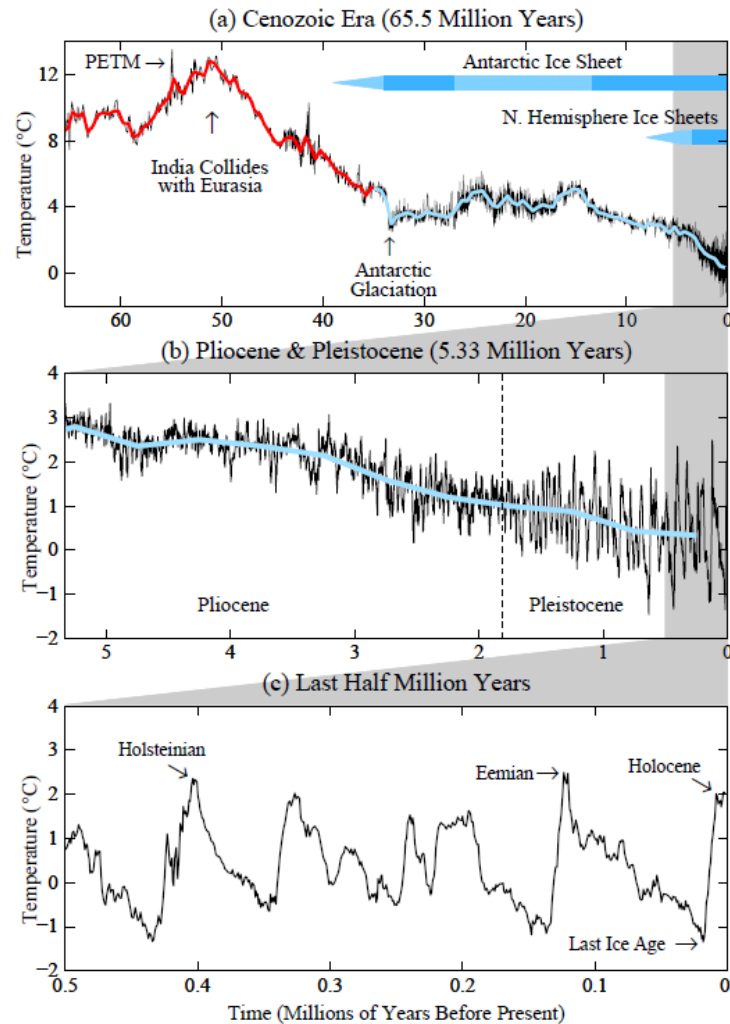


Les tres cares del canvi climàtic

Ferran P. Vilar

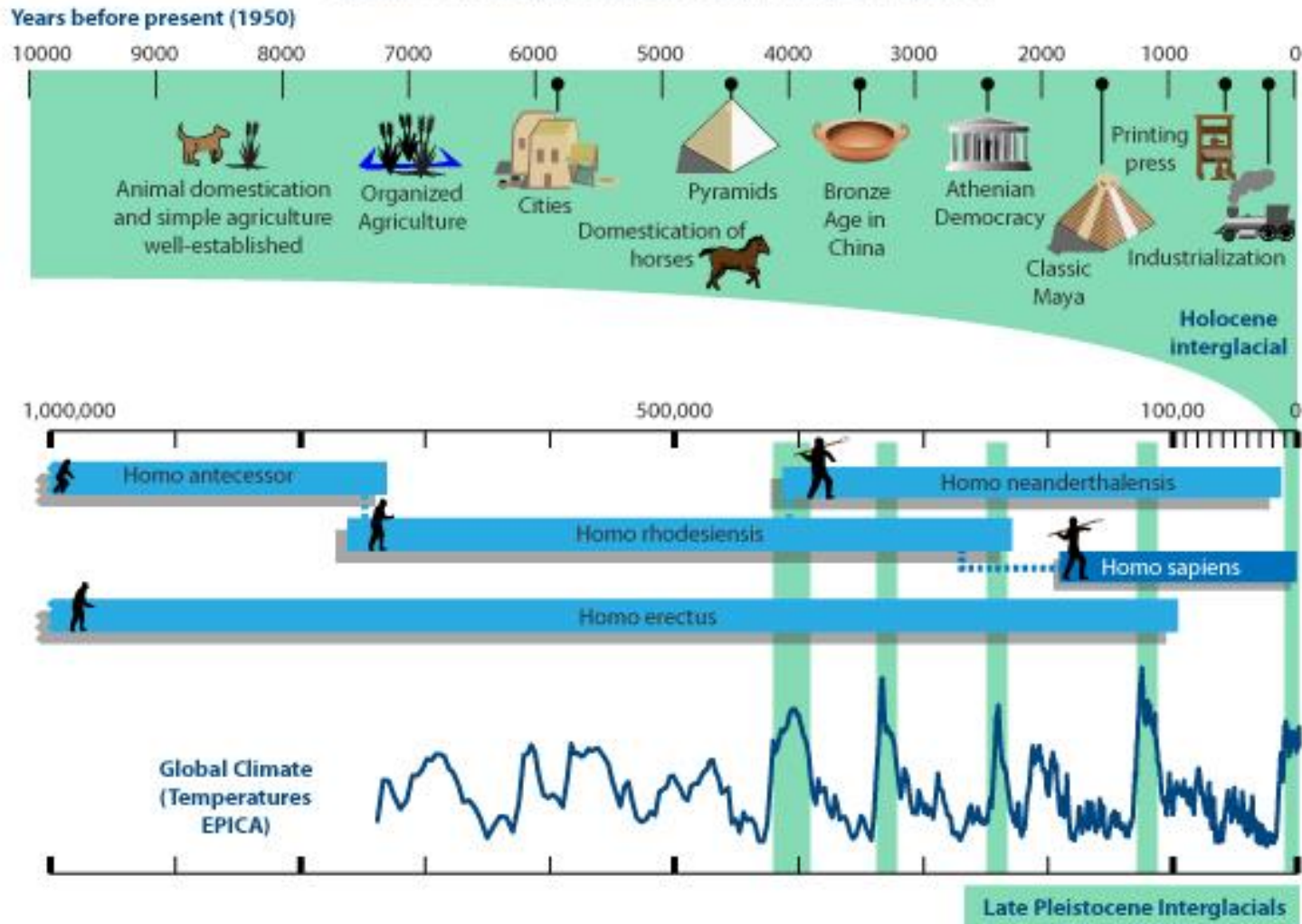
Vinaròs, 25/03/2015

<http://ustednoselocree.com>

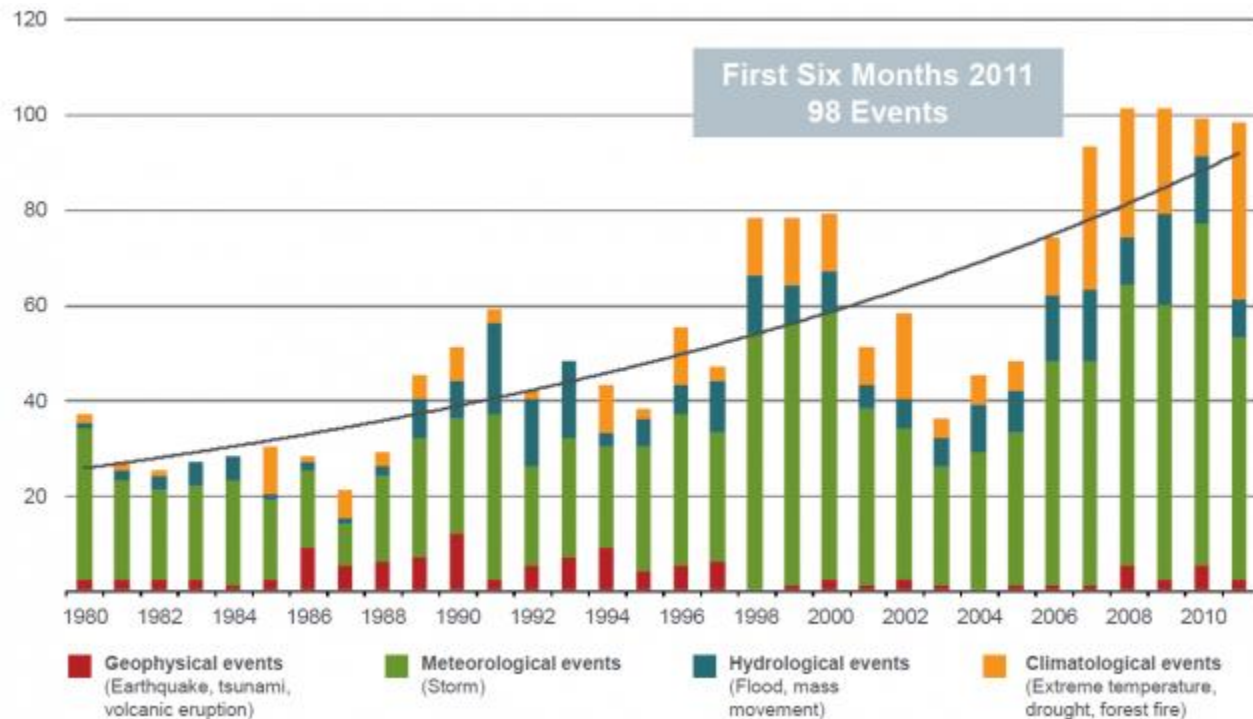


James E. Hansen and Makiko Sato (2011) - Paleoclimate Implications for Human-Made Climate Change - En: Climate Change: Inferences from Paleoclimate and Regional Aspects. A. Berger, F. Mesinger, and D. Šijački, Eds. Springer (In press) - NASA Goddard Institute for Space Studies and Columbia University Earth Institute - http://www.columbia.edu/~jeh1/mailings/2011/20110118_MilankovicPaper.pdf

Global Climate, Human Evolution and Civilization



Esdeveniments catastròfics naturals



Font: Munich Re, 2012

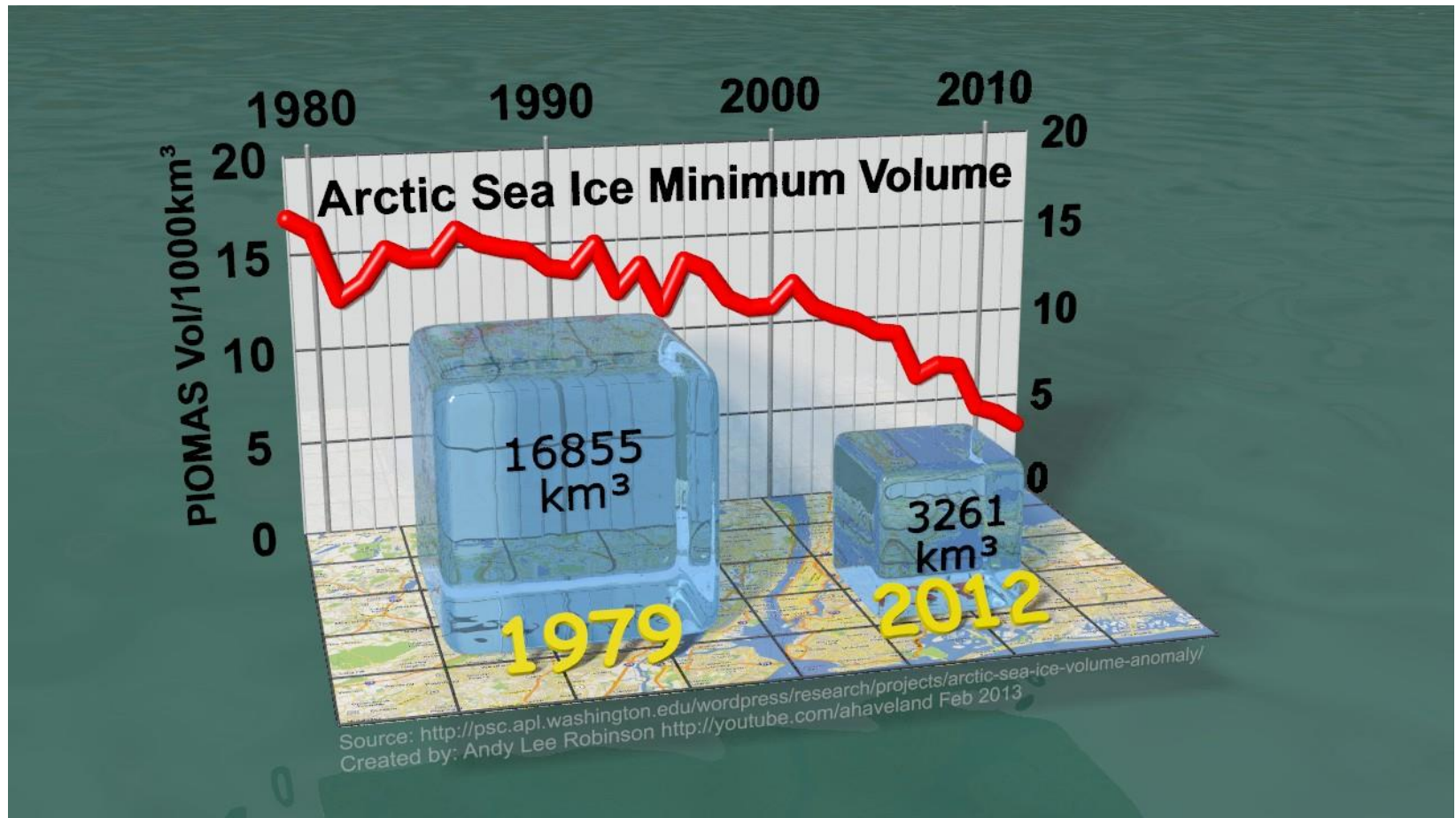


New Jersey, 2012



Northern Spain swamped by severe flooding - <http://www.costa-news.com/costa-del-sol-news/item/4846-northern-spain-swamped-by-severe-flooding>

Volum mínim de gel a l'Àrtic



Tres cares

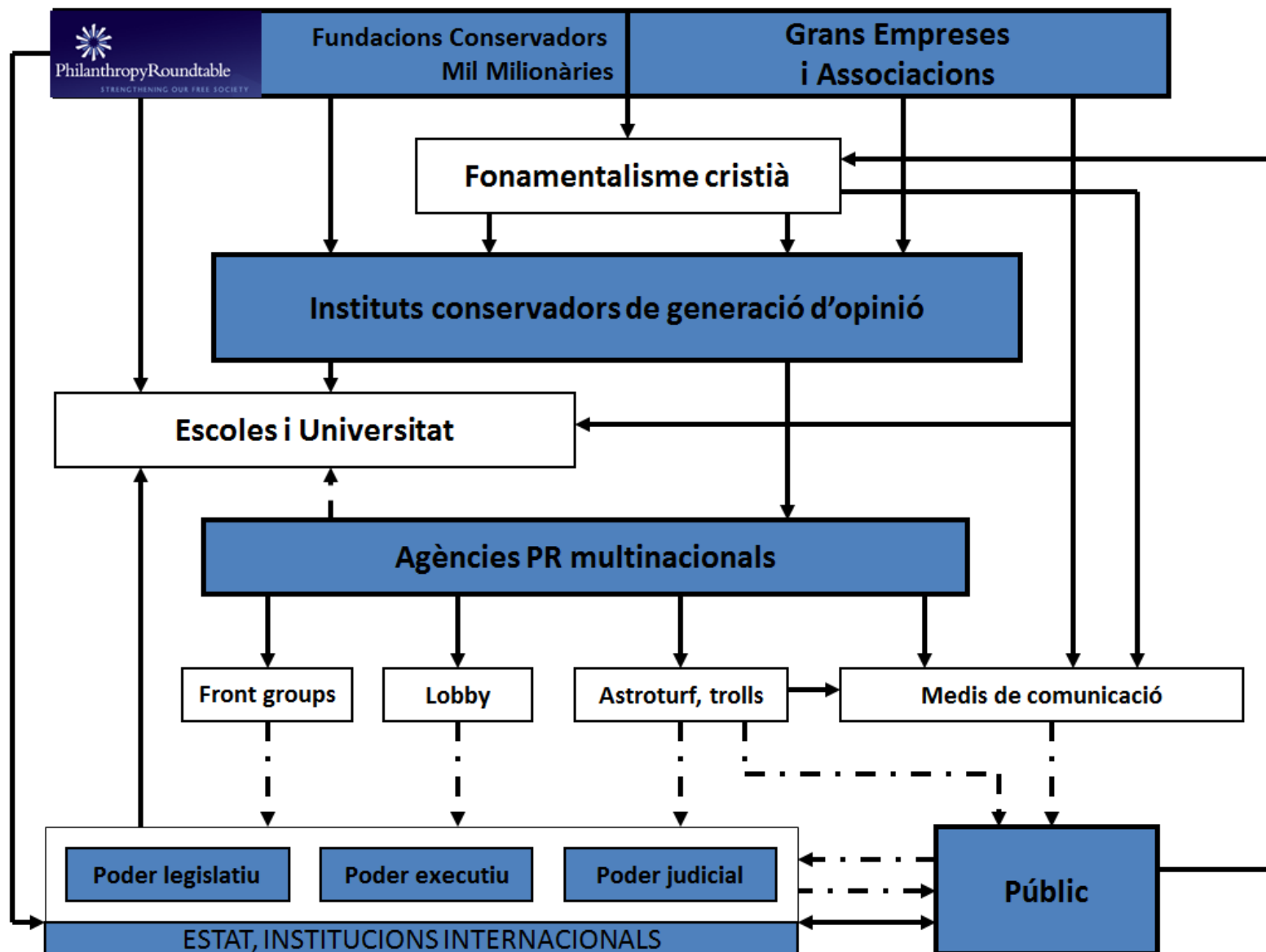
- 1) El negacionisme, i el negacionisme organitzat
- 2) El consens científic institucional (IPCC)
- 3) «Worst than previously thought»



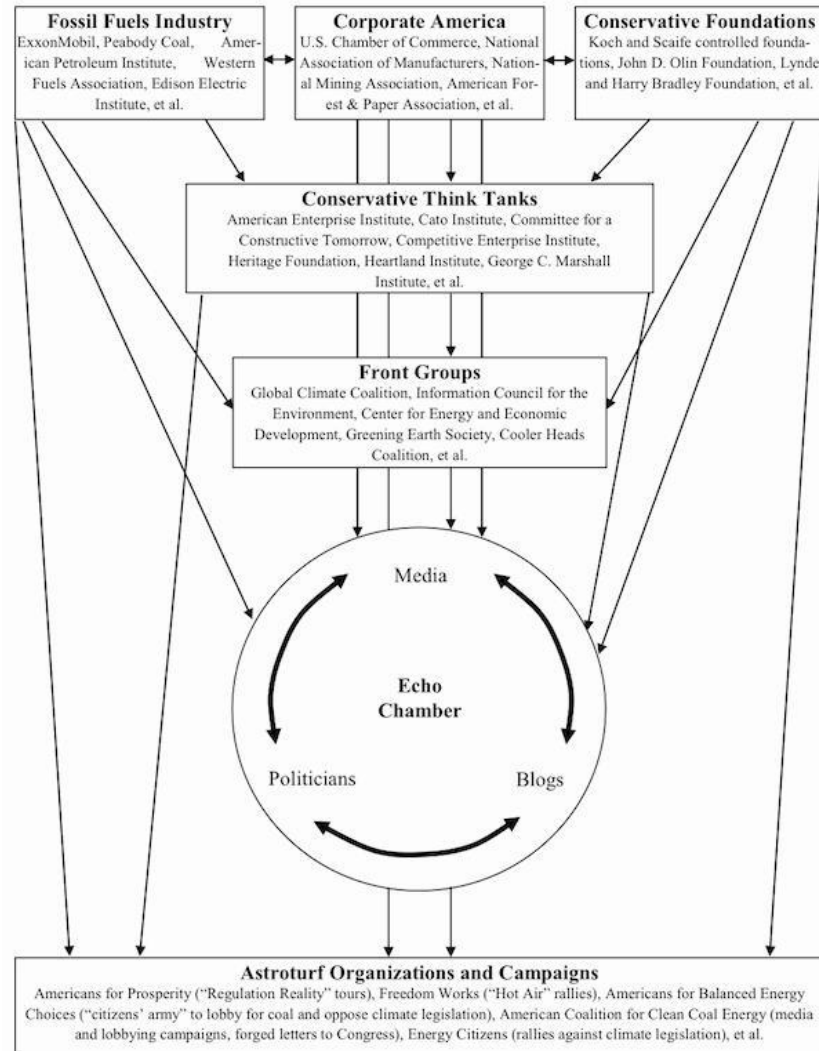
Cara 1 : El negacionisme

Negacions negacionistes

- El clima no està canviant
- El clima està canviant, però molt poc
- El clima està canviant bastant, però és un efecte cíclic (no és el CO₂)
- Si que és el CO₂, però no té a veure amb la combustió de fòssils
- Pot ser que els fòssils influeixin un xic, però el factor dominant és el sol
- Pot ser que sigui sobretot pels combustibles fòssils, però els efectes son assumibles
(en un mercat lliure)

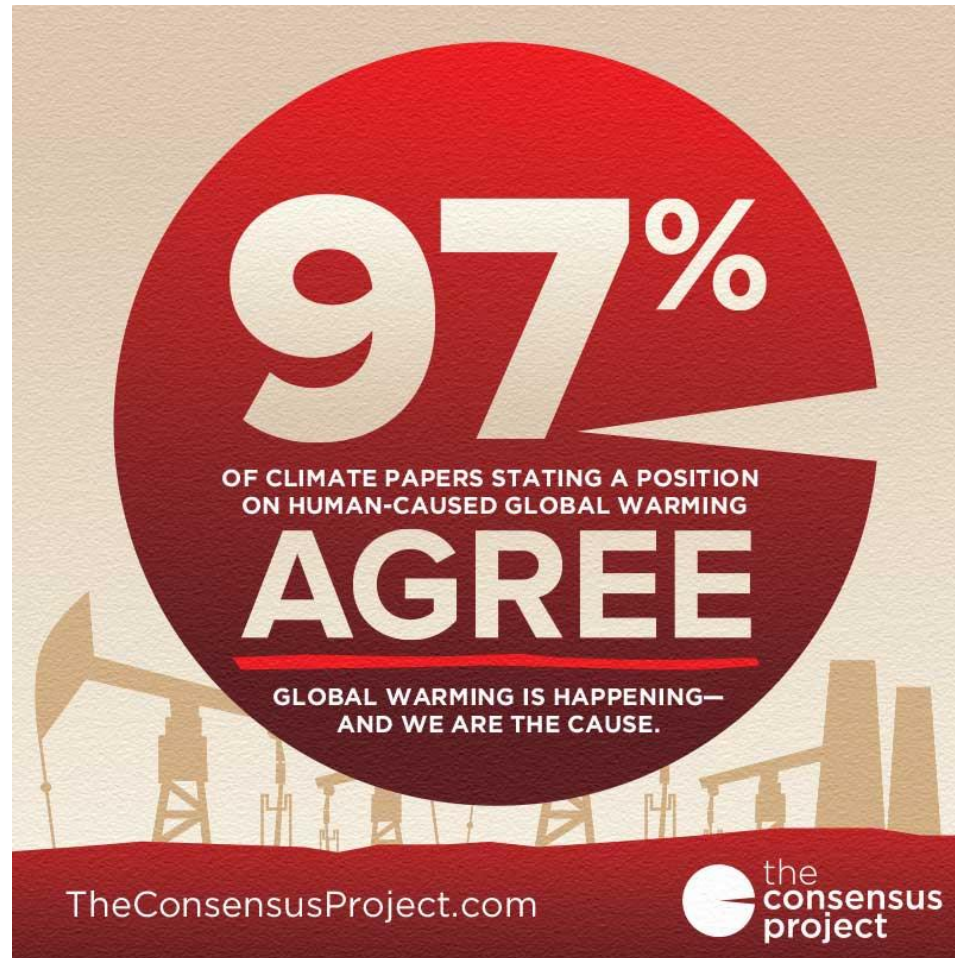


Key Components of the Climate Change Denial Machine

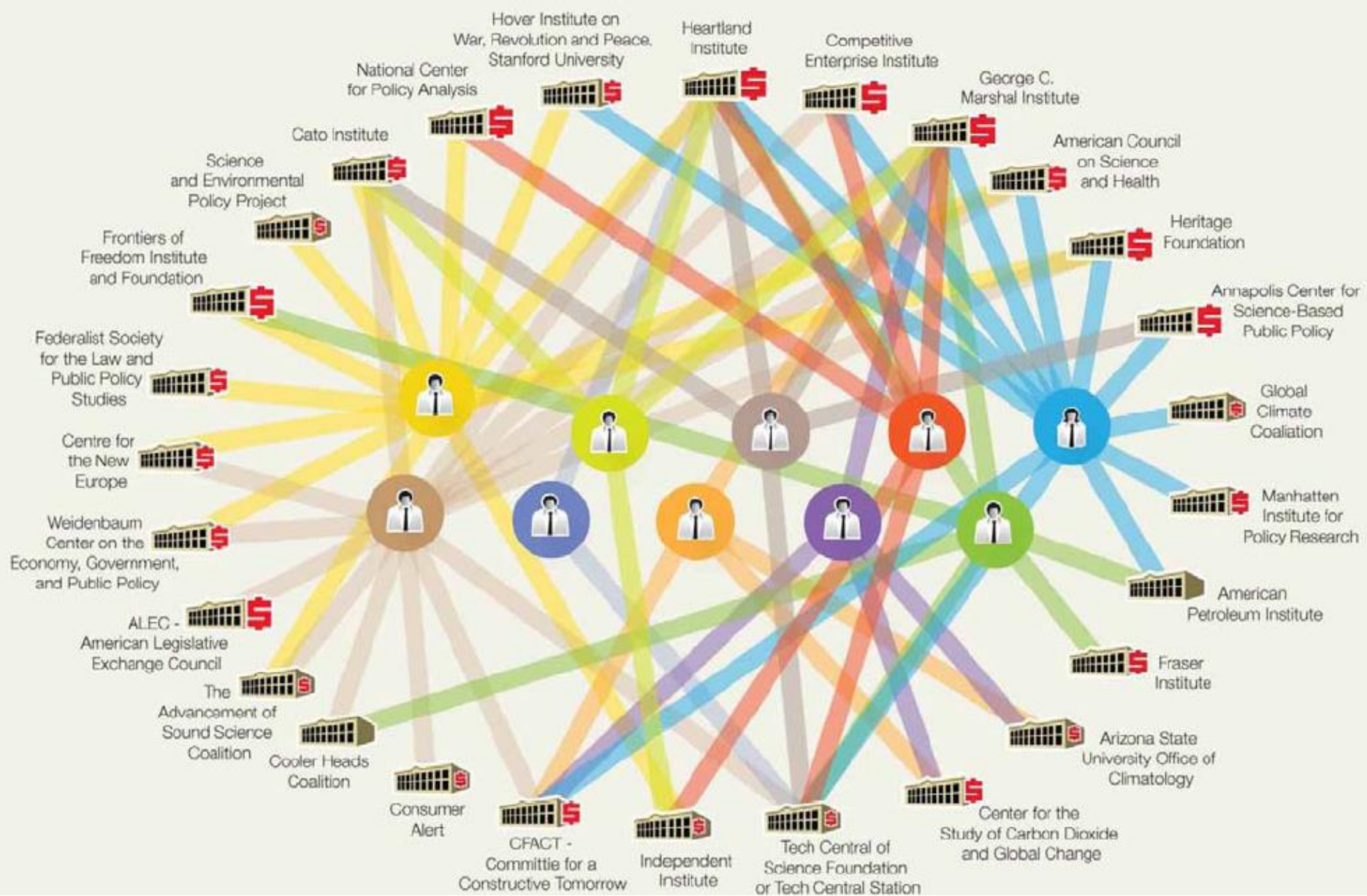


From Riley E. Dunlap and Aaron M. McCright, "Organized Climate-Change Denial," In J. S. Dryzek, R. B. Norgard and D. Schlosberg, (eds.), *Oxford Handbook of Climate Change and Society*. New York: Oxford University Press, 2011, p. 147.

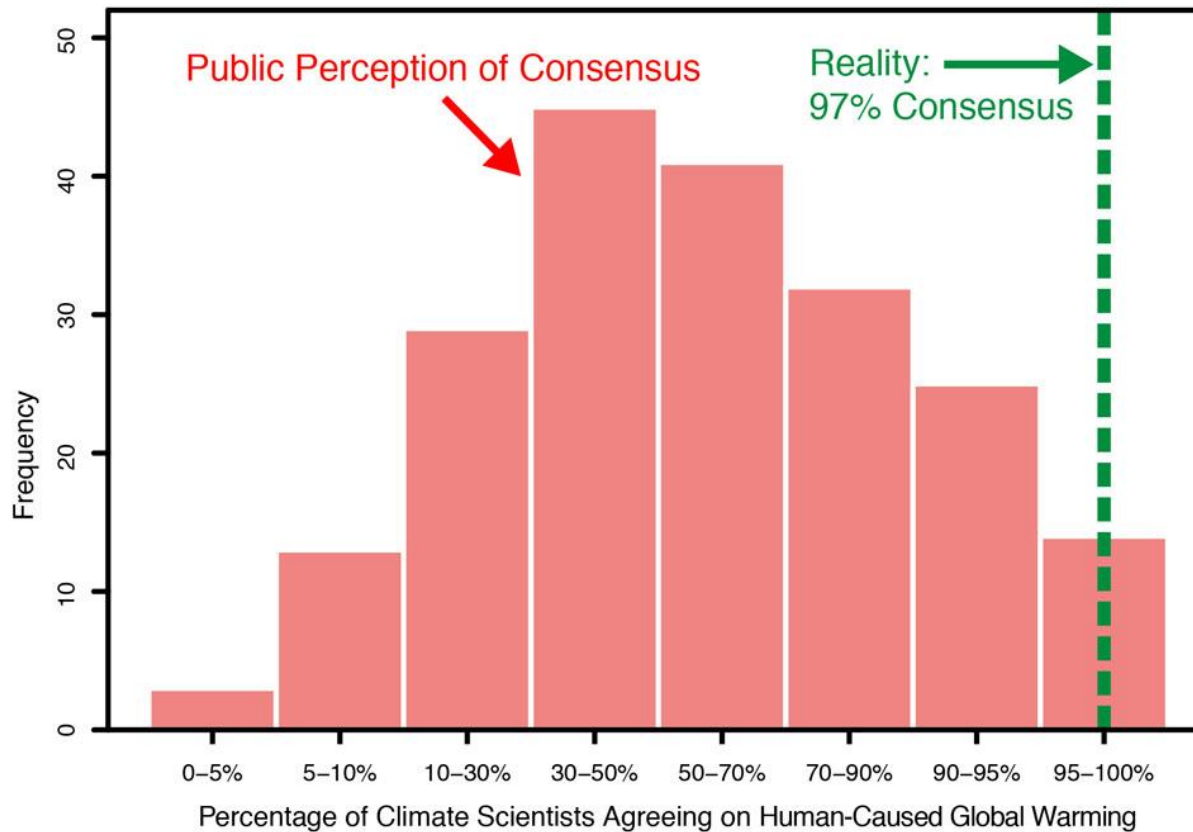
Donald A. Brown (2012) - Ethical Analysis of Disinformation Campaign's Tactics: (1) Reckless Disregard for the Truth, (2) Focusing On Unknowns While Ignoring Knowns, (3) Specious Claims of "Bad" Science, and (4) Front Groups - Climate Ethics - <http://rockblogs.psu.edu/climate/>



John Cook et al (2013) - Quantifying the consensus on anthropogenic global warming in the scientific literature - Environmental Research Letters 8 024024 doi:10.1088/1748-9326/8/2/024024 - Global Change Institute, University of Queensland + Skeptical Science + School of Psychology, University of Western Australia - http://iopscience.iop.org/1748-9326/8/2/024024/pdf/1748-9326_8_2_024024.pdf - 9 authors

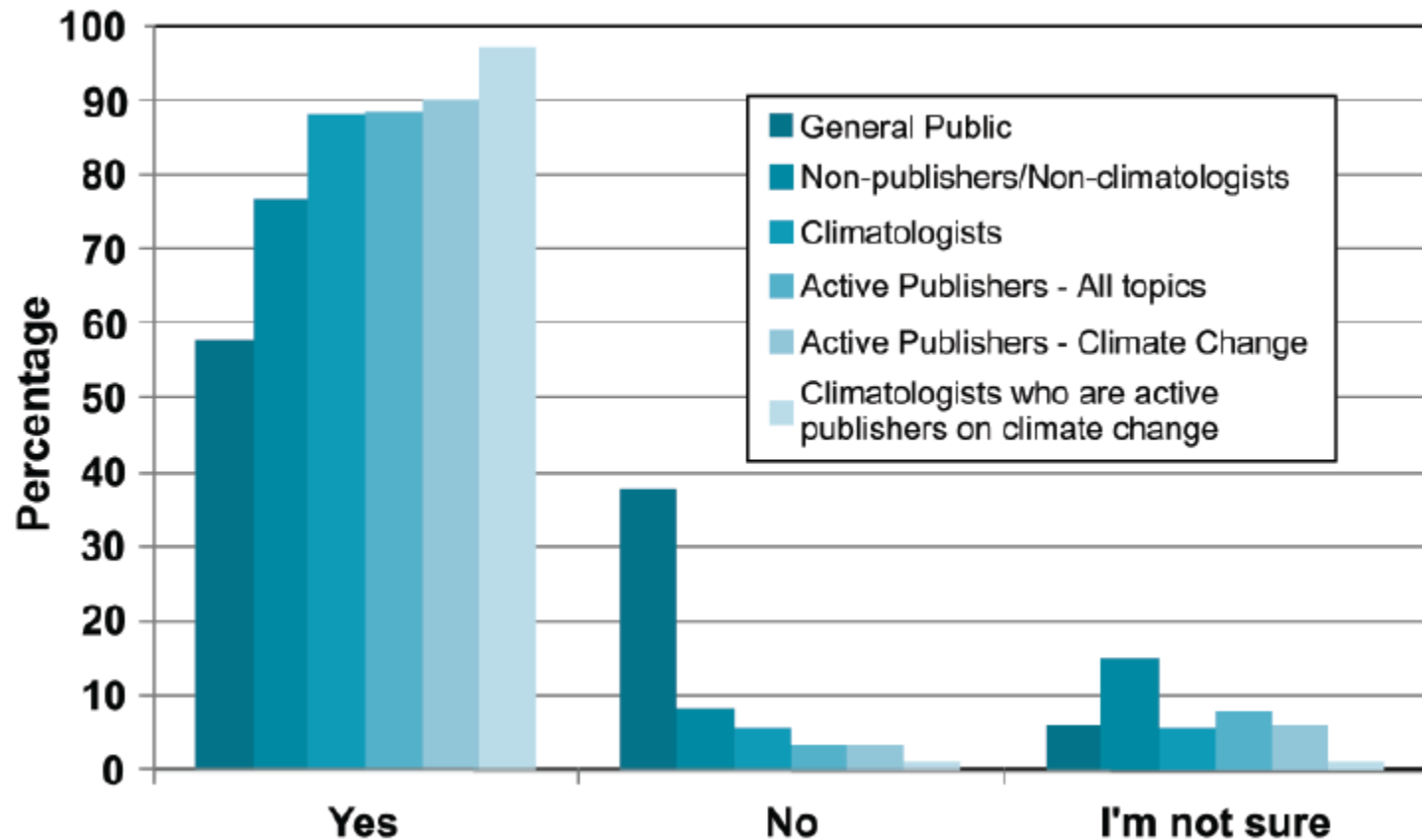


Percepció - realitat

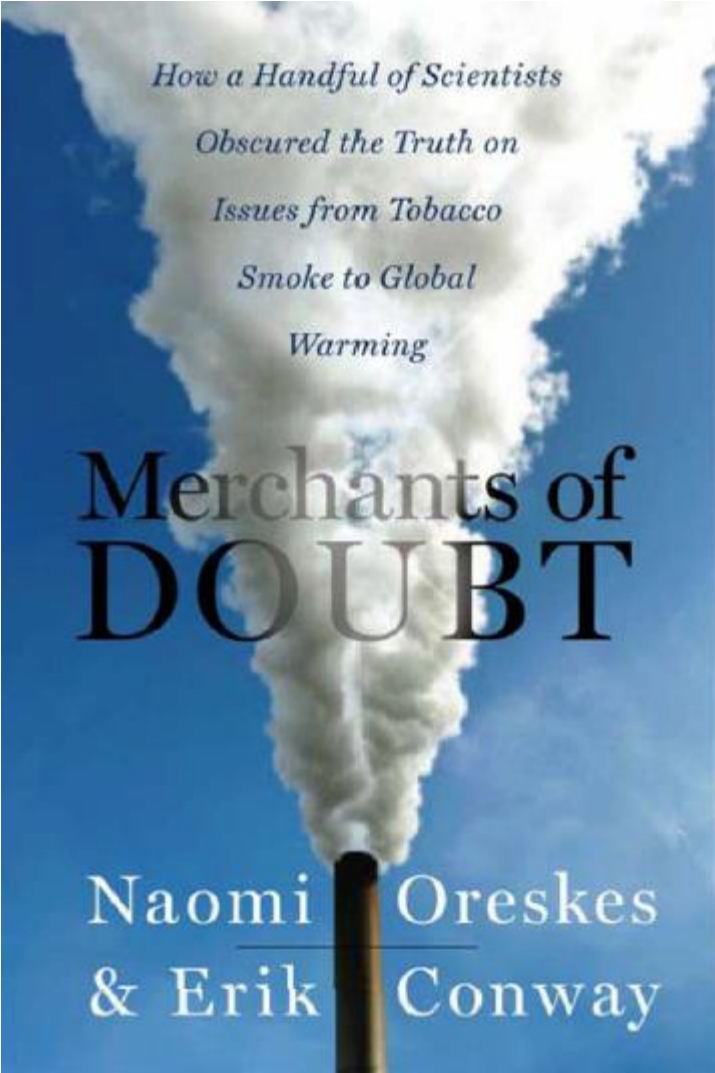


Aaron M. McCright et al (2013) - Perceived scientific agreement and support for government action on climate change in the USA - Climatic Change doi:10.1007/s10584-013-0704-9 - Lyman Briggs College, Department of Sociology + Environmental Science and Policy Program, Michigan State University y John Cook et al (2013) - Quantifying the consensus on anthropogenic global warming in the scientific literature - Environmental Research Letters 8 024024 doi:10.1088/1748-9326/8/2/024024 - Global Change Institute, University of Queensland + Skeptical Science + School of Psychology, University of Western Australia

Percepció pública



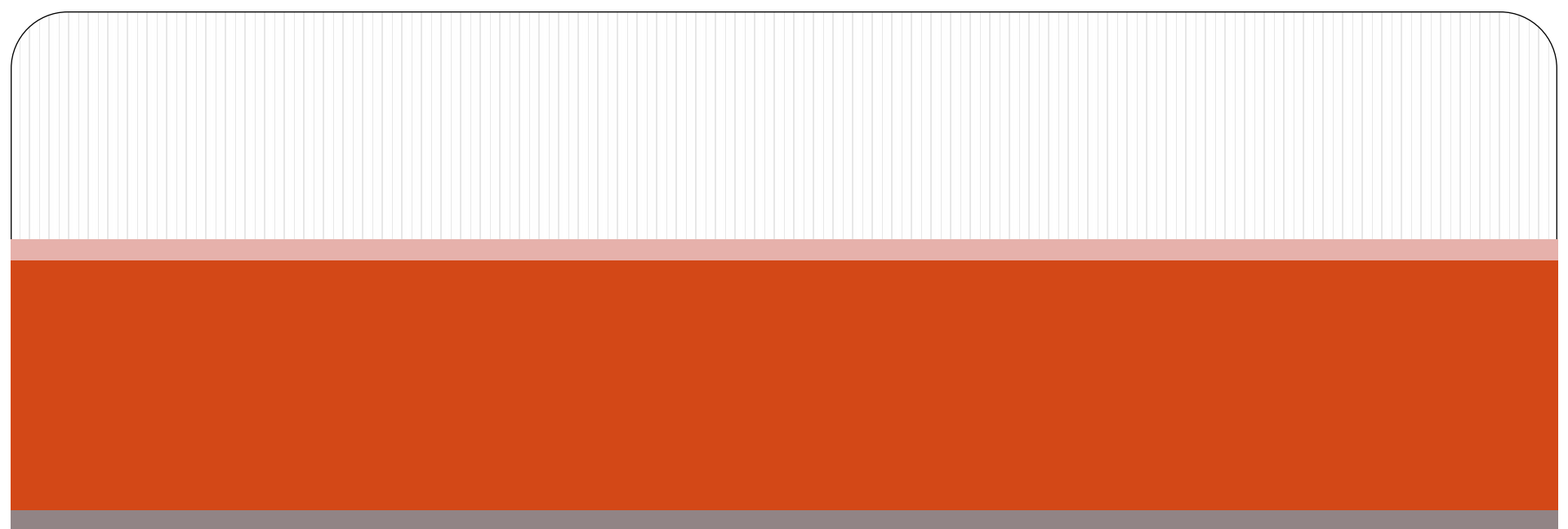
Peter T. Doran and Maggie Kendall Zimmerman (2009) - Examining the Scientific Consensus on Climate Change - EOS Climate Change 90:22-23 - Earth and Environmental Sciences, University of Illinois at Chicago



*How a Handful of Scientists
Obscured the Truth on
Issues from Tobacco
Smoke to Global
Warming*

Merchants of DOUBT

Naomi Oreskes
& Erik Conway

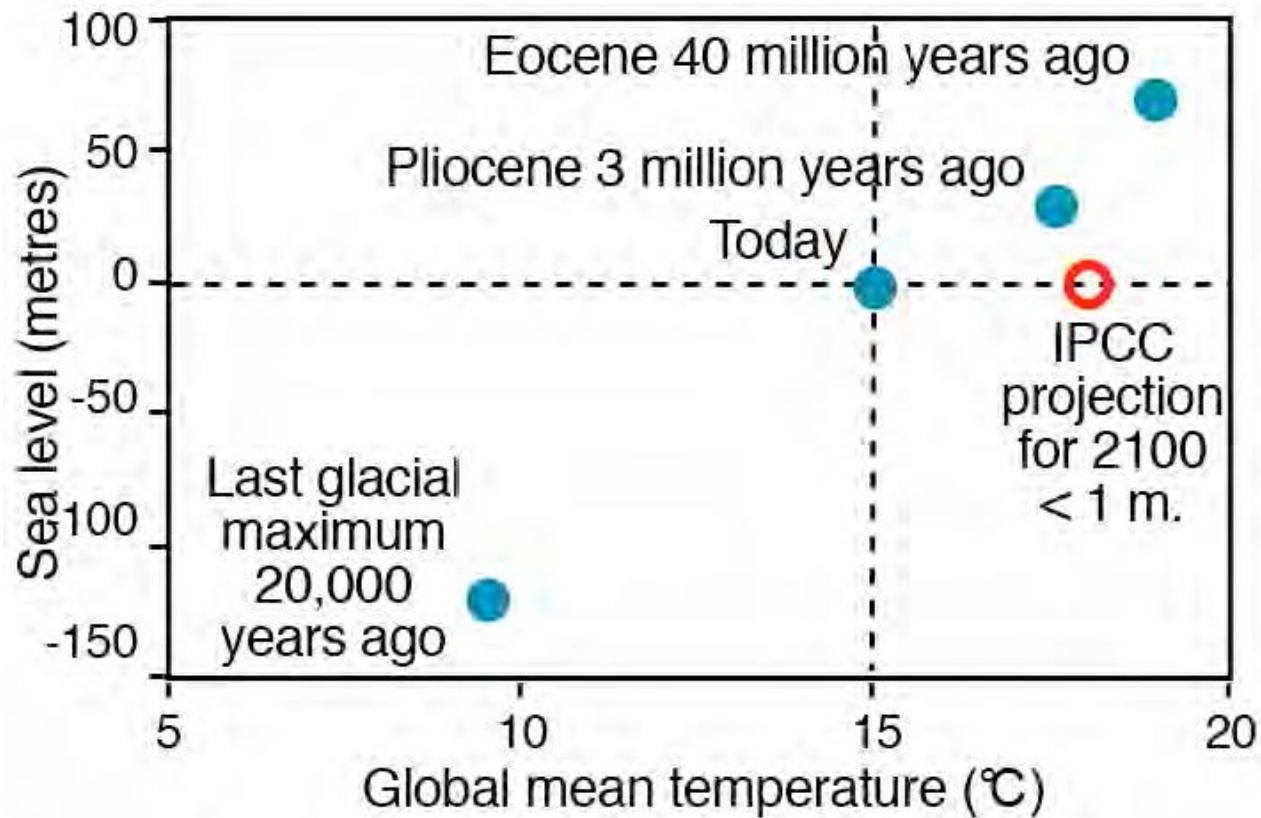


Cara 2: IPCC

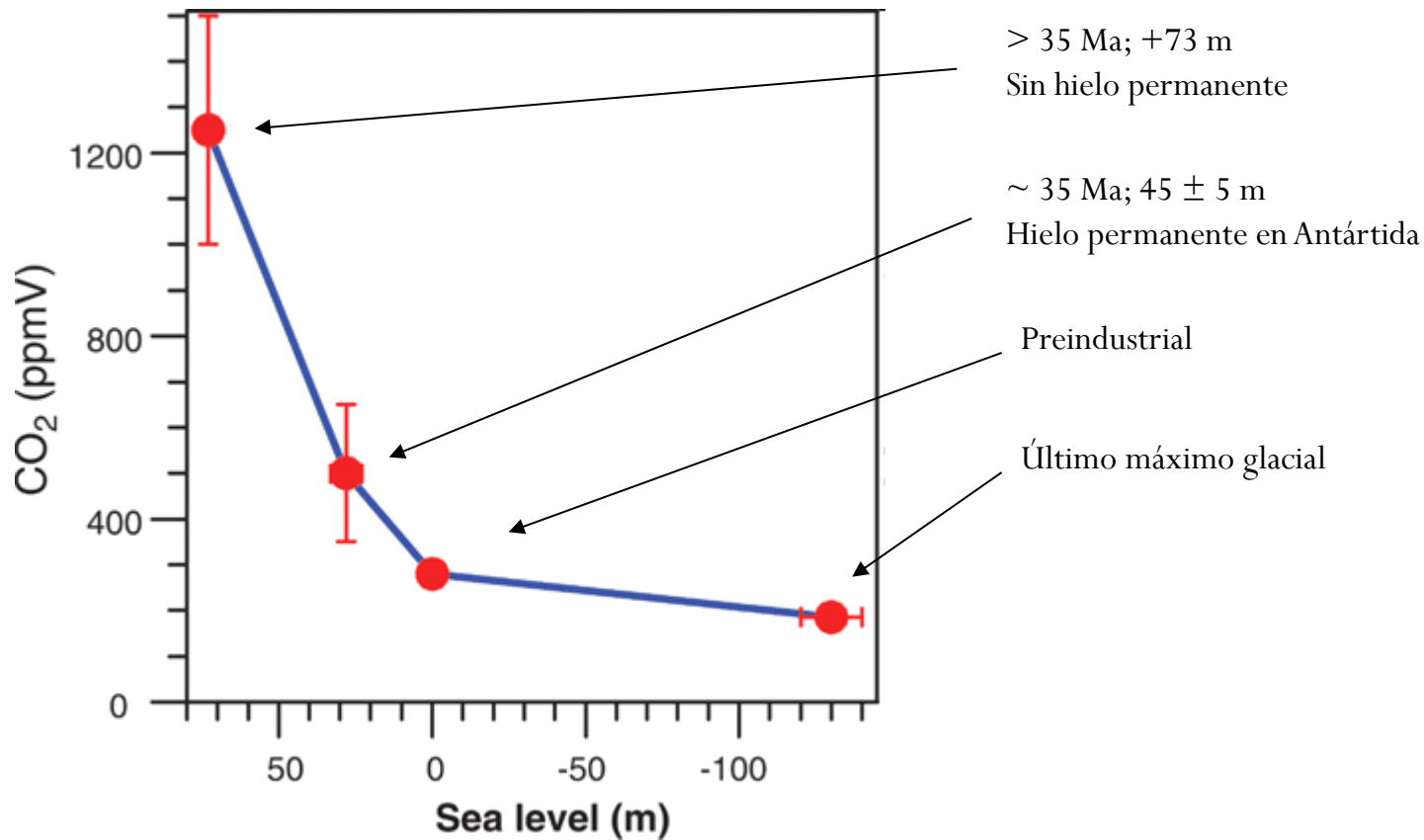
Acord científic: IPCC



El term-ómetro

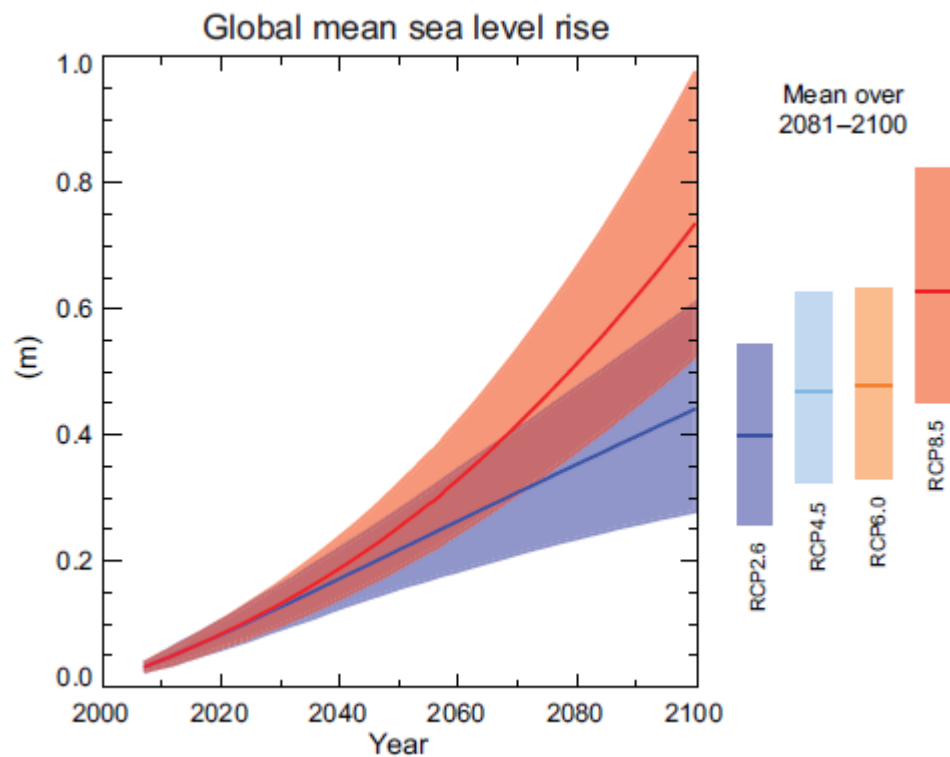


El CO₂-ómetro



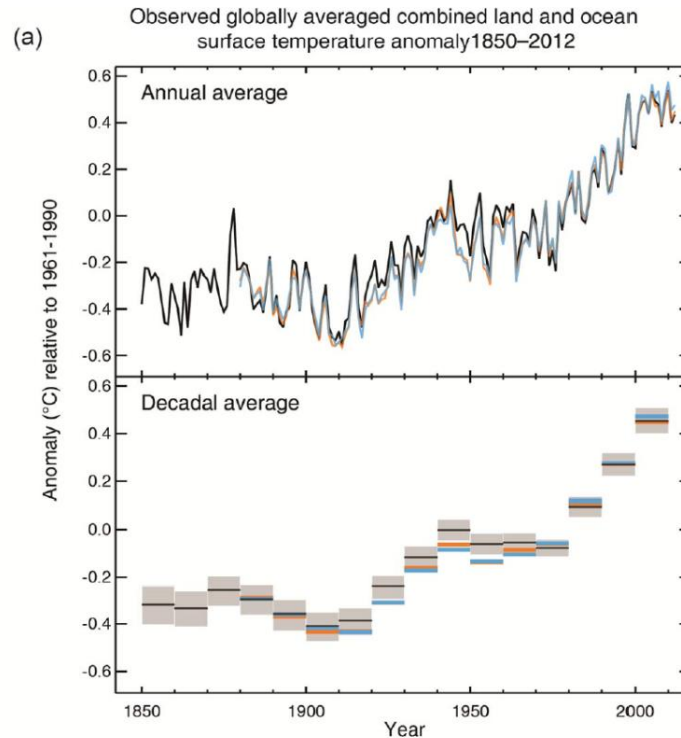
Richard Alley (2005) - Ice-Sheet and Sea-Level Changes – Science 310:456-460
doi:10.1126/science.1114613

Prediccions IPCC nivell del mar



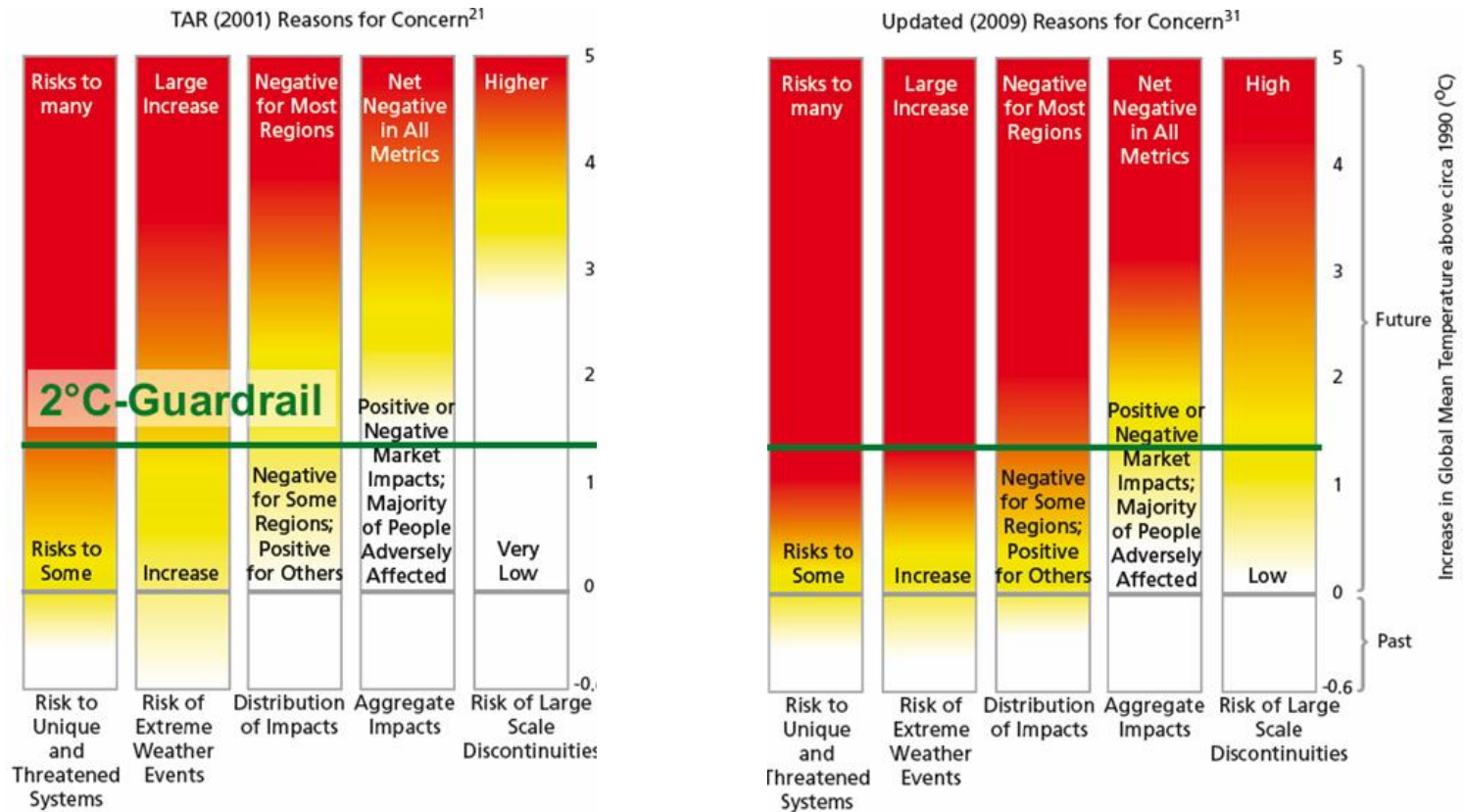
IPCC Working Group I (2013) - 5th Assessment Report The Physical Science Basis - Summary for Policymakers - Intergovernmental Panel on Climate Change - http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf

Evolució temperatura des de 1850



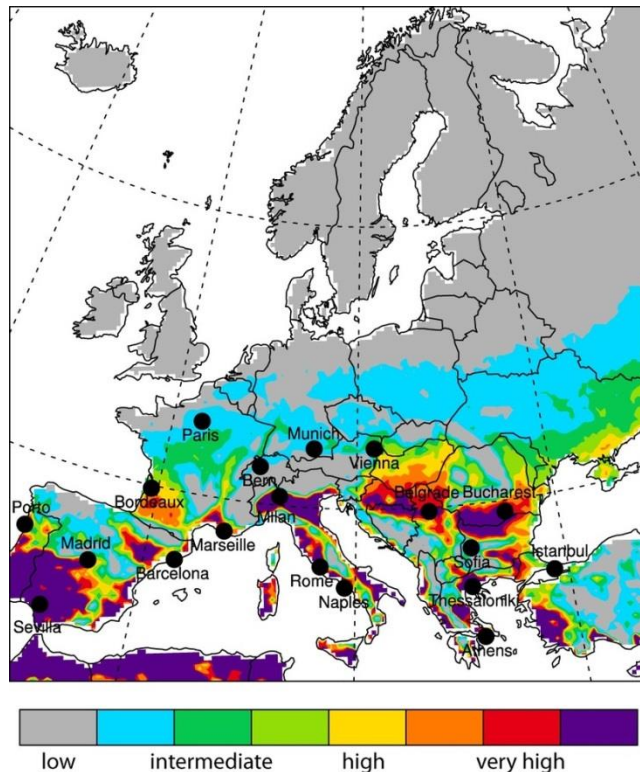
IPCC Working Group I (2013) - 5th Assessment Report The Physical Science Basis - Summary for Policymakers - Intergovernmental Panel on Climate Change - http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf

Son segurs + 2 °C?



Joel B. Smith et al (2009) – Assessing dangerous climate change through an update of the Intergovernmental Panel on Climate Change (IPCC) ‘reasons for concern’ - Proceedings of the National Academy of Sciences PNAS 106:4133–4137
doi:10.1073/pnas.0812355106 – 15 autores

Onades calor combinades



Combined hot summer days and tropical nights (days) (2071-2100)

E.M. Fischer and C. Schär (2010) - Consistent geographical patterns of changes in high-impact European heatwaves - *Nature Geoscience* 3:398-403 doi:10.1038/ngeo866 - Institute for Atmospheric and Climate Science, ETH Zurich; Climate and Global Dynamics Division, National Center for Atmospheric Research (NCAR)

Previsions de temperatura

Variable	Scenario	2046–2065		2081–2100	
		mean	<i>likely range</i> ^c	mean	<i>likely range</i> ^c
Global Mean Surface Temperature Change (°C) ^a	RCP2.6	1.0	0.4 to 1.6	1.0	0.3 to 1.7
	RCP4.5	1.4	0.9 to 2.0	1.8	1.1 to 2.6
	RCP6.0	1.3	0.8 to 1.8	2.2	1.4 to 3.1
	RCP8.5	2.0	1.4 to 2.6	3.7	2.6 to 4.8
Global Mean Sea Level Rise (m) ^b		mean	<i>likely range</i> ^d	mean	<i>likely range</i> ^d
	RCP2.6	0.24	0.17 to 0.32	0.40	0.26 to 0.55
	RCP4.5	0.26	0.19 to 0.33	0.47	0.32 to 0.63
	RCP6.0	0.25	0.18 to 0.32	0.48	0.33 to 0.63
	RCP8.5	0.30	0.22 to 0.38	0.63	0.45 to 0.82

2 °C: Extremadamente peligroso

“... a pesar de las declaraciones de alto nivel en contrario, **la probabilidad de mantener el incremento de la temperatura media global por debajo de +2 °C es mínima o inexistente**. Además, los impactos asociados con +2 °C han sido revisados al alza, lo suficiente como para que **la línea de los +2 °C represente ahora más apropiadamente el umbral entre el cambio climático ‘peligroso’ y el cambio climático ‘extremadamente peligroso.’** [énfasis añadido]

Kevin Anderson and Alice Bows (2011) – Beyond ‘dangerous’ climate change: emission scenarios for a new world – Philosophical Transactions of the Royal Society of London A 369: :20-44 doi:10.1098/rsta.2010.0290 –Tyndall Centre for Climate Change Research + School of Mechanical, Aerospace and Civil Engineering + School of Environmental Sciences and School of Development, University of East Anglia; Sustainable Consumption Institute, School of Earth, Atmospheric and Environmental Sciences, University of Manchester

AIE, noviembre 2013

“En nuestro escenario central, que tiene en cuenta el efecto de las medidas ya anunciadas por los gobiernos para mejorar la eficiencia energética, apoyar las energías renovables, reducir las subvenciones a los combustibles fósiles y, en ciertos casos, fijar un precio a las emisiones de CO₂, las emisiones de CO₂ relacionadas con la energía subirán con todo cerca de un 20% hasta 2035. Esto encaminará al mundo por una senda que supondrá una elevación de la temperatura media a largo plazo de 3,6 °C, es decir, muy por encima del objetivo de 2 °C acordado internacionalmente.”

Probabilitats ΔT a 2100



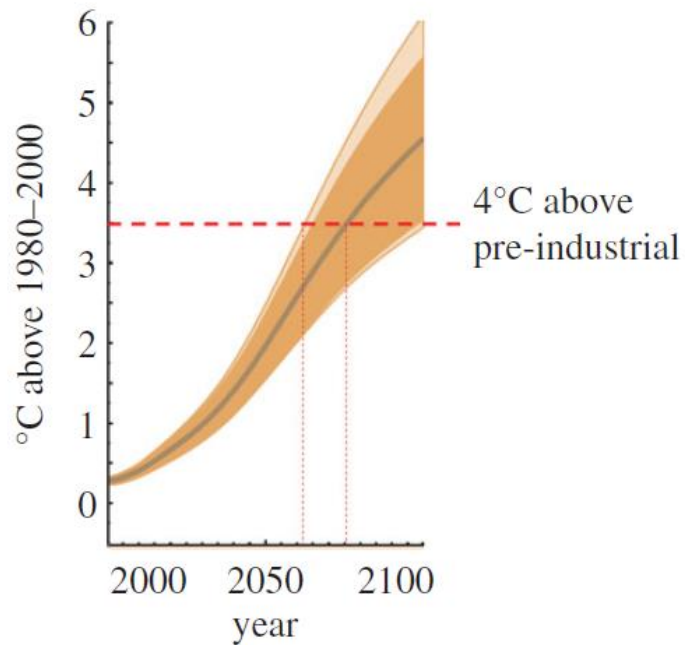
NO POLICY



POLICY

Andrei Sokolov et al (2009) - Probabilistic forecast for 21st century climate based on uncertainties in emissions (without policy) and climate parameters - Journal of Climate 22:5175–5204 doi:10.1175/2009JCLI2863.1 - Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology

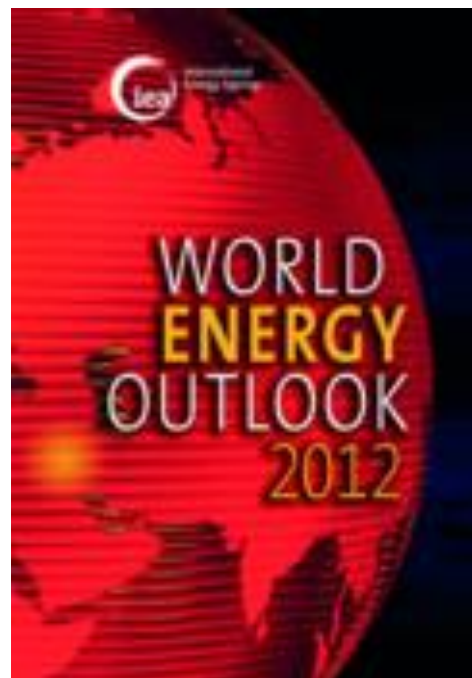
Anys 2060



“Si la retroalimentación con el ciclo del carbono fuera más fuerte, cosa que parece menos probable pero todavía creíble, **el calentamiento de 4 °C podría ser alcanzado en los primeros 2060**, en base a predicciones consistentes con el ‘margen probable’ del IPCC.” [énfasis añadido]



Governments' ambitions to limit warming to 2°C appear highly unrealistic ... **We have passed a critical threshold** ... Even to have a reasonable prospect of getting to a 4°C scenario would imply nearly quadrupling the current rate of decarbonisation."



Las sucesivas ediciones de este informe han demostrado que el objetivo climático de limitar el calentamiento global a 2 °C se hace más difícil y costoso de conseguir cada año que pasa.



Even with the current mitigation commitments and pledges fully implemented, there is roughly a 20 percent likelihood of exceeding 4°C by 2100. **If they are not met, a warming of 4°C could occur as early as the 2060s.**

No one knows exactly what this world will look like, but models provide insights into forced human migrations and our future power generation



<http://www.newscientist.com/article/mg20126971.700-how-to-survive-the-coming-century.html>

Previsión temperatura

	Δ 2081-2100 (°C)	Σ
IPCC WGI 2013 RCP8.5	3,7	
DMS	0,7	4,4
Hidratos + Permafrost		
Extremos		
Otros lazos lentos		5,4
Cambio referencia	0,6	6,0

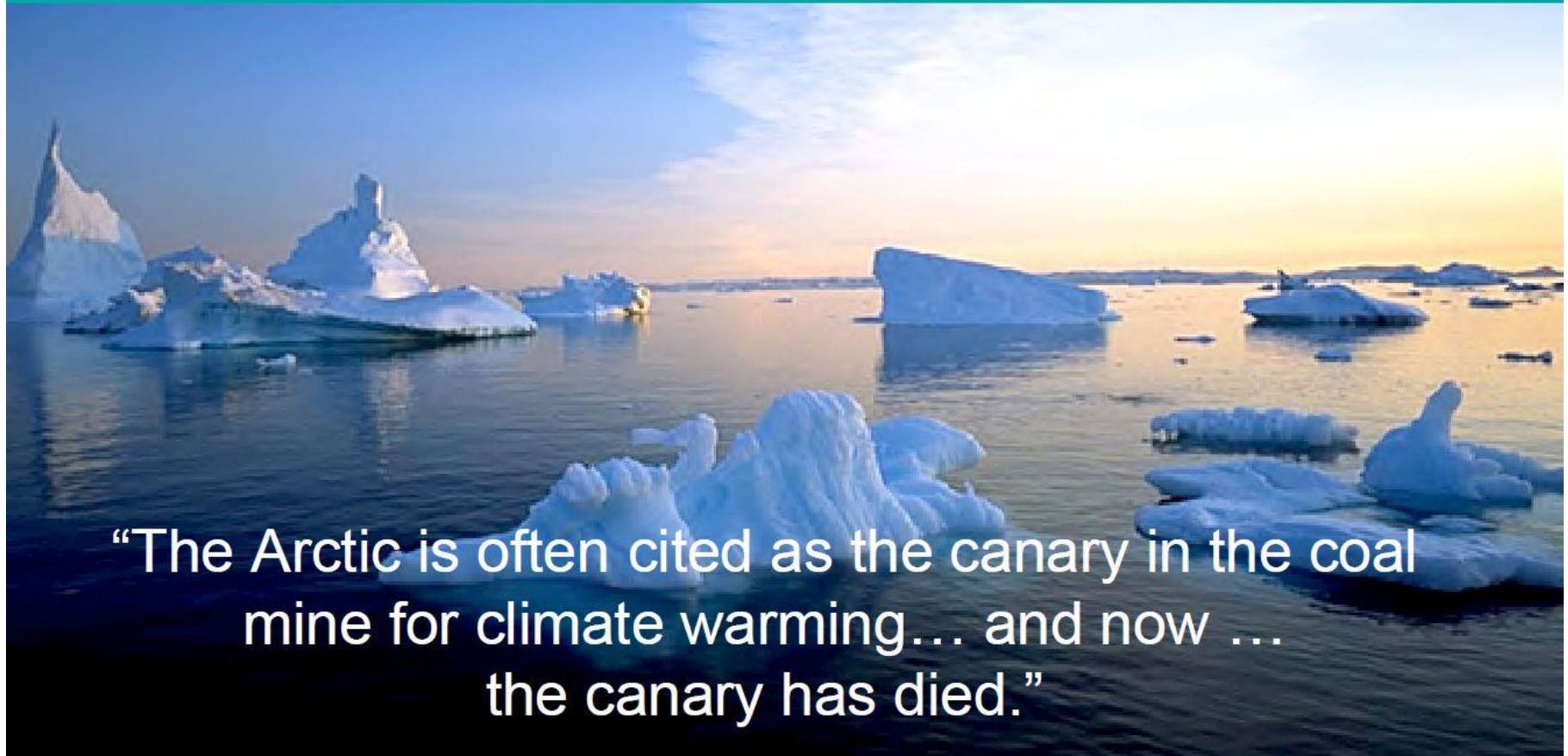
«Worst than previously thought»

«Se han superado las peores previsiones de los científicos»

Cara 3: la bomba de metà

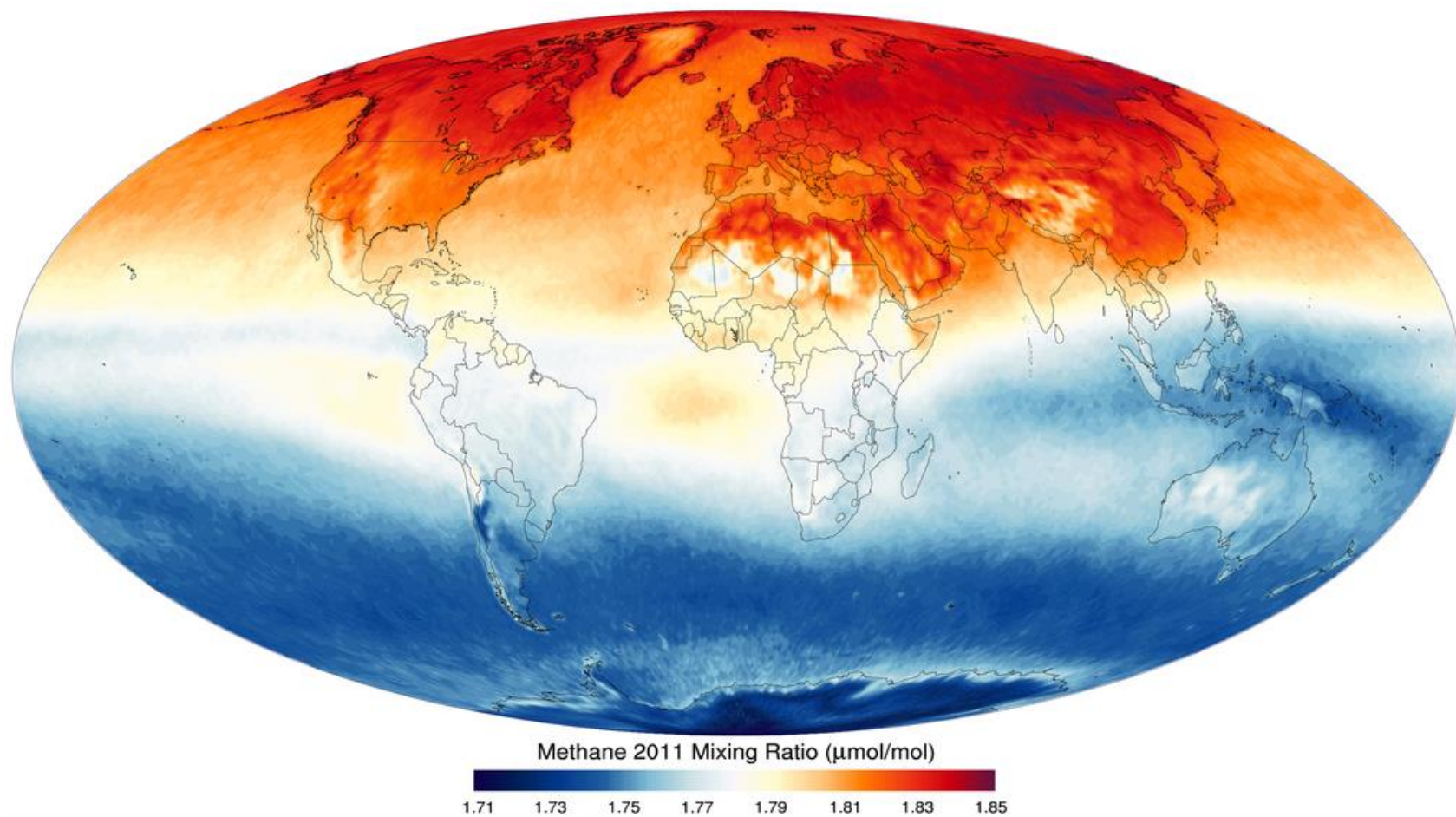
Video Àrtic

The Arctic eco-sytem is changing very quickly



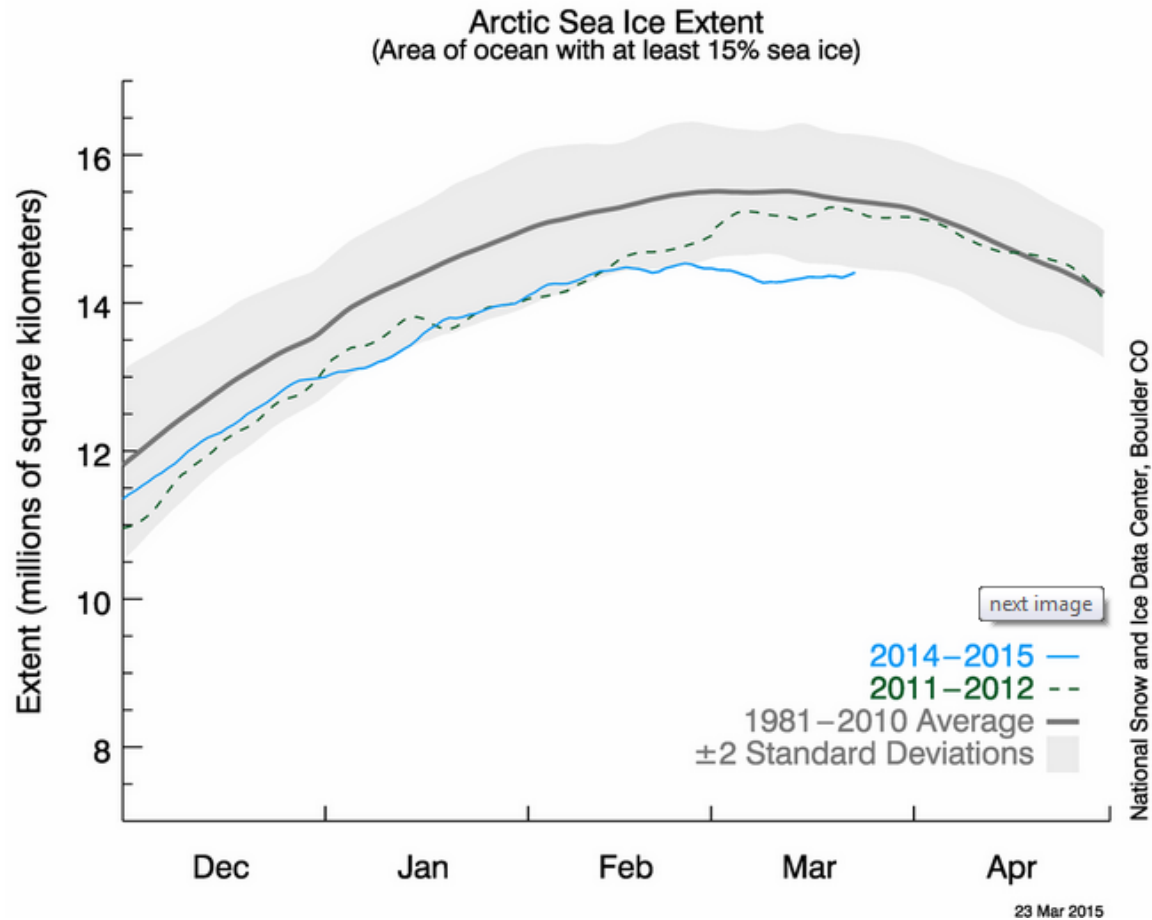
“The Arctic is often cited as the canary in the coal mine for climate warming... and now ... the canary has died.”

Dr Jay Zwally, Glaciologist, NASA, December 2007

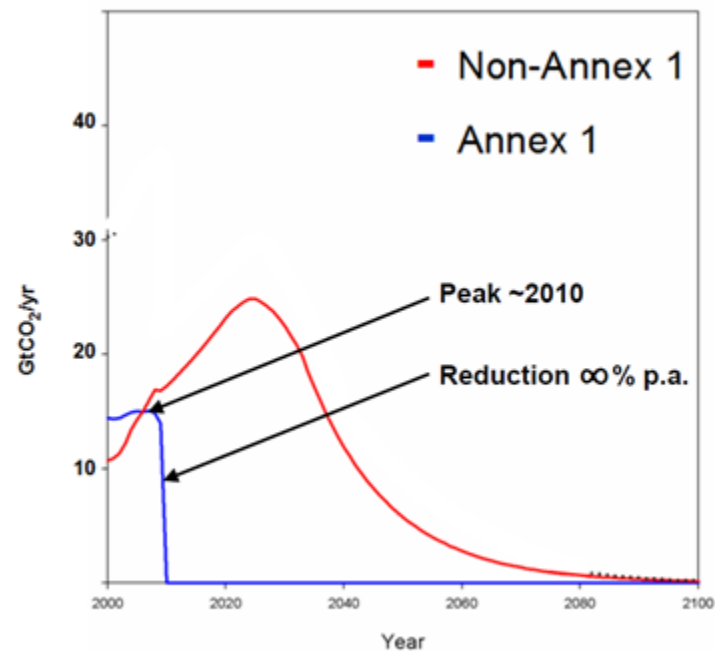
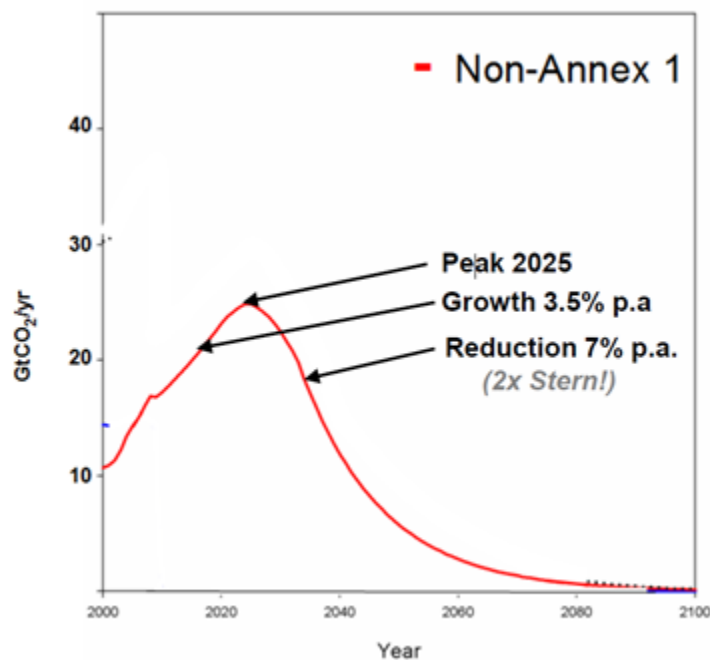


Imatge: NASA

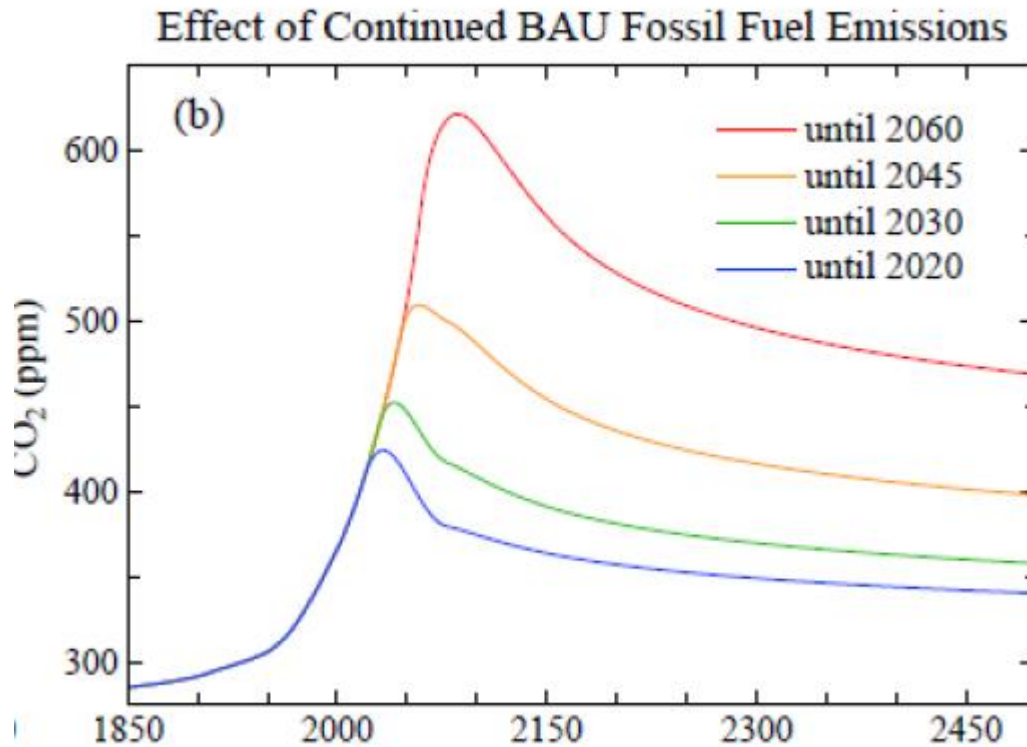
Superficie gel de l'Àrtic



¿Solución?



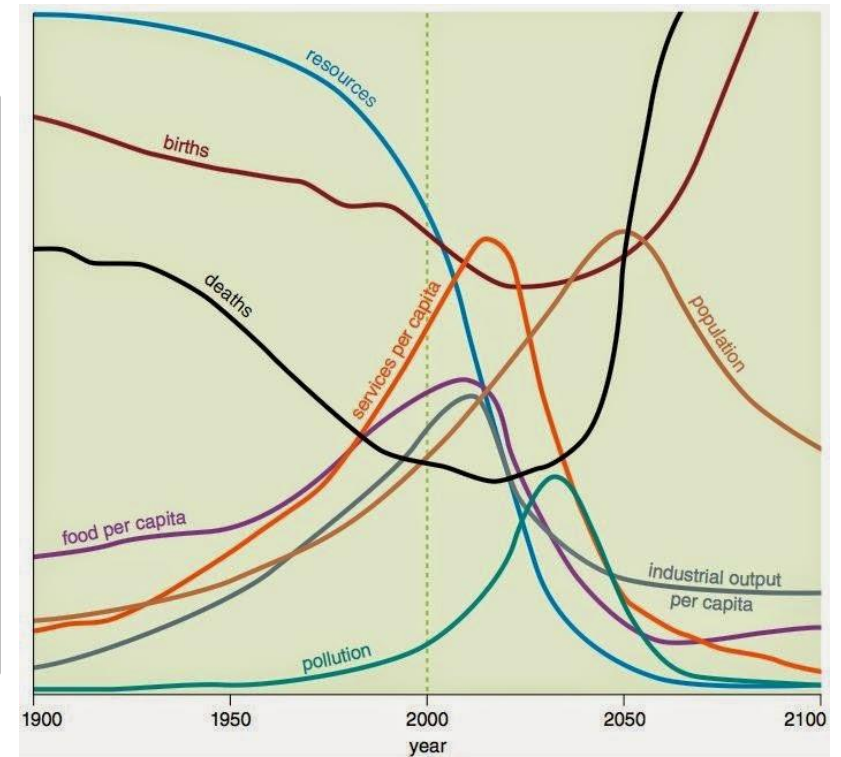
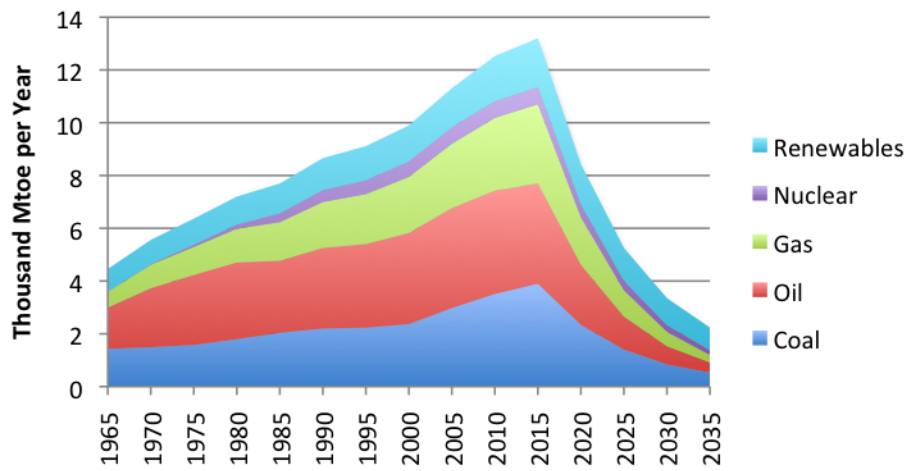
Kevin Anderson and Alice Bows (2011) - Beyond 'dangerous' climate change: emission scenarios for a new world - Philosophical Transactions of the Royal Society of London A 369:20-44 doi:10.1098/rsta.2010.0290 - Tyndall Centre for Climate Change Research + School of Mechanical, Aerospace and Civil Engineering + School of Environmental Sciences and School of Development, University of East Anglia; Sustainable Consumption Institute, School of Earth, Atmospheric and Environmental Sciences, University of Manchester

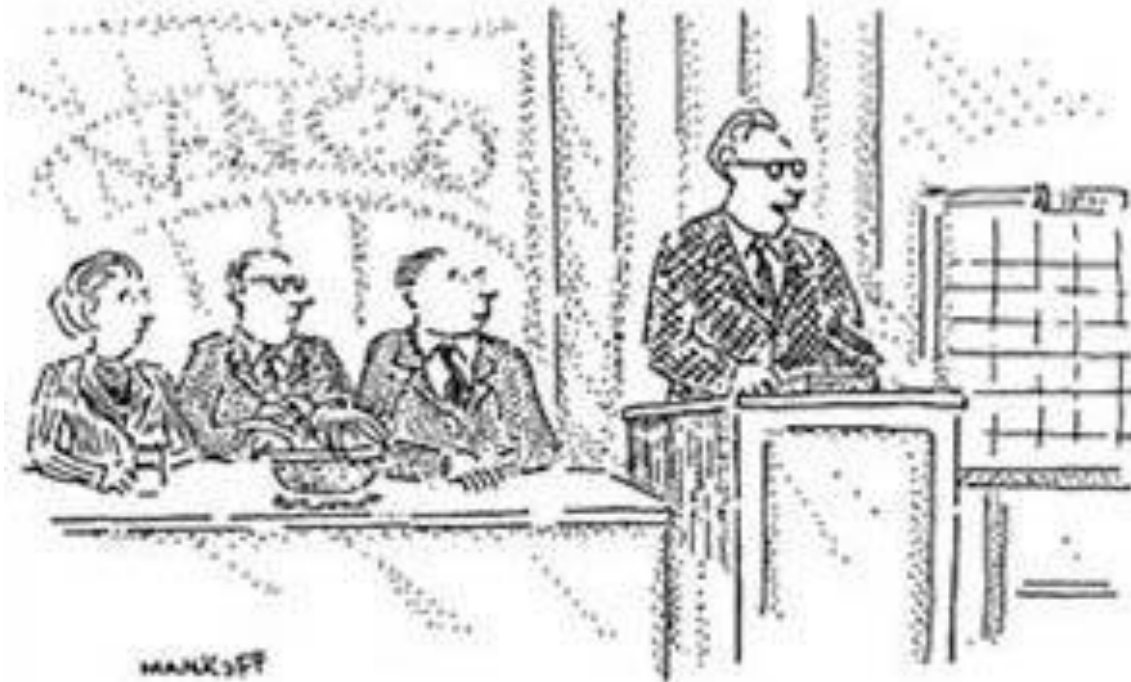


James Hansen et al (2011) – The Case for Young People and Nature: A Path to a Healthy, Natural, Prosperous Future – Columbia University –
04/05/2011 – Columbia University Earth Institute, New York –

http://www.columbia.edu/~jeh1/mailings/2011/20110505_CaseForYoungPeople.pdf - 15 authors

Tverberg Estimate of Future Energy Production





*"And so, while the end-of-the-world scenario will be
rise with unimaginable horrors, we believe that the
pre-end period will be filled with unprecedented
opportunities for profit."*

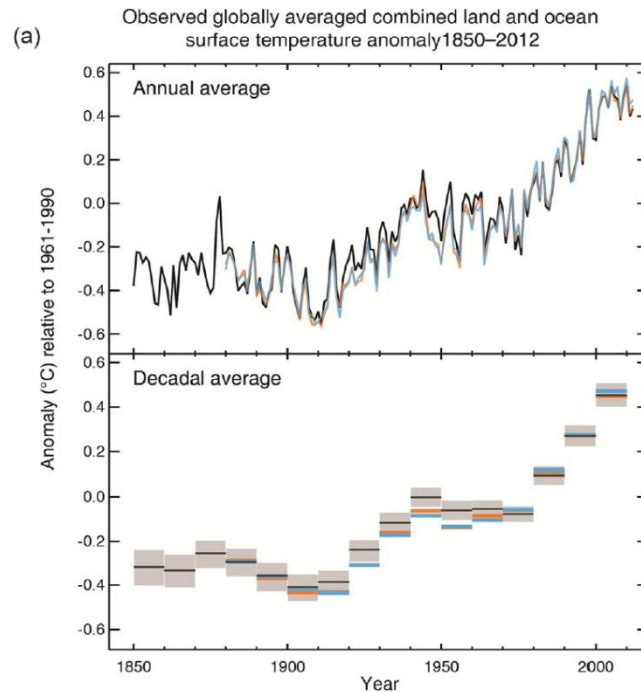
Gràcies

<http://ustednoselocree.com>

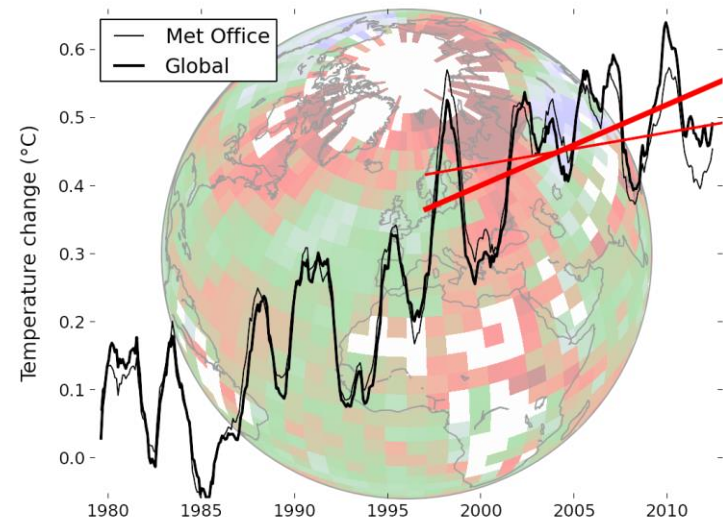
FB: usted no se locree

Tw: @FerranPVilar

No hay pausa



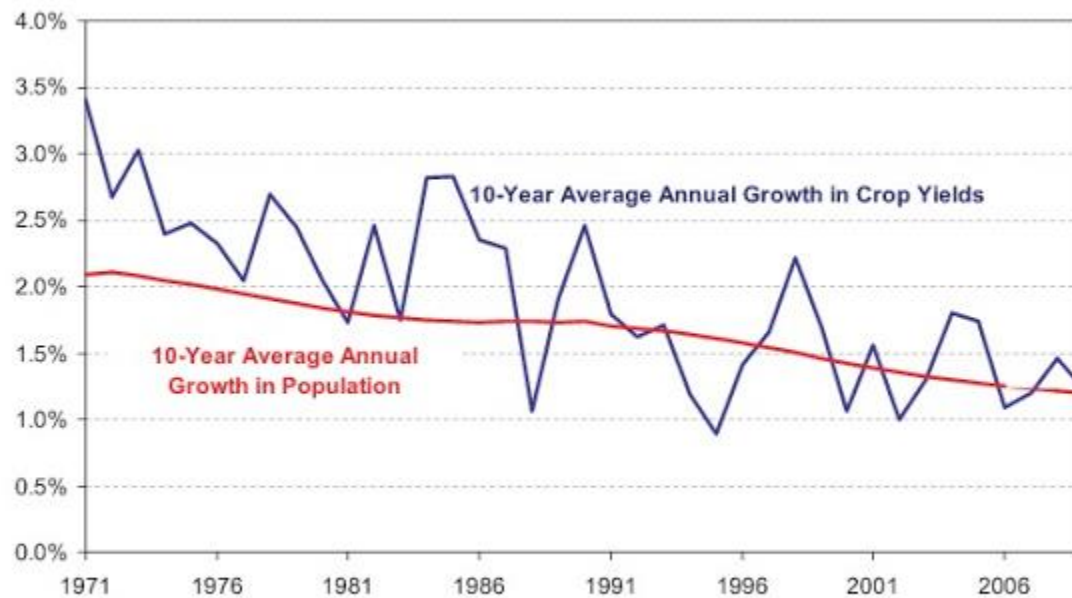
IPCC AR5 WGI SPM 09.2013



Kevin Cowtan and Robert G. Way (2013) - Coverage bias in the HadCRUT4 temperature series and its impact on recent temperature trends - Quarterly Journal of the Royal Meteorological Society doi:10.1002/qj.2297 - Published online: 15/11/2013 - Department of Chemistry, University of York; Department of Geography, University of Ottawa

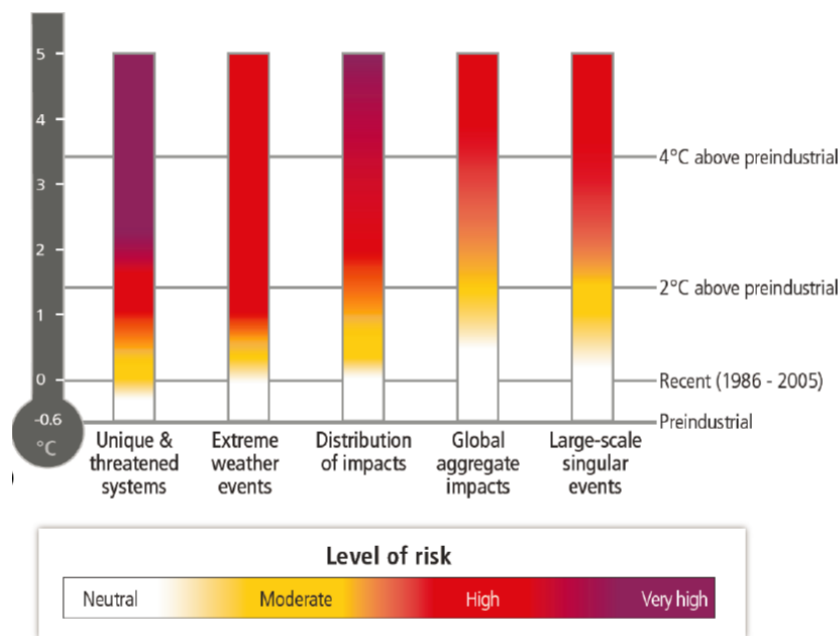


10-Year Average Annual Growth in Crop Yields



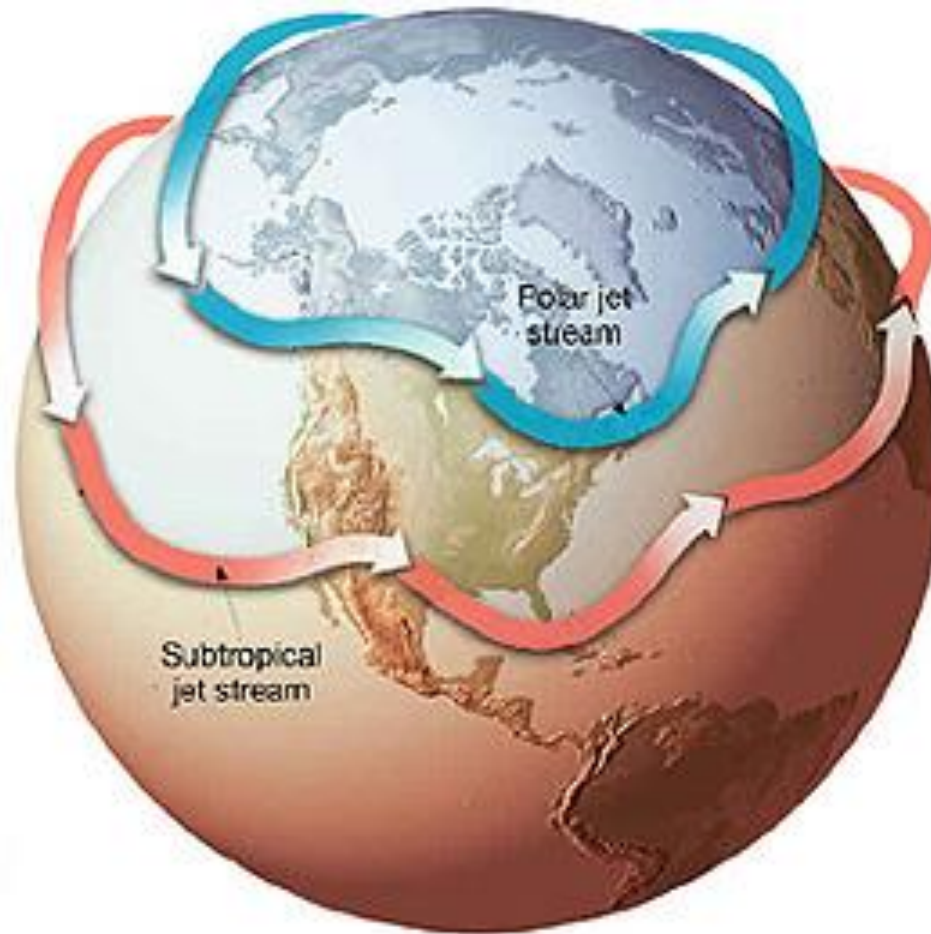
Source: Food and Agriculture Organization of the United Nations As of 12/31/09

¿+2 °C?



“Limiting the warming caused by anthropogenic CO₂ emissions alone with a probability of >33%, >50%, and >66% to less than 2°C since the period 1861–1880[ref], will require cumulative CO₂ emissions from all anthropogenic sources to stay **between** 0 and about 1570 GtC, 0 and about 1210 GtC, and 0 and about 1000 GtC since that period respectively[ref]. These upper amounts are reduced to about 900 GtC, 820 GtC, and 790 GtC respectively, when accounting for non-CO₂ forcings as in RCP2.6. An amount of 515 [445 to 585] GtC, was already emitted by 2011. {12.5} ”

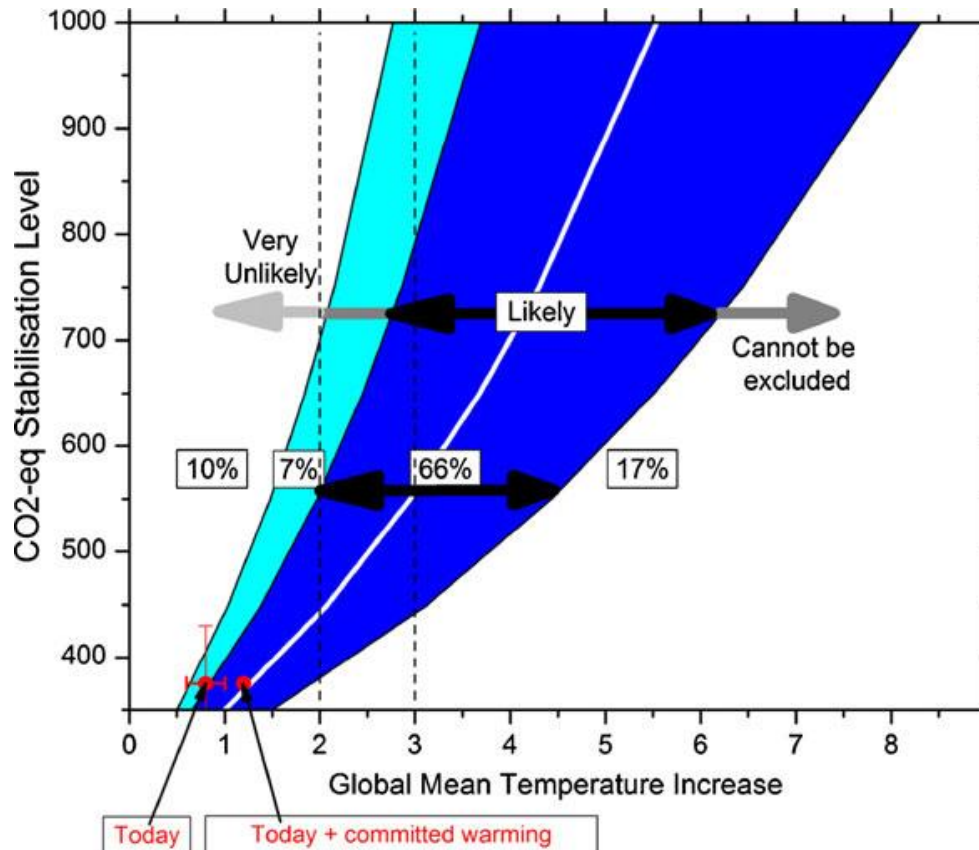
Corrent en jet



¿Umbral superado?

“A cumulative industrial-era limit of ~ 500 GtC fossil fuel emissions and 100 GtC storage in the biosphere and soil would keep climate close to the Holocene range to which humanity and other species are adapted. Cumulative emissions of ~ 1000 GtC, sometimes associated with 2°C global warming, would spur "slow" feedbacks and eventual warming of $3\text{-}4^{\circ}\text{C}$ with disastrous consequences. Rapid emissions reduction is required to restore Earth's energy balance and avoid ocean heat uptake that would practically guarantee irreversible effects.”

James E. Hansen et al (2013) - Scientific Case for Avoiding Dangerous Climate Change to Protect Young People and Nature - PLOS ONE, in press - Published online: 30/03/2012 - NASA Goddard Institute for Space Studies + Columbia University Earth Institute - <http://arxiv.org/ftp/arxiv/papers/1110/1110.1365.pdf> - 18 authors



Robert H. Sokolow (2011) - High-consequence outcomes and internal disagreements: tell us more, please - Climatic Change 108: 775-790 doi:10.1007/s10584-011-0187-5 - Department of Mechanical and Aerospace Engineering, Princeton University