

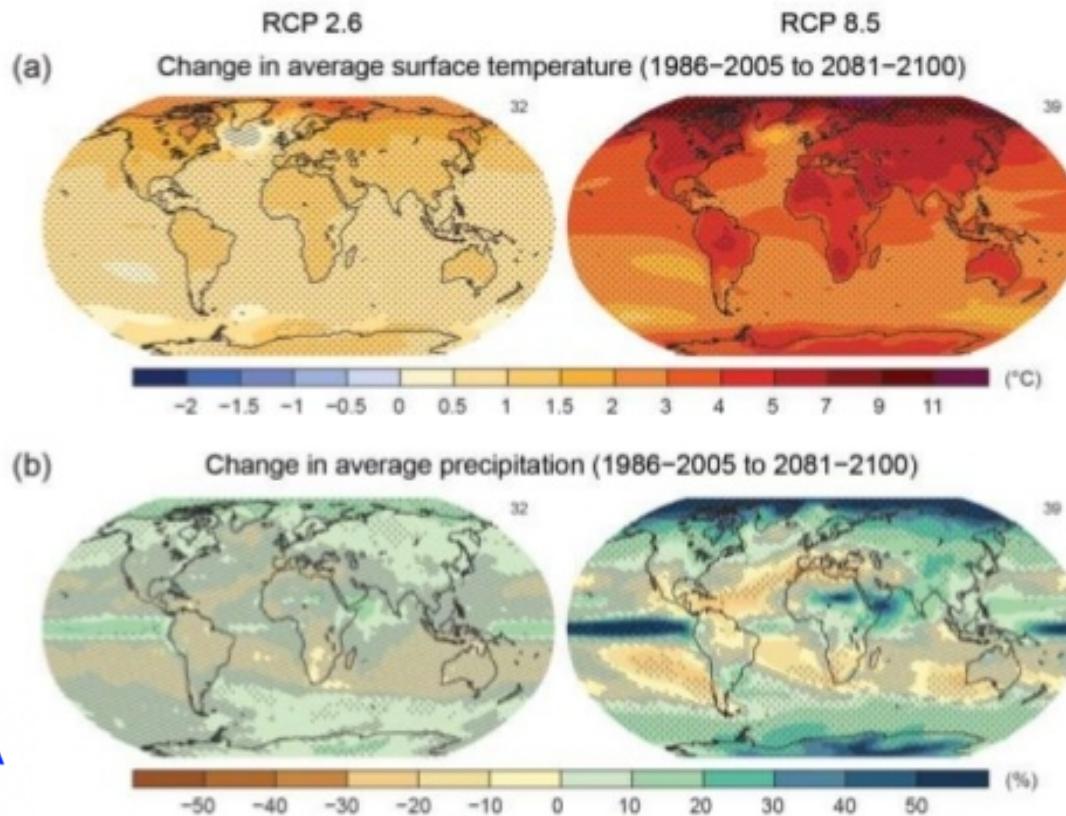
# Gli scenari climatici del futuro

Luca Mercalli – Società Meteorologica Italiana  
[www.nimbus.it](http://www.nimbus.it)

**Figure SPM.8a,b**

Maps of CMIP5 multi-model mean results

All Figures © IPCC 2013



## Article Contents

[Energy](#)[Short-lived pollutants](#)[Nature](#)[Food](#)[Economy](#)[Population](#)[Conclusions](#)[Contributing reviewers](#)[Funding](#)[Project website](#)[Supplemental material](#)[References cited](#)

## World Scientists' Warning of a Climate Emergency



William J Ripple , Christopher Wolf , Thomas M Newsome, Phoebe Barnard, William R Moomaw [Author Notes](#)

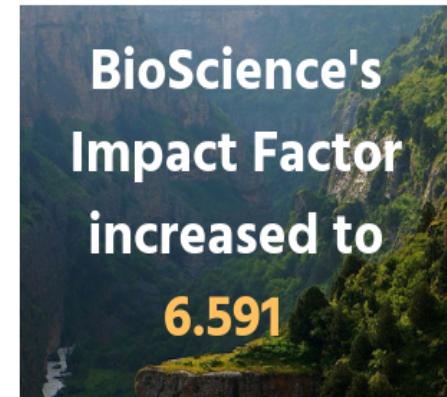
*BioScience*, biz088, <https://doi.org/10.1093/biosci/biz088>

**Published:** 05 November 2019

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**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

[View Metrics](#)

**Email alerts**

# 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.**

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<sup>4</sup> aligns with those of the recent IPCC report<sup>2</sup>. 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



CHRIS  
MADDEN  
COPYRIGHT

### 65 million years BC

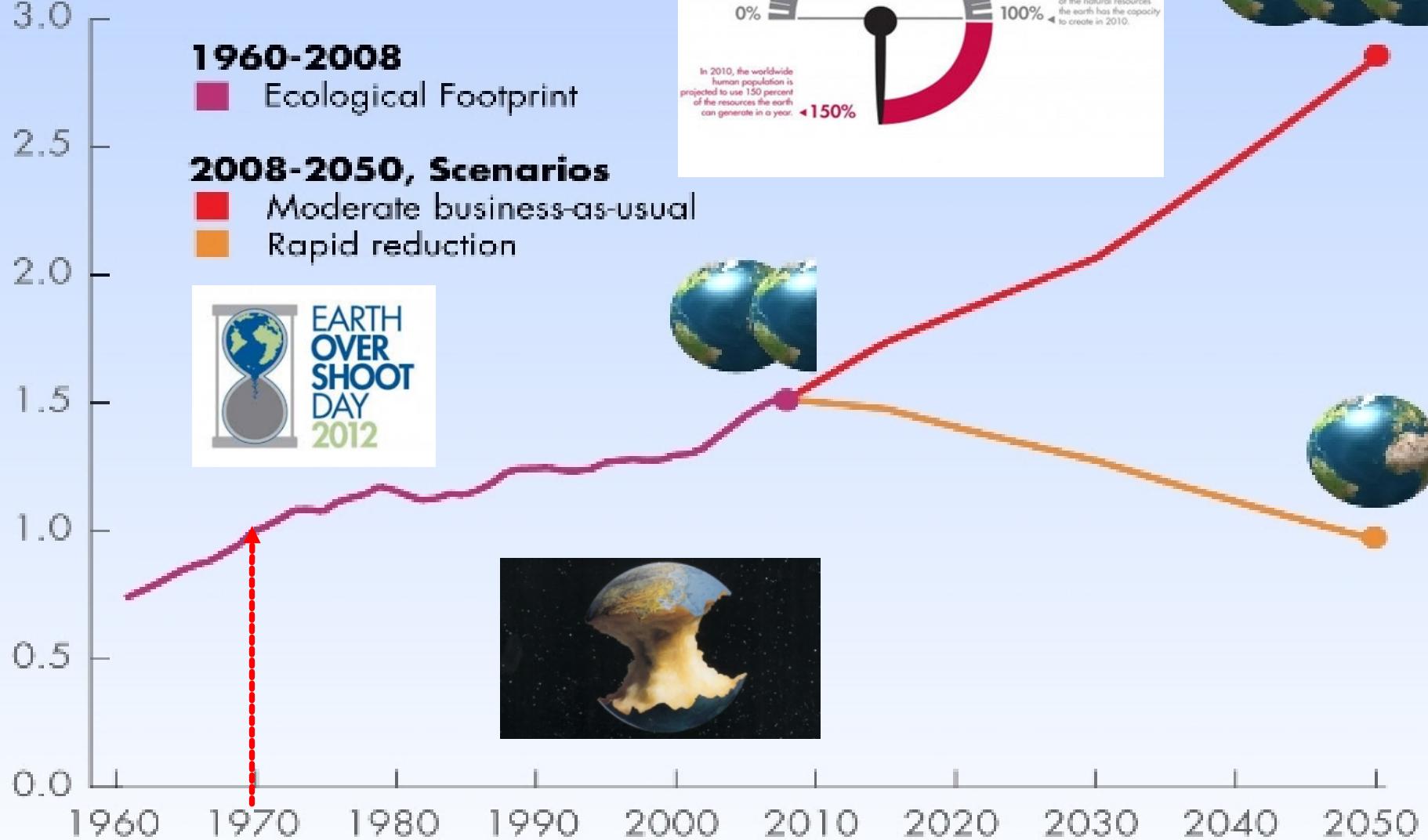
A layer of iridium in the rock strata marks the point above which dinosaur fossils are very rare.

The cause of the iridium layer is implicated in the demise of the dinosaurs



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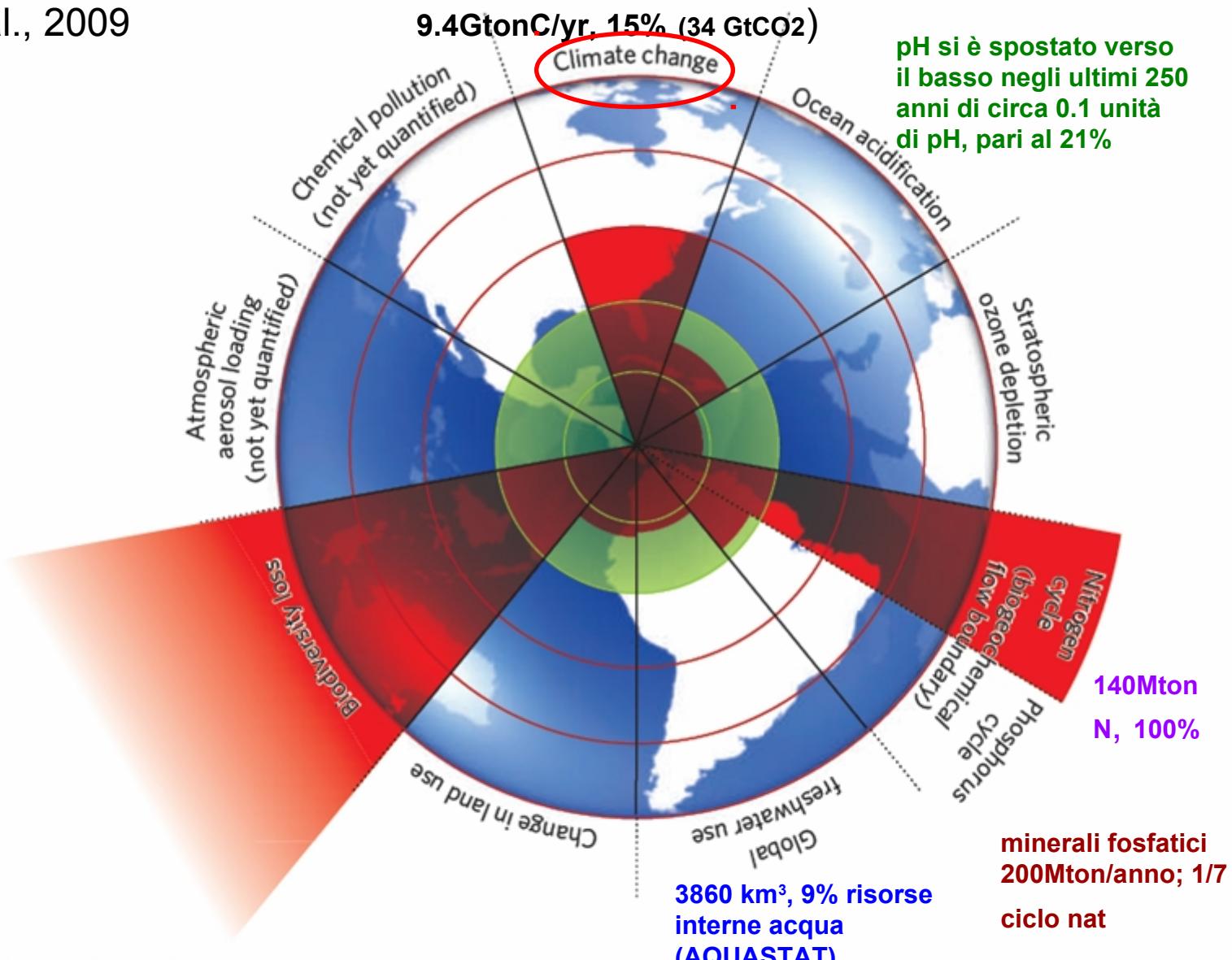
CHRIS MADDEN



y-axis: number of planet earths, x-axis: years

## A safe operating space for humanity

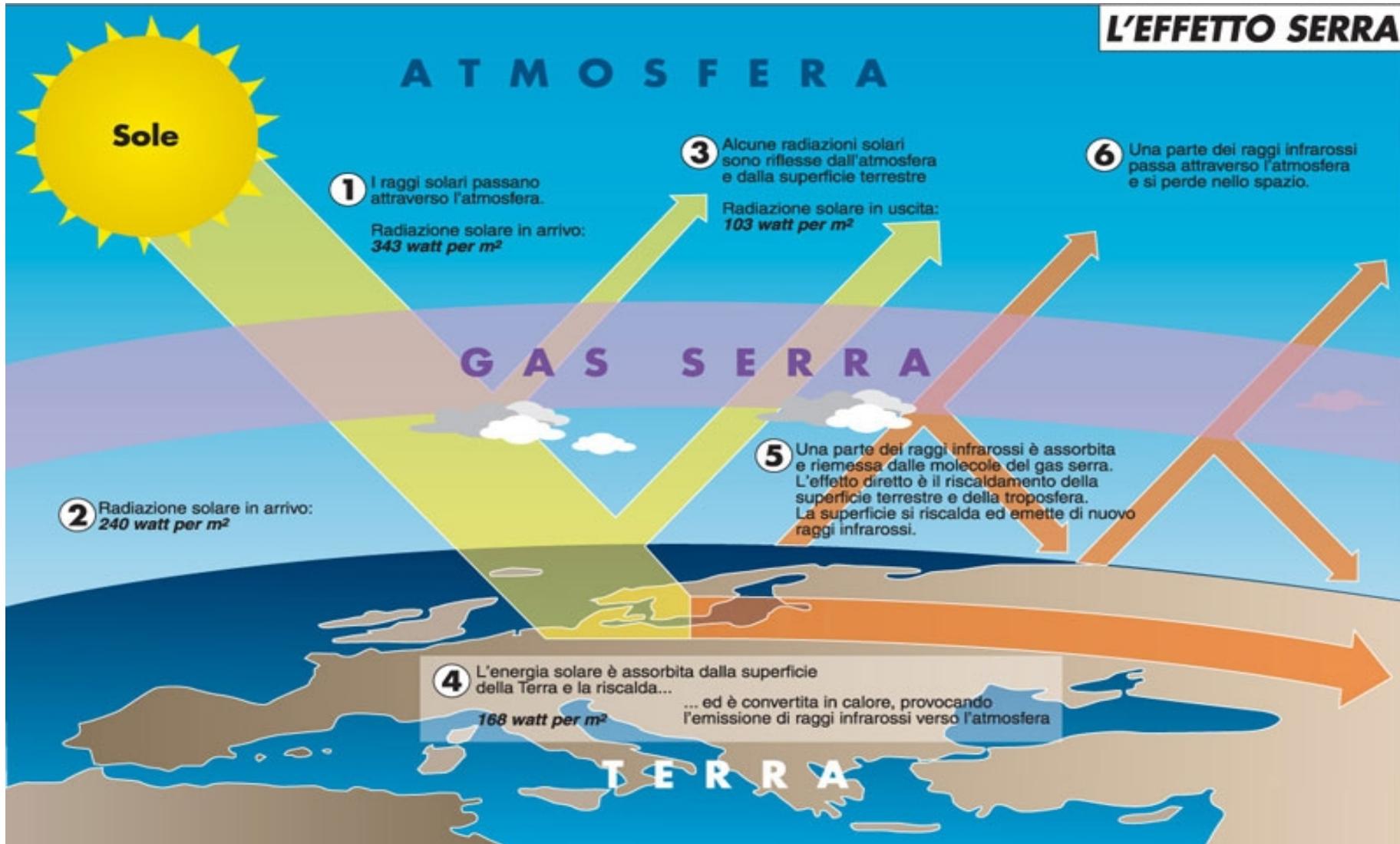
Identifying and quantifying planetary boundaries that must not be transgressed could help prevent human activities from causing unacceptable environmental change, argue **Johan Rockström** and colleagues.



**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.

# Terra senza effetto serra -18 °C

# Con effetto serra naturale +15 °C



Tyndall † in particular has pointed out the anomalous importance of the atmosphere in this respect. In him it was chiefly the diurnal and annual variations of the temperature that were lessened by this circumstance. Another side of the question, that has long attracted the attention of physicists, is this: Is the temperature of the ground in any way influenced by the presence of heat-absorbing gases in the atmosphere? Fourier maintained that the atmosphere acts like the glass of a heated house, because it lets through the bright rays of the sun but retains the dark rays from the ground. This idea was elaborated by Pouillet §; and Langlois ||, in his researches led to the conclusion that the temperature of the earth **XXXI. On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground.** By Prof. SVANTE ARRHENIUS. Low, would probably fall to  $-200^{\circ}$  C.,



**Svante August Arrhenius**  
(Nobel prize, Chemistry, 1903)

Developed the hothouse theory for  $\text{CO}_2$  in 1896, and in 1905 predicted that raising  $\text{CO}_2$  content of the atmosphere would cause an increase in mean global temperature similar in magnitude to modern predictions



# **CO<sub>2</sub>, the greenhouse effect and global warming: from the pioneering work of Arrhenius and Callendar to today's Earth System Models**

Thomas R. Anderson<sup>a,\*</sup>, Ed Hawkins<sup>b</sup> and Philip D. Jones<sup>c,d</sup>

<sup>a</sup>National Oceanography Centre, European Way, Southampton SO14 3ZH, UK

<sup>b</sup> NCAS-Climate, Department of Meteorology, University of Reading, Reading RG6 6BB, UK

<sup>c</sup>Climatic Research Unit, University of East Anglia, School of Environmental Sciences, Norwich NR4 7TJ, UK

<sup>d</sup>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  $\text{CO}_2$  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  $\text{CO}_2$  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  $\text{CO}_2$  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  $\text{CO}_2$  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,<sup>1</sup> rather less pleasant than the 14 °C experienced today.

The concentration of CO<sub>2</sub> 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<sub>2</sub> 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

<sup>a</sup>Corresponding author, Andersen, T.R. (tra@noc.ac.uk);

Hawkins, E. (e.hawkins@reading.ac.uk); Jones, P.D. (p.jones@uea.ac.uk)

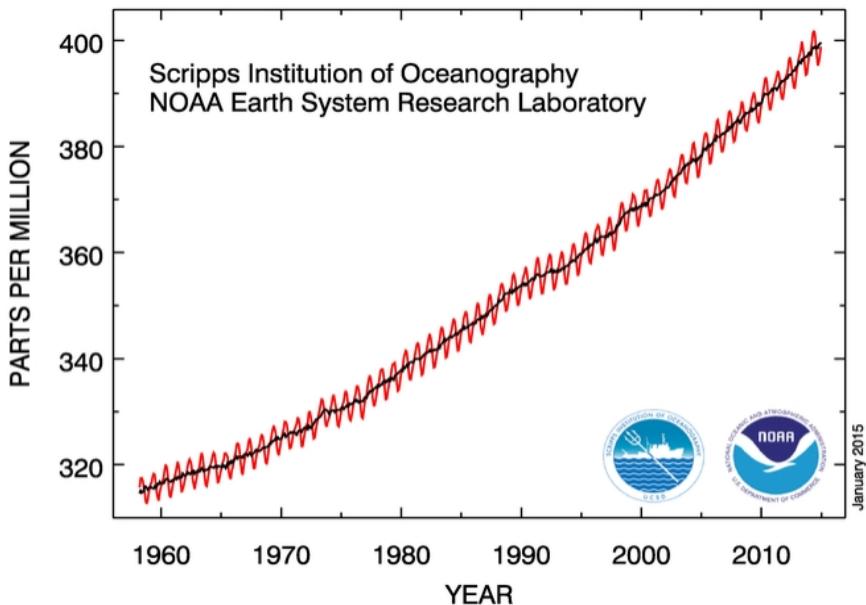
**Keywords:** Greenhouse effect; Global warming; Earth System Models; Arrhenius;

### Callendar.

<sup>3</sup> Andrew A. Lacis, Gavin A. Schmidt, David Rind, and Reto A. Ruedy, "Atmospheric CO<sub>2</sub>: Principal Control Knob Governing Earth's Temperature," *Science* 330 (2010): 356–59.

# Charles David Keeling's first observations, 1958-60

- Unequivocal evidence that CO<sub>2</sub> 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

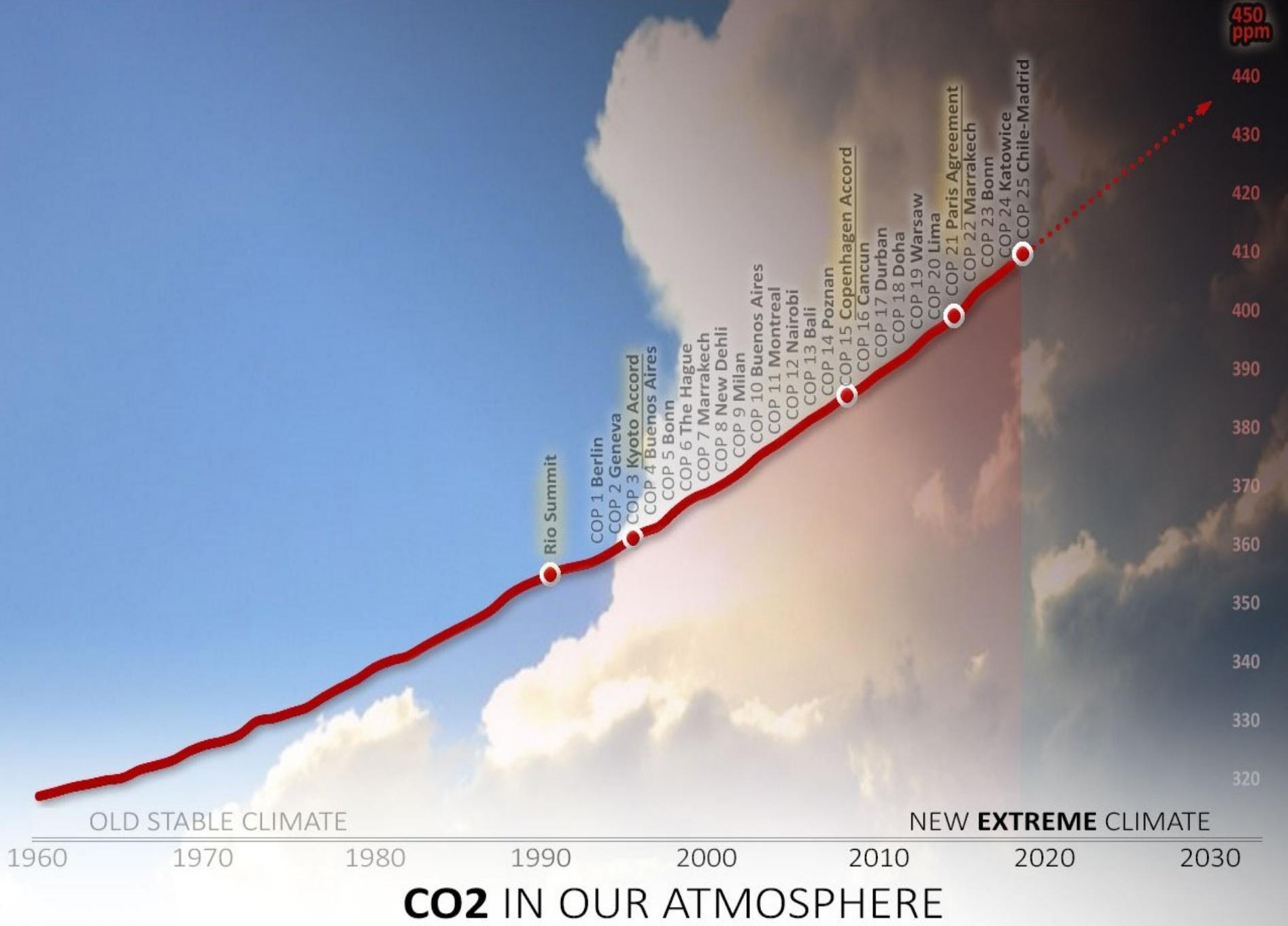


*When it is assumed that the CO<sub>2</sub> content of the atmosphere is doubled and statistical thermal equilibrium is achieved, the more realistic of the modeling efforts predict a global surface warming of between 2°C and 3.5 °C, with greater increases at high latitudes.*

- Oceans “could delay the estimated warming for several decades”
- “We may not be given a warning until the CO<sub>2</sub> 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



# Progetto EPICA

## (European Project for Ice Coring in Antarctica)

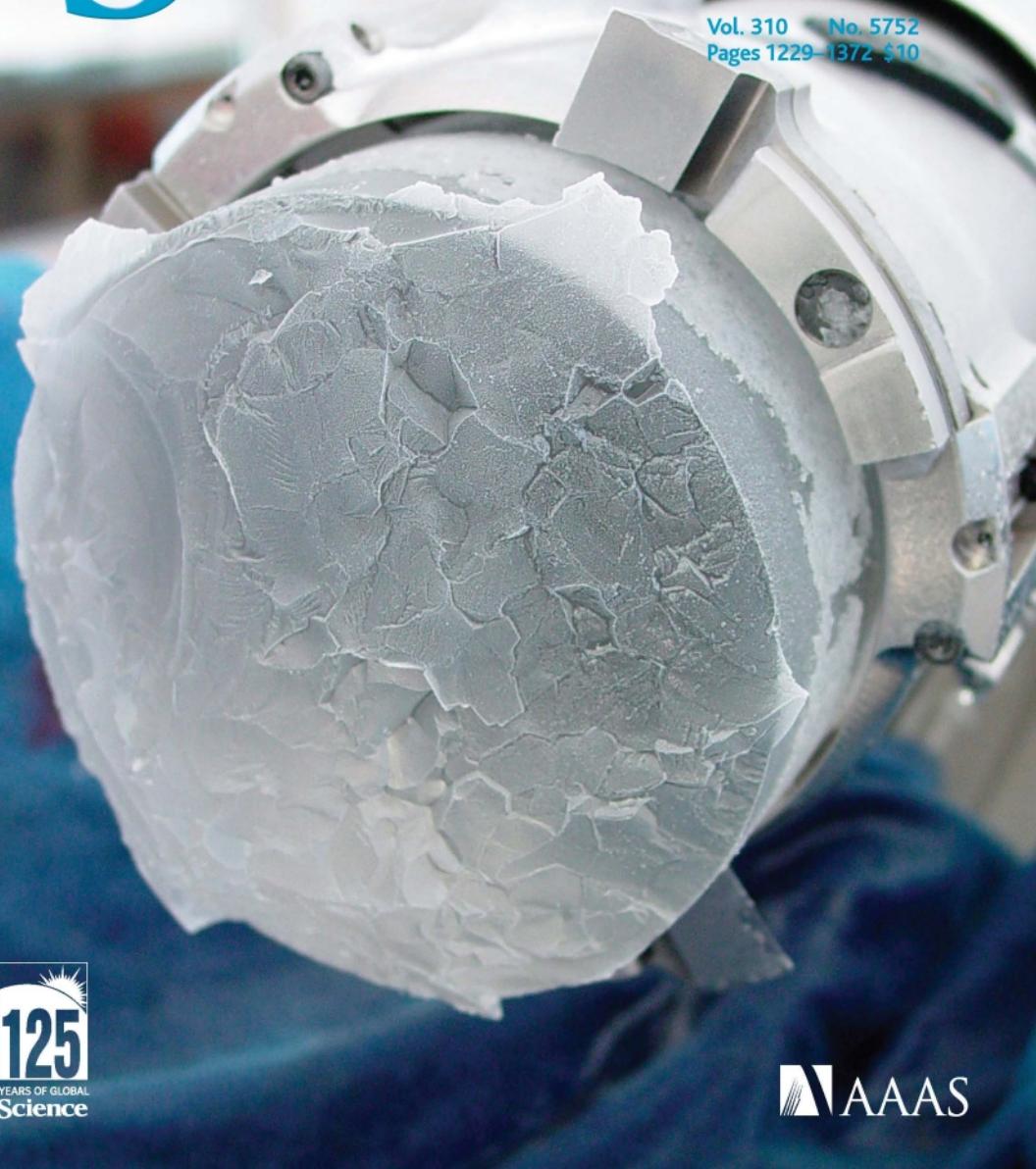
### Stazione italo-francese Concordia, a Dome C - Antartide



# Science

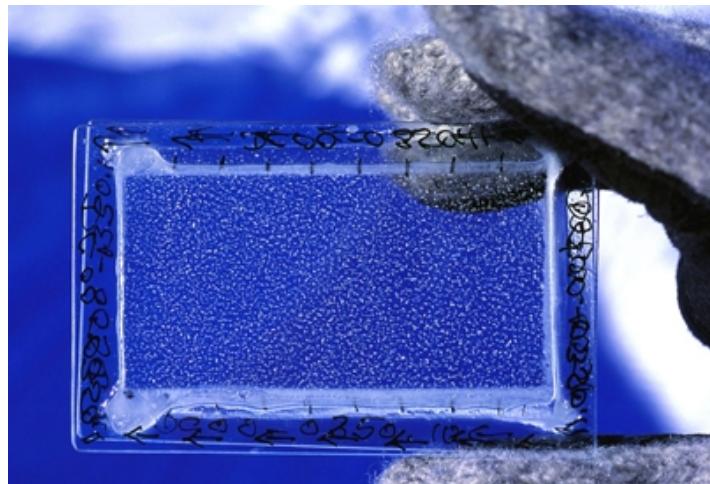
25 November 2005

Vol. 310 No. 5752  
Pages 1229–1372 \$10



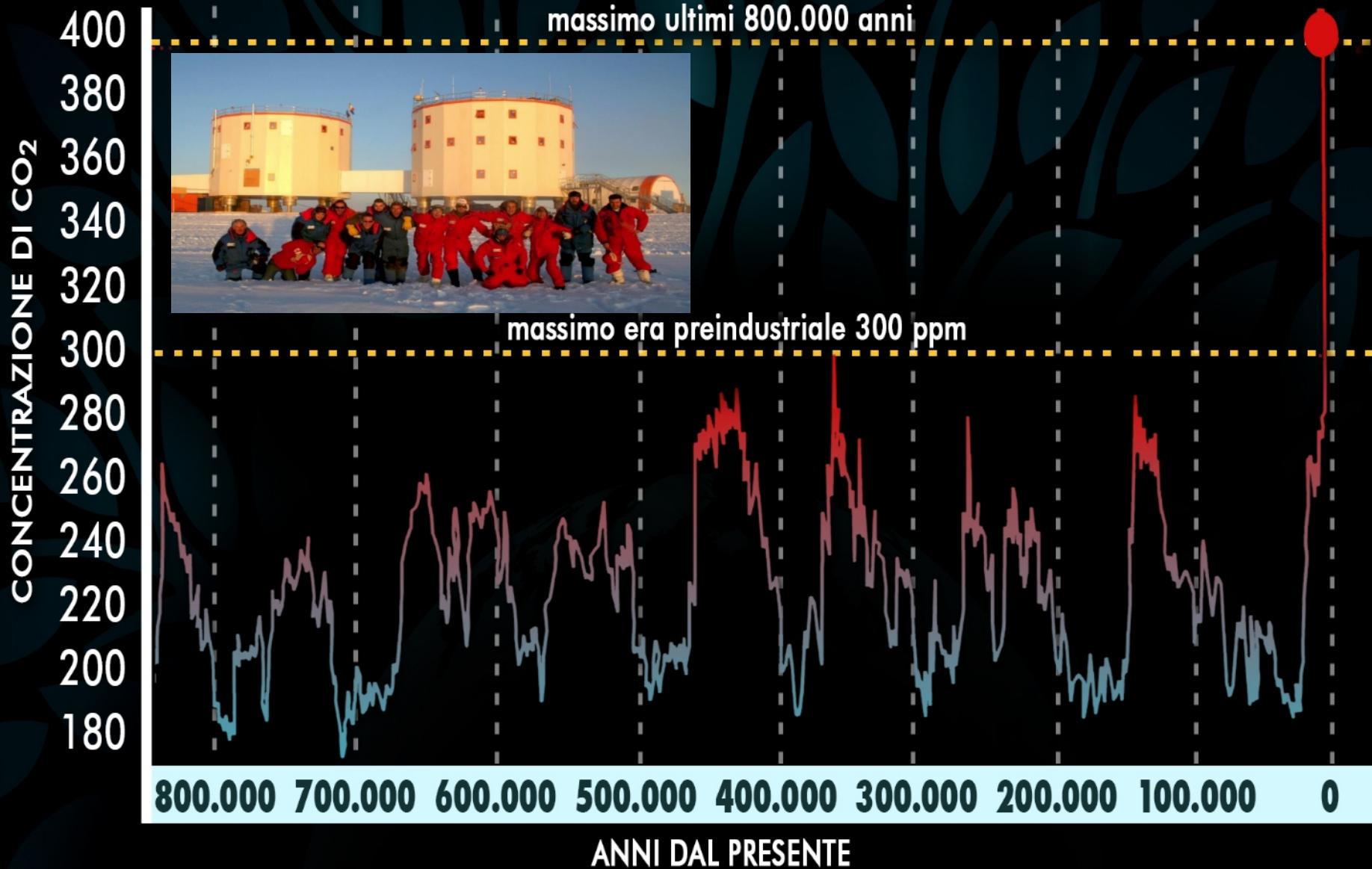
AAAS

**L'analisi delle bolle d'aria sigillate nel ghiaccio permette di ricostruire le concentrazioni storiche di CO<sub>2</sub> e metano**



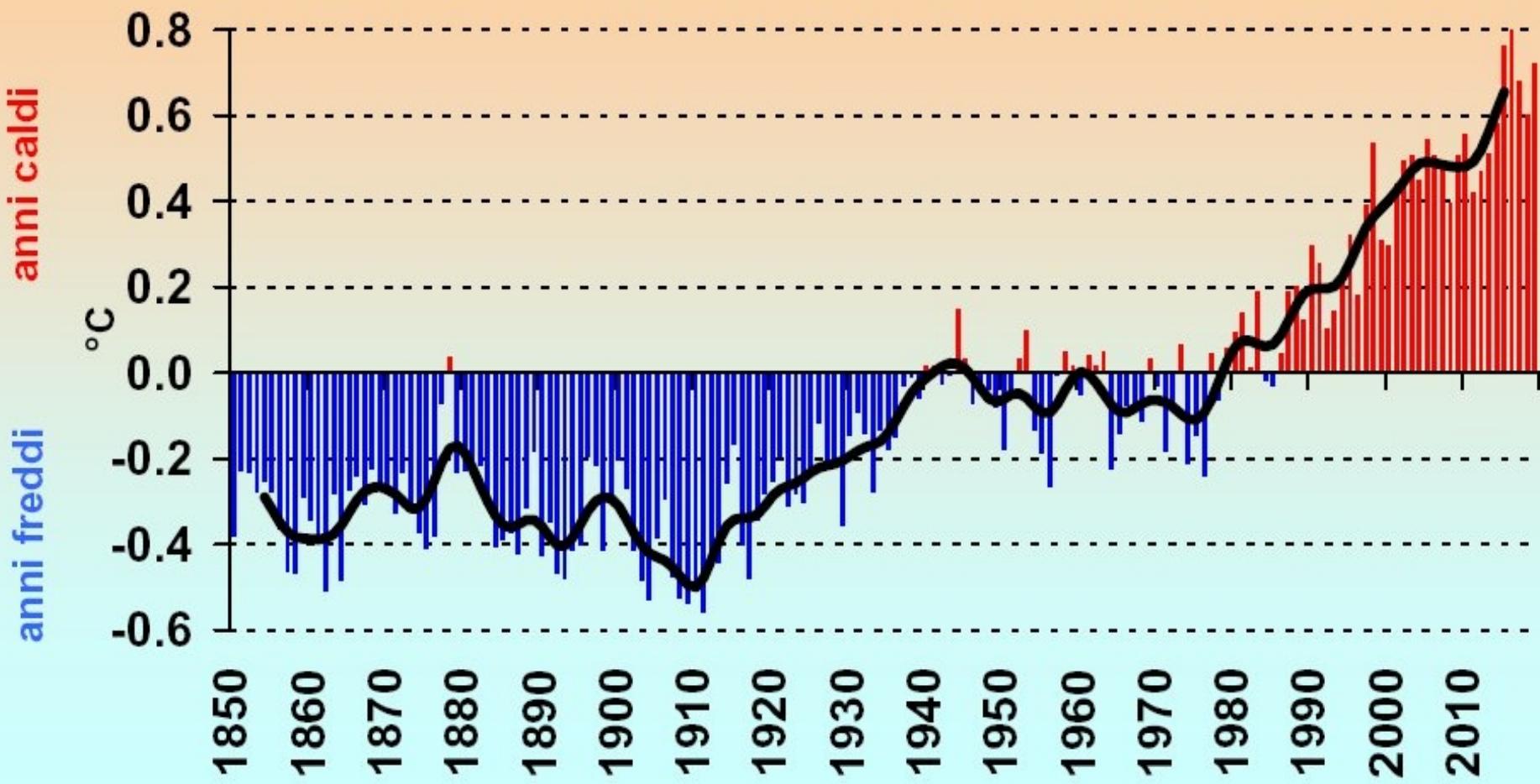
fonte: progetto EPICA

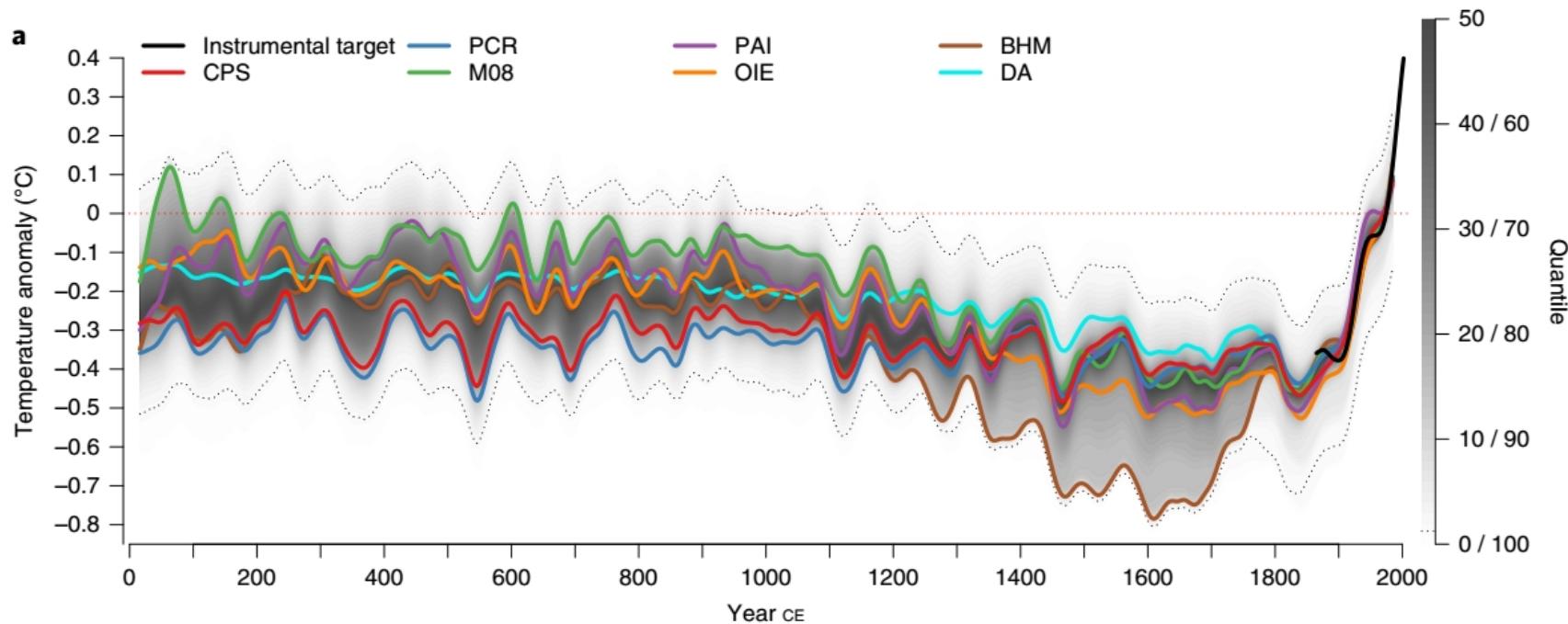
## LIVELLO CO<sub>2</sub> NEL TEMPO



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

Anomalie termiche globali 1850-2019  
(rispetto a media trentennio 1961-90)  
serie *MetOffice - Hadley Center*





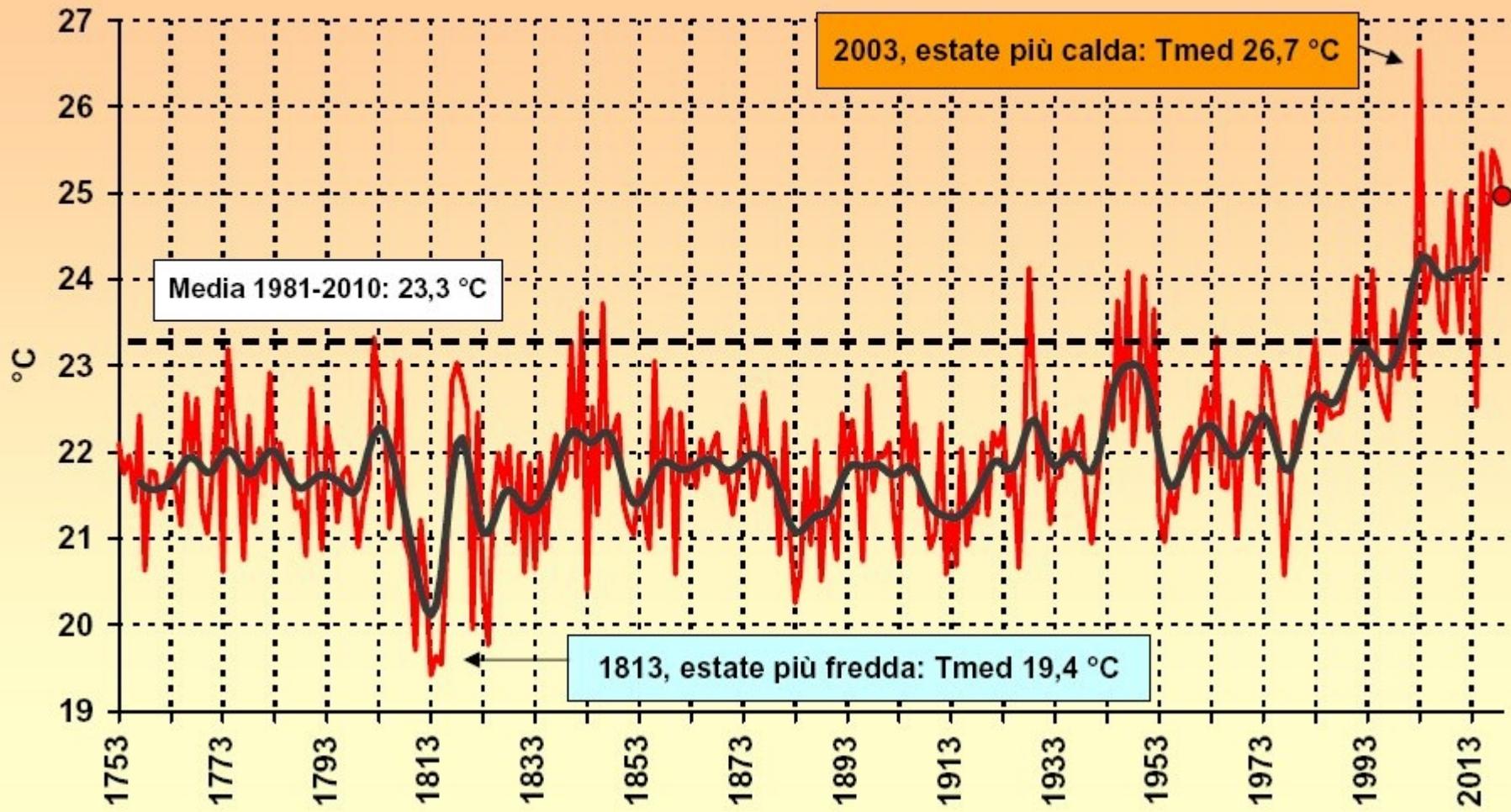
## Consistent multidecadal variability in global temperature reconstructions and simulations over the Common Era

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.

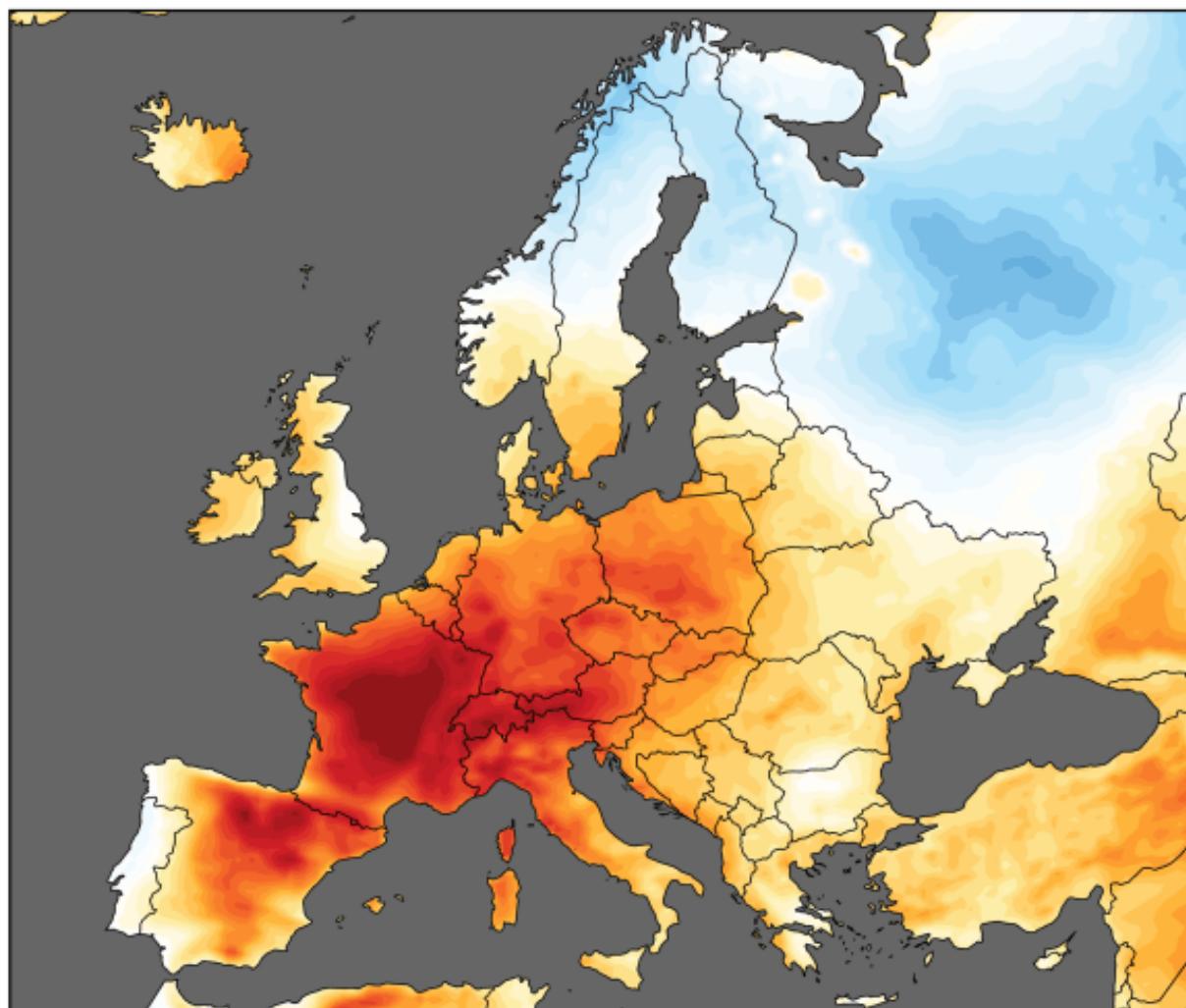
## Torino - Temperature medie estive (°C) dal 1753 al 2019

(elaborazione dati: SMI - [www.nimbus.it](http://www.nimbus.it))



9 su 10 delle estati più calde sono successive al 2002

Average 2m temperature anomaly for 25-29 June 2019



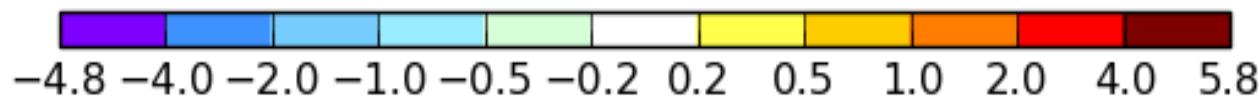
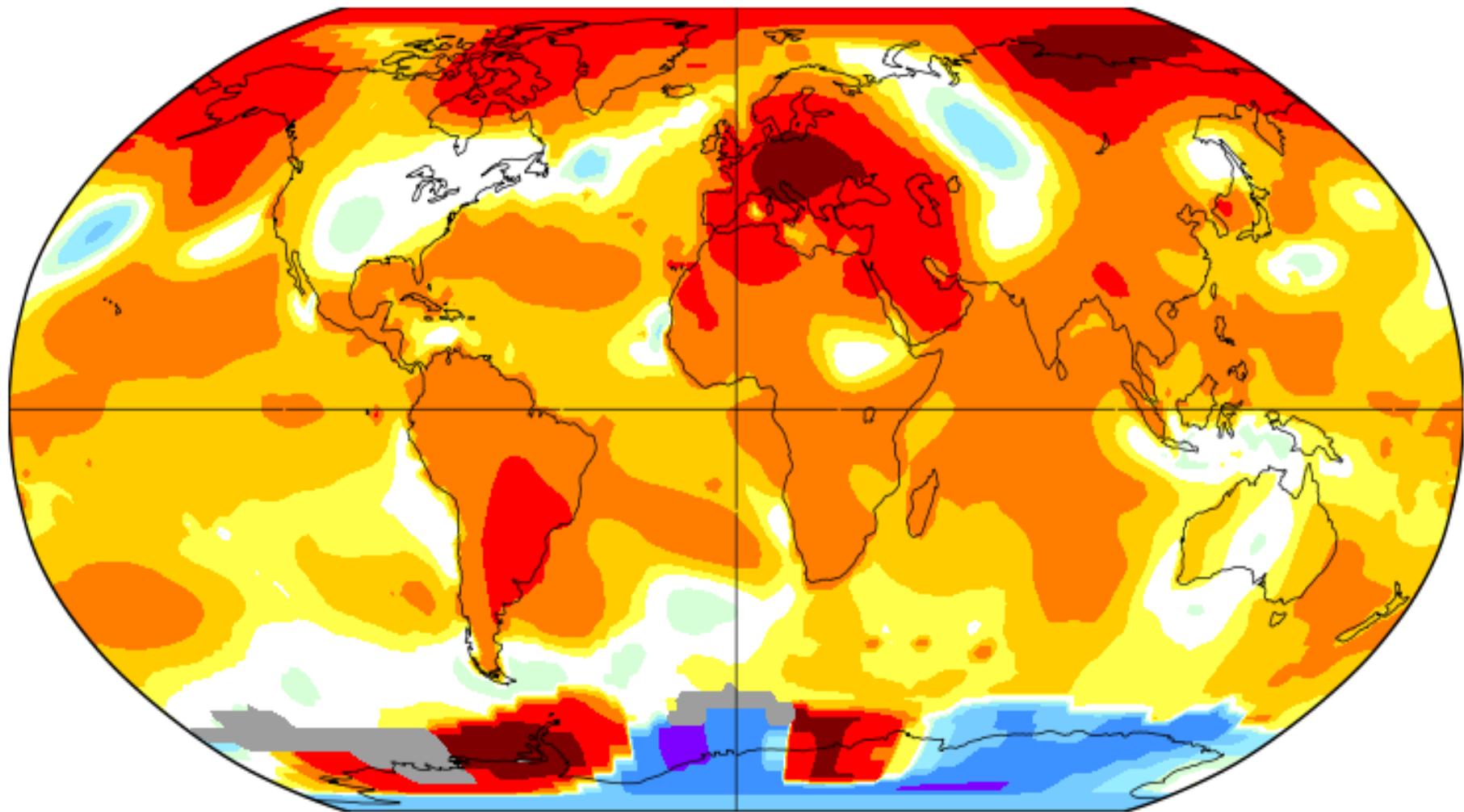
Giugno 2019 è risultato in Europa il **più caldo in assoluto** mai registrato. Mediamente anomalie dell'ordine dei 2°C rispetto al periodo 1981-2010, ma alcune aree, come Francia, Svizzera, Germania e Nord Italia, hanno fatto registrare anomalie anche di 6-10°C nei 5 giorni più caldi dal 25 al 29 giugno.



June 2019

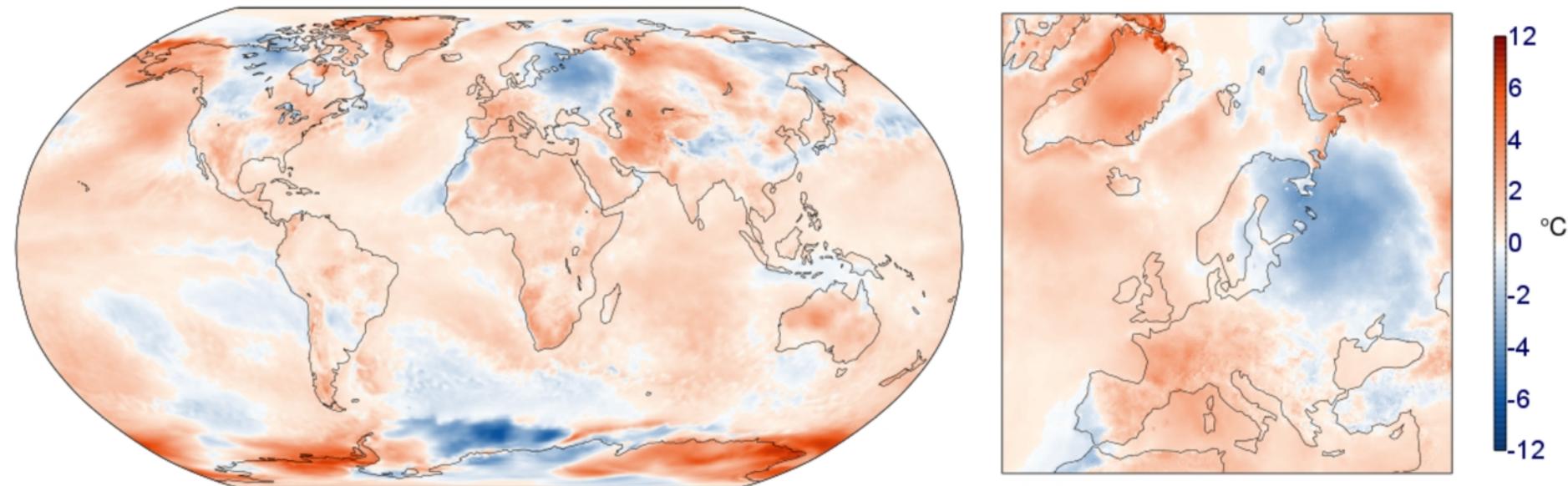
L-OTI(  $^{\circ}$  C) Anomaly vs 1951-1980

0.92



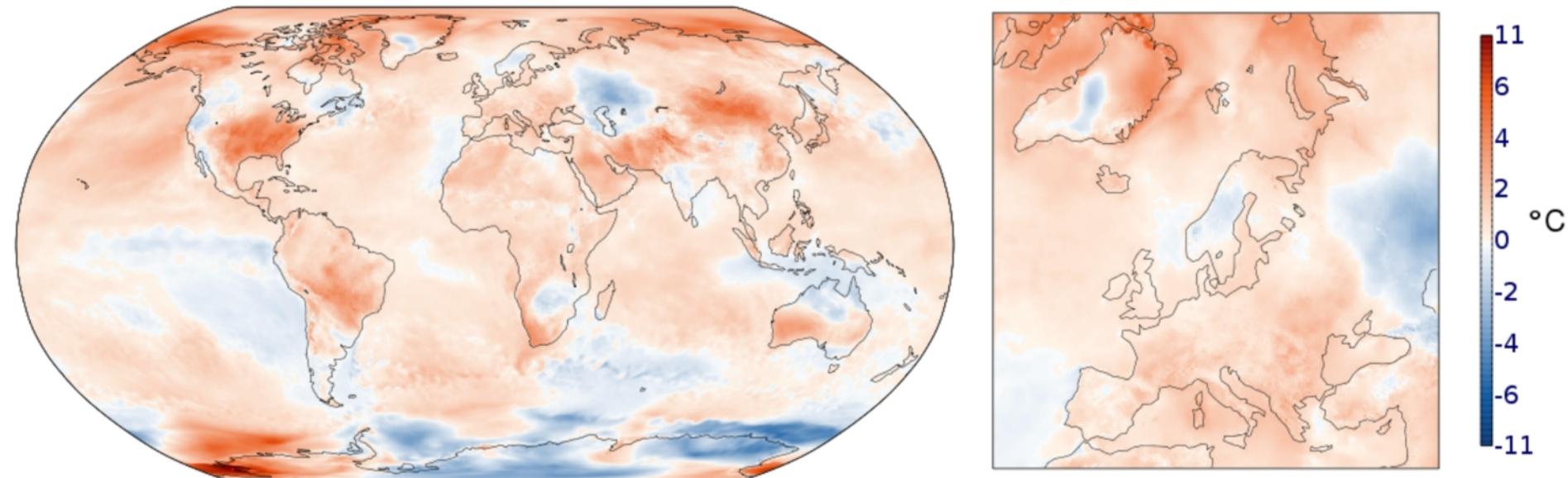
# Luglio 2019: il mese più caldo della storia meteorologica terrestre

Surface air temperature anomaly for July 2019 relative to 1981-2010



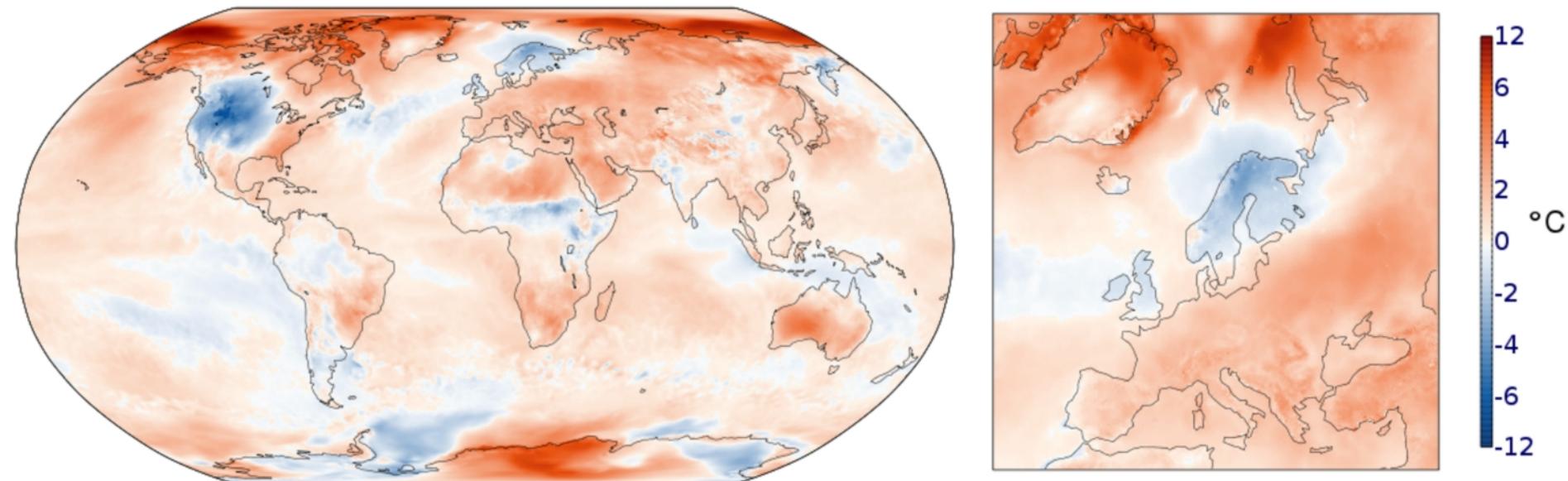
# Settembre 2019: anche questo, il più caldo della storia meteo

Surface air temperature anomaly for September 2019 relative to 1981-2010



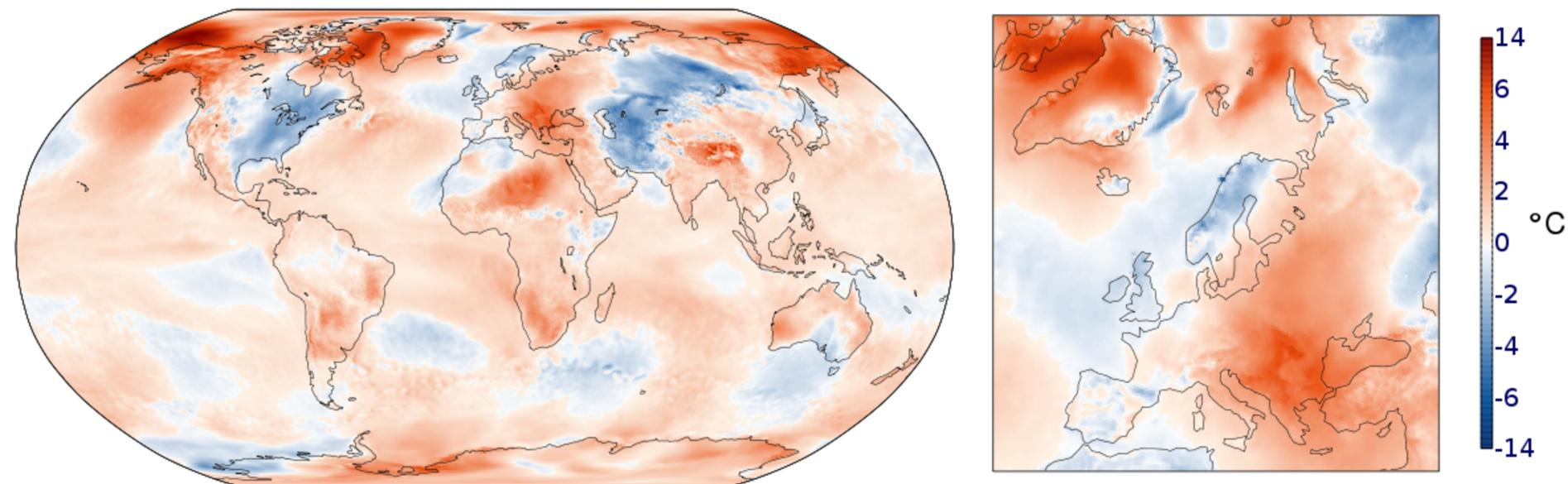
# Ottobre 2019: ancora il più caldo della serie globale

Surface air temperature anomaly for October 2019 relative to 1981-2010



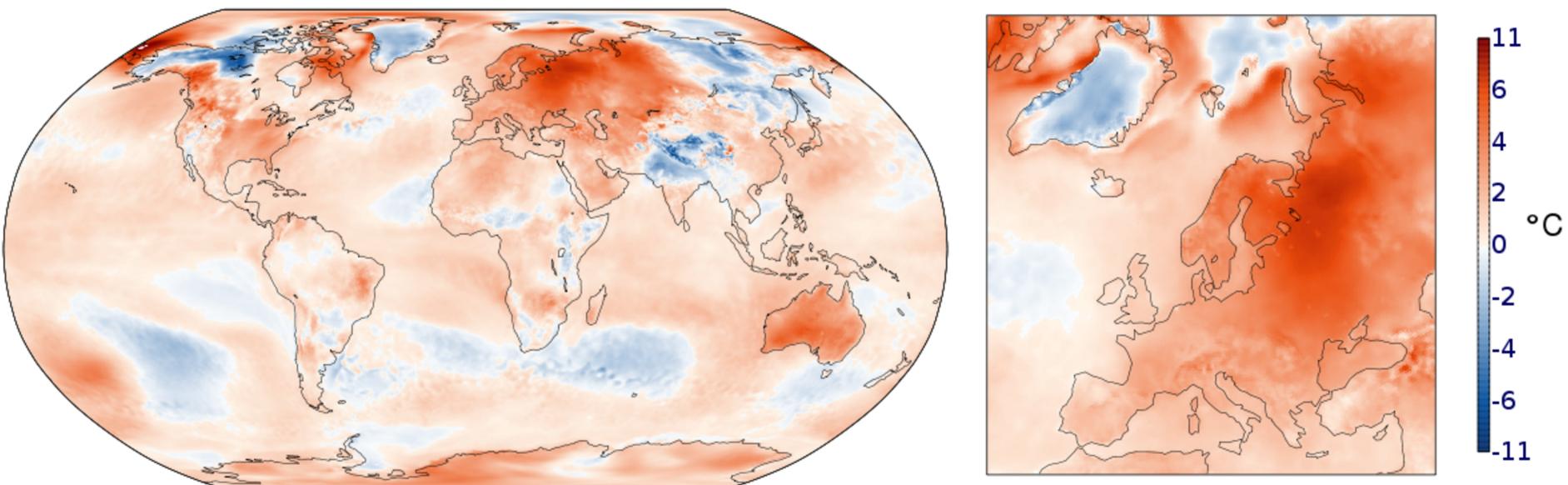
# Novembre 2019: ancora il più caldo della serie globale, pari con 2016

Surface air temperature anomaly for November 2019 relative to 1981-2010



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

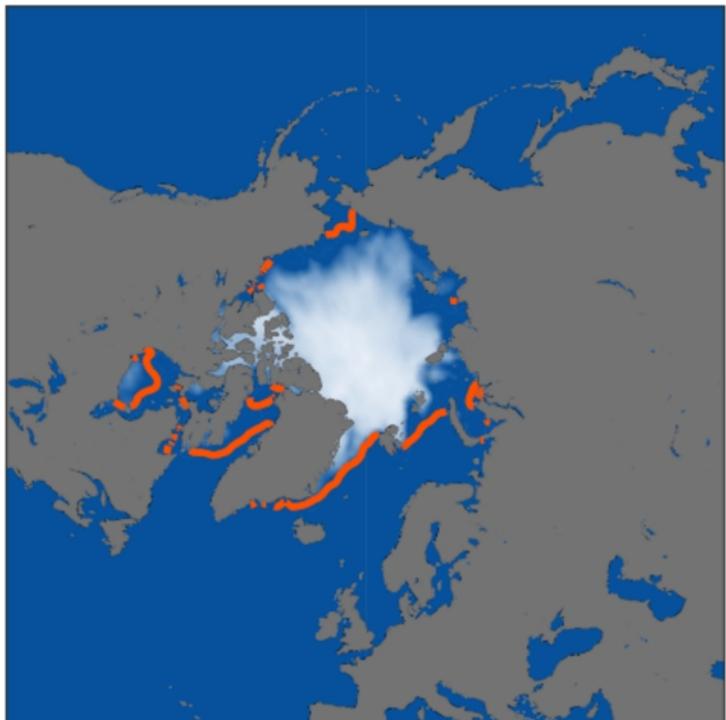
Surface air temperature anomaly for December 2019 relative to 1981-2010



# Banchisa polare ai minimi

Arctic sea-ice cover for July 2019

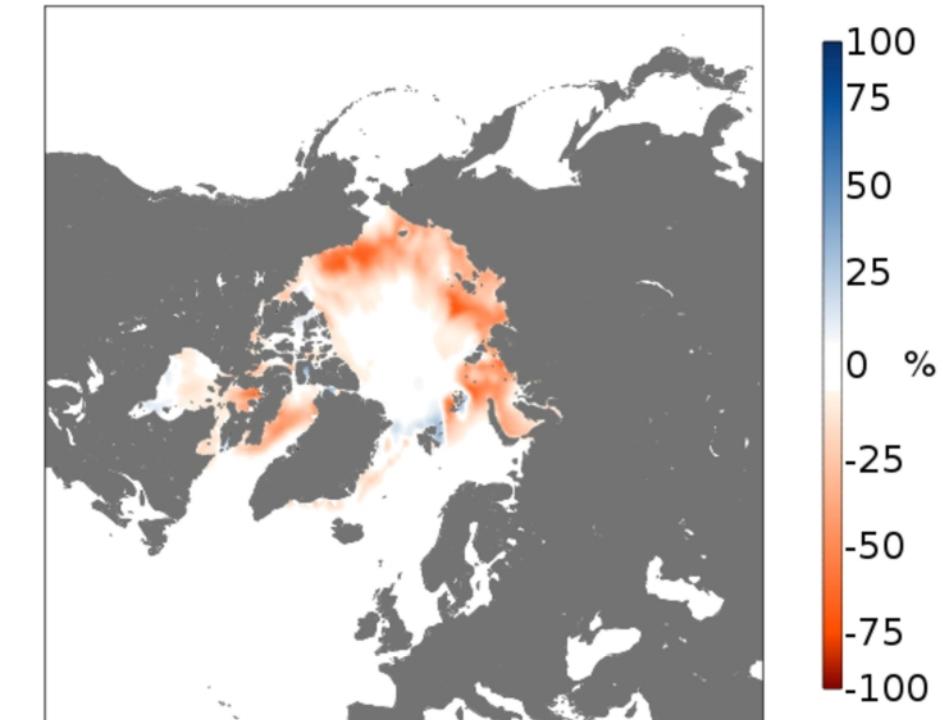
Average cover

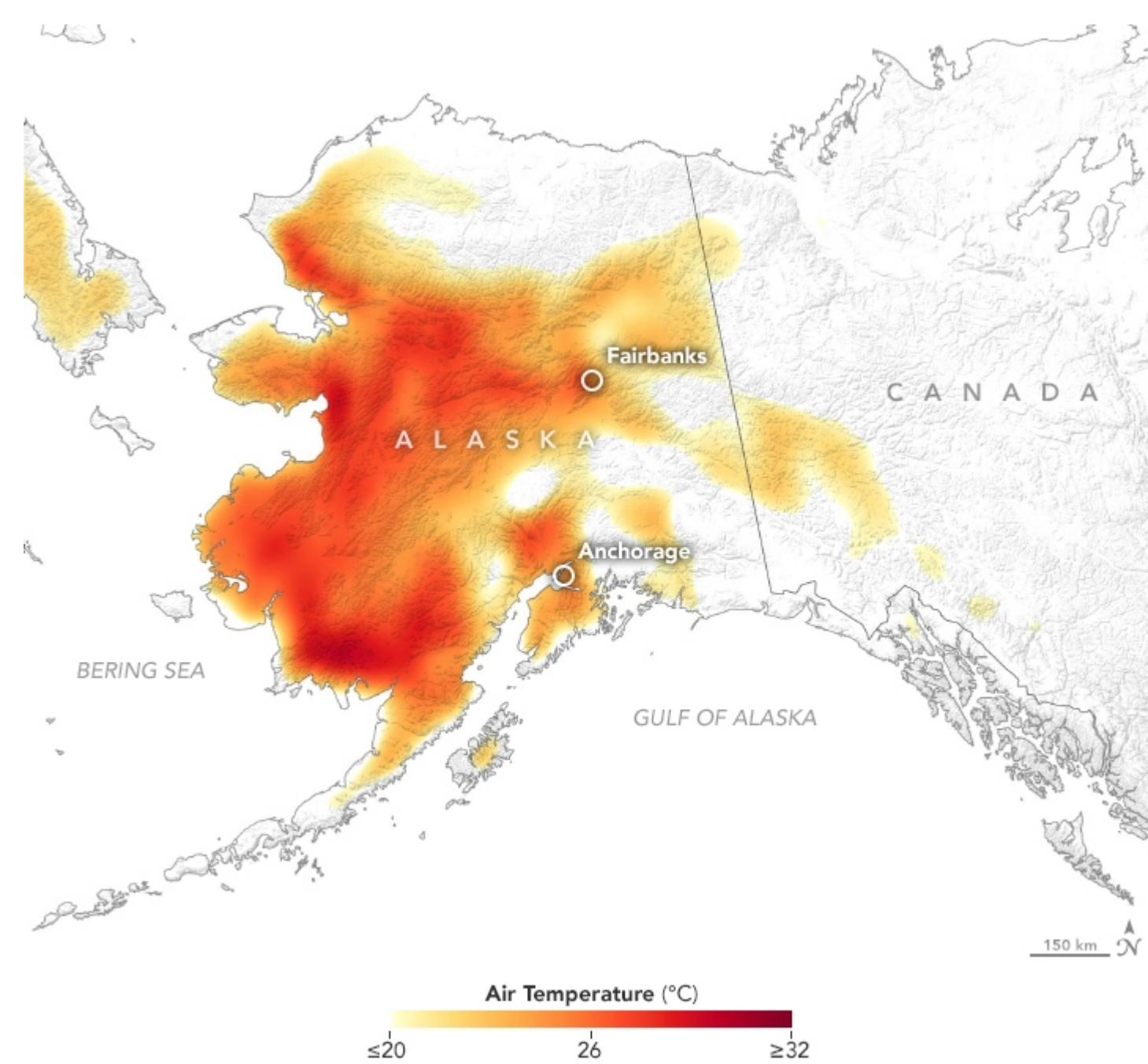


Average ice edge July 1981-2010

Data: ERA5

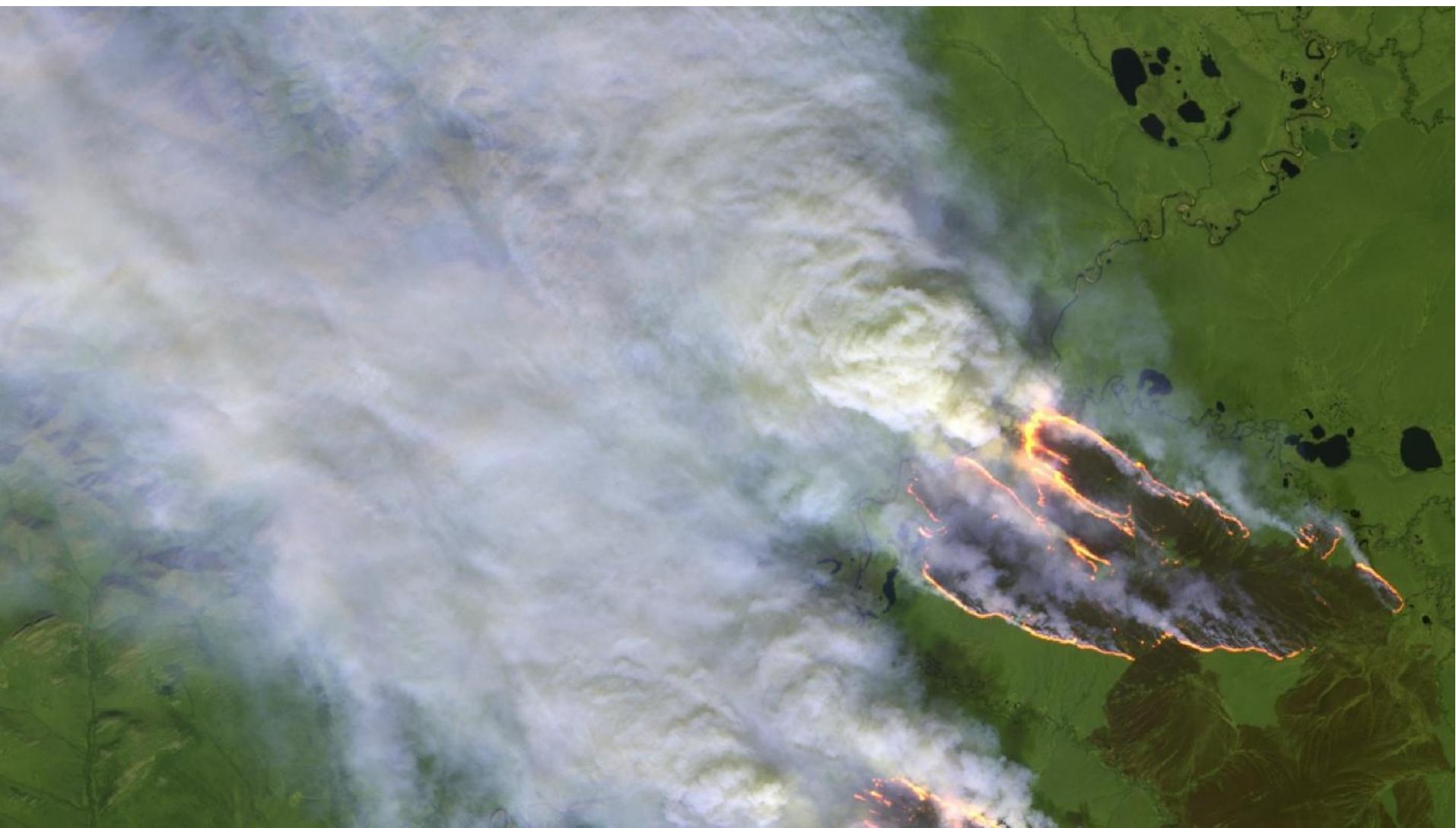
Anomaly relative to 1981-2010

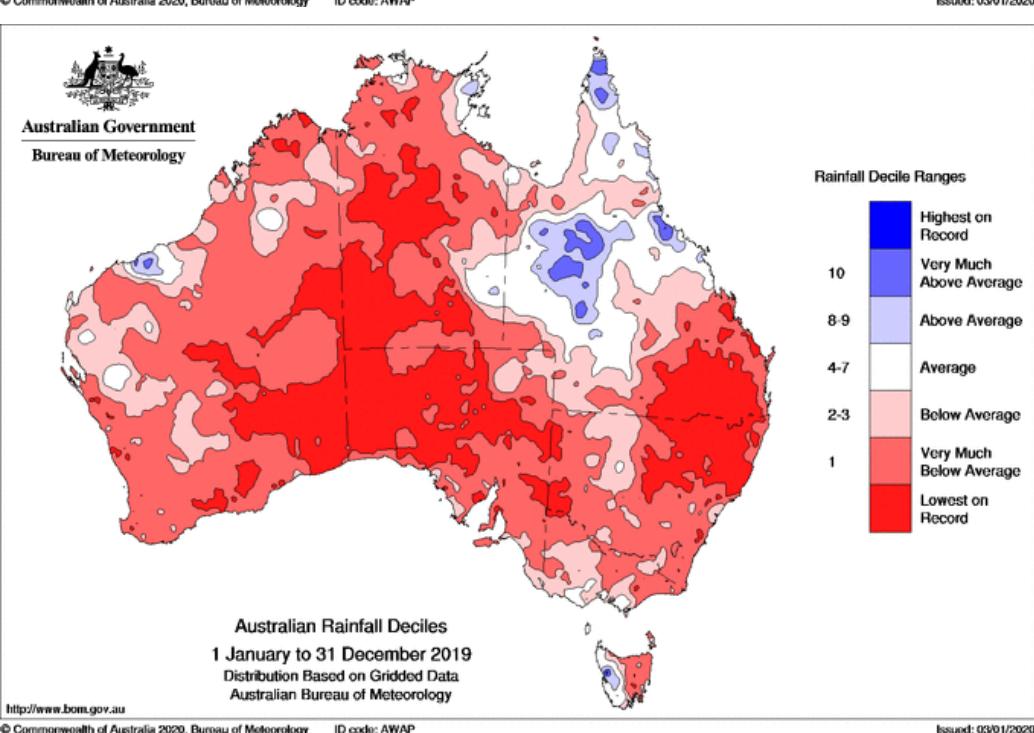
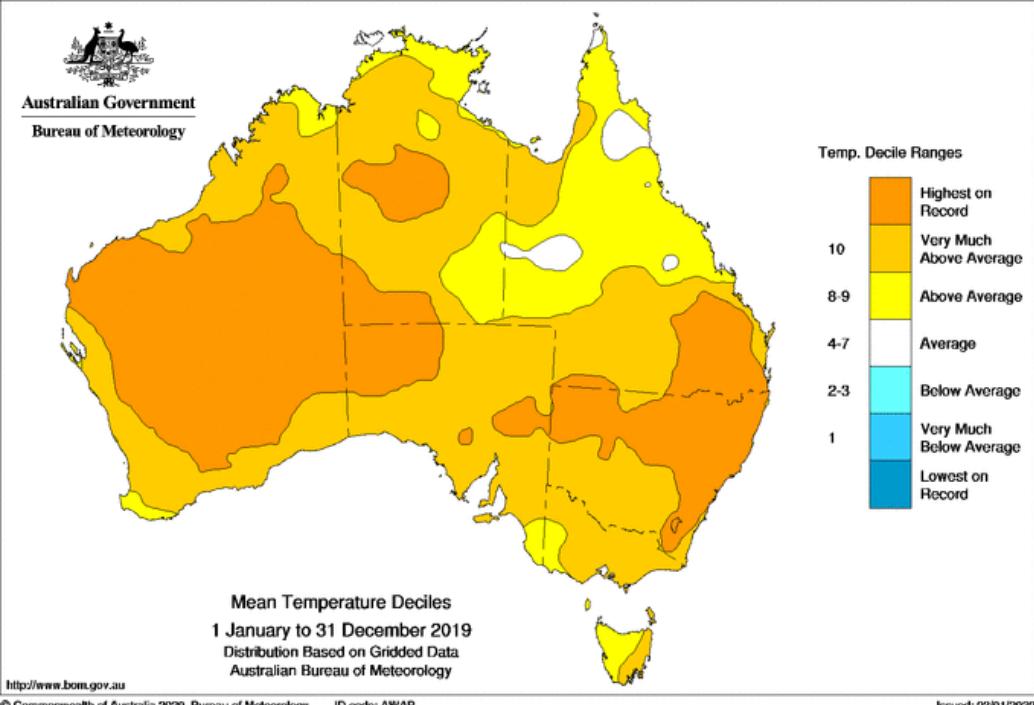




Record  
32°C  
Alaska  
4 lug  
2019

# 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%)

# 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**

~ 1960

Archivio Pessina,  
Domodossola



19.09.2018

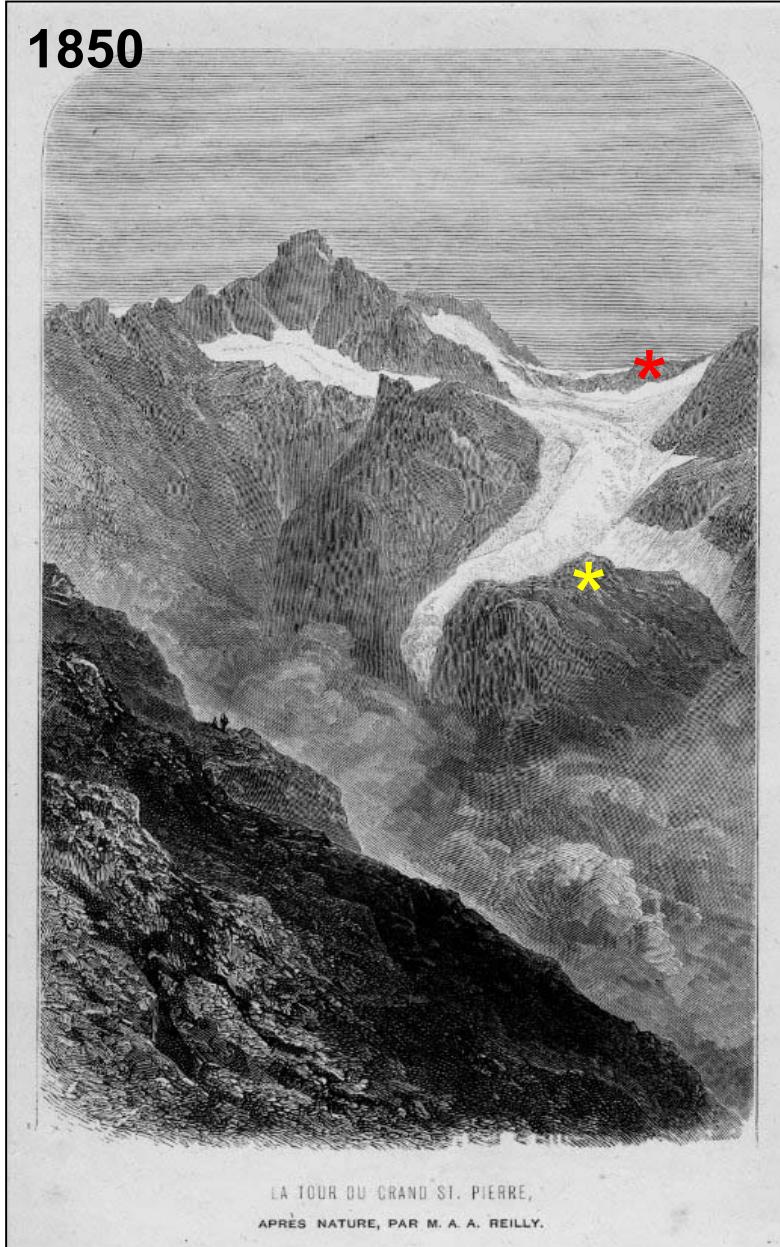
f. L. Mercalli



Ghiacciaio  
Meridionale del  
Sabbione  
(Ossola)  
dalla diga.

Regresso frontale  
circa 1200 m.

1850



2017

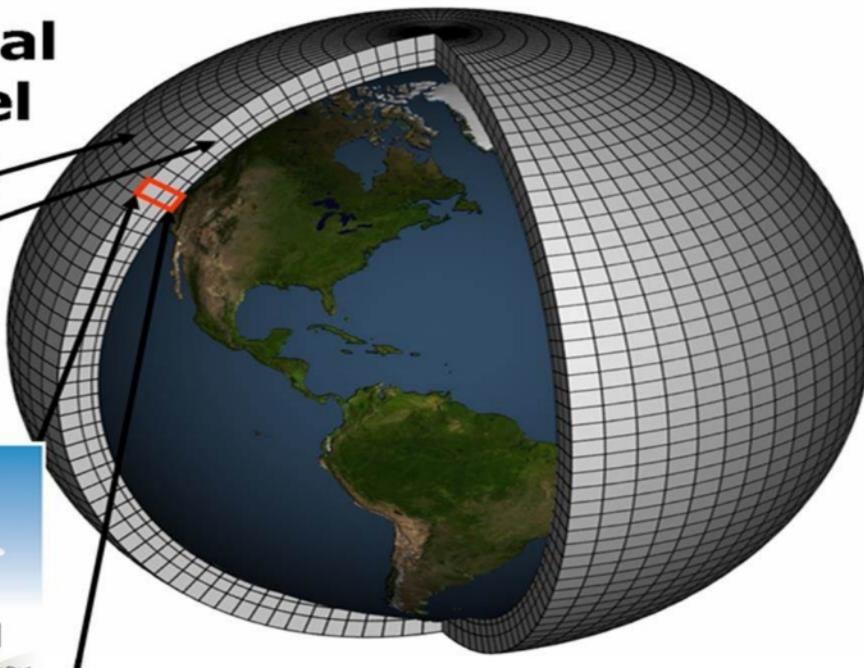
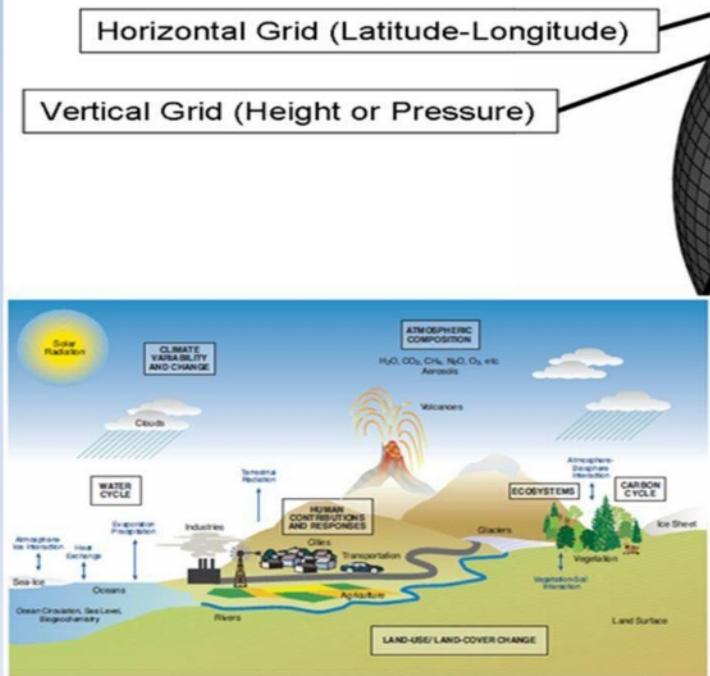


Ghiacciaio di Teleccio (Gran Paradiso)

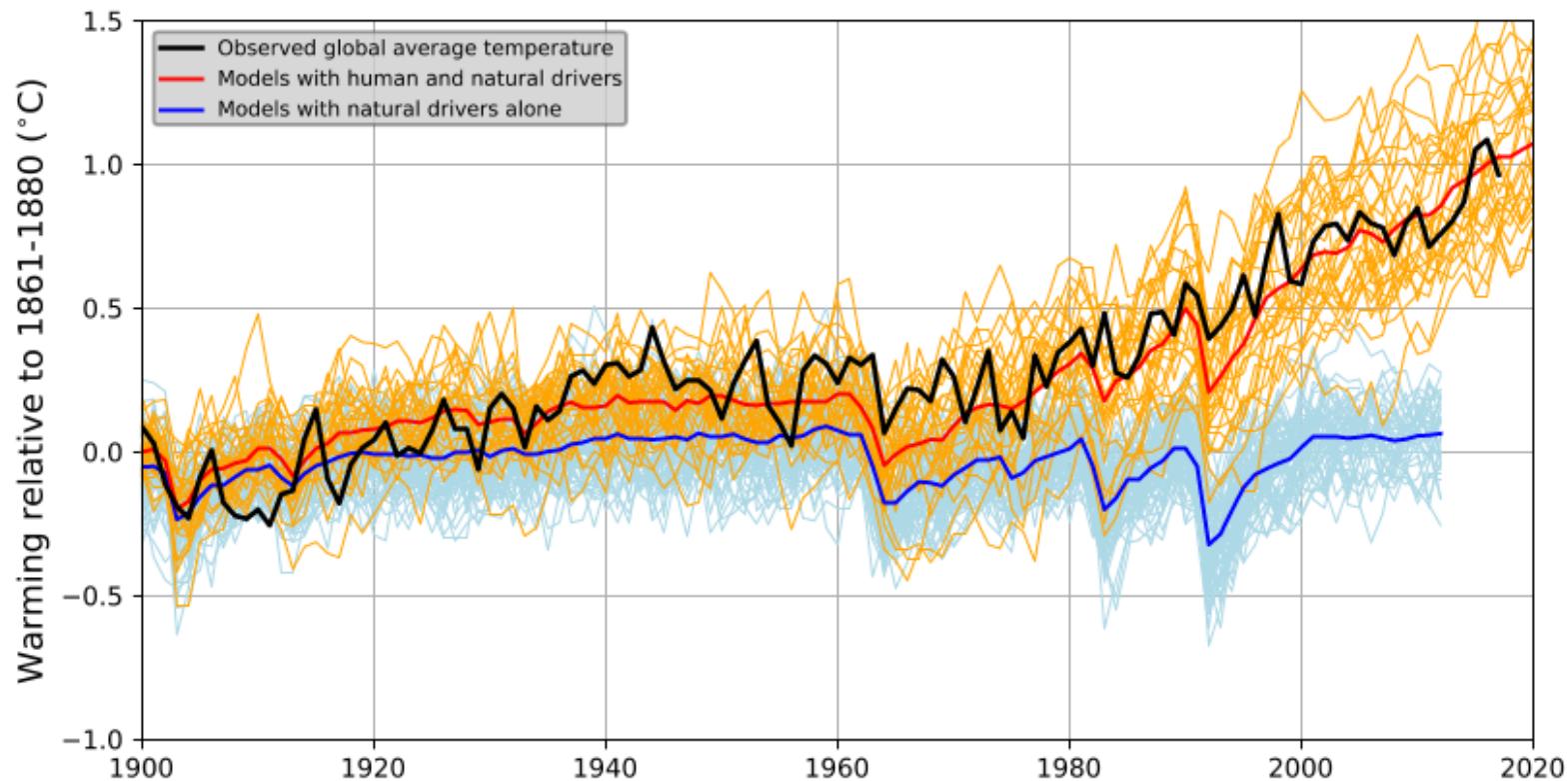


# Global Climate Models

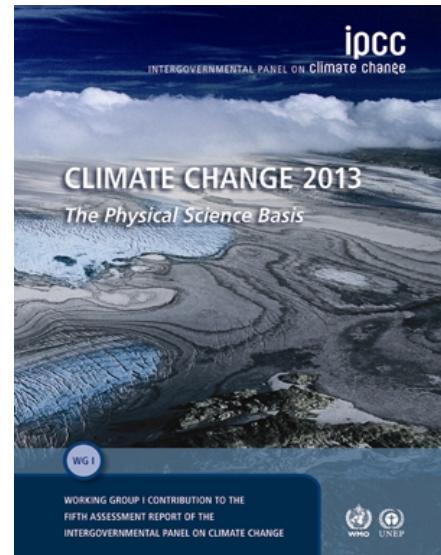
## Schematic for Global Atmospheric Model



# Climate models reproduce observed warming only when human influences are included

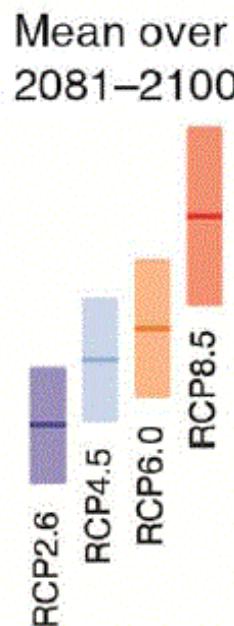
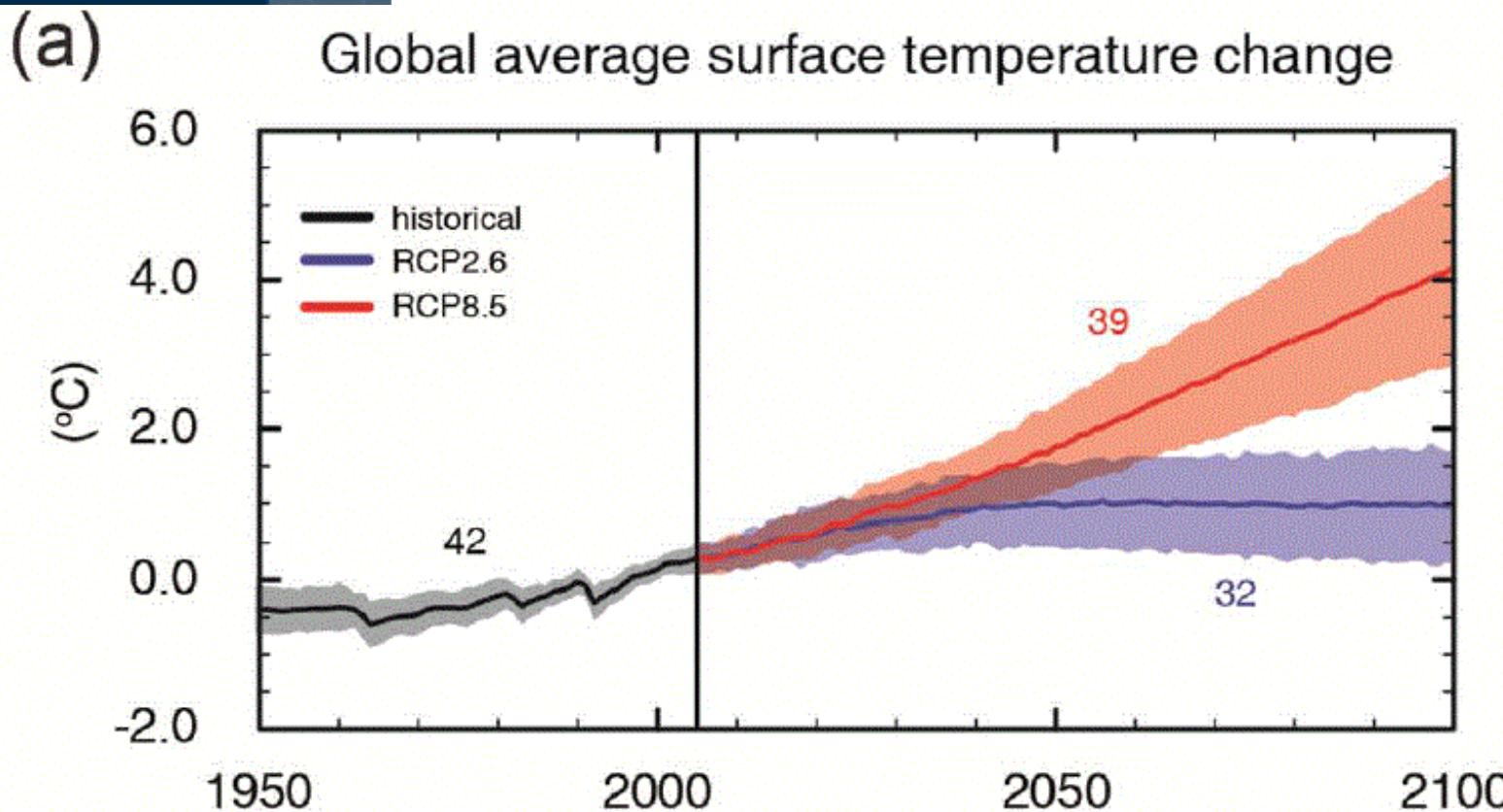


Richardson et al, 2017



## 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)



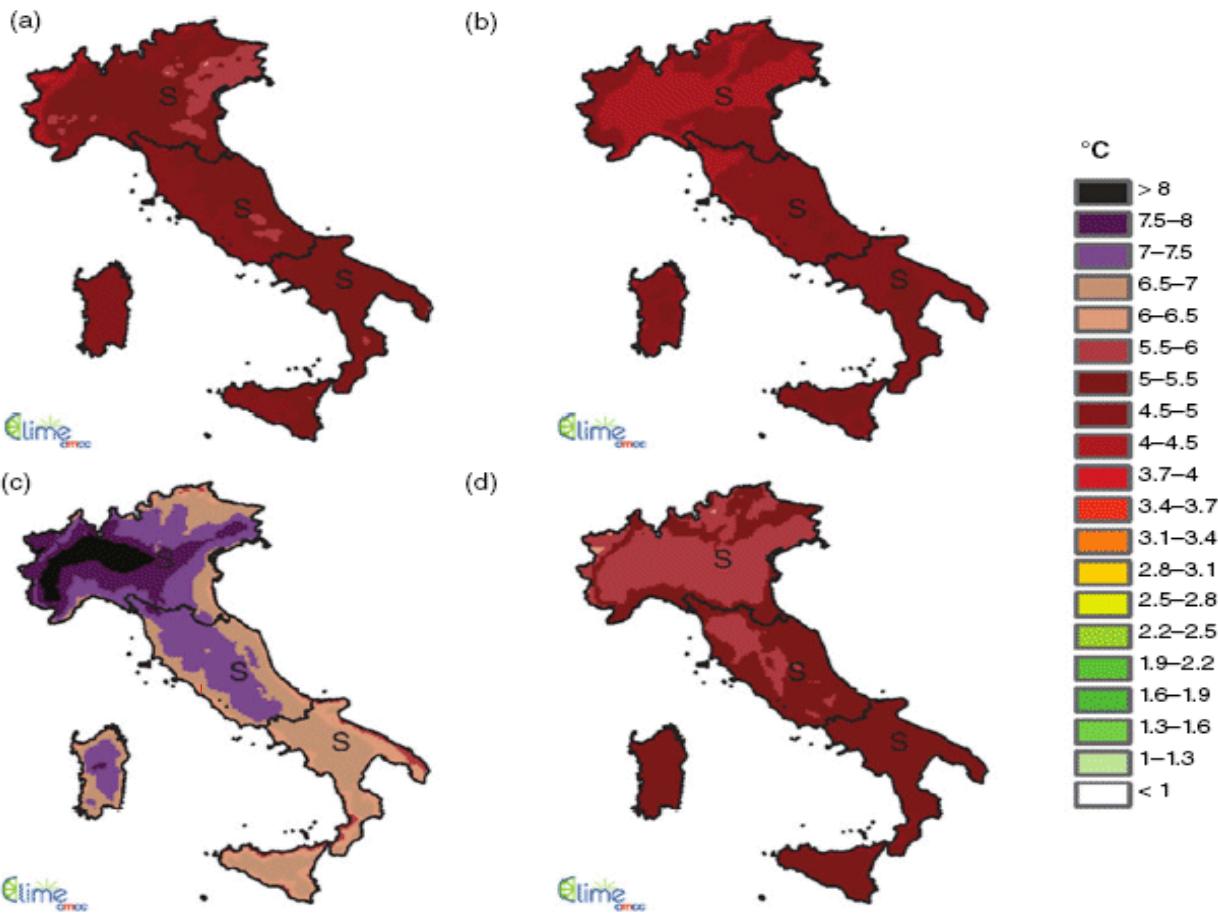


Figure 9. Temperature climate projections, RCP8.5: seasonal differences (°C), between the average value over 2071–2100 and 1971–2000 for (a) DJF, (b) MAM, (c) JJA and (d) SON (S, significant; NS, not significant).

**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**



Biennale  
Arte 2019

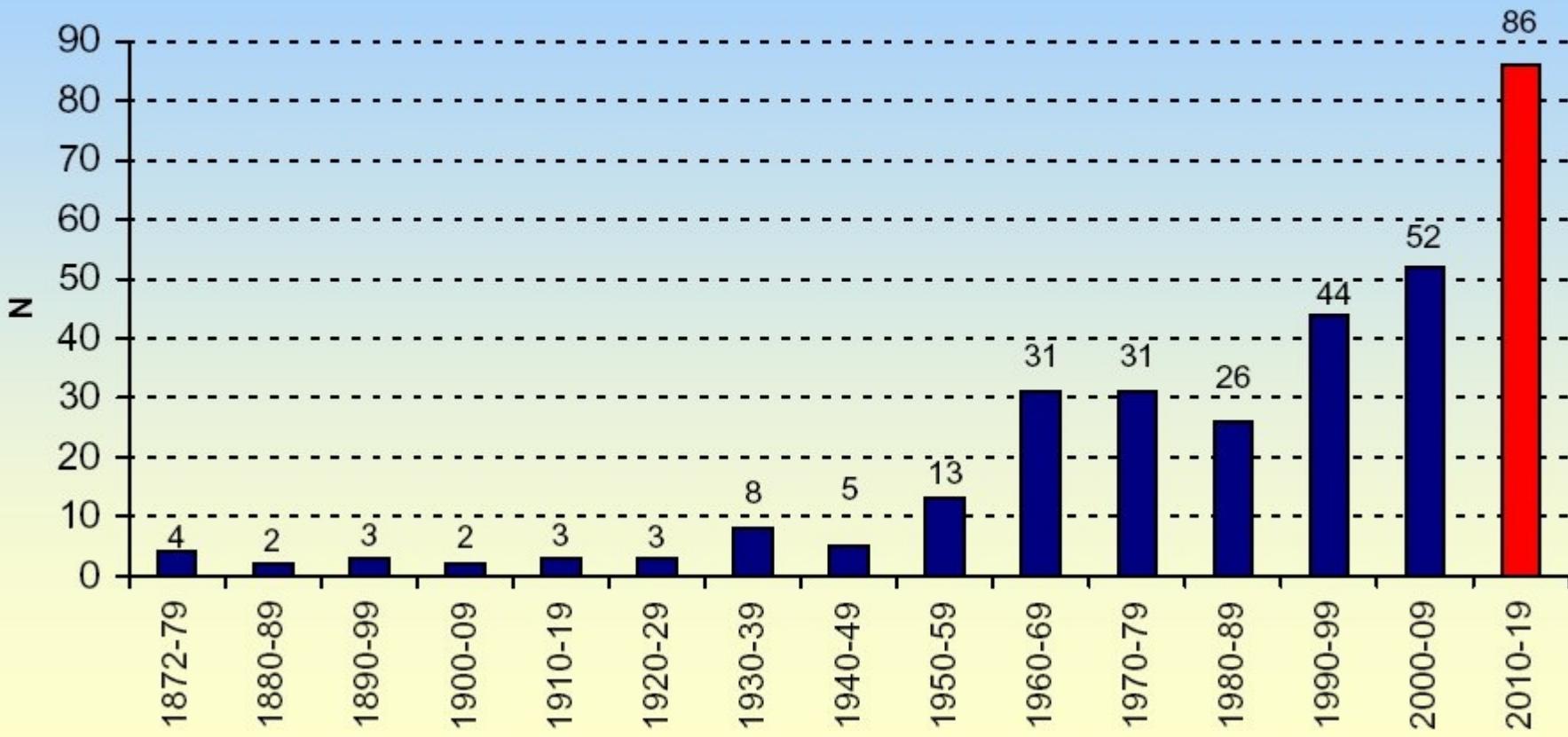
11 Maggio  
24 Novembre  
Venezia

VE 9318

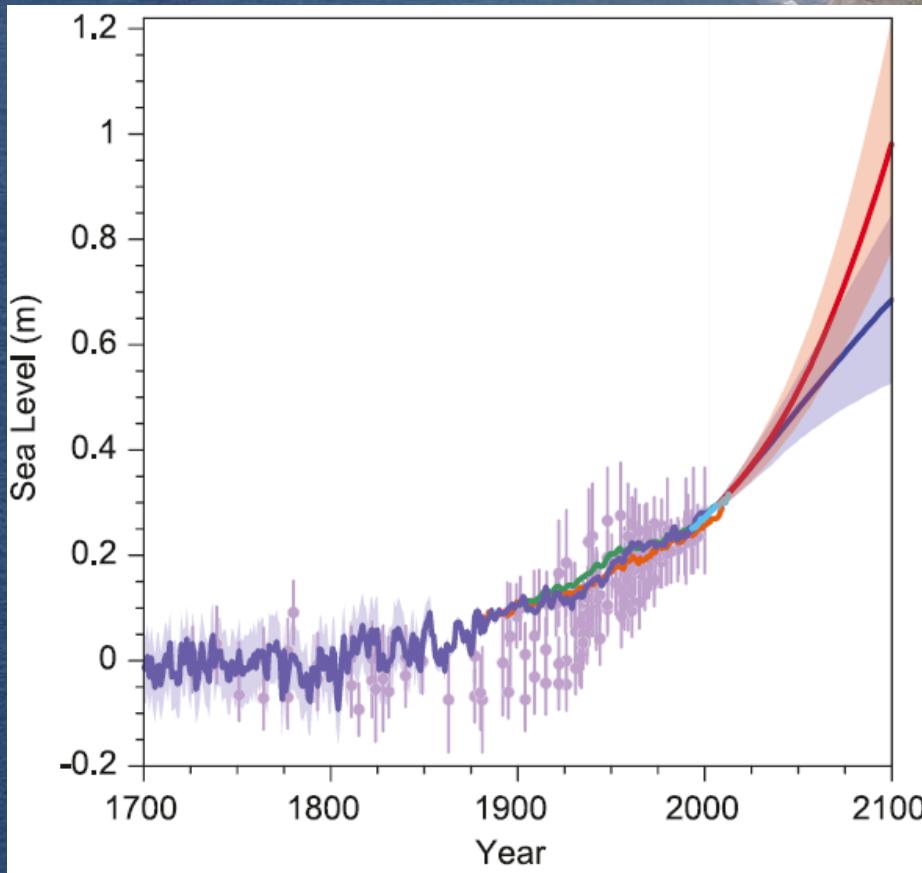


## Distribuzione decennale delle alte maree $\geq 110$ cm a Venezia-Punta della Salute dal 1872 al 2019

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

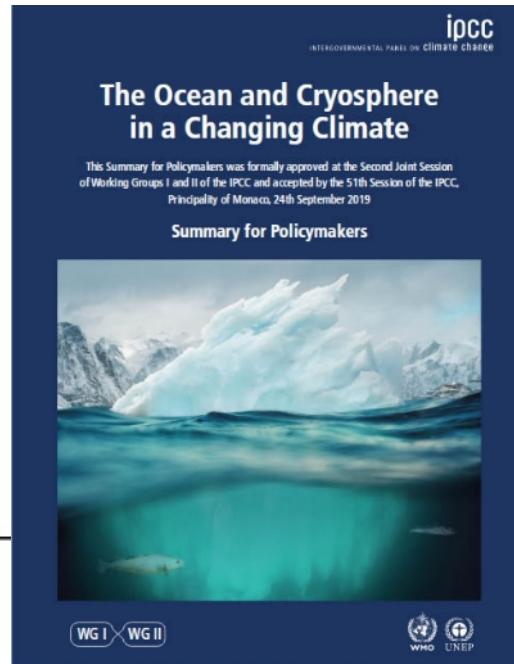
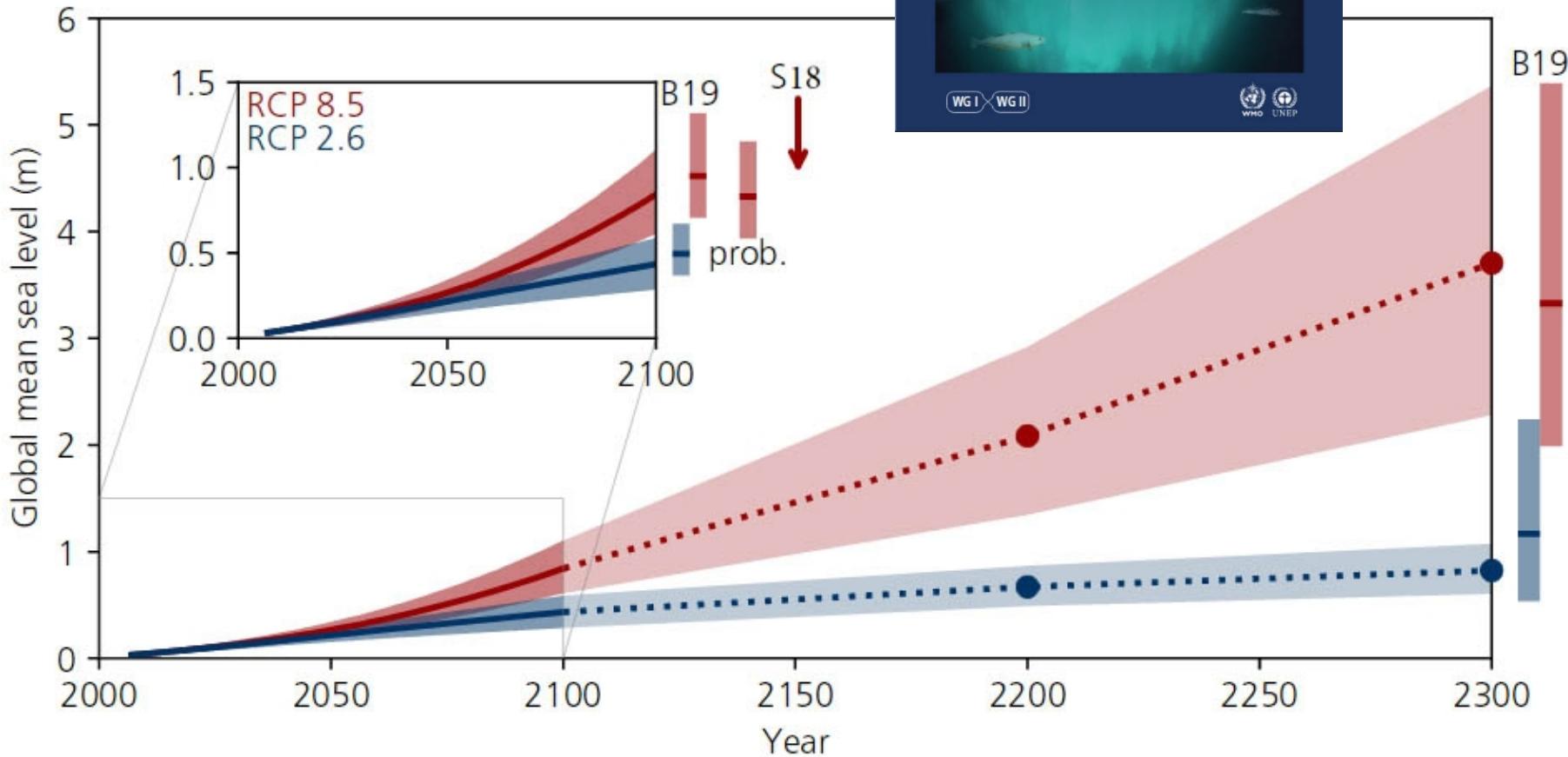


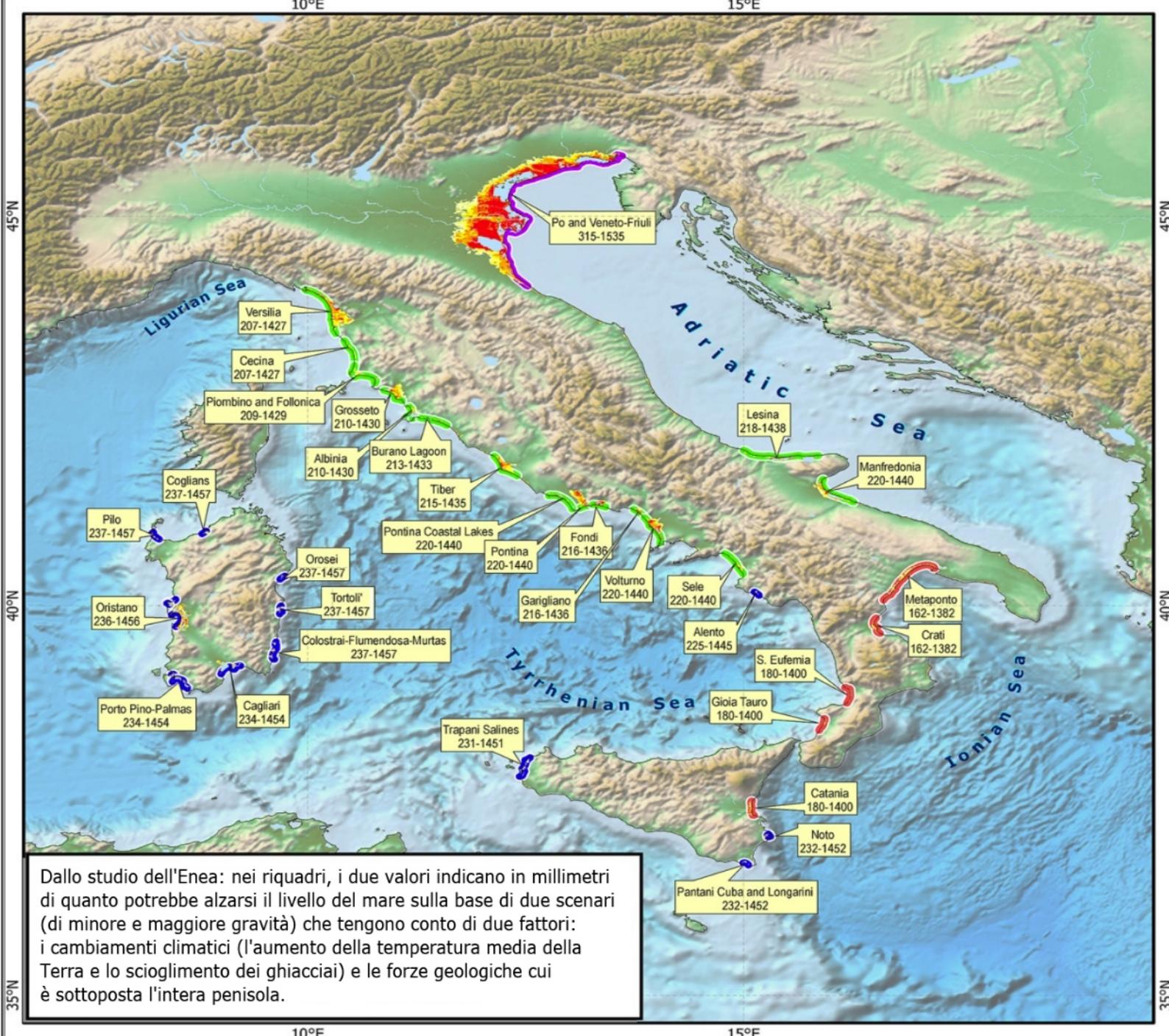
Le zone costiere risentiranno dell'aumento del livello marino, e dovranno essere adeguatamente protette (es: Venezia, delta del Po)



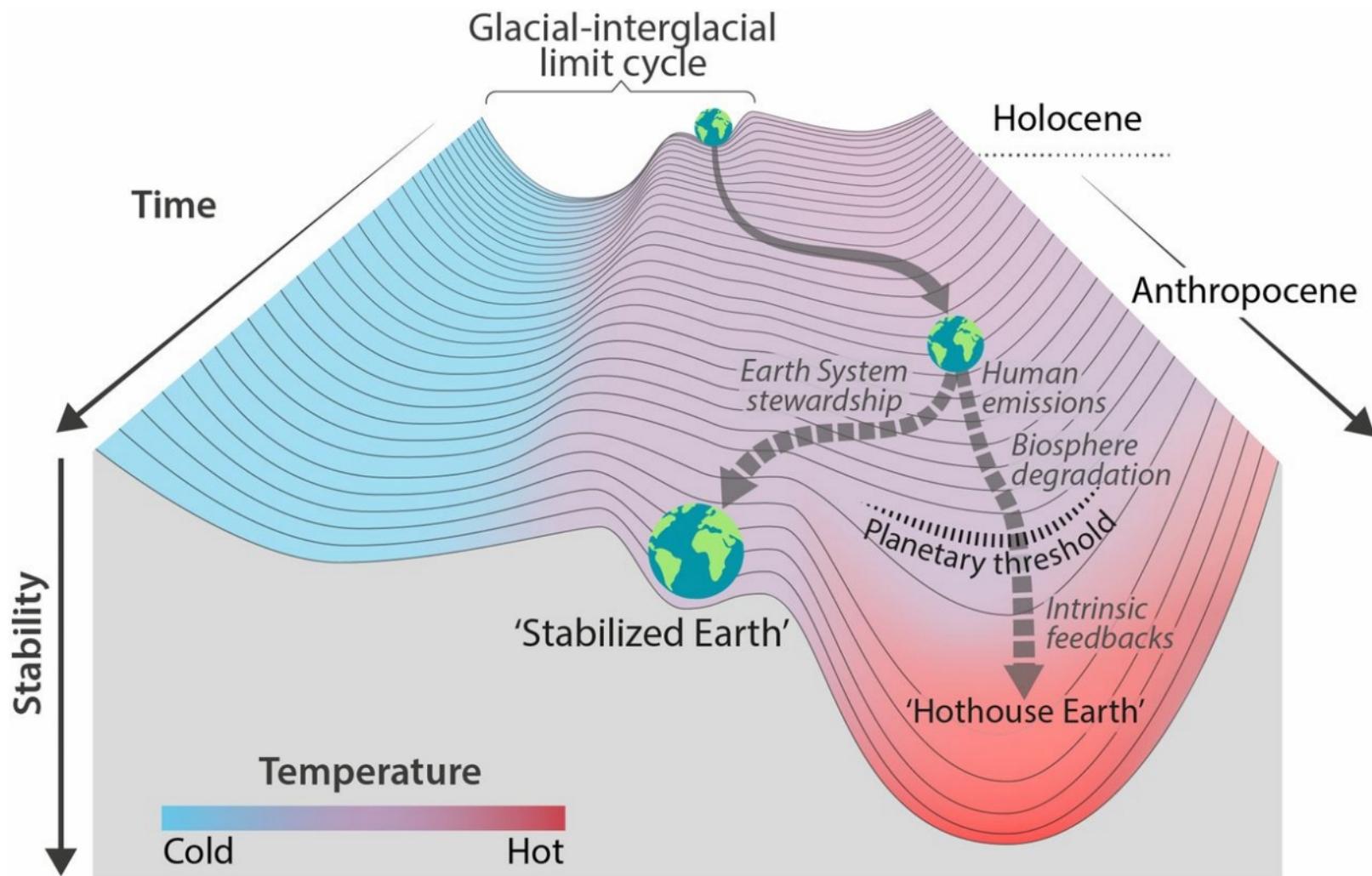
# Settembre 2019 – Rapporto IPCC Oceano e criosfera

Fino a +5 m di livello marino nel 2300





**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.**

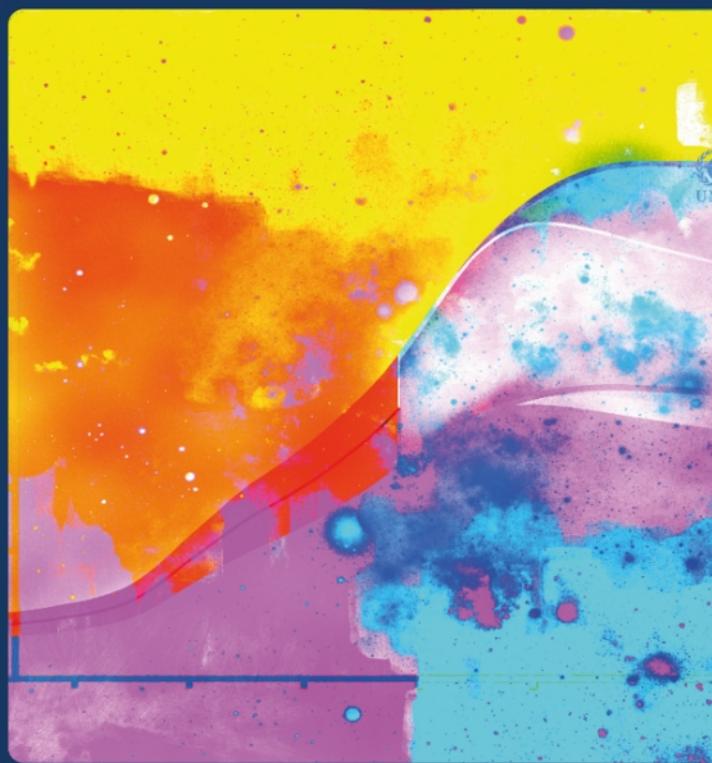


Will Steffen et al. PNAS doi:10.1073/pnas.1810141115

**PNAS**

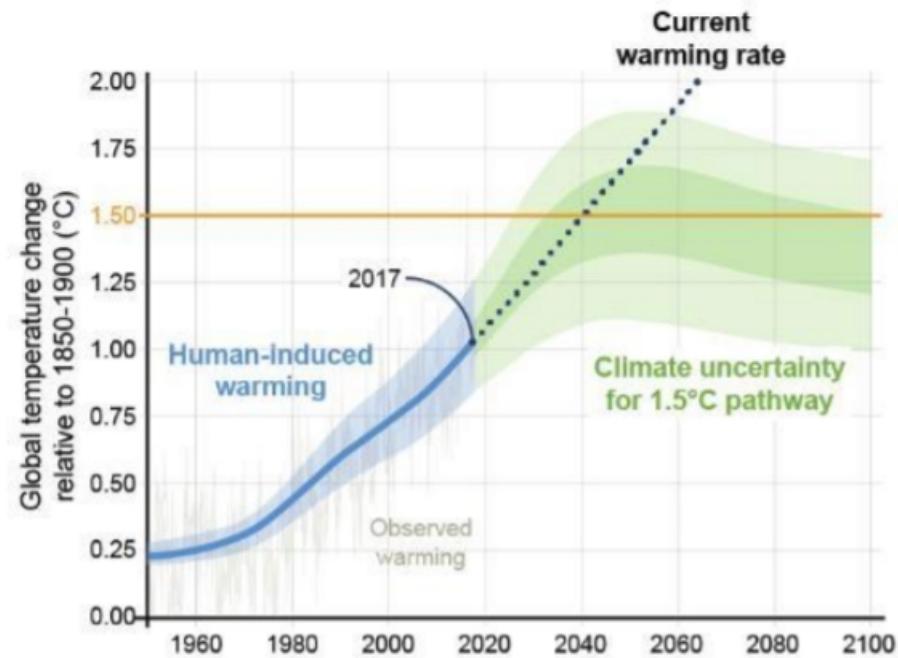
# Global Warming of 1.5°C

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.



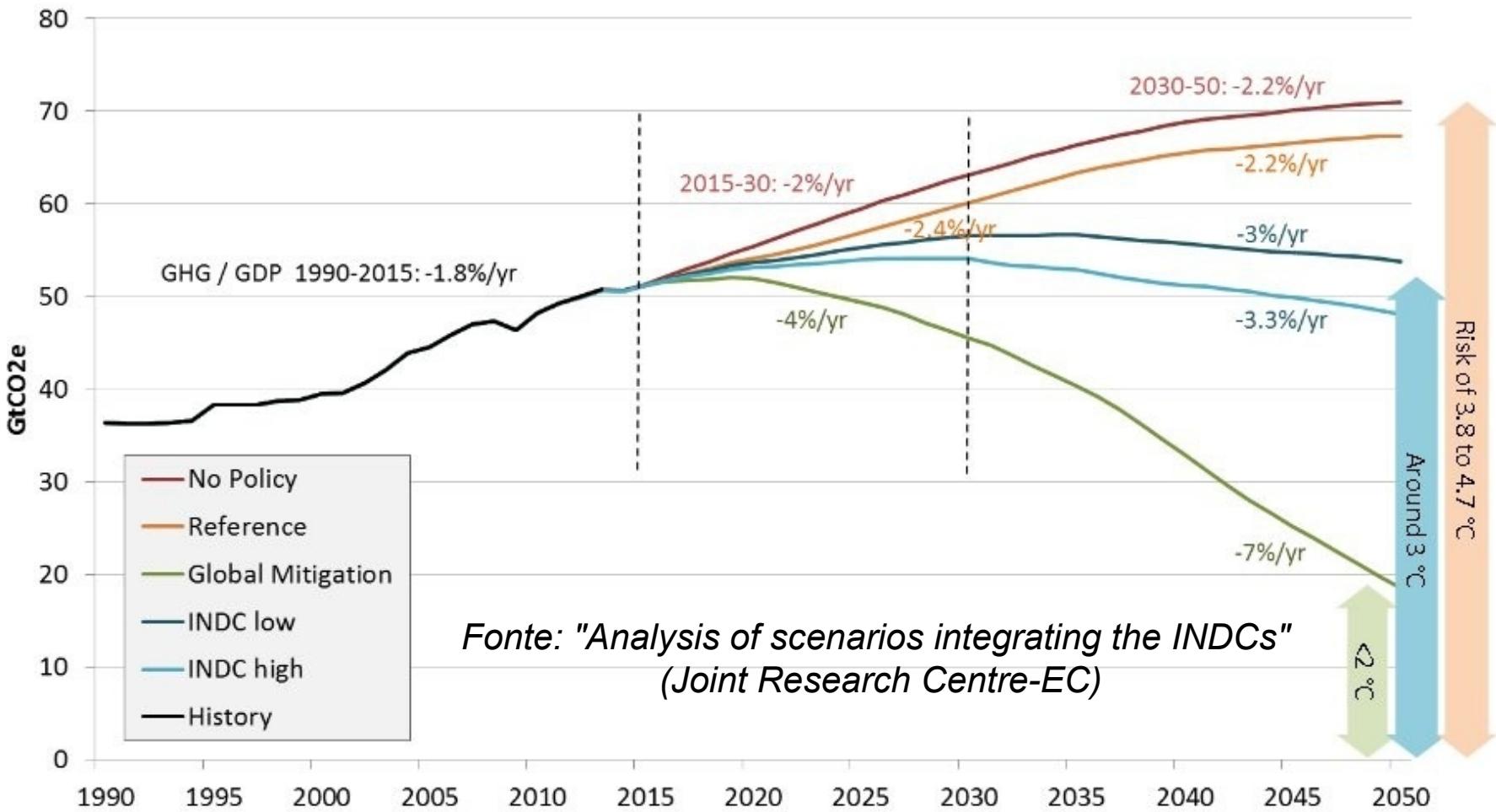
## FAQ1.2: How close are we to 1.5°C?

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

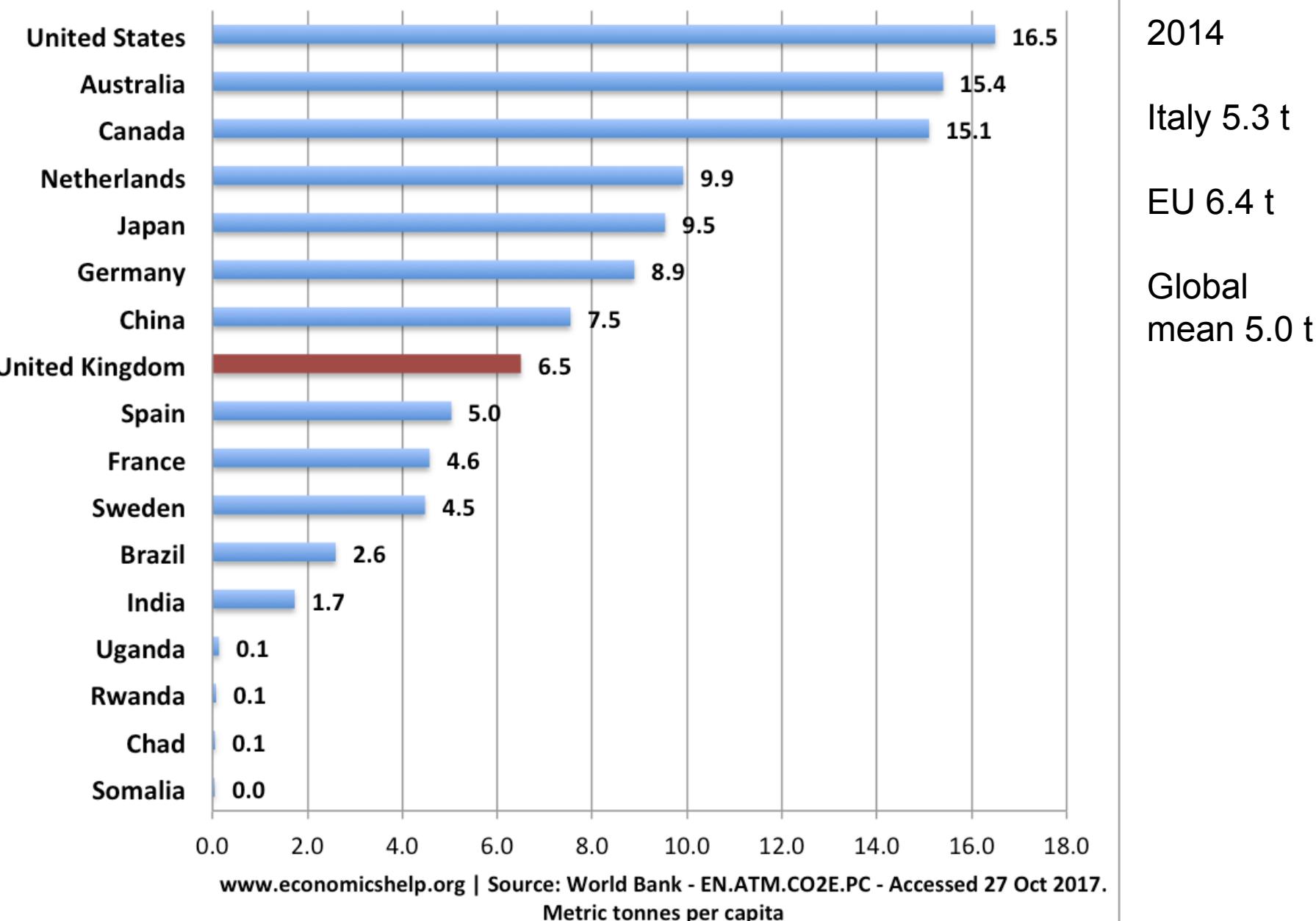


FAQ1.2, Figure 1: Human-induced warming reached approximately 1°C above pre-industrial levels in 2017. At the present rate, global temperatures would reach 1.5°C around 2040.

# Promesse ambiziose di riduzione CO<sub>2</sub>, ma non bastano: se applicate, circa +3 °C nel 2100 !



## CO2 emissions per capita



## OIL & GAS SUPPLY AND STRANDED ASSET RISK

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

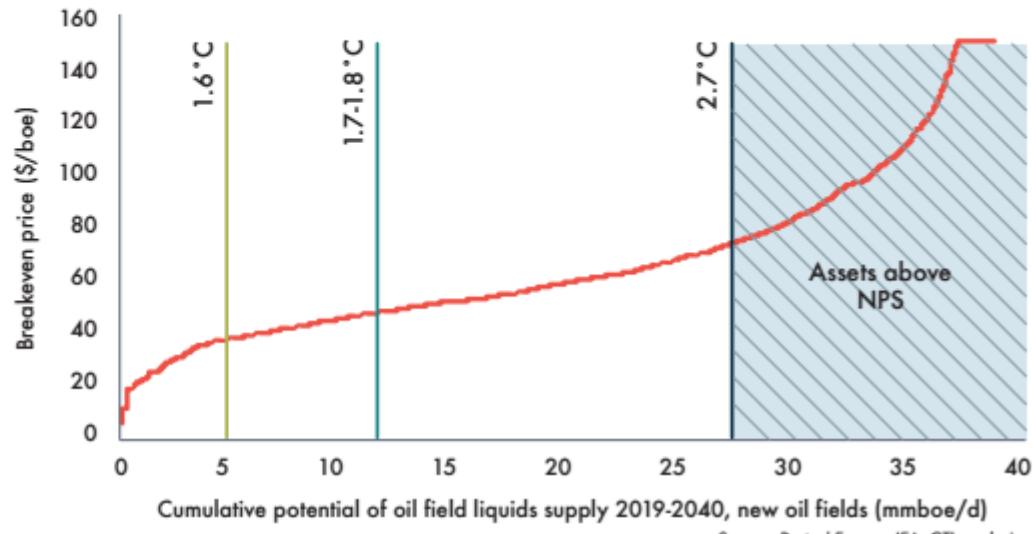
B2DS demand      SDS demand

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.

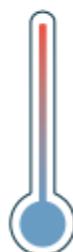
In the context of the energy transition towards a decarbonised economy, these potential fossil fuel developments risk destroying investor value as well as the climate.



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



60%  
83%



**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.

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                          | <b>\$13</b> bn  | Canada    | <span>No</span> <span>No</span> |
|                | Gorgon/Jansz Stage 2 | Shell, Chevron, ExxonMobil     | <b>\$3.6</b> bn | Australia | <span>No</span> <span>No</span> |
|                | Aspen Phase 1        | ExxonMobil                     | <b>\$2.6</b> bn | Canada    | <span>No</span> <span>No</span> |
|                | Amoca FFD            | Eni                            | <b>\$1.4</b> bn | Mexico    | <span>No</span> <span>No</span> |
|                | Zinia 2              | BP, ExxonMobil, Total, Equinor | <b>\$1.3</b> bn | Angola    | <span>No</span> <span>No</span> |

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

1.6 °C

SDS

1.7 - 1.8 °C

NPS

2.7 °C

# The Economist

## The climate issue

1850

1900

1950

2000

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

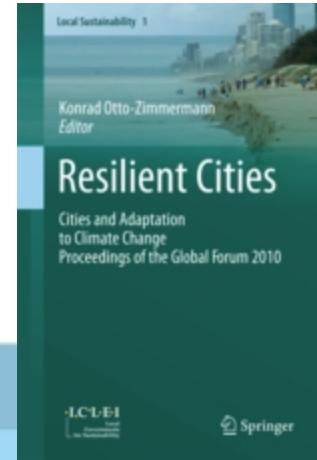
# ROTTERDAM RESILIENCE STRATEGY.

READY FOR THE  
21<sup>ST</sup> CENTURY

CONSULTATION  
DOCUMENT



# 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 = riconfigurazione 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

Totale consumo  
fonte primaria  
**169,7 Mtep**

18,7% Rinnovabili  
31,7 Mtep

36,0% Metano  
61,2 Mtep

33,0% Petrolio  
56,1 Mtep

6,1% Carbone 10,4Mtep

Perdite  
Bunkeraggi  
3,1 Mtep (1,8%)

Calore rinnovabile (bioenergie e pompe di calore)

2,4 Mtep 1,4%

5 TWh 0,3%

11,2 Mtep 6,6%

**Totale consumi finali  
125,5 Mtep**

Usi civili  
22,2 Mtep 13,1%

159 TWh 8,1%

35,9 Mtep 21,1%

13,8 Mtep 8,1%

5,7 Mtep 3,3%

126 TWh 6,4%

0,8Mtep 1,5%

Industria  
11 TWh 0,6%

2,6 Mtep

Forza  
motrice  
9Mtep (6 %)

Perdite e  
calore raffluo  
(radiatori,  
gas di  
scarico)

Reti termici  
29Mtep (18%)

Calore utile da cogenerazione

Perdite reti di  
teleriscaldamento

Calore raffluo delle  
centrali termoelettriche  
(disperso nell'ambiente)

19 TWh  
1% Perdite  
rete elettr.

Importazioni  
8,3Mtep (4,9 %) energia elettrica  
dall'estero

Le percentuali riportate sono riferite al  
totale di fonte primaria = 169,7Mtep (100%)

Bioenergie + geotermia

Idroelettrico  
Solare FV + eolico  
(fonti rinnovabili  
non-programmabili)

3,9Mtep (2,3%)

Accumuli / Pompaggi  
idro-elettrici  
2,5 TWh (1,1%)

Generatori  
a fonti  
rinnovabili

93 TWh

7,4Mtep (4,3%)

Totale input  
combustibili fossili  
35,6 Mtep (21 %)

6,5Mtep

Centrali  
termo-  
elettriche  
45% efficienza

190 TWh

321TWh

38 TWh

24Mtep  
14,2%

Calore raffluo delle  
centrali termoelettriche  
(disperso nell'ambiente)

19 TWh  
1% Perdite  
rete elettr.

Perdite reti di  
teleriscaldamento

Fonti dati: MSE, GSE, TERNA

**1 Mtep = 11,63 TWh**

LEGENDA:

Combustibili fossili

Energia elettrica

Fonti rinnovabili

Calore

Confine nazionale

Ing. Alex Sorokin

## 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**



**MENO  
È MEGLIO**

RIDURRE CARNE E PRODOTTI  
LATTIERO-CASEARI

PER UNA VITA E UN  
PIANETA PIÙ SANI

# Fermare la cementificazione, il suolo non è infinito!



**7,64%**

IL CONSUMO DI  
SUOLO IN ITALIA

**23.039**

CHILOMETRI  
QUADRATI (2016)

**12,96% LOMBARDIA**  
**2,91% VALLE D'AOSTA**  
**12,21% VENETO**

**3,75% SARDEGNA**

**10,76% CAMPANIA**

**3,38% BASILICATA**

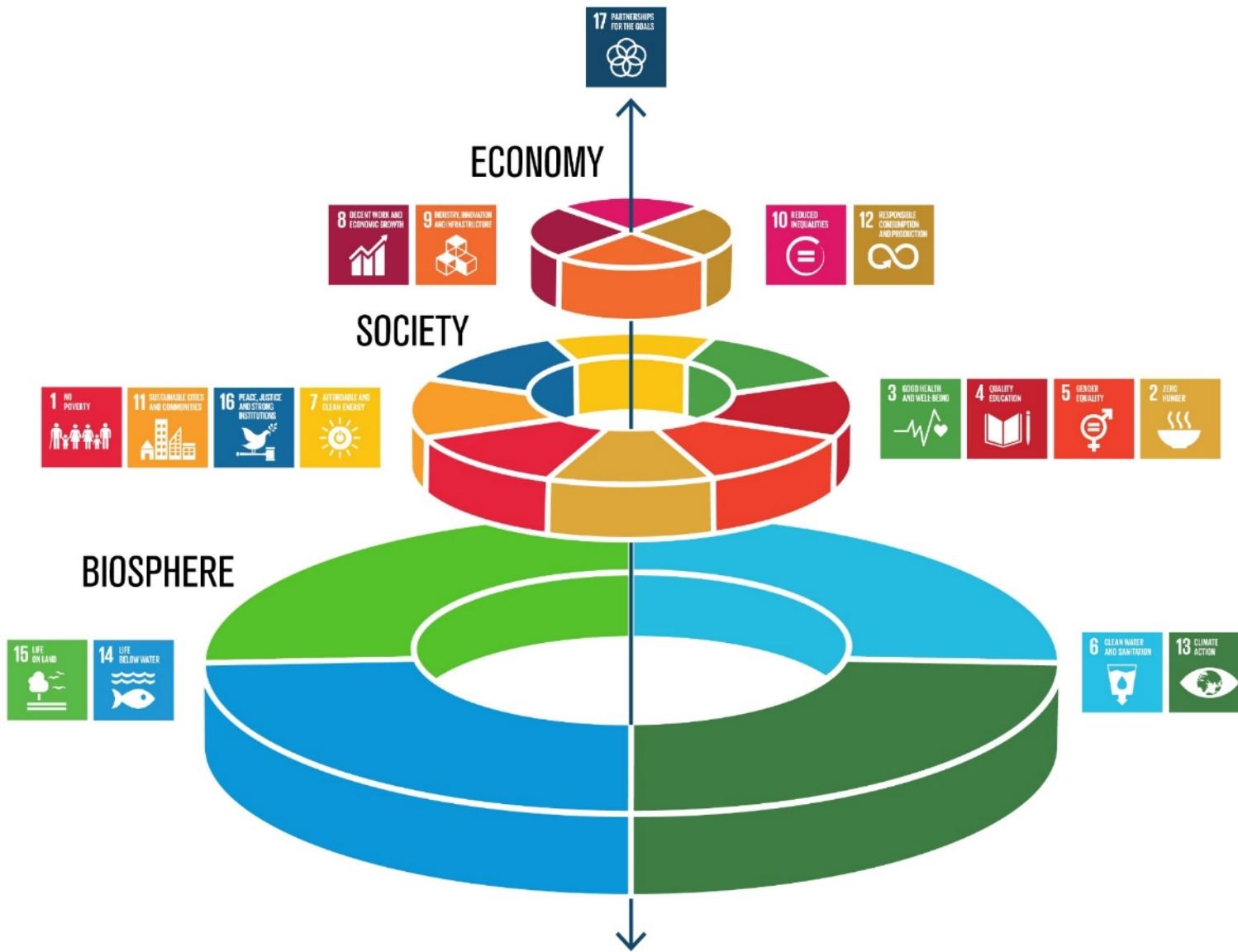
## Legenda

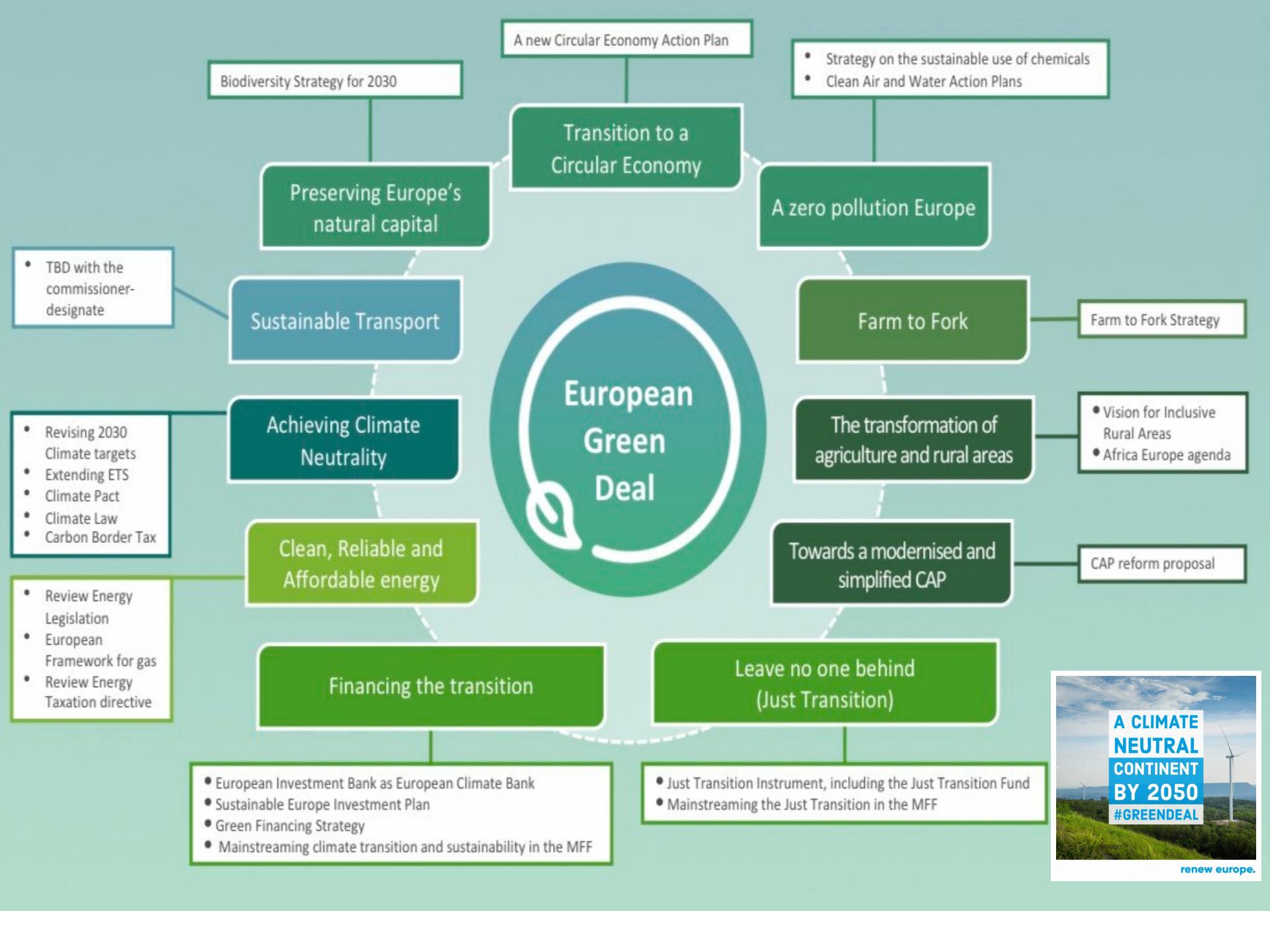
| Consumo di suolo (% 2016) |   |
|---------------------------|---|
| ≤ 3                       | ■ |
| 3 - 5                     | ■ |
| 5 - 7                     | ■ |
| 7 - 9                     | ■ |
| 9 - 15                    | ■ |

# AI lavoro! Gli obiettivi UN dell'Agenda 2030



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







# A RACE WE CAN WIN

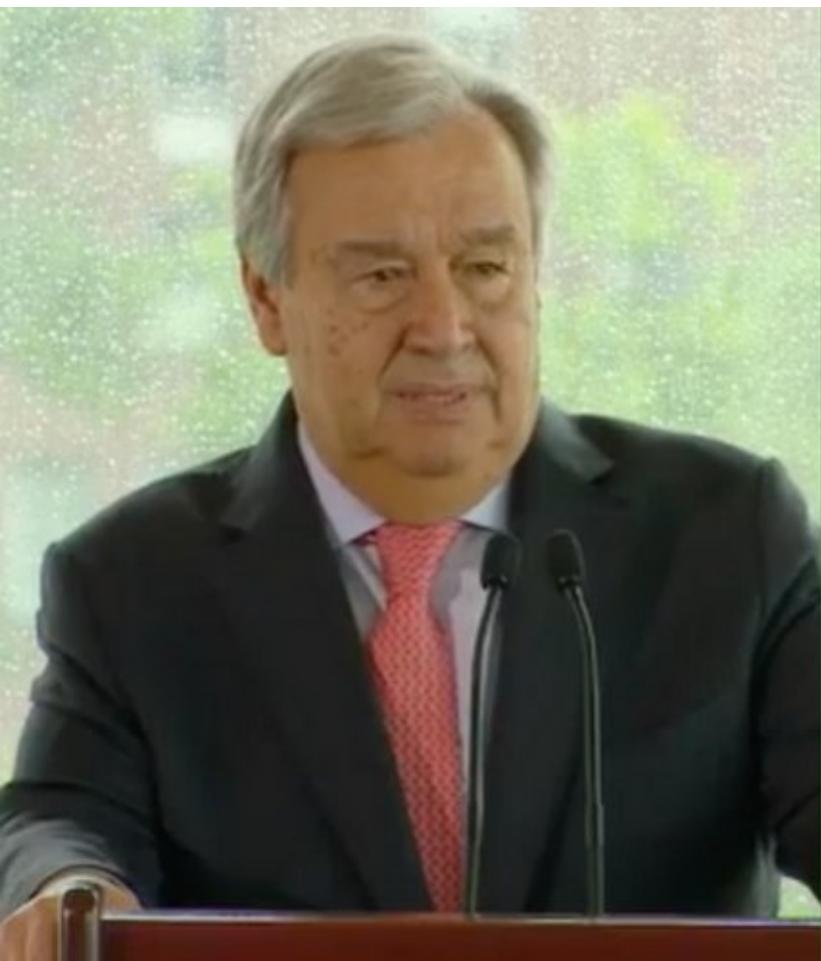
**“ Climate change is the defining issue of our time – and we are at a defining moment. ”**



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

**“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

SPLENDENDO GENERO

LMMF

MMXII

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

8

9

10

11

12

1

2

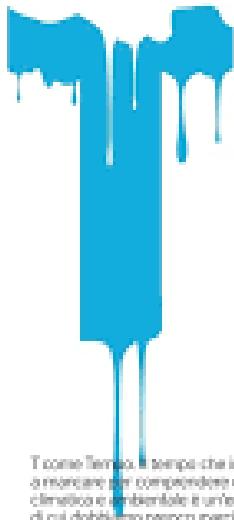
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The only question is how to communicate the gravity of our situation to the non-scientific public. In the words of Kaisa Kosonen, an observer at the negotiations, “Scientists might want to write in capital letters, ‘ACT NOW, IDIOTS,’ but they need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



# LUCA MERCALLI NON C'È PIÙ TEMPO

COME REAGIRE AGLI ALLARMI AMBIENTALI



T come tempo. Il tempo che inizia a mosciare per comprendere che quello climatico e ambientale è un'emergenza di cui dobbiamo preoccuparci.



# LUCA MERCALLI PREPARIAMOCI

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



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