



Naturressource

***Vores sande
valuta!***

**Katherine Richardson, prof.,
Center for Macroecology, Evolution
and Climate,
Københavns Universitet**



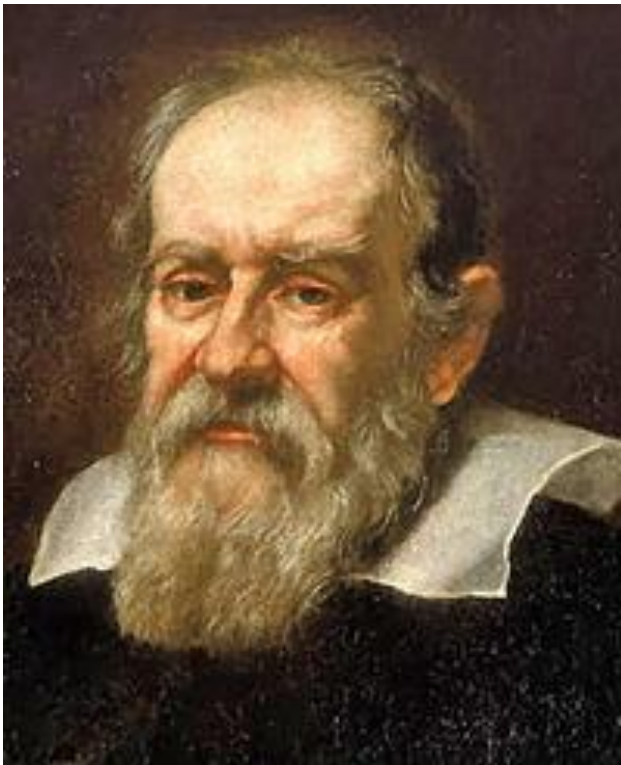
I det meste af menneskenes historie har forholdet mellem mennesker og jorden/natur kunne forstås alene m.hj.a. religion...



A solar deity (also sun god/dess) is a [deity](#) who represents the [Sun](#), or an aspect of it, usually by its perceived power and strength. Solar deities and sun worship can be found throughout most of recorded [history](#) in various forms. (Wikipedia 2011)



Galileo Galilei (1564-1642)

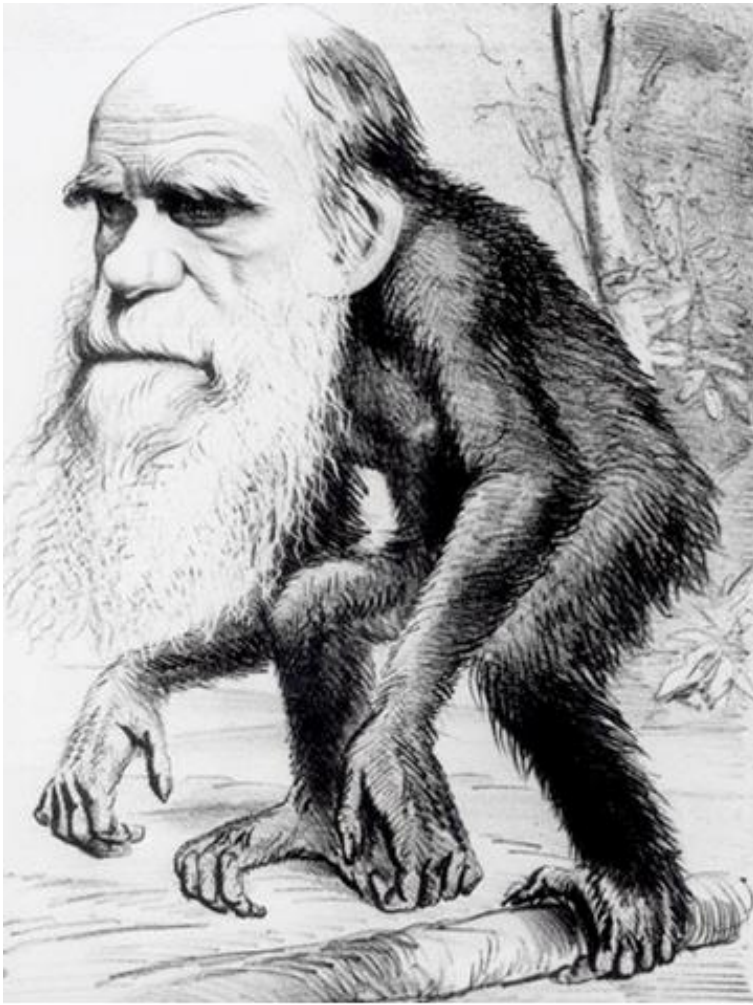


- 1633: tvunget af kirken til at benægte at han troede, at jorden har et kredsløb omkring solen og ikke omvendt.
- 1992: “benået” af Paven Johannes Paul II, som indrømmede, at der havde været fejl i kirkens undersøgelse af Galileos videnskabelige holdninger.

"Galileo, perhaps more than any other single person, was responsible for the birth of modern science" Stephen Hawking, 1988



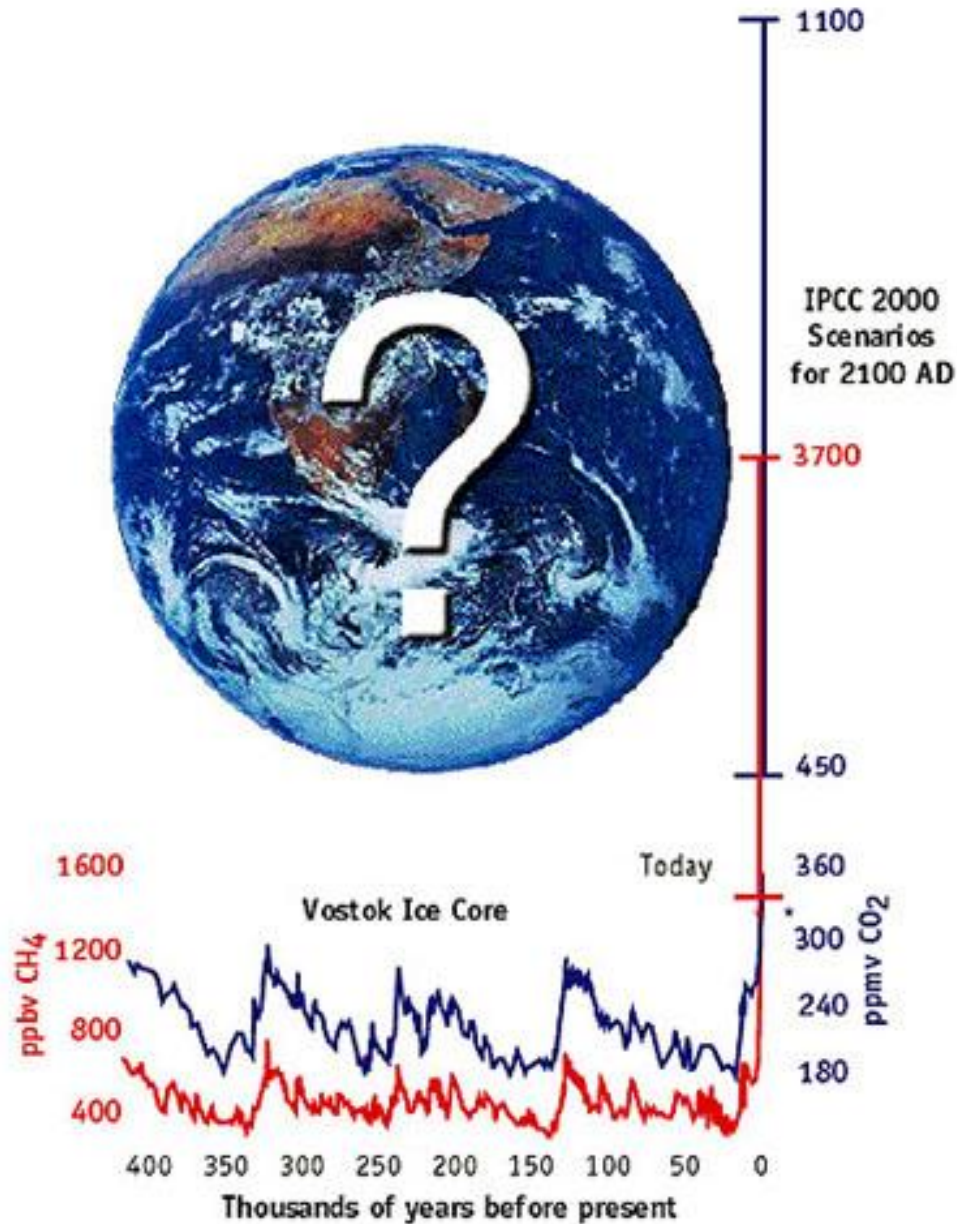
Charles Darwin: 1809-1882



- ***Om Arternes Oprindelse (1859)***

Udfordrede den daværende forståelse af forholdet mellem mennesker og naturen OG det gældende økonomiske paradigme.

•> 150 år senere er der stadig skoler i verdens mest magtfulde lande, som ikke må undervise om Darwins videnskabelige resultater.



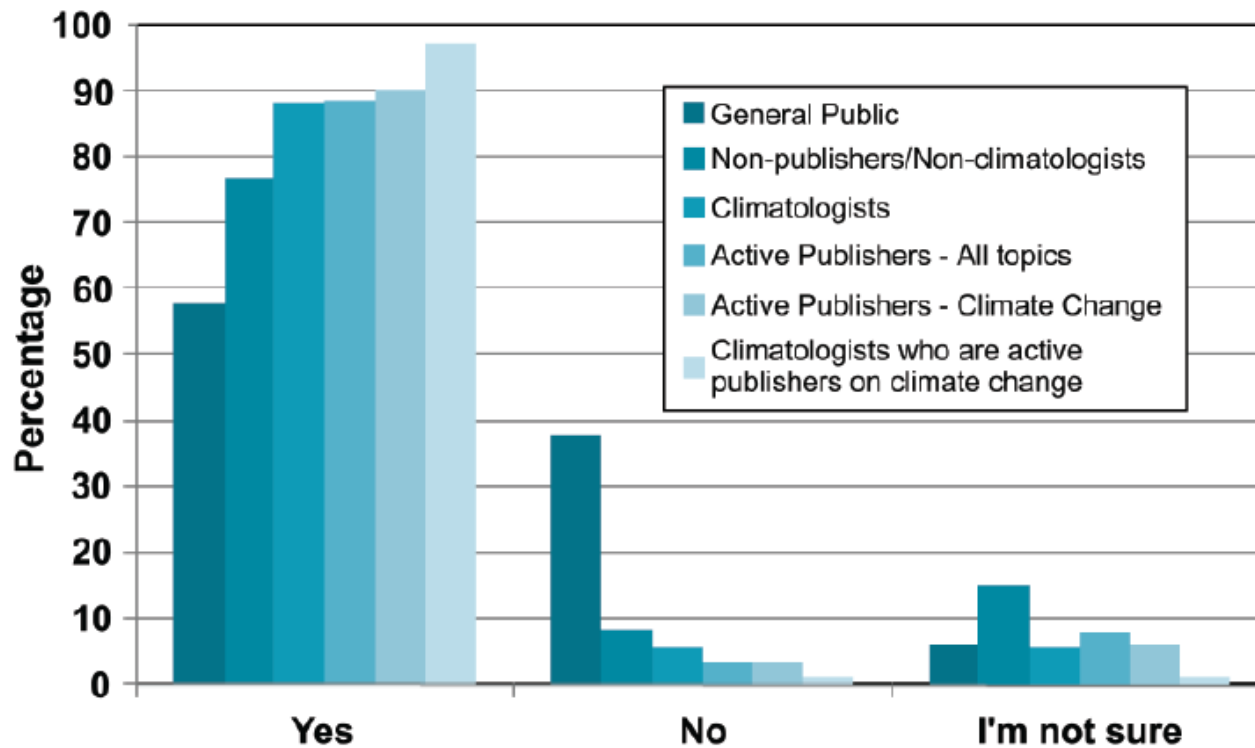
1999: Petit et al.

**2007: IPCC: ”>
90 %
sandsynlighed
...”**

**2009: COP 15,
Verdens ledere
accepterede
den
videnskabelige
evidens... (2°)**

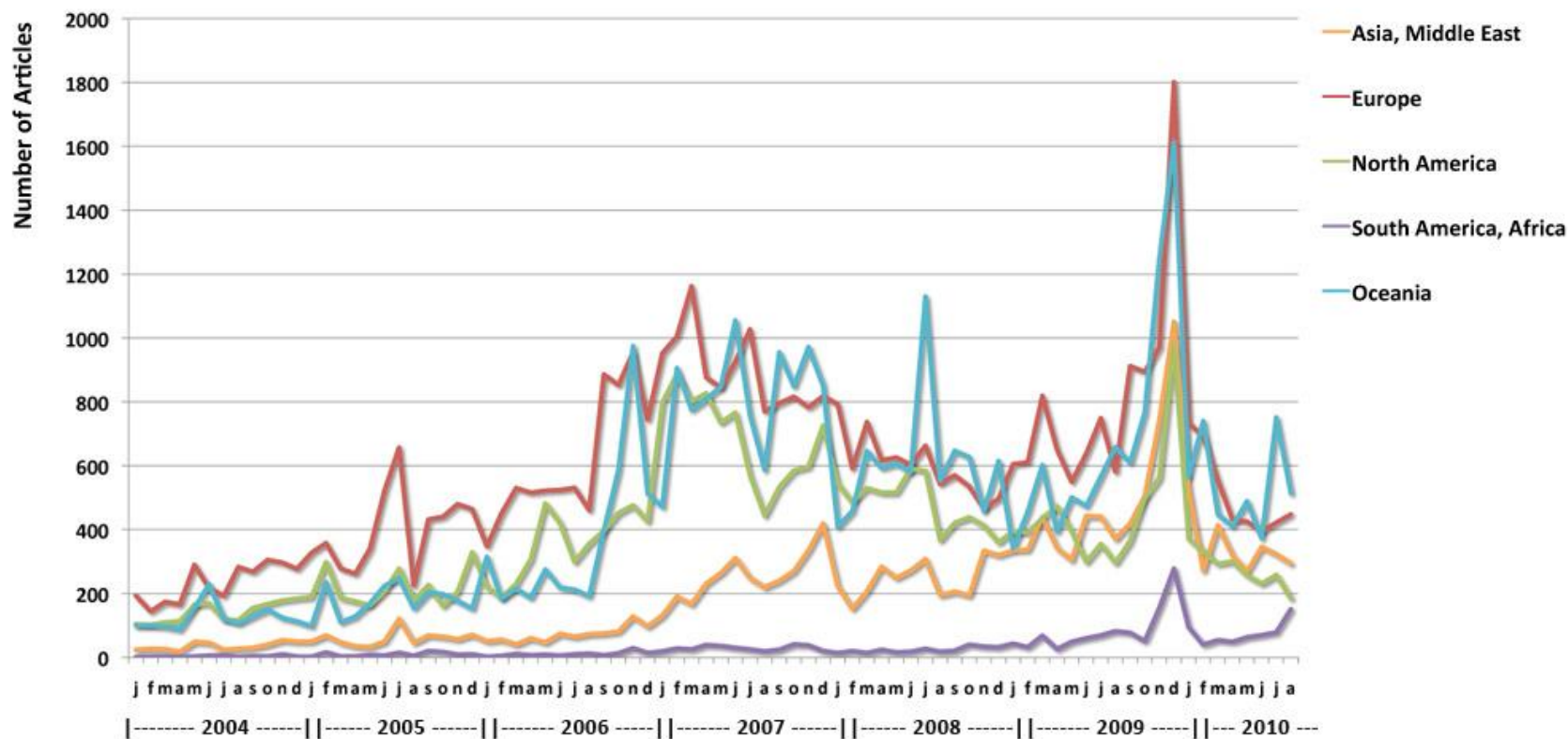


Response distribution to the question **“Do you think human activity is a significant contributing factor in changing mean global temperatures?”** with 3146 individuals responding. The general public data come from a 2008 Gallup poll (<http://www.gallup.com/poll/1615/Environment.aspx>).





2004-2010 World Newspaper Coverage of Climate Change or Global Warming

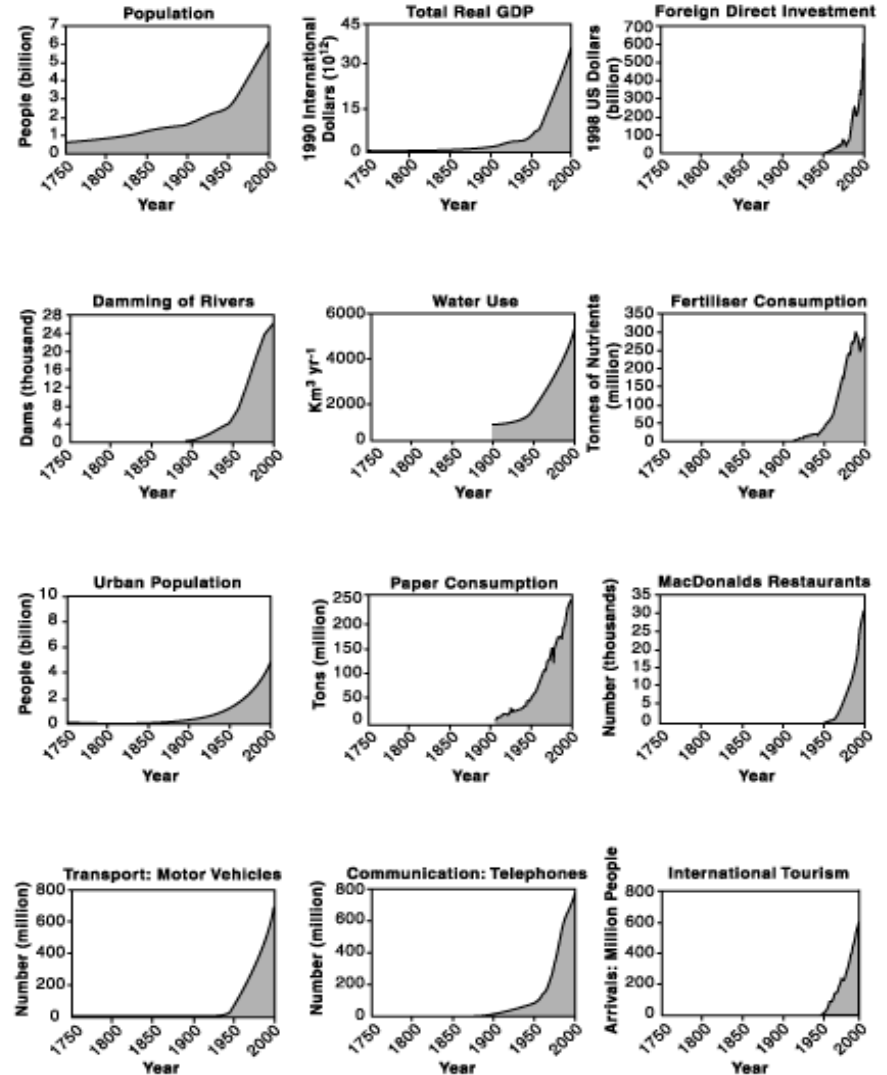


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updated August 2010

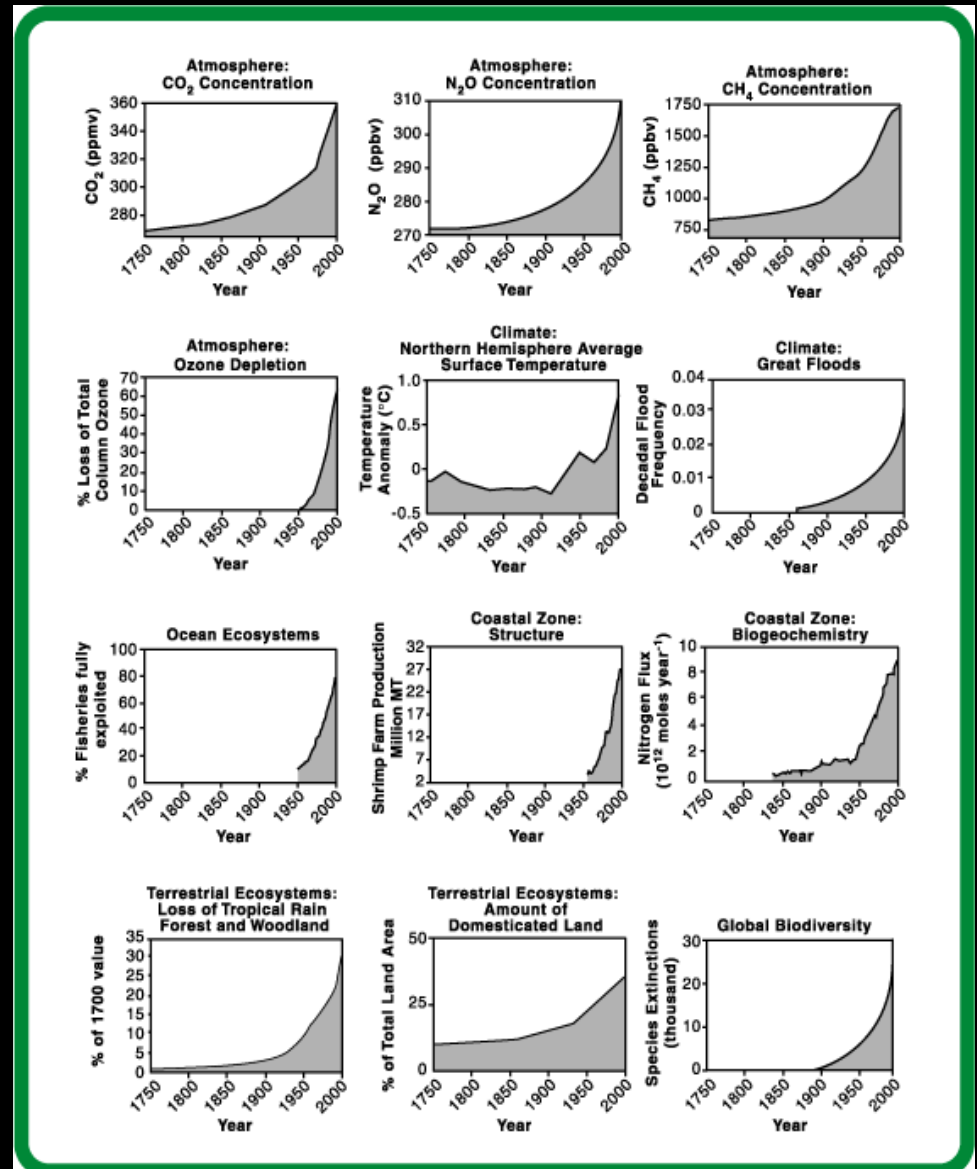
The changing human enterprise, from 1750 to 2000

Note the start of the 'Great Acceleration' around 1950, when many activities began or accelerated sharply



Responses of the Earth System to the accelerating human enterprise.

Root cause = demand for resources approaching supply!



“Business as usual” not an option! Lord Nicholas Stern, 2009

Earth System resources, goods and services

<u>Type of Service</u>	<u>Ecosystem</u>	<u>Earth System</u>
<i>Provisioning</i>	Food	Fossil Fuels
<i>Supporting</i>	Soil formation	Upwelling branches of ocean circulation
<i>Regulating</i>	Ecological control of pests and diseases	Ozone formation in the stratosphere

Provisioning services are more commonly known as “resources”, and supporting and regulation services are sometimes known as “environmental resources”.

Planetary Boundaries: Exploring the safe operating space for humanity in the Anthropocene

(*Nature*, 461 : 472 – 475, Sept 24 - 2009)

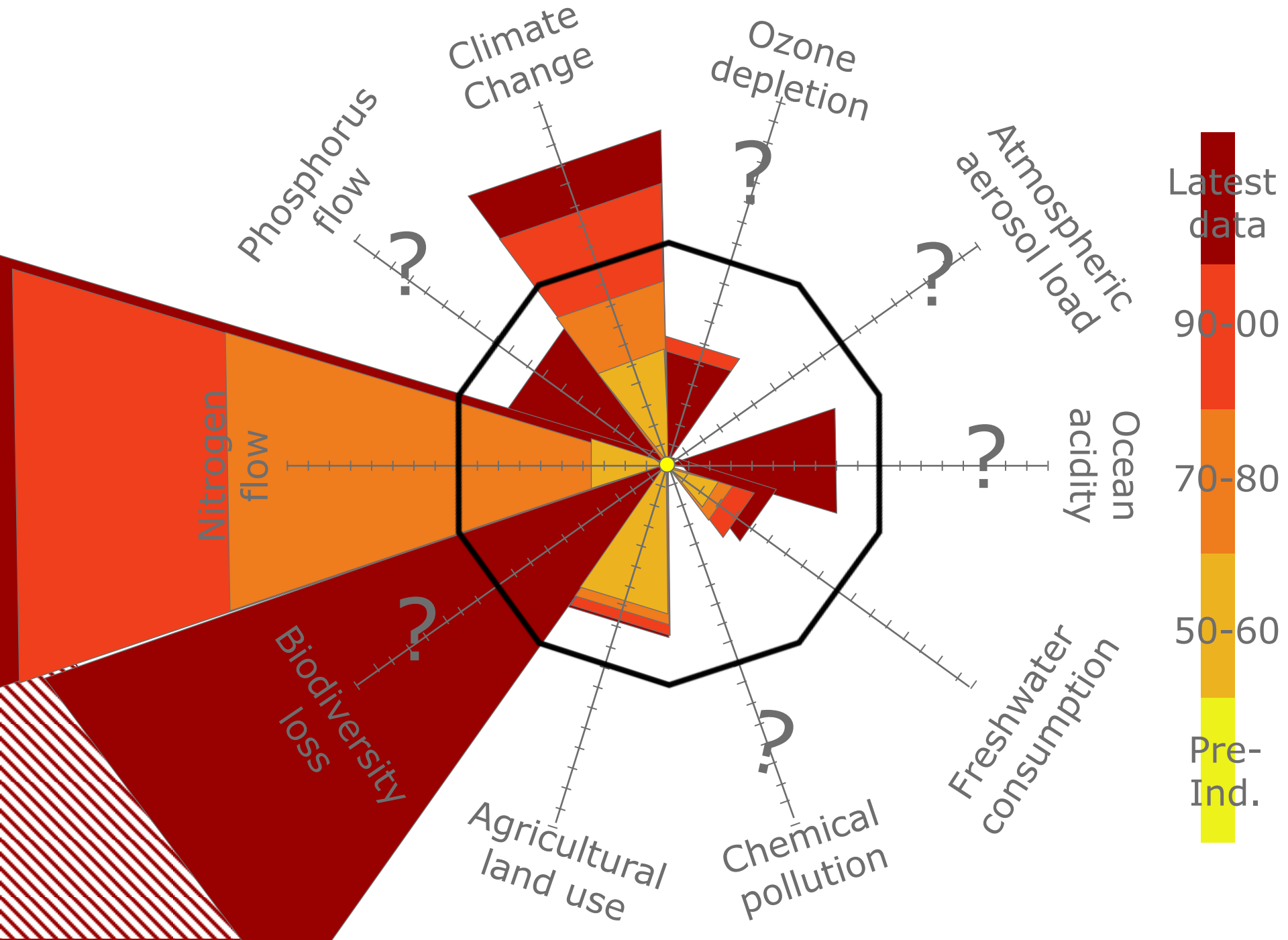


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Research Planetary Boundaries: Exploring the Safe Operating Space for Humanity

Johan Rockström^{1,2}, *Will Steffen*^{1,3}, *Kevin Noone*^{1,4}, *Åsa Persson*^{1,2}, *F. Stuart III Chapin*⁵, *Eric Lambin*⁶, *Timothy M. Lenton*⁷, *Marten Scheffer*⁸, *Carl Folke*^{1,9}, *Hans Joachim Schellnhuber*^{10,11}, *Björn Nykvist*^{1,2}, *Cynthia A. de Wit*⁴, *Terry Hughes*¹², *Sander van der Leeuw*¹³, *Henning Rodhe*¹⁴, *Sverker Sörlin*^{1,15}, *Peter K. Snyder*¹⁶, *Robert Costanza*^{1,17}, *Uno Svedin*¹, *Malin Falkenmark*^{1,18}, *Louise Karlberg*^{1,2}, *Robert W. Corell*¹⁹, *Victoria J. Fabry*²⁰, *James Hansen*²¹, *Brian Walker*^{1,22}, *Diana Liverman*^{23,24}, *Katherine Richardson*²⁵, *Paul Crutzen*²⁶, and *Jonathan Foley*²⁷

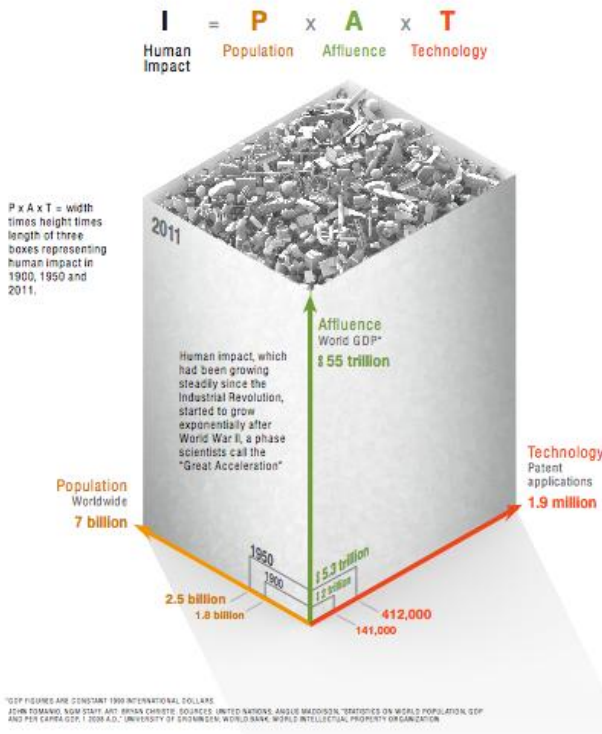
Ecology and Society 14(2): 32
<http://www.ecologyandsociety.org/vol14/iss2/art32/>



$$I = P \times A \times T$$

WHY IS OUR IMPACT GROWING?

Is population growth the root cause? Or is it affluence, which leads to greater consumption of energy and other resources? Or technology, which offers new tools for exploiting and consuming? The IPAT formula is a way of thinking about the issue: It says the three factors compound. Since 1900 world GDP (a measure of A) and the number of patent applications (a measure of T) have grown even faster than population.



- Equity issues profoundly complicate the challenge of global change.
- In the Great Acceleration technology and especially consumption have overtaken population as a driver of change.

National Geographic, March 2011

For **første gang i menneskenes historie** er vores efterspørgsel efter visse nødvendige naturressourcer ved at overstige det globale udbud

- *“Miljøhensyn” kan ikke længere være set som værende adskilt fra økonomiske interesser (naturressourcer = valuta)*
- *Fremtidig økonomisk “vækst” kan kun blive baseret på mere effektiv udnyttelse af ressourcerne og udvikling af erstatninger for de ressourcer, hvor efterspørgsel nærmere sig udbuddet*





"Bæredygtig udvikling" kan nu kvantificeres!

- "Bæredygtig" = efterspørgelse inden for udbuddet af ressourcer
- Kræver "systemforståelse"
naturvidenskab kan kvantificere både udbud og efterspørgsel (samt udvikling af alternativer)
samfundsvidenskab kan hjælpe med at prioritere efterspørgsel, ændre adfærd, osv.



Hvor står videnskab anno 2011?

AMBIO

DOI 10.1007/s13280-011-0185-x

INVITED PAPER

The Anthropocene: From Global Change to Planetary Stewardship

Will Steffen, Åsa Persson, Lisa Deutsch, Jan Zalasiewicz, Mark Williams, Katherine Richardson, Carole Crumley, Paul Crutzen, Carl Folke, Line Gordon, Mario Molina, Veerabhadran Ramanathan, Johan Rockström, Marten Scheffer, Hans Joachim Schellnhuber, Uno Svedin

”...the advent of the Anthropocene, the time interval in which human activities now rival global geophysical processes, suggests that we need to fundamentally alter our relationship with the planet we inhabit...”



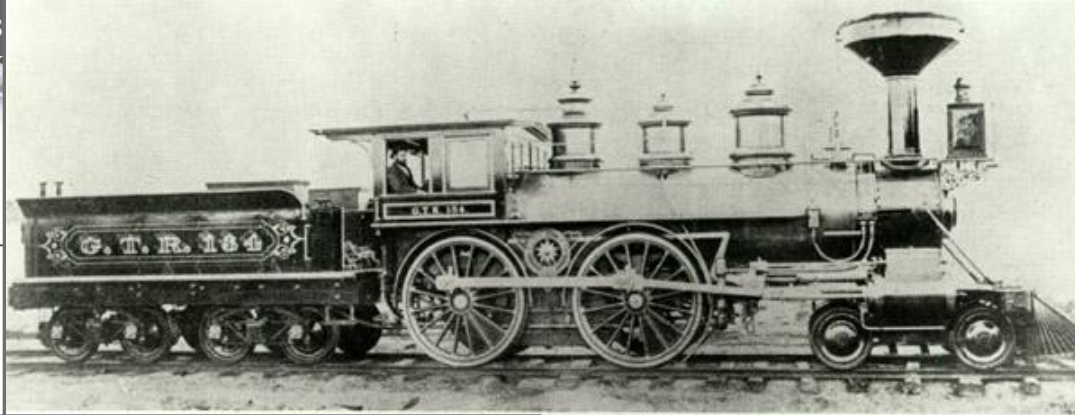
McKinsey study to be released late November 2011:

**Demonstrates the economic
consequenses of not curtailing
resource demand.**

Hvor står vi, så?

Et overblik:

- Jorden blev dannet for ca. 4.7 milliarder år siden
- Vores art i dens nuværende form har været på jorden i ca. 250.000 år...
- Dvs. ca. 10.000 generationer...
- De fleste af disse boede i jordhuler...



GRAND TRUNK RAILWAY—LOCOMOTIVE 134.

Donald A. Somerville



- For **6-8** generationer siden erstattede vores forfædre dyr med maskiner
- For **4** generationer siden begyndte man at masseproducere biler
- Kun vores generation har haft videnskabelig dokumentation – og derved forståelsen for – at vores arts aktiviteter påvirker jorden og er ved at true vores eget habitat.

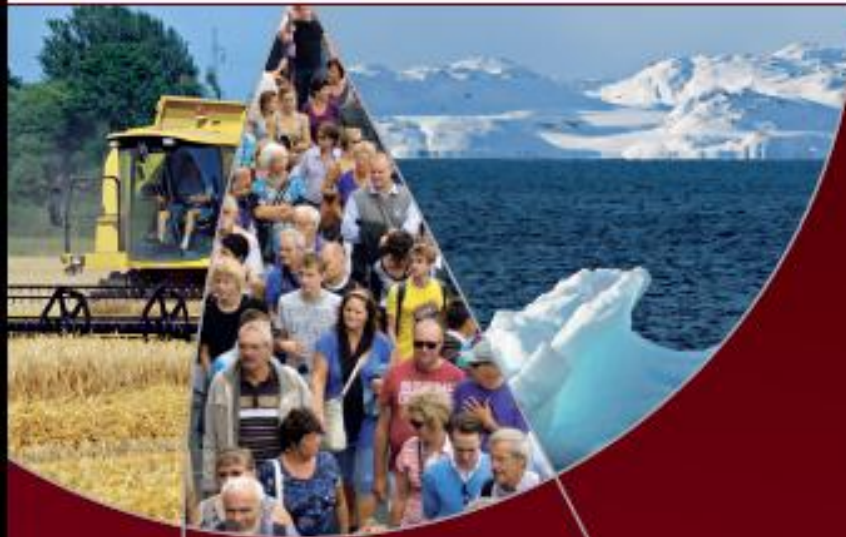


Den viden giver
både **MAGTEN TIL**
og **ANSVARET FOR**
at ændre og at
forvalte forholdet
mellem mennesker
og jorden på en ny
måde.

**Energieffektiviseringer i byggeri er en vigtig del af
historien, men I må ikke stoppe dér!!**



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Addressing the challenges of the 21st Century