

## Remarks in the National Assembly of France

The European Climate Foundation kindly helped arrange a discussion about global climate change at the French National Assembly while I was in Paris last week. The handout that I provided to the members is attached here. The principal points that I made were:

**Climategate.** Matters used in the past year to discredit climate science and reduce concern about global warming in the eyes of the public, upon closer examination, actually strengthen the case that rapid climate change is underway and warrants action by policymakers. Matters addressed: (1) recent cold winter, (2) mountain glacier retreat (inordinate publicity re minor IPCC errors), (3) global temperature change (East Anglia e-mails).

**Target CO<sub>2</sub>.** Reality of ongoing global change, specifically: trends of Arctic sea ice, Antarctic and Greenland ice sheet mass balance, shifting climate zones, ocean acidification and coral reef deterioration, and Earth's energy imbalance all lead to the conclusion that the target atmospheric CO<sub>2</sub> that humanity must aim for is less than 350 ppm. The ultimate target may need to be significantly less than 350 ppm, depending upon other climate forcings, but "<350 ppm" tells us what we need to know: fossil fuel emissions must be phased out as rapidly as possible.

**Fossil fuel reservoirs.** Implications of climate re exploitation of geophysical reservoirs of carbon: (1) coal emissions must be phased out rapidly, (2) unconventional fossil fuels, such as tar sands, cannot be exploited, (3) we should not go after every drop of oil/gas on the planet.

**Reality.** Governments worldwide are ignoring these conclusions from the science. In their policy discussions they seemingly do not appreciate a fossil fuel/economics "law" that is as sure as the law of gravity: as long as fossil fuels are the cheapest energy, the world will keep burning them.

I did not write my talk, except the final few paragraphs, which were:

It is not my job to suggest policy, and I certainly will not interfere in French politics. However, I would like to note that we, the world, desperately need some nation to stand up and tell the other nations the truth: we cannot solve the climate/energy problem without a rising price on carbon, a tax. Cap-and-trade with offsets will not work. And China and India will never accept a cap – why should they, as long as their per capita emissions are much smaller than the West? There needs to be a steadily rising price on carbon, with the money collected distributed to the public.

I think that it is my job as a scientist to connect the dots all the way with scientific objectivity using all empirical evidence. And it is my job, as a father and grandfather concerned about young people, future generations, and the other species that share our planet, to point out that the path the world is on, if we stay on it, guarantees that we will push the climate system beyond tipping points.

This is a moral issue, a matter of intergenerational injustice. Because of the inertia and slow response of the climate system, our generation burns most of the fossil fuels and reaps the benefits while future generations bear the costs. We, the older generations and our governments, cannot pretend that we do not understand this situation – we must accept responsibility.

Note: charts provided here (as PDF and Powerpoint) without discussion, because several people requested them. I will provide discussion of them in upcoming talks/papers, including how a fair, transparent and popular "carbon fee and dividend (green check)" would work.

\*China, the United States and Europe need to agree to a carbon fee on their internal consumption of fossil fuels. Why would China agree: to avoid fossil fuel addiction, clean up its polluted air and water, avoid climate catastrophe, and economics (a leg up on clean technology).

# **A Convenient Falsehood: Global Warming Is a Hoax\***

**James Hansen**

**12 May 2010**

***Discussion, French National Assembly***

**Paris, France**

**\*Statements relating to policy are personal opinion**

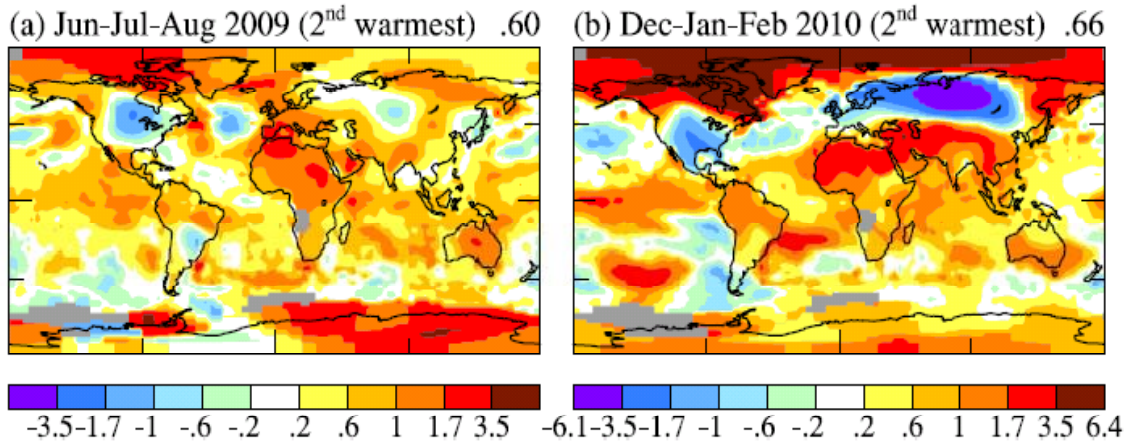
**Discrediting Climate Science**

**Cold Weather this Past Winter**

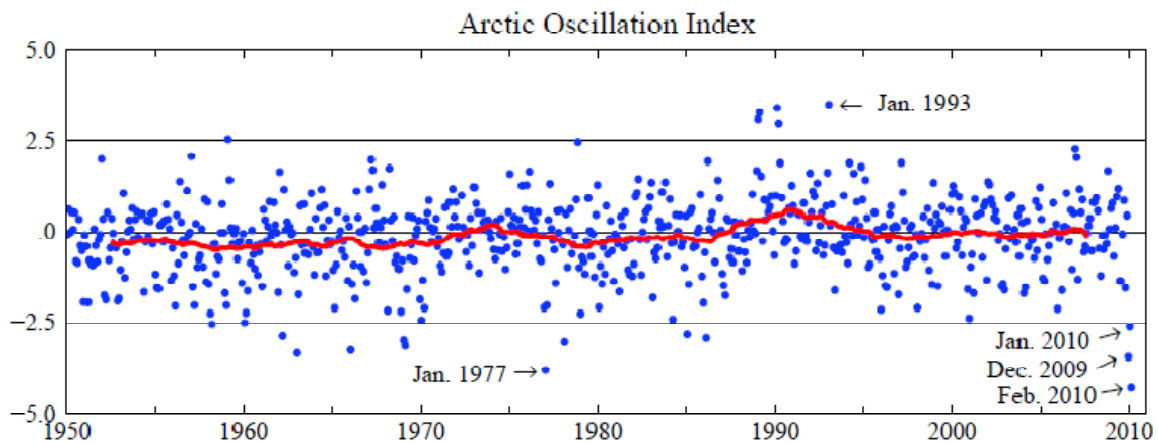
**IPCC “Himalayan Error”**

**ClimateGate: The Stolen E-Mails**

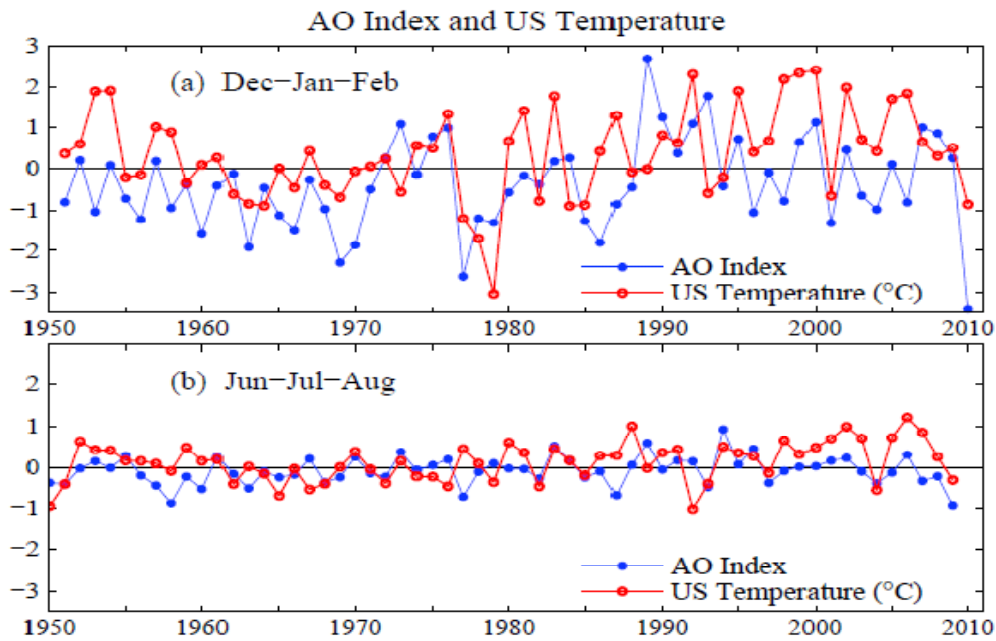
## Surface Temperature Anomaly (°C)



Source: Hansen, Ruedy, Sato, Lo, Global surface temperature change. Preprint to be submitted to *Rev. Geophys.*

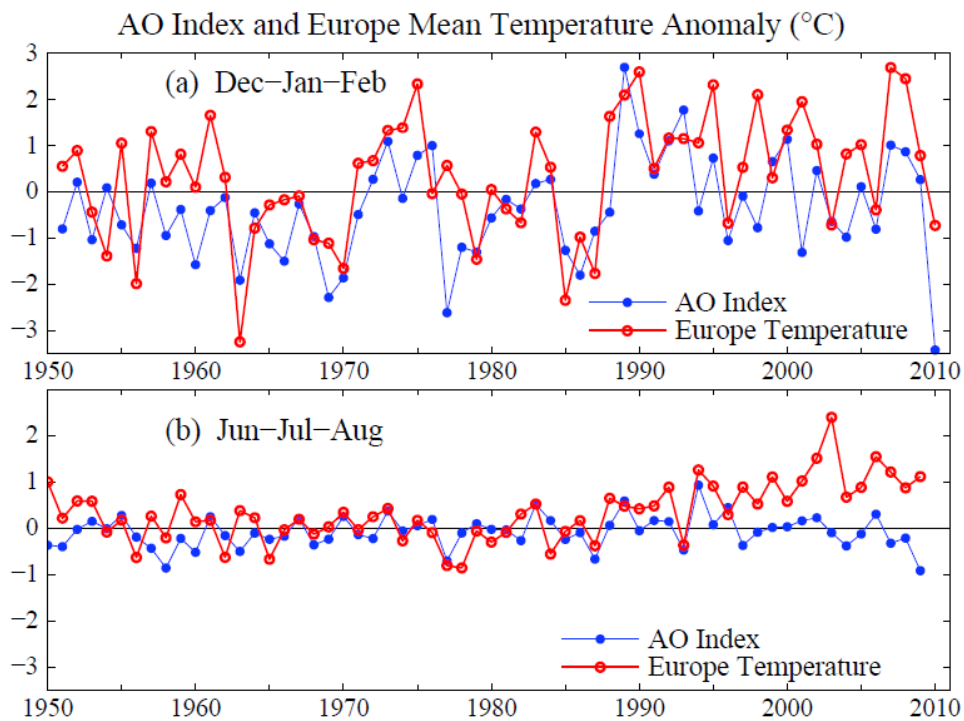


Source: Hansen, Ruedy, Sato, Lo, Global surface temperature change. Preprint to be submitted to *Rev. Geophys.*



**AO index & U.S. (48 states) surface temperature anomaly for Dec-Jan-Feb & Jun-Jul-Aug. Temperature is correlated with AO index, but there is also a warming trend. 8 of last 10 winters and 8 of last 10 summers have been warmer than 1951-1980 average.**

Source: Hansen, Ruedy, Sato, Lo, Global surface temperature change. Preprint to be submitted to *Rev. Geophys.*



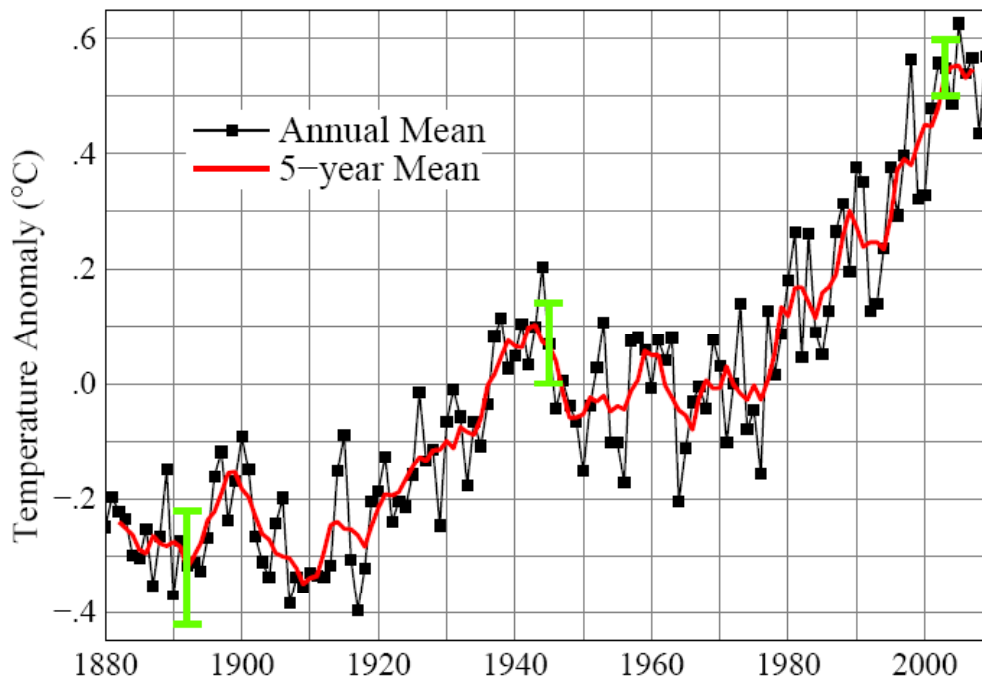
**AO index & Europe surface temperature anomaly for Dec-Jan-Feb & Jun-Jul-Aug. Temperature is correlated with AO index, but there is also a warming trend. 7 of last 10 winters and all of last 10 summers have been warmer than 1951-1980 average.**

## Himalayan (Rongbuk) Glacier



Rongbuk, the largest glacier on Mount Everest's northern slopes, in 1968 (top) and 2007. Glaciers are receding rapidly world-wide, including the Rockies, Andes, Alps, Himalayas. Glaciers provide freshwater to rivers throughout the dry season and reduce spring flooding.

## Global Land–Ocean Temperature Index

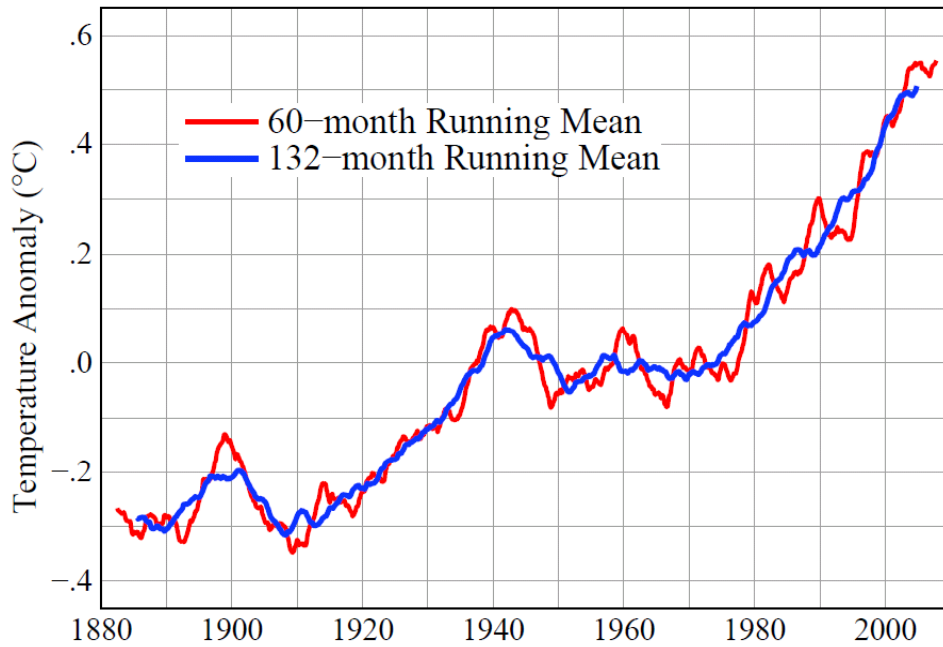


**GISS analysis of global surface temperature change. Base period = 1951-1980.**

**Green vertical bar is estimated 95 percent confidence range.**

Source: update of Hansen et al., GISS analysis of surface temperature change. *J. Geophys. Res.* **104**, 30997-31022, 1999.

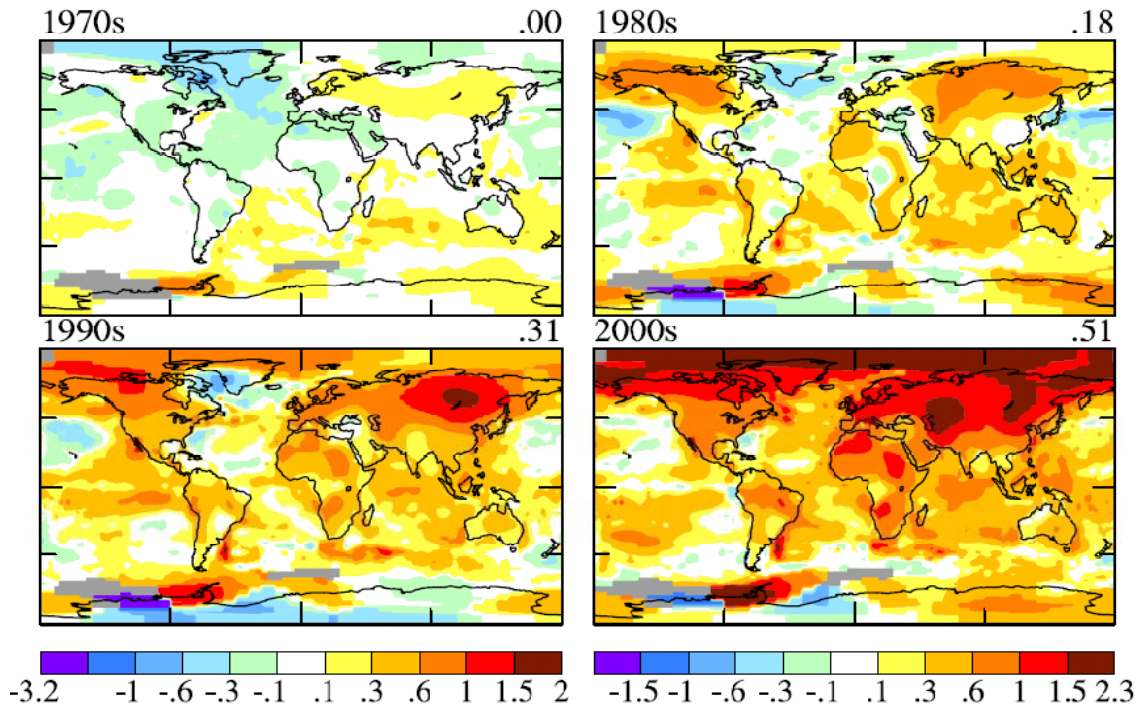
### Global Land–Ocean Temperature Index



60-month (5-year) and 132-month (11-year) mean temperature anomaly relative to 1951–1980 mean. Input data extend through April 2010.

Source: Hansen, Ruedy, Sato, Lo, Global surface temperature change. Preprint to be submitted to *Rev. Geophys.*

### Decadal Surface Temperature Anomalies (°C)



**Decadal mean surface temperature anomalies relative to base period 1951–1980.**

Source: update of Hansen et al., GISS analysis of surface temperature change. *J. Geophys. Res.* **104**, 30997–31022, 1999.

# Climate Science Discredited?

**Au Contraire: Global Temperature Change, Glacier Recession, Planetary Energy Imbalance Confirm Overall Understanding**

**Suggestion: Ask National Academies to report on understanding of climate change and urgency of mitigation actions**

## Global Warming Status

### 1. Knowledge Gap Between

- What is Understood (scientists)
- What is Known (public)

### 2. Planetary Emergency

- Climate Inertia → Warming in Pipeline
- **Tipping Points → Could Lose Control**

### 3. Bad News & Good News

- Safe Level of CO<sub>2</sub> < 350 ppm
- Multiple Benefits of Solution

# Climate Tipping Points

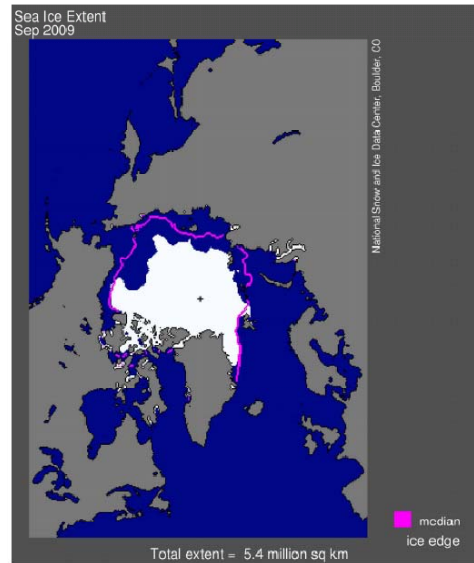
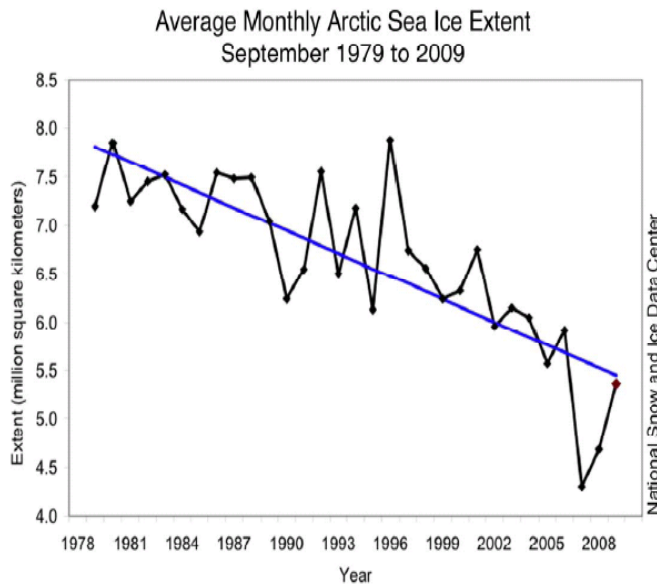
- 1. Ice Sheet Disintegration**
  - Ocean Warming → Ice Shelves Melt  
→ Ice Streams Surge → Disintegration
- 2. Species Extermination**
  - Shifting Climate Zones, Multiple Stresses, Species Interdependencies
- 3. Methane Hydrate 'frozen methane'**
  - In Tundra & On Continental Shelves
  - Depends On Ocean & Ice Sheets

## Basis of Understanding

- 1. Earth's Paleoclimate History**
- 2. On-Going Global Observations**
- 3. Climate Models/Theory**

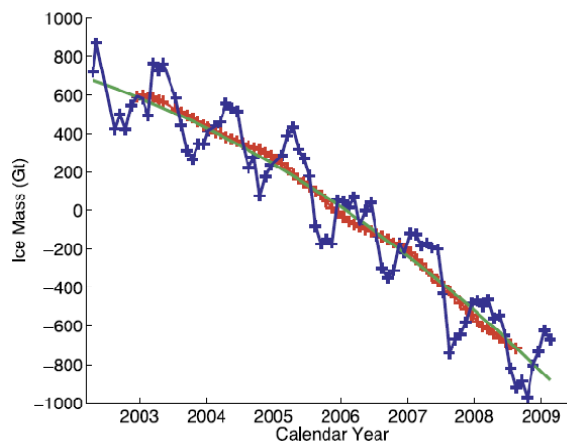


# Arctic sea ice area at warm season minimum

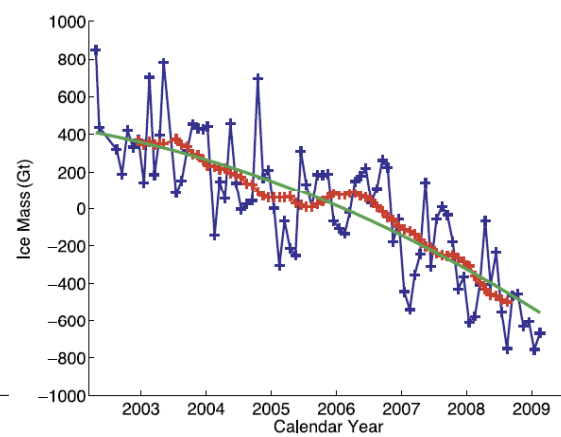


Source: National Snow and Ice Data Center, Boulder, Colorado.

# Gravity Satellite Ice Sheet Mass Measurements



**Greenland Ice Sheet**



**Antarctic Ice Sheet**

Source: Velicogna, I. *Geophys. Res. Lett.*, **36**, L19503, doi:10.1029/2009GL040222, 2009.

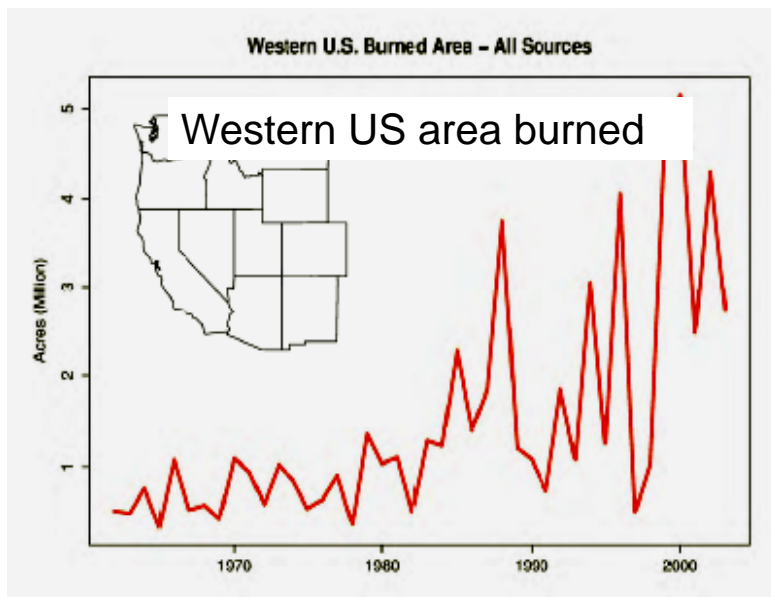
## Pier on Lake Mead



**Subtropics are expected to expand with global warming.**

**Observations show, on average, 4 degrees of latitude expansion.**

## Fires Are Increasing World-Wide



**Wildfires in Western US have increased 4-fold in 30 years.**

Source: Westerling et al., Warming and earlier spring increase western U.S. forest wildfire activity, *Science* **313**, 940, 2006.

# Stresses on Coral Reefs



**Coral Reef off Fiji**

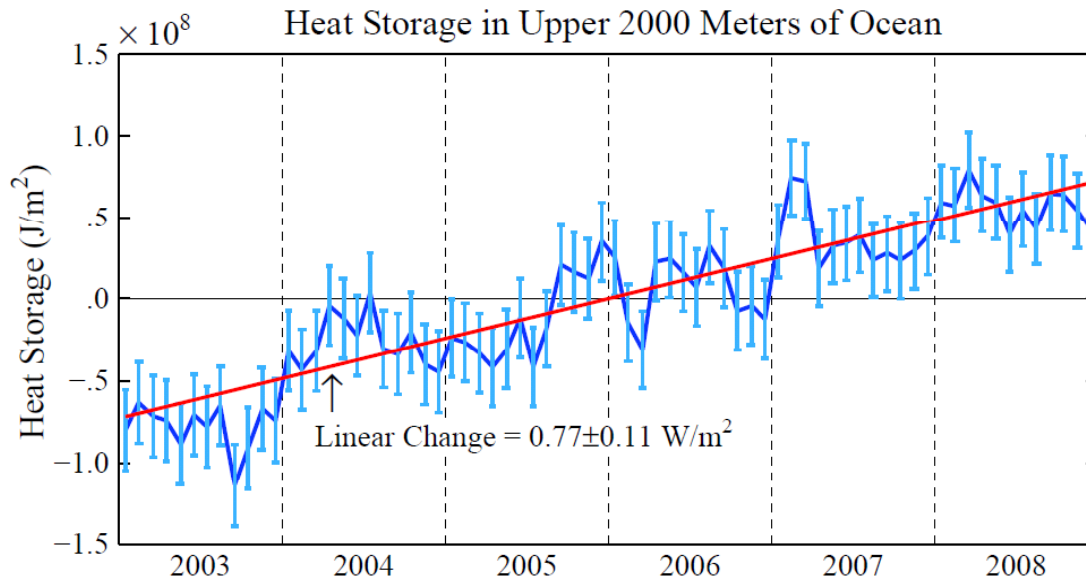
(Photo credit: Kevin Roland)

## Assessment of Target CO<sub>2</sub>

<u>Phenomenon</u>	<u>Target CO<sub>2</sub> (ppm)</u>
1. Arctic Sea Ice	300-350
2. Ice Sheets/Sea Level	300-350
3. Shifting Climatic Zones	300-350
4. Alpine Water Supplies	300-350
5. Avoid Ocean Acidification	300-350

→ Initial Target CO<sub>2</sub> = 350\* ppm

\*assumes CH<sub>4</sub>, O<sub>3</sub>, Black Soot decrease



**Heat storage in upper 2000 meters of ocean during 2003-2008 based on ARGO data.**

**Knowledge of Earth's energy imbalance is improving rapidly as ARGO data lengthens.**

**Data must be averaged over a decade because of El Nino/La Nina and solar variability.**

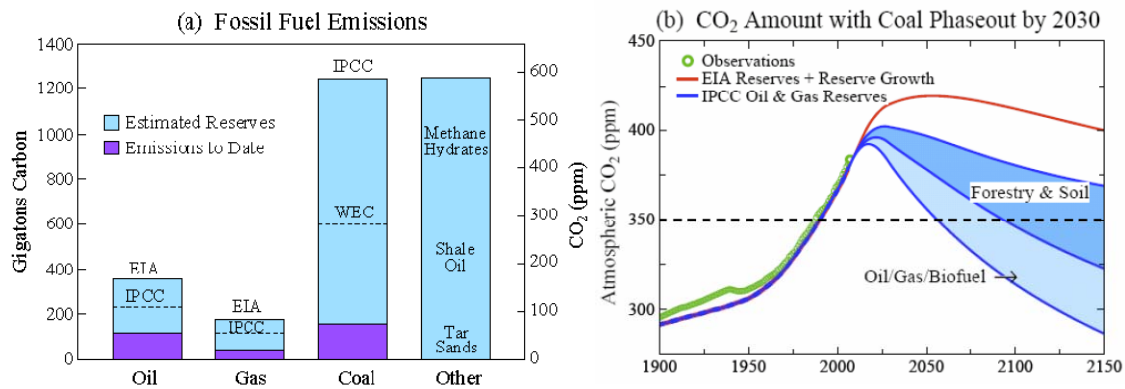
**Energy imbalance is smoking gun for human-made increasing greenhouse effect.**

Data source: von Schuckmann *et al. J. Geophys. Res.* **114**, C09007, 2009, doi:10.1029/2008JC005237.

# Target CO<sub>2</sub>:

# < 350 ppm

**To preserve creation, the planet  
on which civilization developed**



Scenarios assume no “Other” = Tar Sands, Oil Shale, Methane Hydrates  
 Coal phase-out by 2030 → peak CO<sub>2</sub> ~400-425 ppm, depending on oil/gas.  
 Faster return below 350 ppm requires additional actions

Source: Hansen *et al.*, Target atmospheric CO<sub>2</sub>: where should humanity aim? *Open Atmos. Sci. J.*, 2, 217-231, 2008.

**Initial Target CO<sub>2</sub>: 350 ppm**

**Technically Feasible**

**Quick Coal Phase-Out Necessary**

**All coal emissions halted in 20 years**

**No Unconventional Fossil Fuels**

**Tar sands, Oil shale, Methane hydrates**

**Don't Pursue Every Last Drop of Oil**

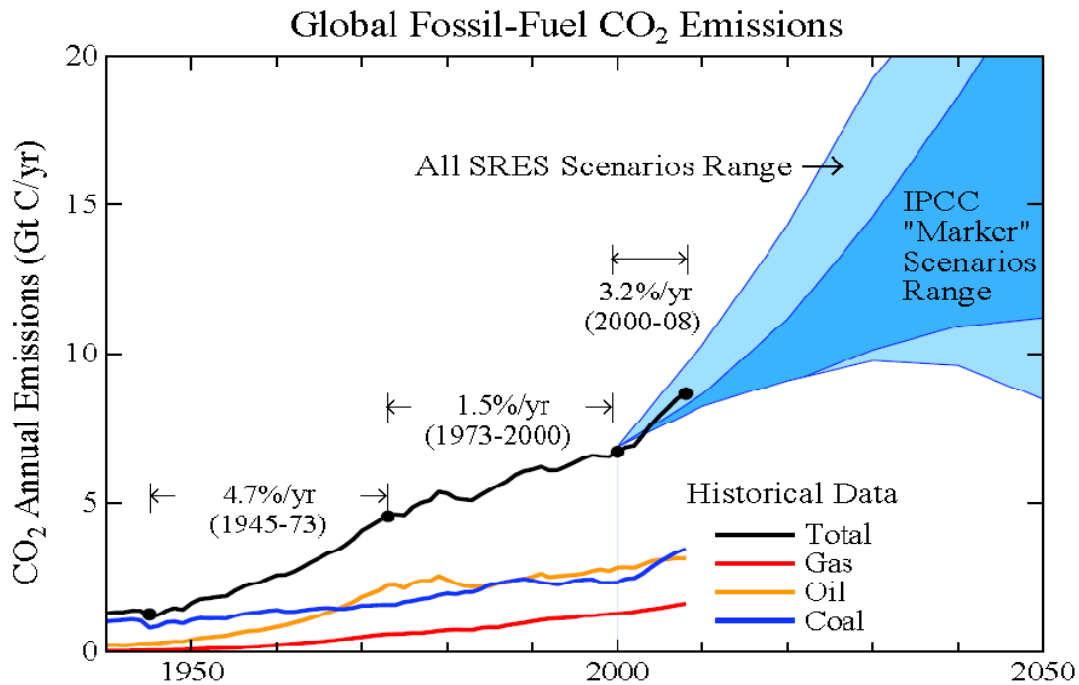
**Polar regions, Deep ocean, Pristine land**

## **What's Really Happening**

- 1. Tar Sands Agreement with Canada**  
Pipeline planned to transport oil
- 2. New Coal-fired Power Plants**  
Rationalized by 'Clean Coal' mirage
- 3. Mountaintop Removal Proceeds**  
Diminishes wind potential of mountains
- 4. Fossil Fuel Exploration Expands**  
Arctic, offshore, public lands

## **Global Action Status**

- 1. Huge Gap: Rhetoric & Reality**
  - Rhetoric: Planet in Peril
  - Reality: Small Perturbations to BAU
- 2. Greenwash/Disinformation Winning**
  - Appeasement of Fossil Interests
  - Still Waiting for a Winston Churchill
- 3. Kyoto & Copenhagen Fiascos**
  - Kyoto → accelerating emissions
  - Copenhagen → same "cap-&-trade"



**Global fossil fuel carbon dioxide emissions accelerated after Kyoto Protocol.**

Date sources: Marland et al. (U.S. Dept. Energy, Oak Ridge and extended with BP Statistical Review of World Energy.)

## Problem & Solution\*

- 1. Fossil Fuels are Cheapest Energy**
  - Subsidized & Do Not Pay Costs
  - Solution: Rising Price on Carbon
- 2. Regulations also Required**
  - Efficiency of Vehicles, Buildings, e.g.
  - Carbon Price Provides Enforcement
- 3. Technology Development Needed**
  - Driven by Certainty of Carbon Price
  - Government Role Limited

\* my opinion

# Fee & Green Check (Dividend)

- 1. Fee Applied at First Sale/Port of Entry**  
Covers all Oil, Gas, Coal → No Leakage
- 2. Fee Specified: No Speculation, No Volatility**  
No Wall Street Millionaires at Public Expense
- 3. Other Merits**  
Only Potentially Global Approach  
Simple, Honest, Can be Implemented Quickly  
Market Chooses Technology Winners  
Most Efficient & Largest Carbon Reductions

# Fee & Green Check Addresses

- 1. Economy: Stimulates It**  
Puts Money in Public's Hands– A Lot!
- 2. Energy: Fossil Fuel Addiction**  
Fastest Route to Clean Energy Future
- 3. Climate**  
Only Internationally Viable Approach - -  
Zero Chance of China/India Accepting a Cap  
Would Result in Most Coal & Unconventional  
Fossil Fuels, and some Oil, left in the Ground



# Intergenerational Justice

**Jefferson to Madison:** ...self-evident that  
“Earth belongs in usufruct to the living”\*

**Native People:** obligation to 7<sup>th</sup> generation

**Most Religions:** duty to preserve creation

**Governments (with fossil interests):** we set  
emissions at whatever level we choose

**Public:** when will it become involved?

\*Legal right to use something belonging to another

*Jake: You're on your own baby - Good Luck!*



# Fundamental Messages

- 1. Climate Science: Near Tipping Points**  
Unfair to young people & other species
- 2. Need Simple Carbon Price & Dividend**  
Let efficiency, renewables, nuclear, etc. compete

## Web Site

[www.columbia.edu/~jeh1](http://www.columbia.edu/~jeh1)

includes

Target Atmospheric CO<sub>2</sub>: Where Should Humanity Aim?

Global Warming Twenty Years Later:  
Tipping Points Near

In Defence of Kingsnorth Six