

Naturwissenschaften in der Klimakrise:

Was tun mit der wissenschaftlichen
Evidenz?

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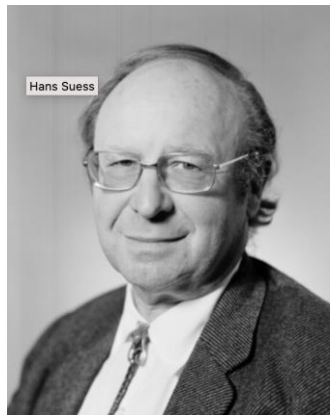


Roger Revelle (1909-1991)

Carbon Dioxide Exchange Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO₂ during the Past Decades

By ROGER REVELLE and HANS E. SUESS, Scripps Institution of Oceanography, University of California, La Jolla, California

(Manuscript received September 4, 1956)

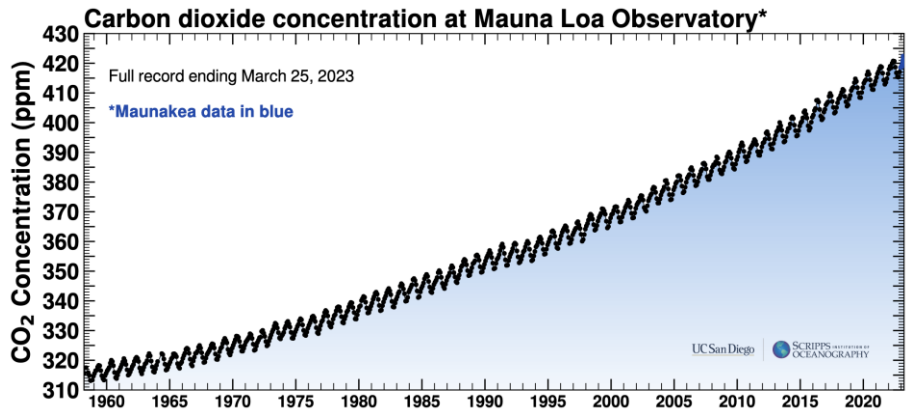


Hans E. Suess (1909-1993)

Abstract

From a comparison of C¹⁴/C¹² and C¹³/C¹² ratios in wood and in marine material and from a slight decrease of the C¹⁴ concentration in terrestrial plants over the past 50 years it can be concluded that the average lifetime of a CO₂ molecule in the atmosphere before it is dissolved into the sea is of the order of 10 years. This means that most of the CO₂ released by artificial fuel combustion since the beginning of the industrial revolution must have been absorbed by the oceans. The increase of atmospheric CO₂ from this cause is at present small but may become significant during future decades if industrial fuel combustion continues to rise exponentially.

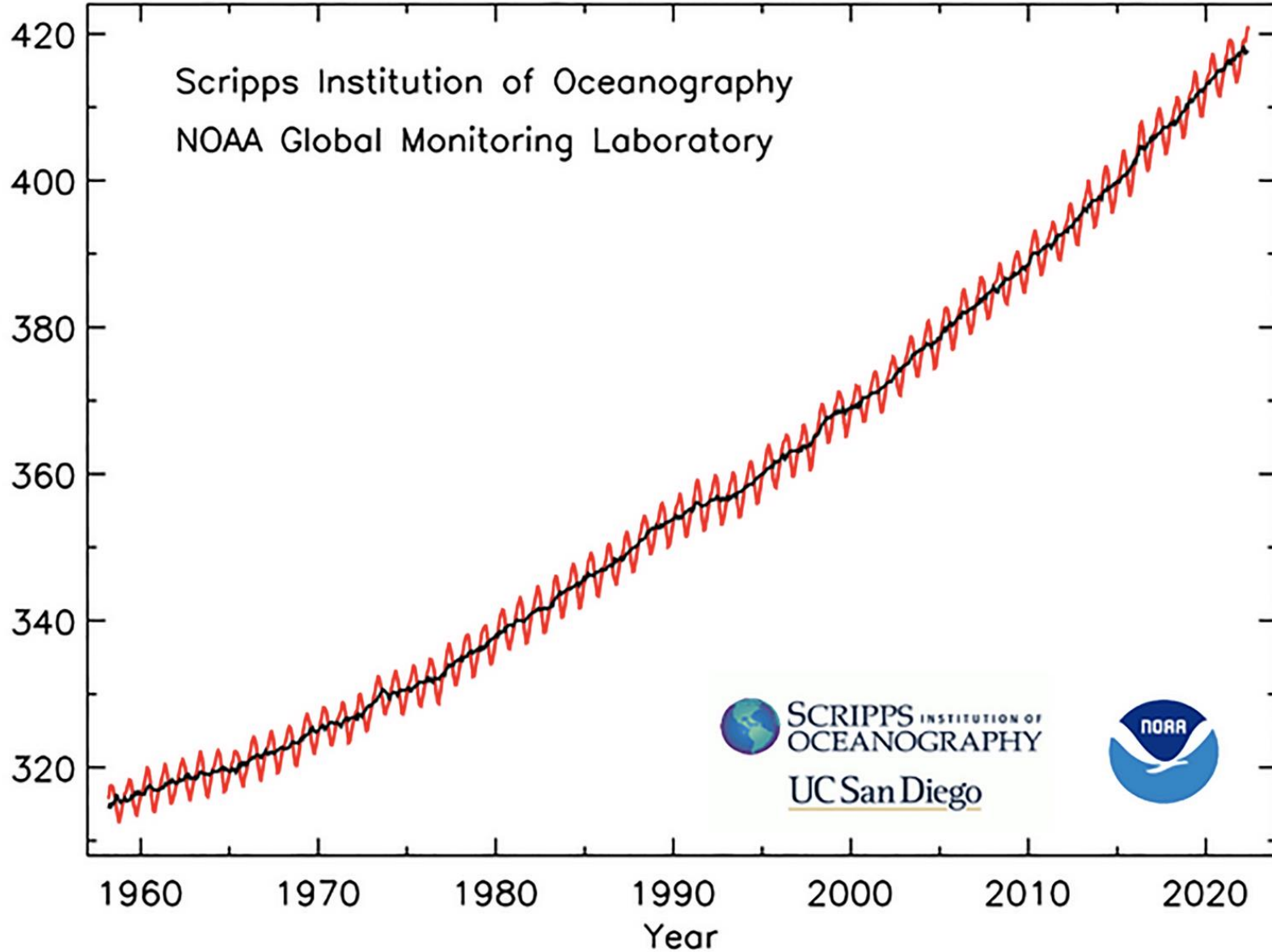
Present data on the total amount of CO₂ in the atmosphere, on the rates and mechanisms of exchange, and on possible fluctuations in terrestrial and marine organic carbon, are inadequate for accurate measurement of future changes in atmospheric CO₂. An opportunity exists during the International Geophysical Year to obtain much of the necessary information.



Atmospheric CO₂ at Mauna Loa Observatory

Scripps Institution of Oceanography
NOAA Global Monitoring Laboratory

parts per million (ppm)

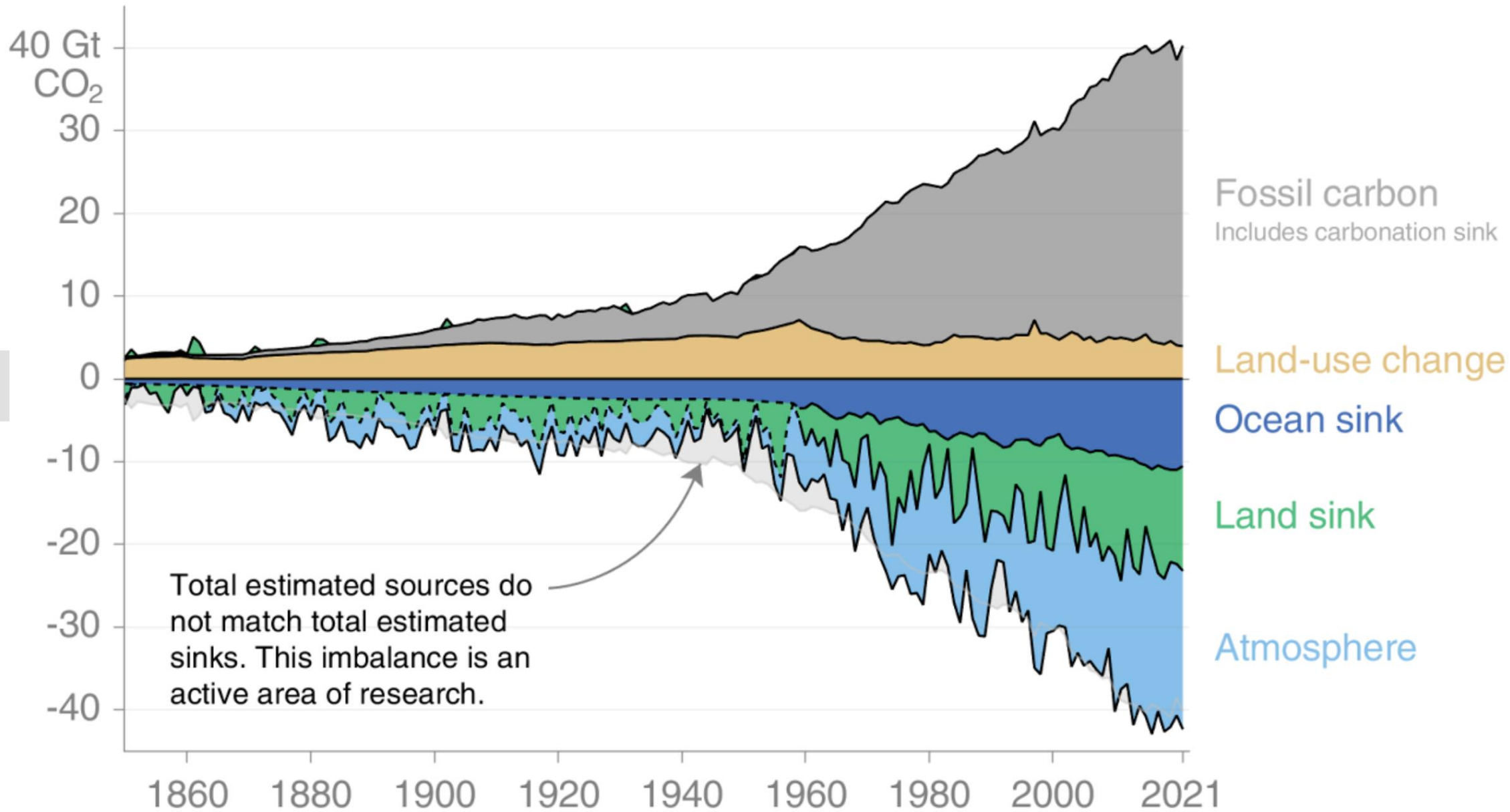


Zusammenhang CO₂ Anstieg
in Atmosphäre und globaler
Erwärmung erstmals
formuliert 1956

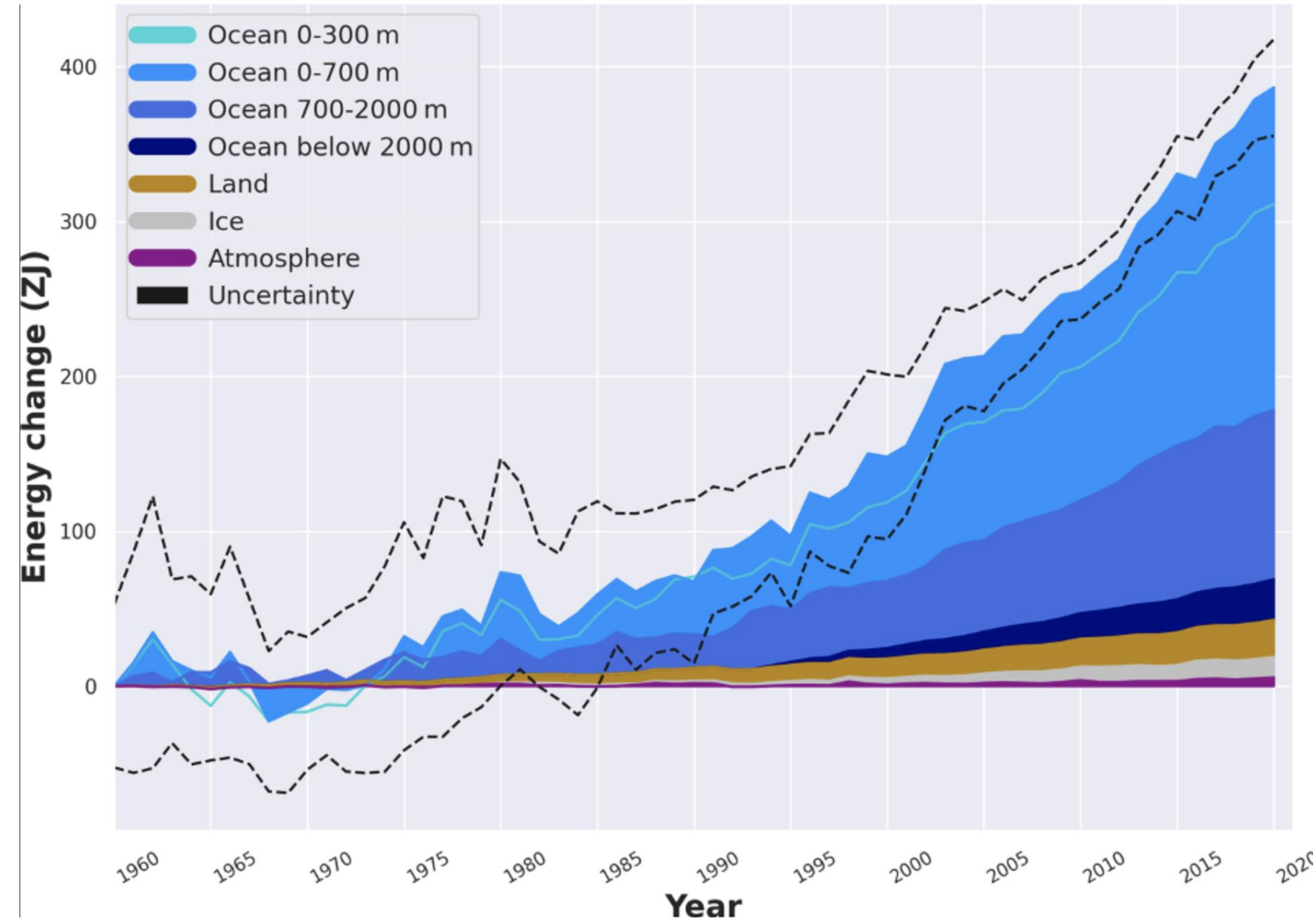
SCRIPPS INSTITUTION OF
OCEANOGRAPHY
UC San Diego



Balance of sources and sinks



Energy accumulation relative to 1971



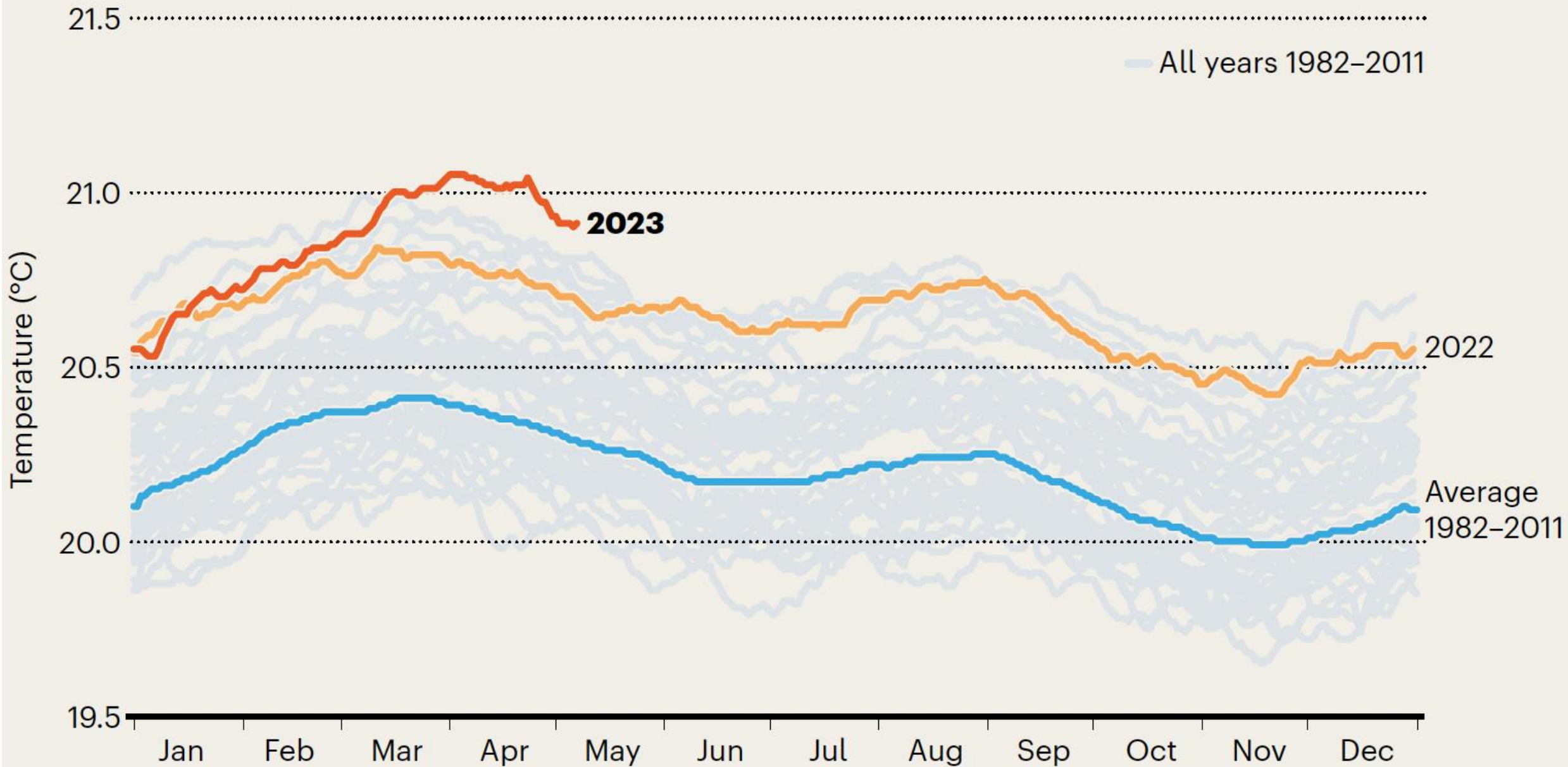
in ZJ = 10^{21} Joule

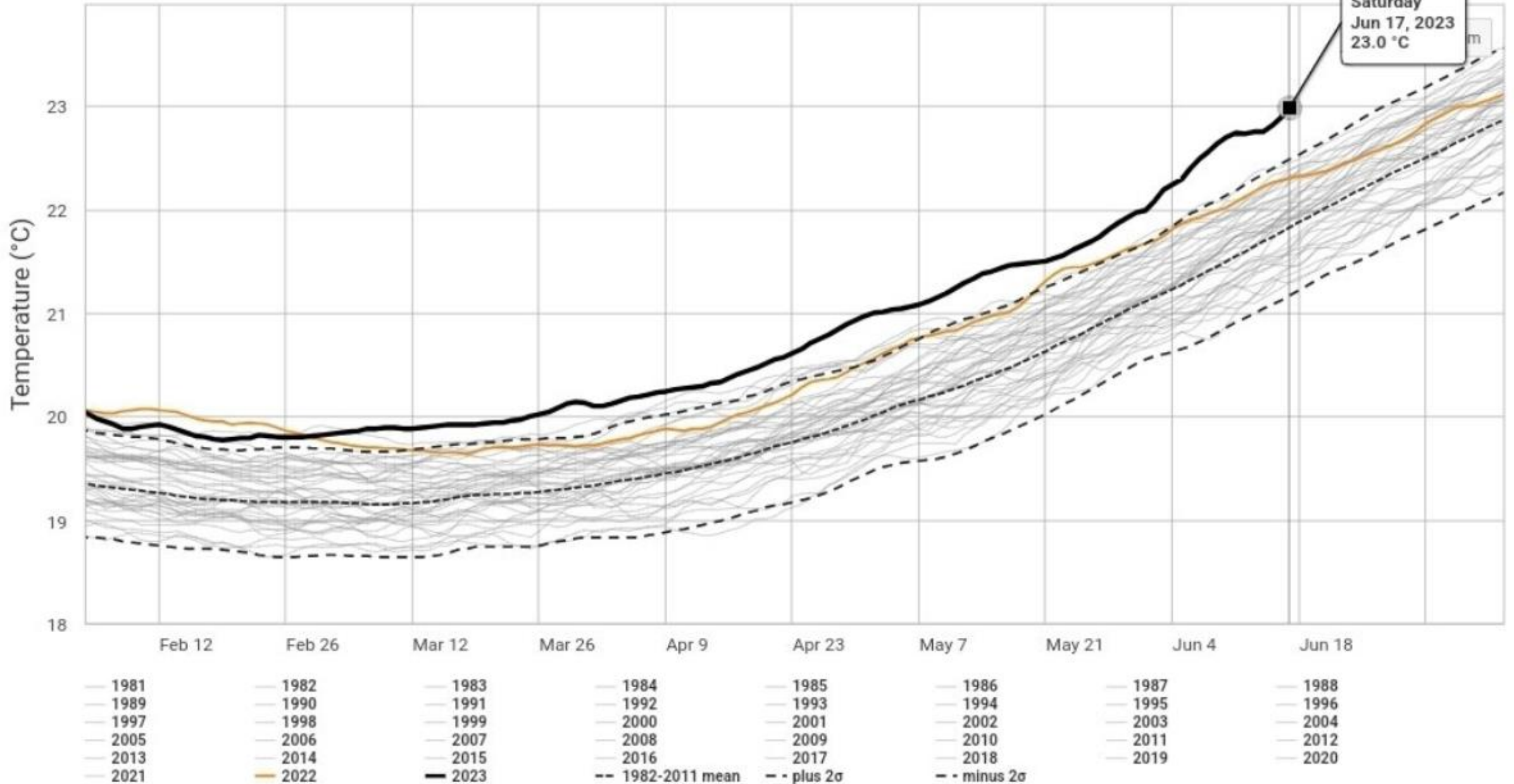
Almost all heat stored
in the ocean!
Thus, oceans are
warming up!!!

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

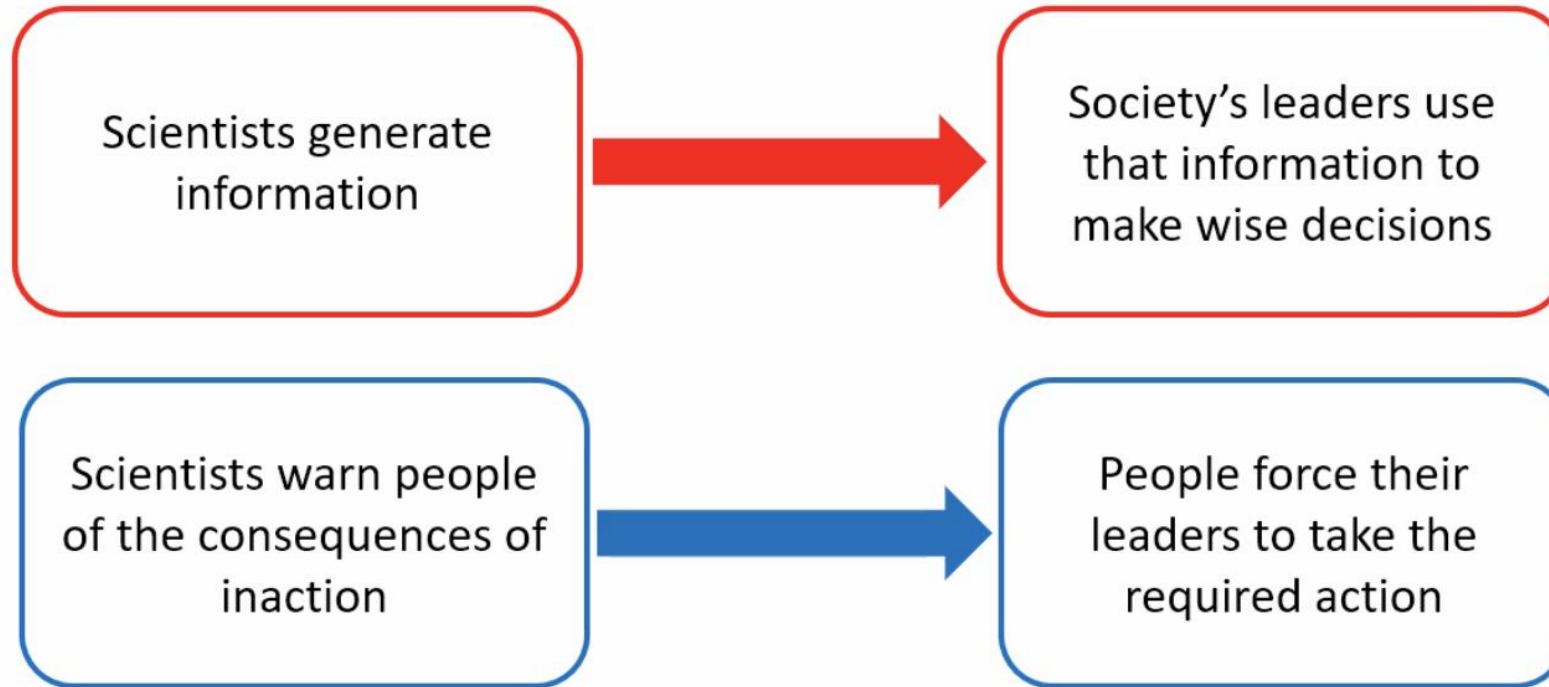
HOW THE OCEAN IS WARMING

In early April 2023, the global ocean surface temperature hit a record high.





Science's theories of change



Theory of Change 1 is false



Governments don't listen to scientists

Driven by an economic growth imperative; respond to corporate lobbyists (and public pressure)

In 2020, oil & gas sector spent \$136 million in political contributions and \$110 million on lobbying in the USA (OpenSecrets.org)

'Pollution paradox'

Theory of Change 2 is false



Public is misinformed: Fossil fuel funded climate denialism and 'delayism'

Public is uninformed: Media do not cover issues as emergencies

The public does not demand action from its leaders

From Publications to Public Actions: The Role of Universities in Facilitating Academic Advocacy and Activism in the Climate and Ecological Emergency

Charlie J. Gardner^{1}, Aaron Thierry², William Rowlandson³ and Julia K. Steinberger⁴*

¹ Durrell Institute of Conservation and Ecology, University of Kent, Canterbury, United Kingdom, ² Cardiff School of Social Sciences, Cardiff University, Cardiff, United Kingdom, ³ Division of Arts and Humanities, University of Kent, Canterbury, United Kingdom, ⁴ Faculté de Géosciences et de l'environnement, Université de Lausanne, Lausanne, Switzerland

Gardner CJ, Thierry A, Rowlandson W, Steinberger JK (2021) Front. Sustain. 2:679019. doi: 10.3389/frsus.2021.67901

“We suggest that the traditional academic roles of research and teaching are not sufficient to drive transformative change in a time of rapidly accelerating global crises, so those with the greatest knowledge and understanding of these crises have a moral obligation to provide leadership, and engage in advocacy and activism. Given this, universities must reconsider their role in society and adapt their operational models to explicitly recognise engagement in policy and political processes as part of the work mandate of their staff, and adopt mechanisms to facilitate and reward it.”