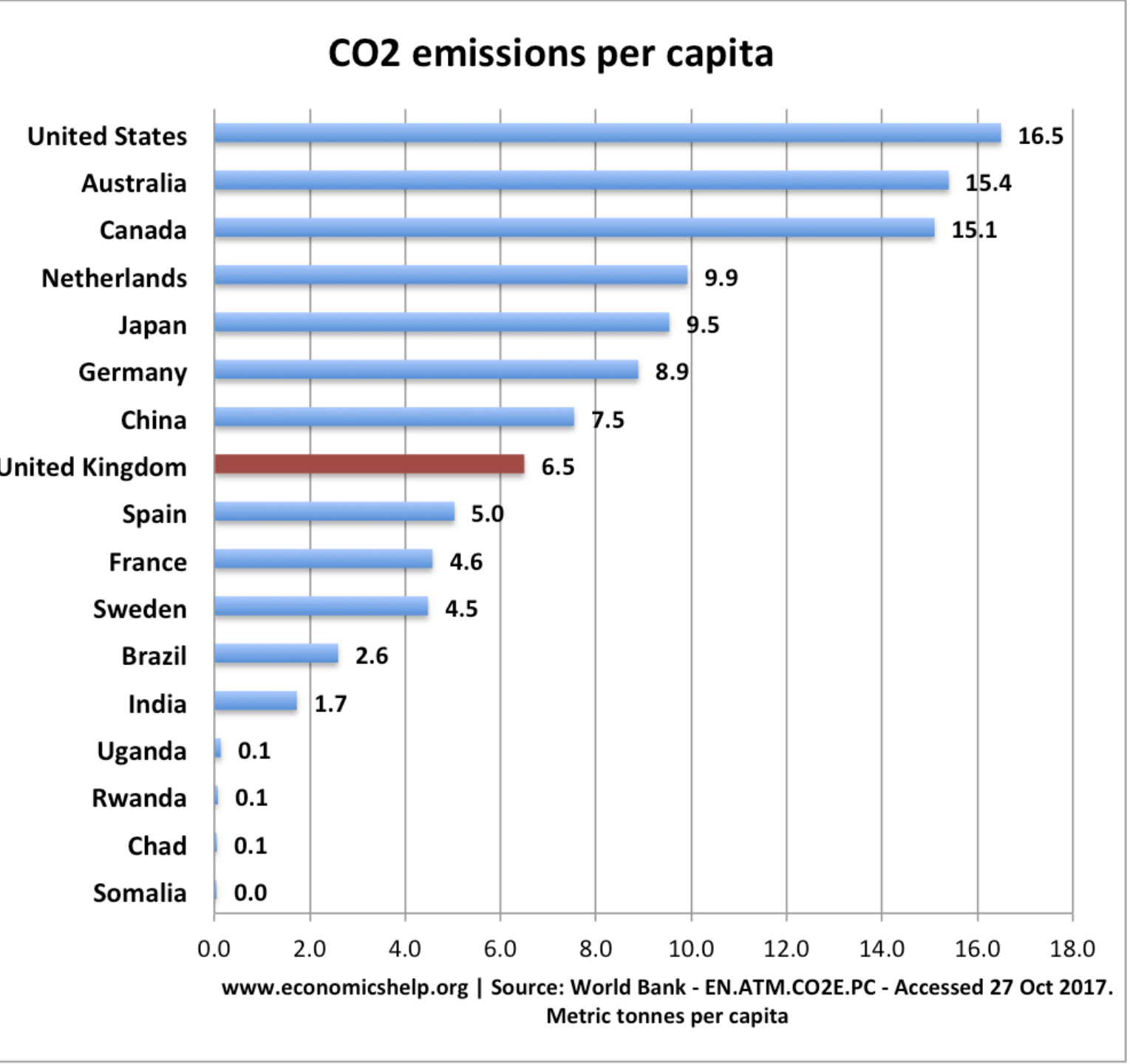


FAQ1.2, Figure 1: Human-induced warming reached approximately 1°C above pre-industrial levels in 2017. At the present rate, global temperatures would reach 1.5°C around 2040.

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)



2014

Italy 5.3 t

EU 6.4 t

Global mean 5.0 t

OIL & GAS SUPPLY AND STRANDED ASSET RISK

How does potential oil and gas supply compare to demand under different global warming outcomes?

B2DS demand

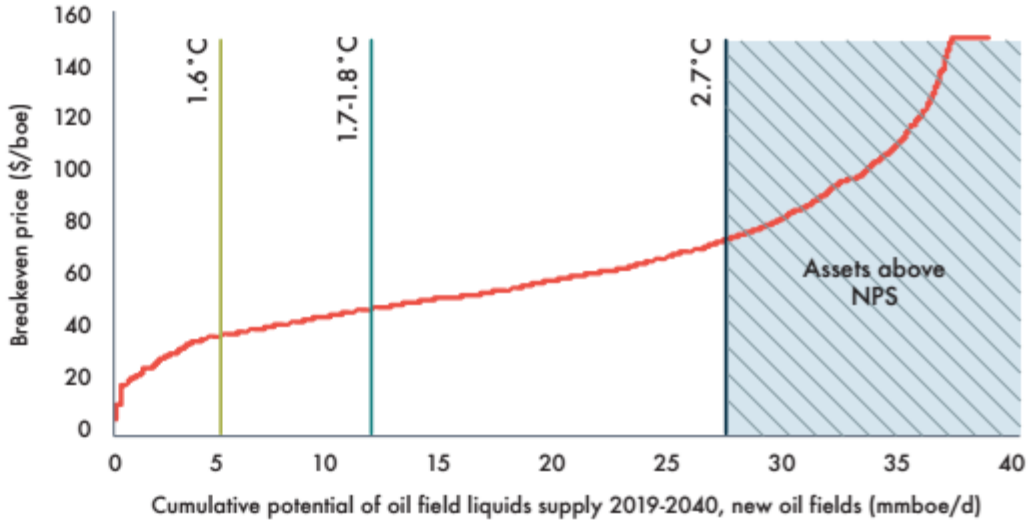
SDS demand

NPS demand

Production from new oil fields 2019-2040

The only way that fossil fuel companies can be "Paris-aligned" is to commit to not sanctioning projects that fall outside the remaining carbon budget constraint.

In the context of the energy transition towards a decarbonised economy, these potential fossil fuel developments risk destroying investor value as well as the climate.



Source: Rystad Energy, IEA, CTI analysis

Share of capital expenditure at risk of stranding in each scenario (2019-2030)

1.5°C warming

In a 1.5°C world, no new oil & gas project would be compliant

If no CCS is assumed, 1.5°C warming is delivered by existing projects alone.

The oil and gas in projects that have already been sanctioned will take the world past 1.5°C, assuming carbon capture and storage remains sub-scale. Without a response sufficient to prematurely close existing projects, a warming of a warming of 1.5°C is already effectively locked in, and no new projects are compliant with the low end of the Paris goals.

Source: 'Breaking the Habit - Why none of the large oil companies are "Paris-aligned", and what they need to do to get there', Carbon Tracker, Sep 2019

Oil and gas companies have approved $50 billion of investment since 2018 in major projects that undermine climate targets and threaten shareholder returns

Largest non-Paris compliant projects sanctioned by oil and gas majors since 2018

Carbon Tracker has identified $50 billion of investment in 19 major projects that are not even consistent with a 1.7-1.8 °C pathway and would require oil prices of nearly $60 per barrel or more to deliver adequate returns. They include:

Resource theme	Project	IOC partners	2019-2030 capex	Country	Scenario compliant	
	LNG Canada T1, T2	Shell	**$13** bn	Canada	No	No
	Gorgon/Jansz Stage 2	Shell, Chevron, ExxonMobil	**$3.6** bn	Australia	No	No
	Aspen Phase 1	ExxonMobil	**$2.6** bn	Canada	No	No
	Amoca FFD	Eni	**$1.4** bn	Mexico	No	No
	Zinia 2	BP, ExxonMobil, Total, Equinor	**$1.3** bn	Angola	No	No

Source: Rystad Energy, IEA, CTI analysis

Investment decisions on a further $21 billion in 12 projects inconsistent with a low-carbon world are due this year.

These projects represent an imminent challenge for investors and companies looking to align with climate goals.

Demand / global warming scenarios:

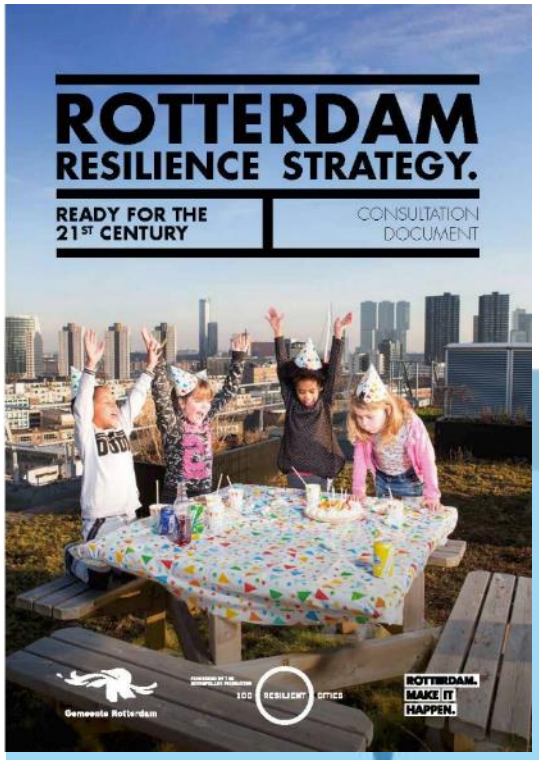
B2DS	SDS	NPS
1.6 °C	1.7 - 1.8 °C	2.7 °C

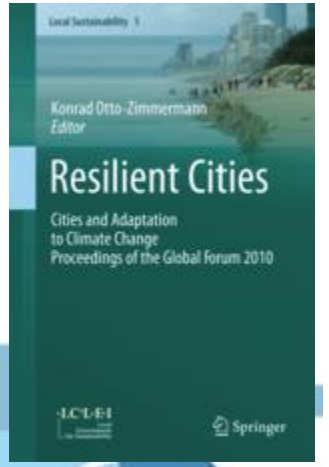

The Economist
Iran's dangerous game
Lessons from a Wall Street titan
Why rent controls are wrong-headed
Goddess of the Taiwan Strait
SEPTEMBER 21ST–27TH 2019
The climate issue
1850
1900
1950
2000

“physical risks related to climate change can severely damage our economies, for example through the large cost of repairing infrastructure and coping with uninsured losses.”

www.bis.org/publ/othp31.pdf

Città resilienti e sostenibili



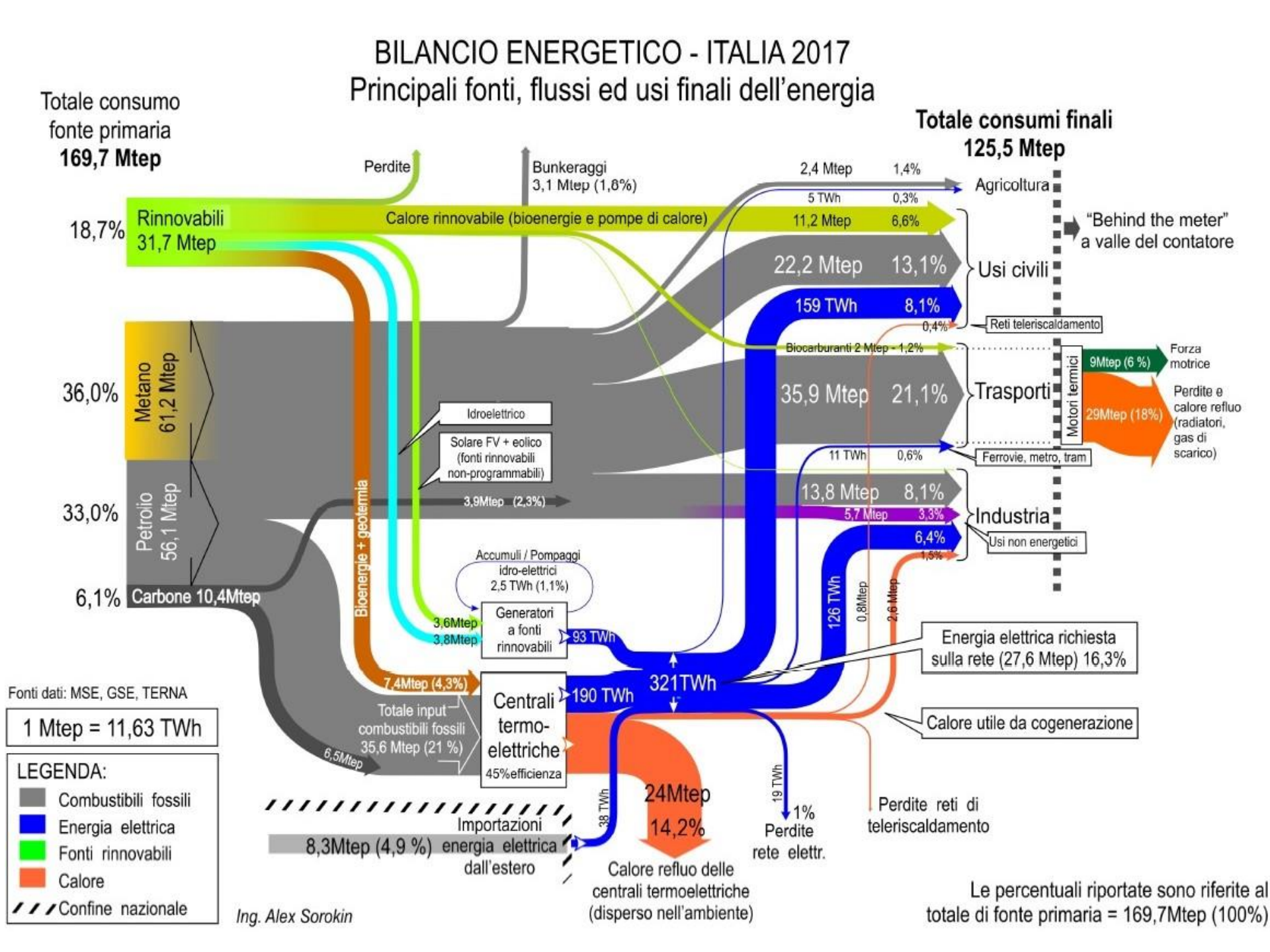


The Risks

As more people and assets become rapidly concentrated in cities and as infrastructure struggles to keep up with rapid growth, the risk from natural disasters and climate change is rising.


Mitigazione = riqualificazione per efficienza
energetica e minori emissioni
Più energie rinnovabili ed
efficienza energetica abitazioni

BILANCIO ENERGETICO - ITALIA 2017
Principali fonti, flussi ed usi finali dell'energia

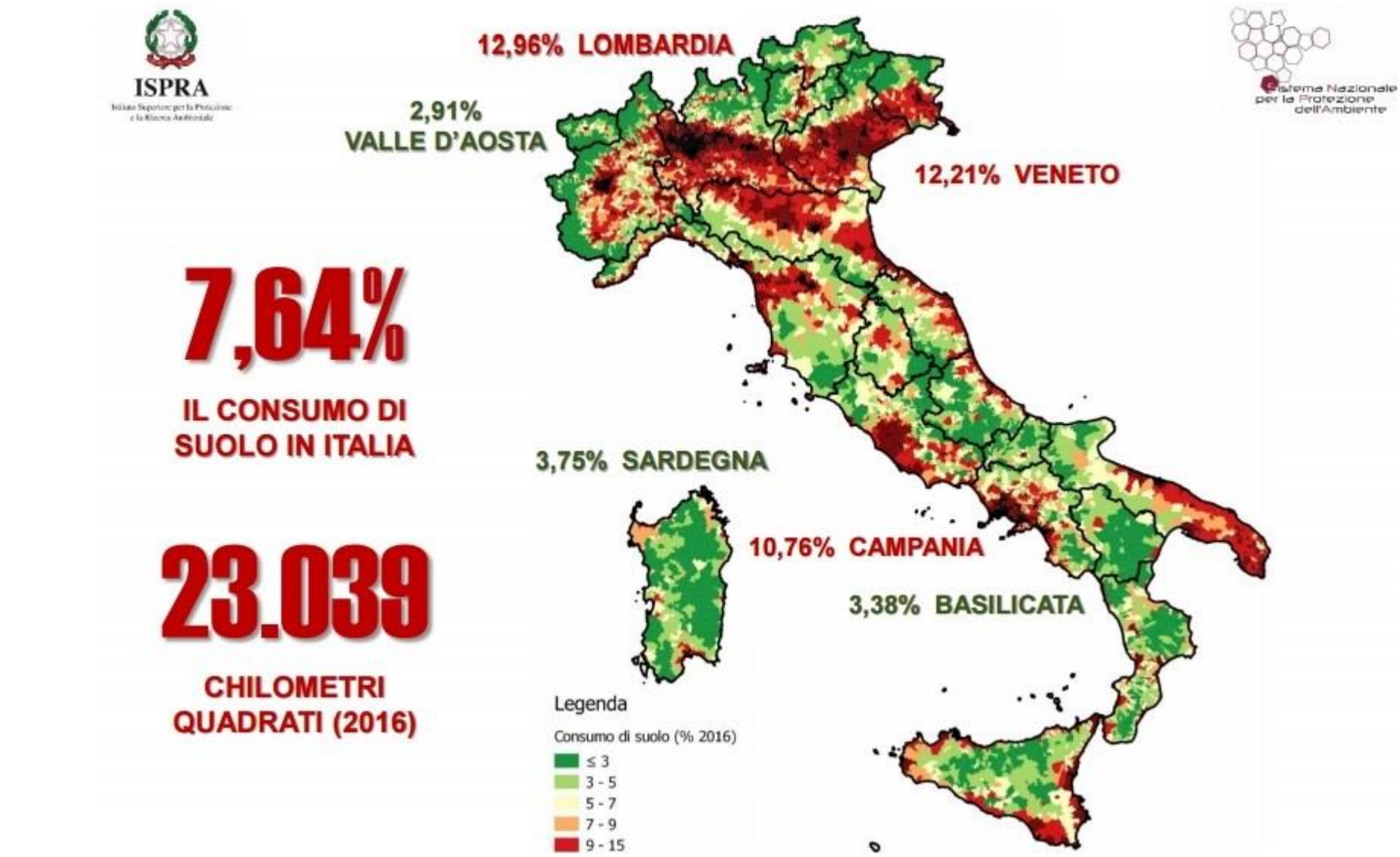


Favorire mobilità elettrica

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

Fermare la cementificazione, il suolo non è infinito!



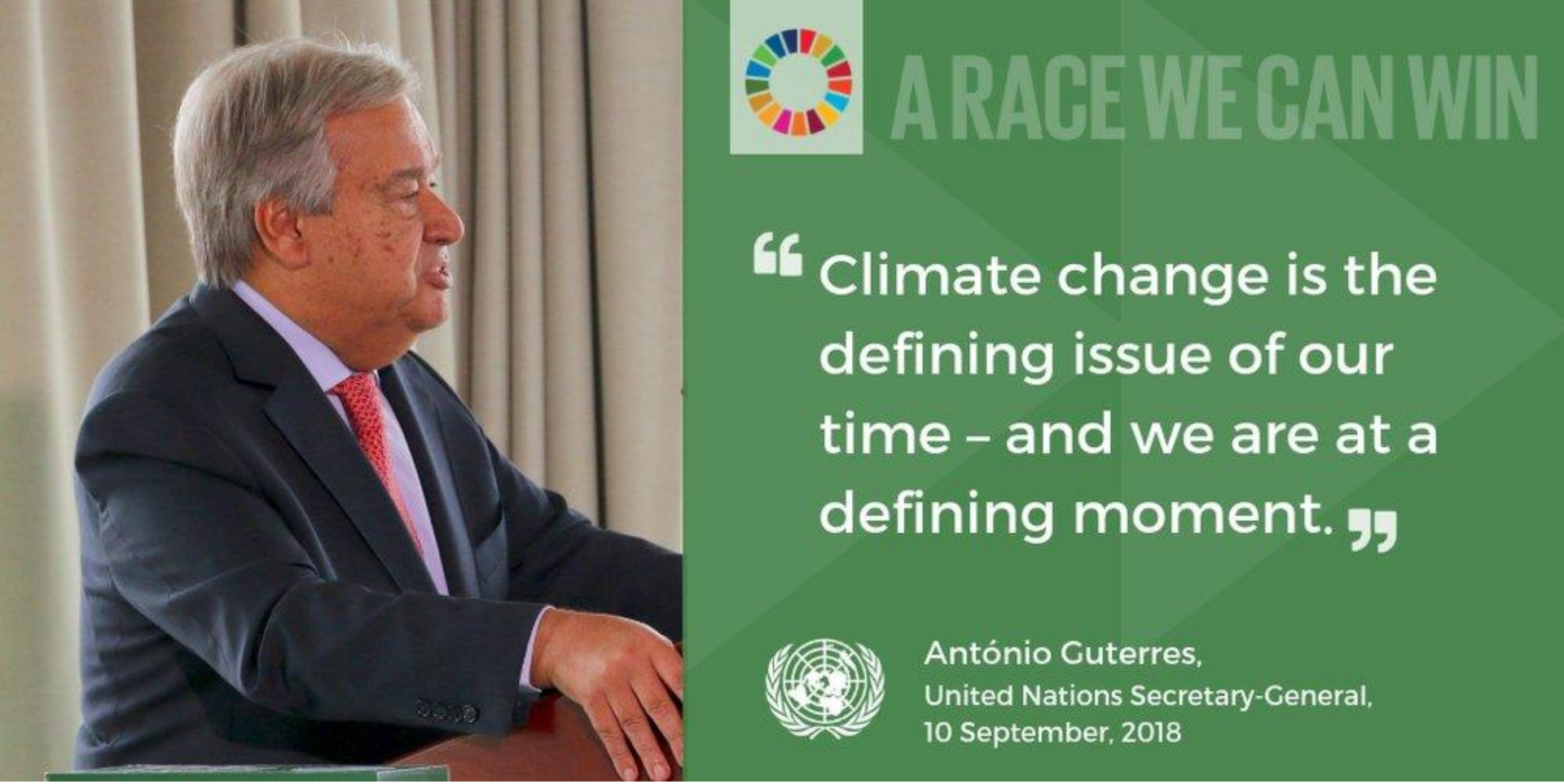
Al lavoro! Gli obiettivi UN dell'Agenda 2030

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

“The wedding cake” - organizzazione gerarchica dei Sustainable Development Goals (SDGs) - Da Johan Rockström and Pavav Sukhdev - Stockholm Resilience Centre

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



“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.”

A RACE WE CAN WIN

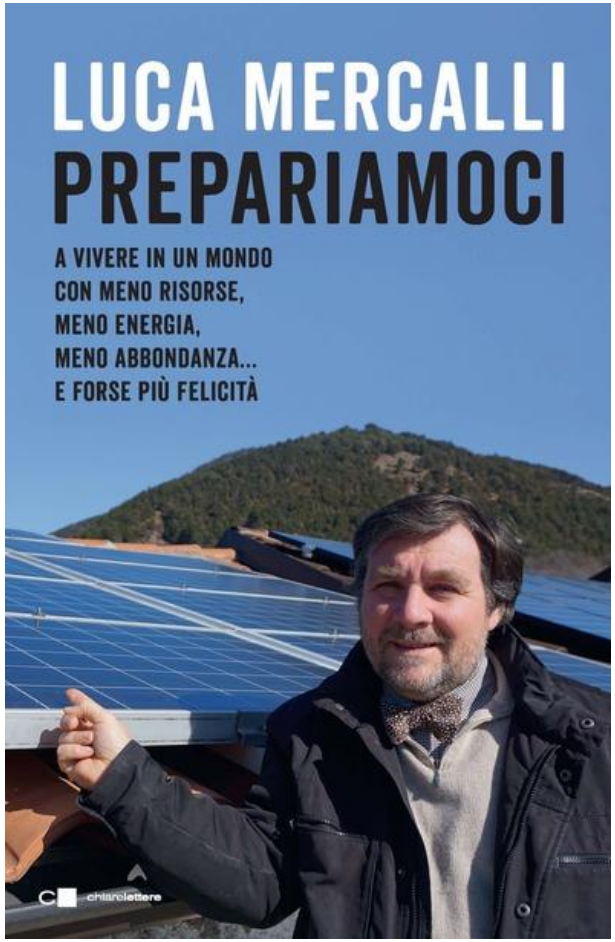
"The transition to a cleaner, greener future needs to speed up. We stand at a truly "use it or lose it" moment."

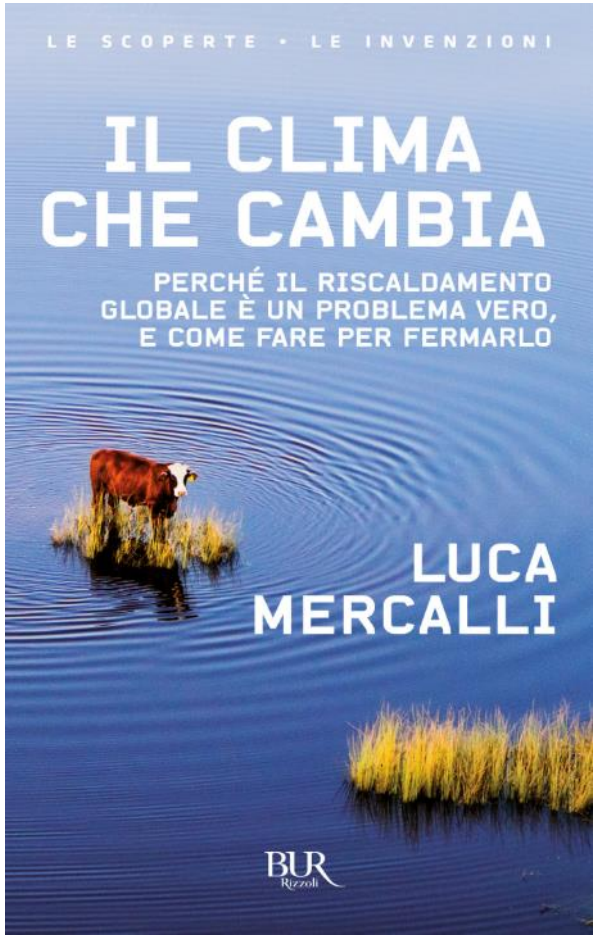
António Guterres,
United Nations Secretary-General,
10 September, 2018

Il tempo è il fattore critico di successo.
Dobbiamo accelerare la transizione!

The only question is how to communicate the gravity of our situation to the non-scientific public. In the words of Kaisa Kosonen, an observer at the negotiations, “Scientists might want to write in capital letters, ‘ACT NOW, IDIOTS,’ but they need to say that with facts and numbers.”


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