

Climate Science and Wind Farms

A tragic waste of resources

Ken Gregory, P.Eng.
Friends of Science Society
For the Grizzly Bear Creek Protection Group
Mannville, Alberta
November 6, 2013.

Friends of Science Society

- Operates Website; FriendsOfScience.org
- Facebook; active discussions.
- In operation since 2002.
- Annual luncheons
- Newsletters
- Presentations and videos
- Issued 45 press releases from May 2012.
- Message: The Sun is the main driver of climate changes, Not You, Not CO₂.



As a practical matter of politics, nobody knows what Kyoto is or what it commits us to.

Michael Ignatieff , former leader, Liberal Party of Canada

- Home
- About Us
- News And Events
- Newsletters
- Climate Science
- Video / Audio
- FoS Initiatives
- Myths / Facts
- Policies & Economics
- Consensus & Skeptics
- Scientific References
- Website Links
- Get Involved - Join Us
- Contact Us
- Site Map

PROVIDING INSIGHT INTO CLIMATE CHANGE

THE SUN

29 Articles
< Previous 1 2 3 4 5 6 Next >



Real risk of a Maunder Minimum 'Little Ice Age' says Leading Scientist
Technical Rating: ★
Solar scientist Professor Lockwood of Reading University studied isotopes in ice cores and believes solar activity is now falling more rapidly than at any time in the last 10,000 years. He found 24 different occasions when the sun was in exactly the same state as it is now - and the present decline is faster than any of those 24. Lockwood says a repeat of the Dalton solar minimum is 'more likely than not' to happen over the next few decades, and a the risk of a new Maunder minimum is 25-30%. The Maunder minimum corresponds to the colder part of the Little Ice Age. He believes that we are already beginning to see a cooling climate - witness the colder winters and poor summers of recent years.



IPCC Ignored Evidence Showing Sun's Clear Impact
Technical Rating: ★
There's an overwhelming body of evidence showing a close correlation of the earth's cyclically fluctuating climate with solar activity. The IPCC fifth report takes only a cursory look at solar activity before simply dismissing the sun's impact. This article lists 123 peer-reviewed papers linking solar activity to climate published between 2008 and 2012 that the IPCC ignored.



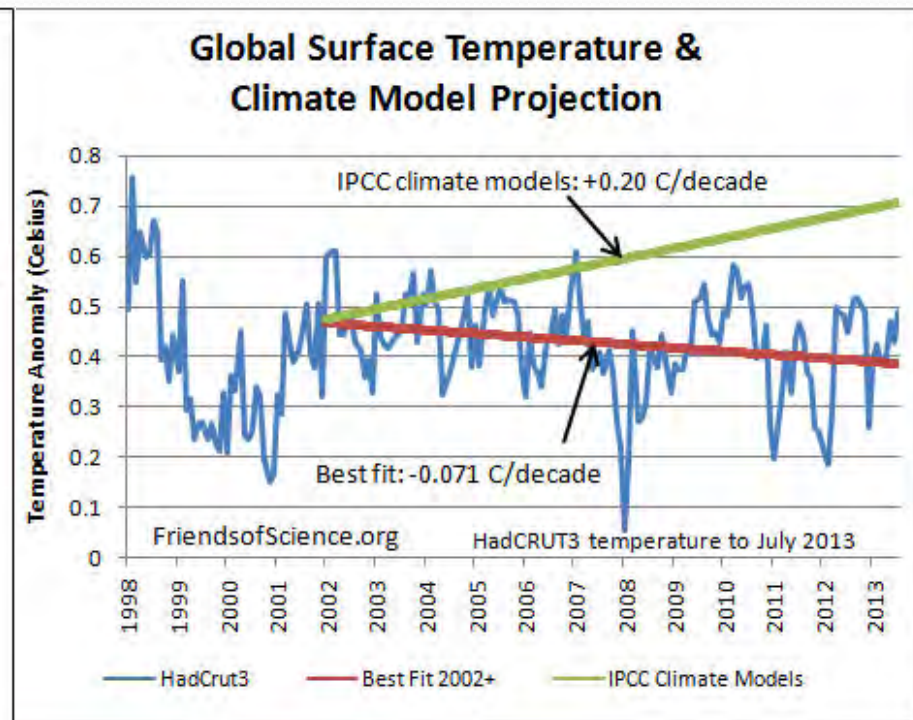
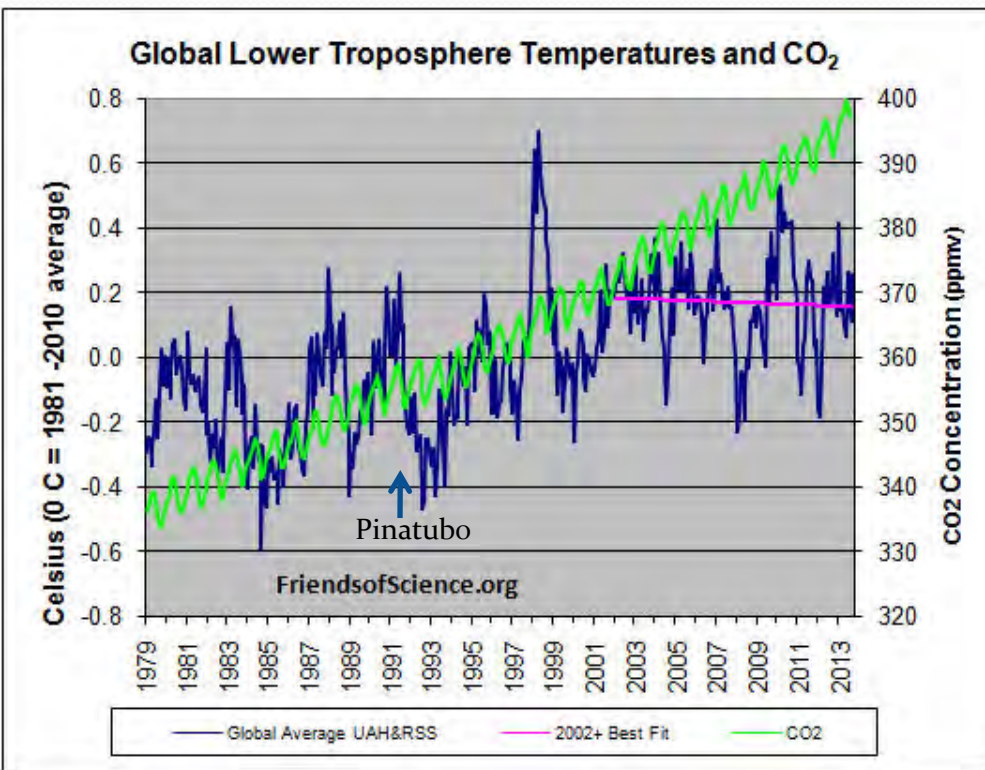
Danish Experiment Confirms Cosmic Rays Promote Cloud Formation
Technical Rating: ★
Researchers in the Technical University of Denmark (DTU) reported (September 4, 2013) that simulated cosmic rays form molecular clusters that grow to the sizes suitable for seeding clouds. Previous experiments had shown that cosmic rays created molecular clusters, but chemical theory suggested that few of them would grow large enough to seed clouds. The tests in a reaction chamber called SKY2 show that the chemical theory



Climate Change Fears: Wind Farm Subsidies

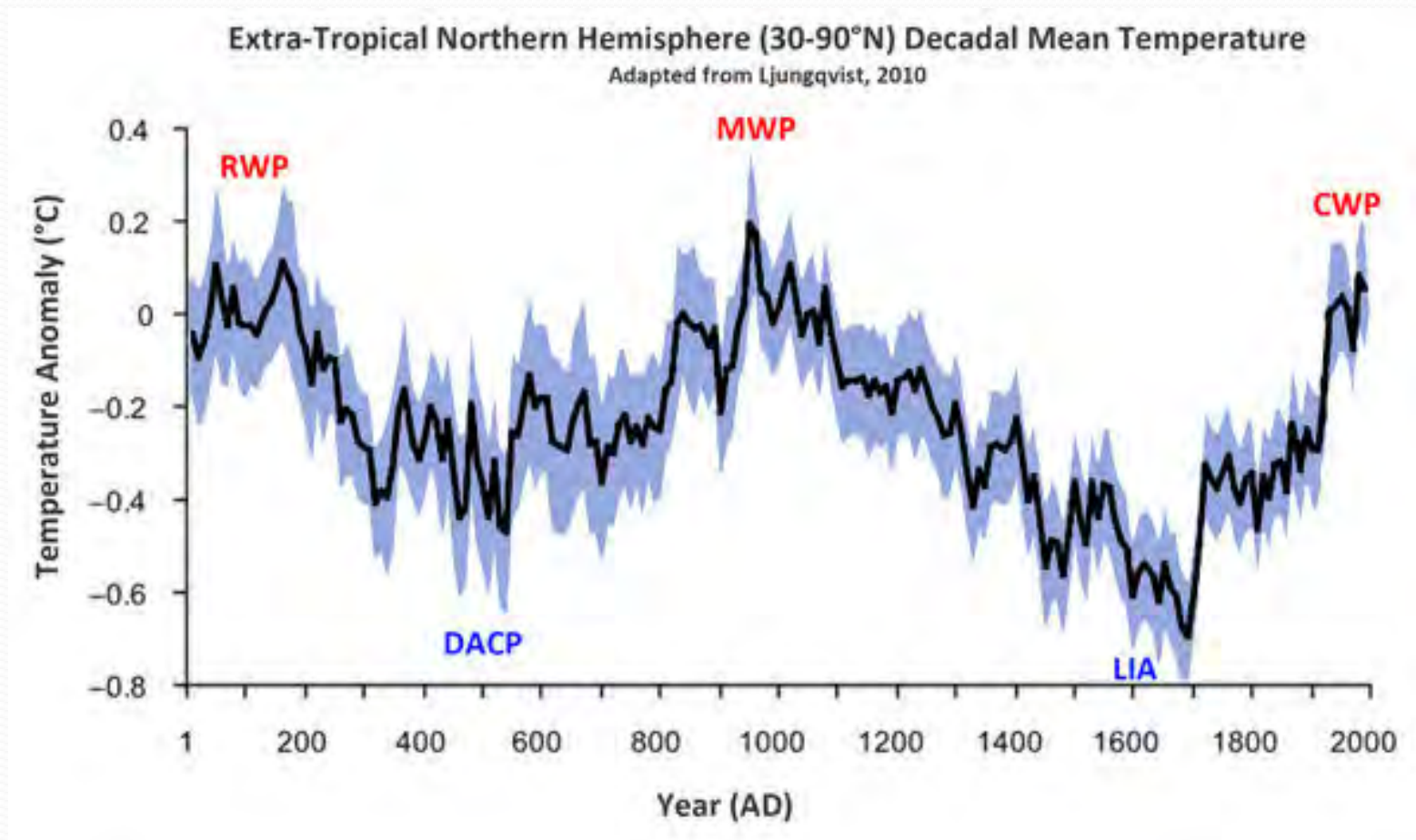
- “Save the Planet” from Global Warming caused by the greenhouse effect of carbon dioxide emissions.
- Ontario Feed-in tariffs 13.5 – 14.5 ¢/kwh
- Federal tax credits
- Alberta R&D tax credits
- Alberta transmission lines for wind
- Renewable Energy Certificates
- Wind is given priority access despite extreme variability.

Recent Global Temperatures



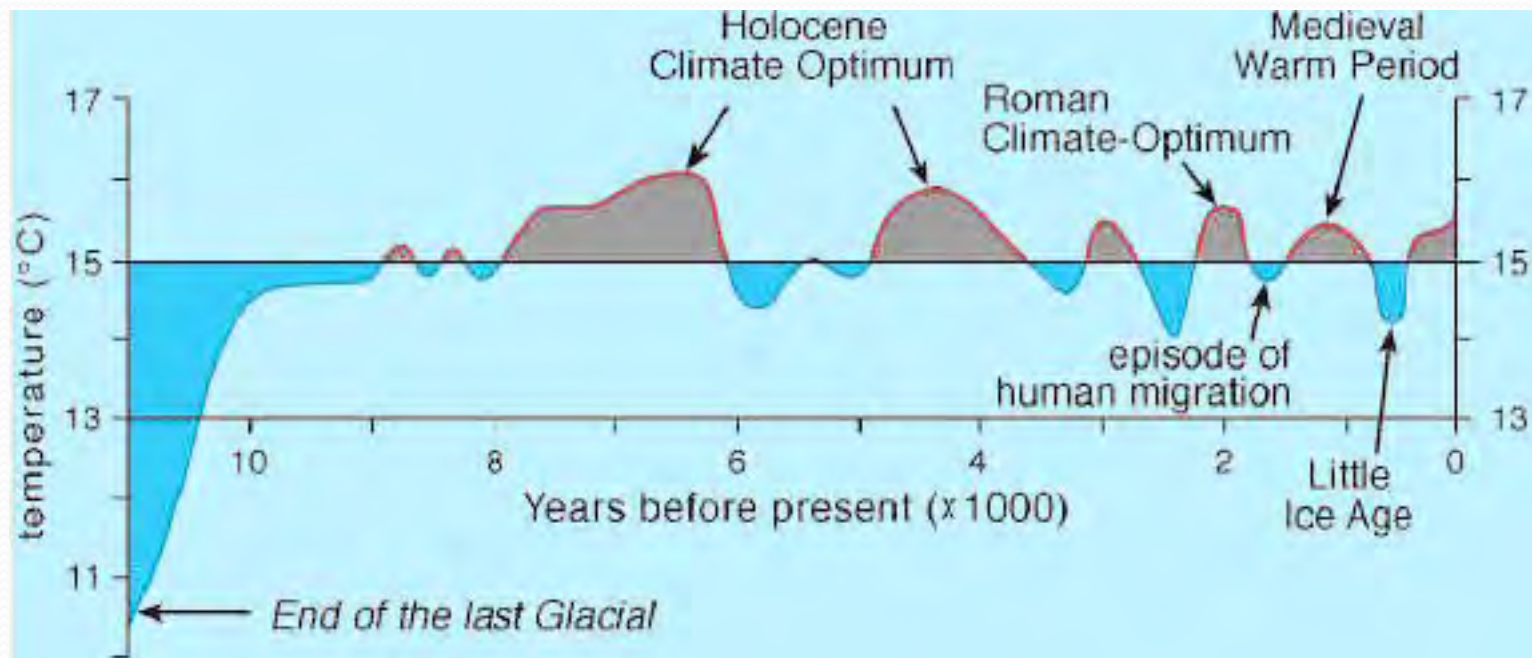
Satellite and surface temperatures are declining since 2001.

Northern Hemisphere Temperatures



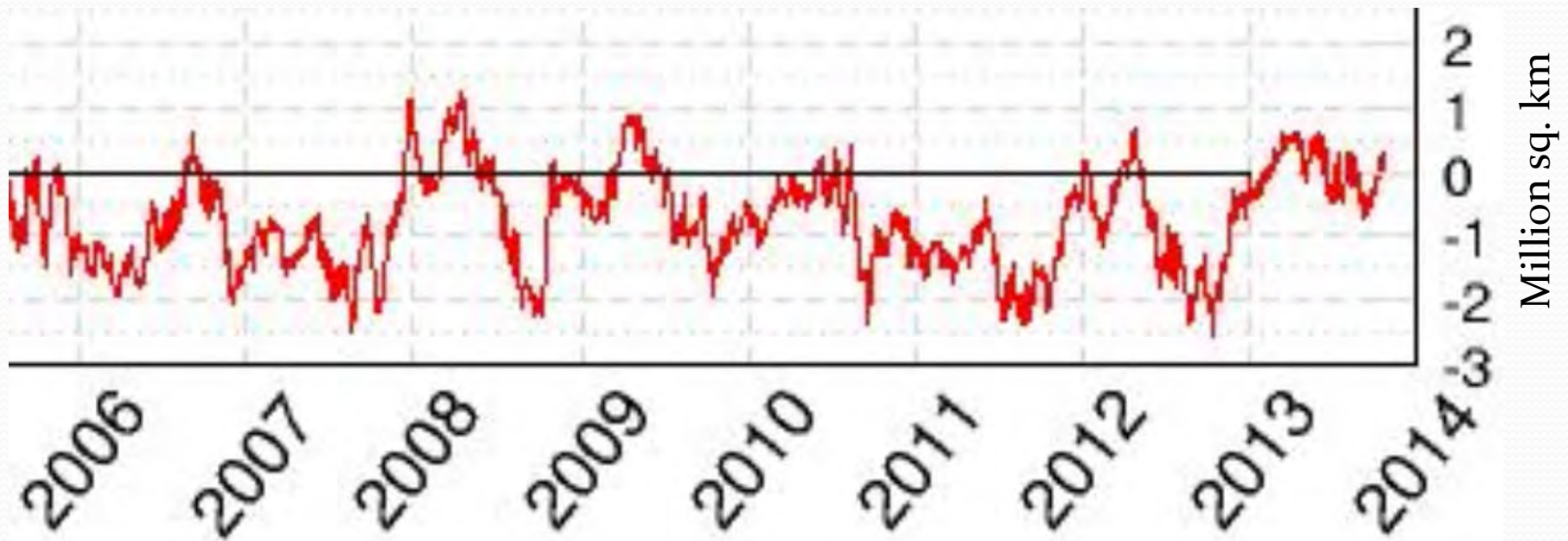
Previous Warm & Cold Periods

Climate always changes with no help from Man.



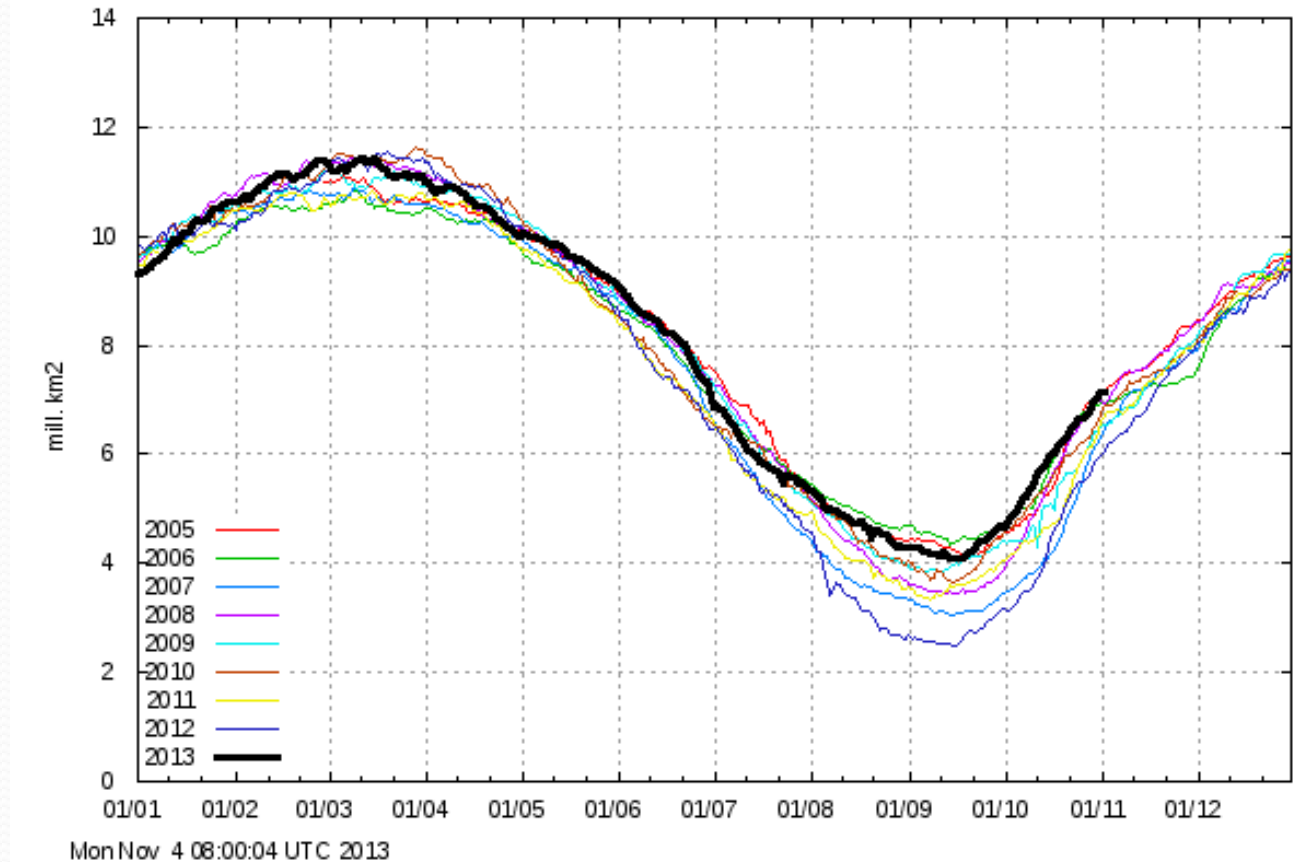
Average near-surface temperatures of the northern hemisphere during the past 11,000 years (after Dansgaard et al., 1969, and Schönwiese, 1995)

Global Sea Ice Area



Global sea ice area has been above the 1979 – 2008 average (set at zero) for most of 2013.

Northern Sea Ice Extent



Northern sea ice is the highest in 9 years.

Polar Bear Numbers Double Since 1960

- The polar bear population has more than doubled since 1960.
- A recent study shows that declining later summer sea ice has no effect on either Chukchi or Southern Beaufort polar populations.
- Polar bear are healthy and thriving.



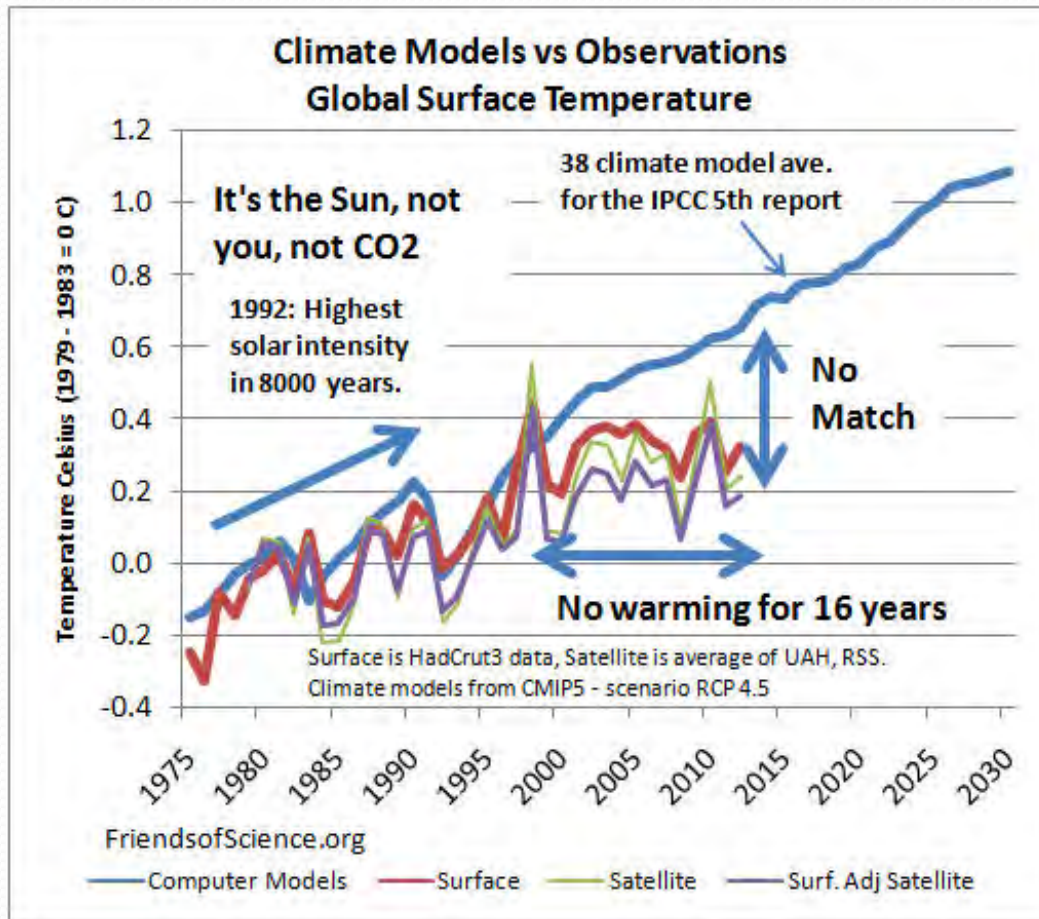
IPCC Reports

- Intergovernmental Panel on Climate Change (IPCC) Mandate is to review man-made climate change
- Ignores most natural causes of climate change
- Ignores contrary evidence
- 2007 Report contains references to 5600 non-scientific, non-peer reviewed sources.
- Most expert reviewer comments critical of IPCC statements are ignored.

IPCC 5th Report - Extremes

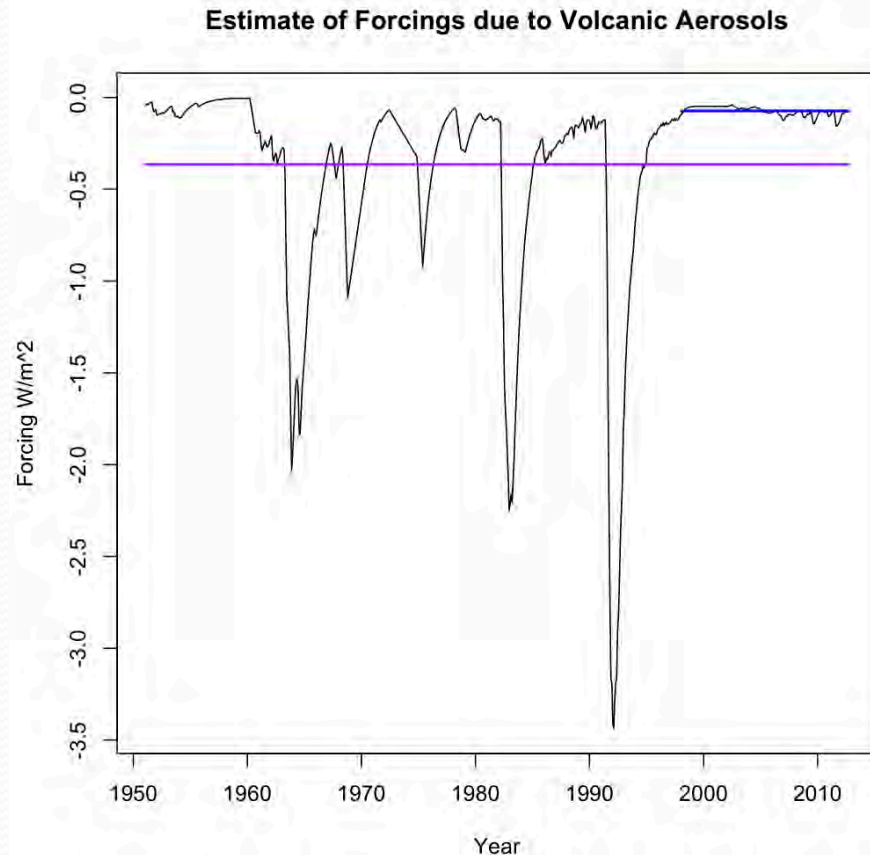
- **complete reversal from AR4 on trends in drought, hurricanes, floods.**
- “high confidence that natural variability dominates any AGW influence in observed/historical TC records.”
- “no significant observed trends in global tropical cyclone frequency.”
- “low confidence regarding the sign of trend in the magnitude and/or frequency of floods.”
- “does not support the AR4 conclusions regarding global increasing trends in droughts.”

Global Surface Temperatures & Models



- The new climate models ignored the lack of warming since 1998.
- A model MUST have a good history match to be useful.

IPCC Makes Excuses: 16-yr No Warming.



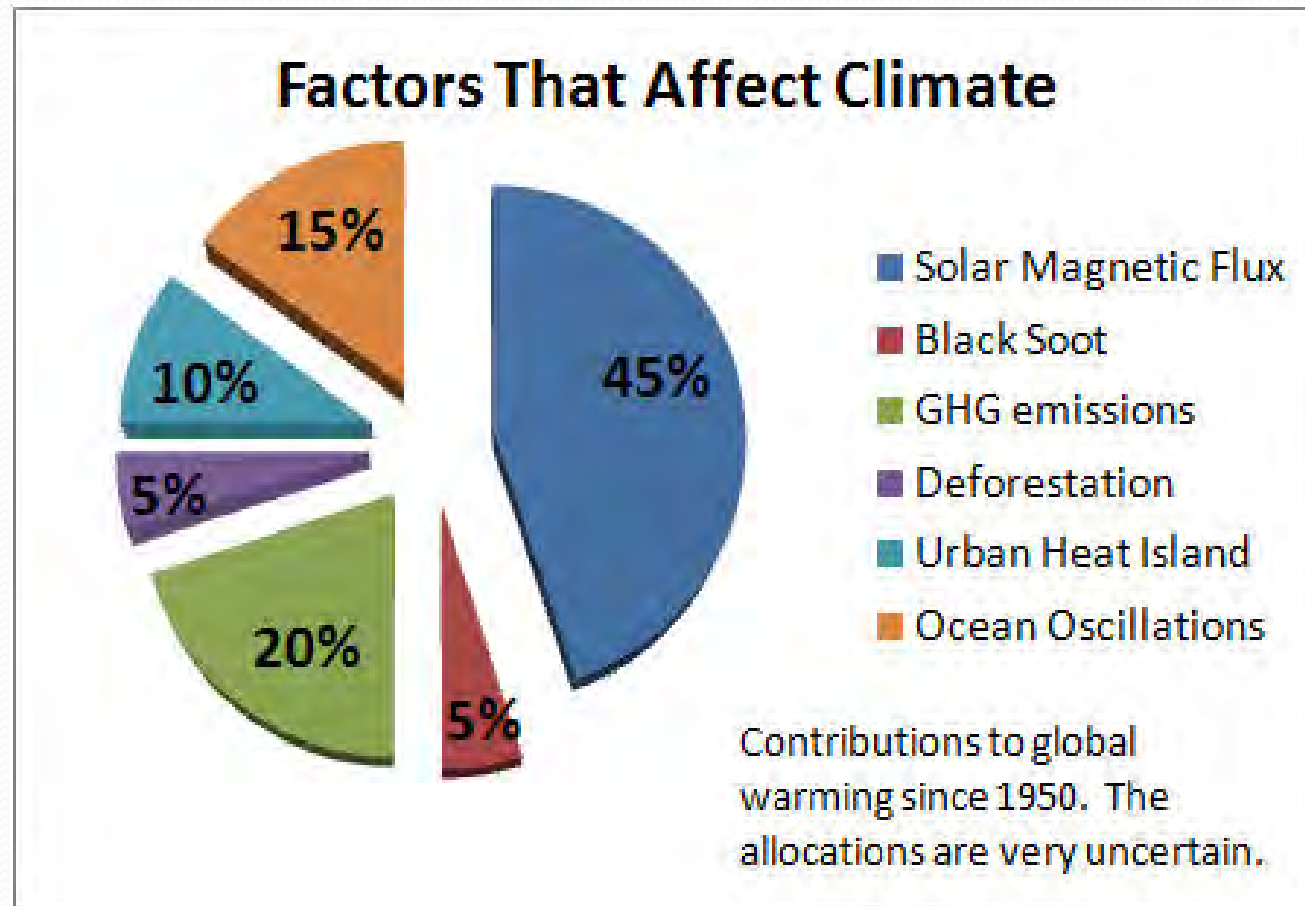
- The reduced trend ... due to volcanic eruptions and downward phase of the 11-year solar cycle.”
- No recent volcanoes to cause cooling.
- IPCC claims 98% CC due to GHG.



IPCC 5th Report – Ignores the Sun

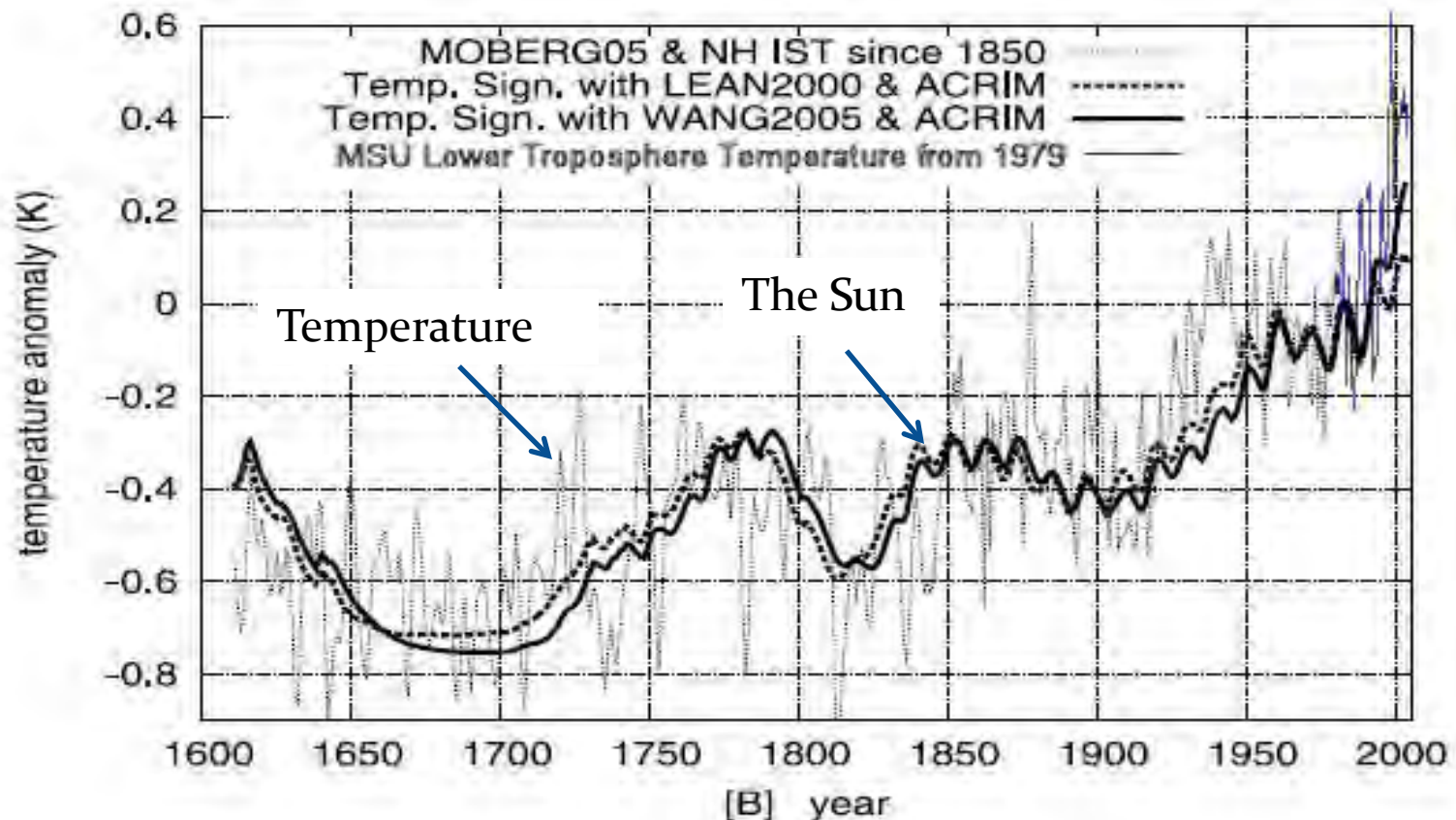
- The IPCC ignored 123 peer-reviewed articles published 2008 – 2012 that show the Sun is a main driver.
- IPCC: “The forcing from changes in total solar irradiance alone does not seem to account for these observations, implying the existence of an amplifying mechanism”
- Then, ignores solar effects.

Causes of Climate Change



The Sun and Temperature

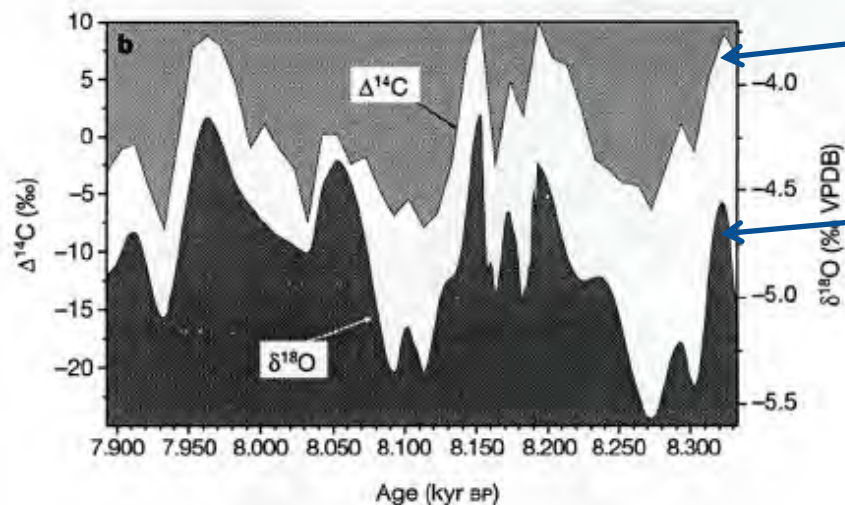
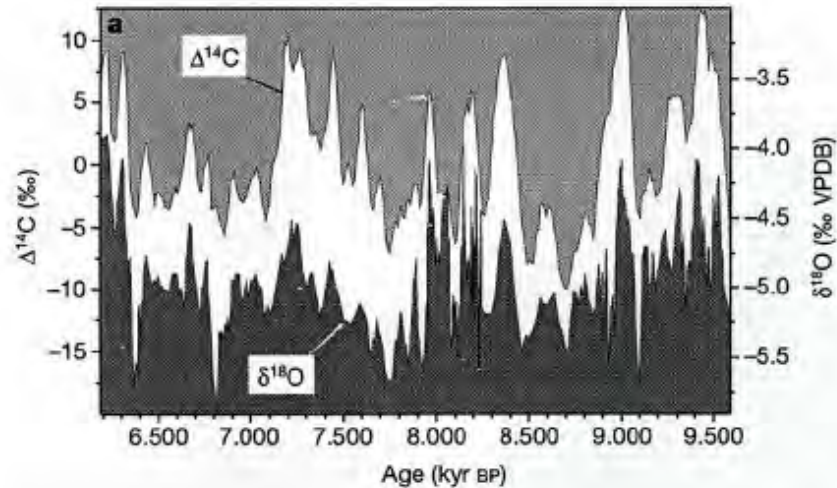
- Sun TSI versus temperature since 1600
- The Sun may have caused up to 70% of the 20th century warming.



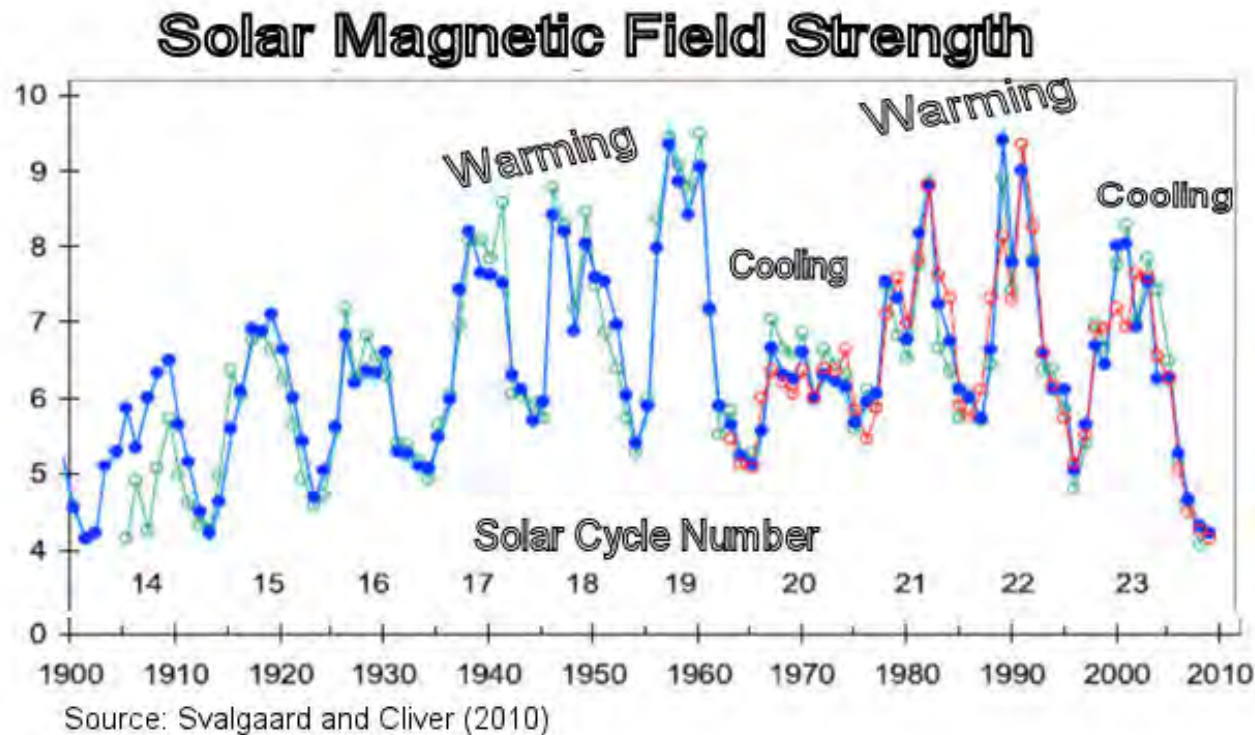
The Sun and Temperature Proxies

Solar proxy $\Delta^{14}\text{C}$
vs temperature
 $\delta^{18}\text{O}$ over 3000
years.

Solar Activity and Climate (as seen by proxies)

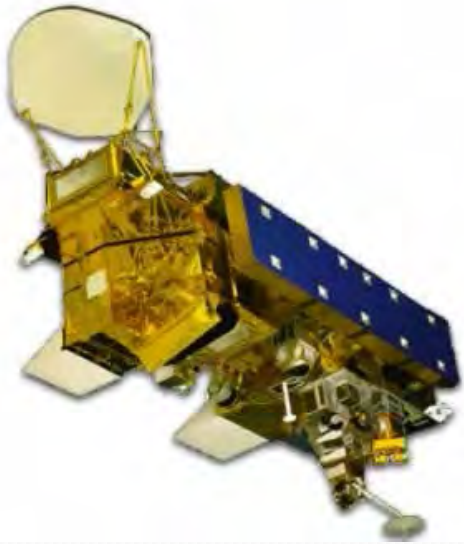


Sun and Climate

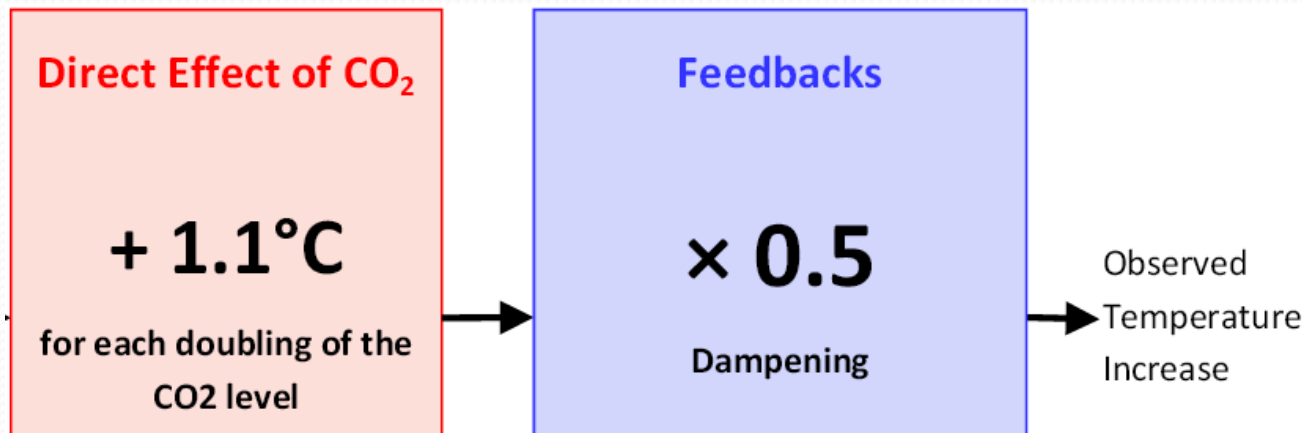


The solar magnetic field has doubled from 1900 to 1991 causing warming. It has since declined, leading to cooling.

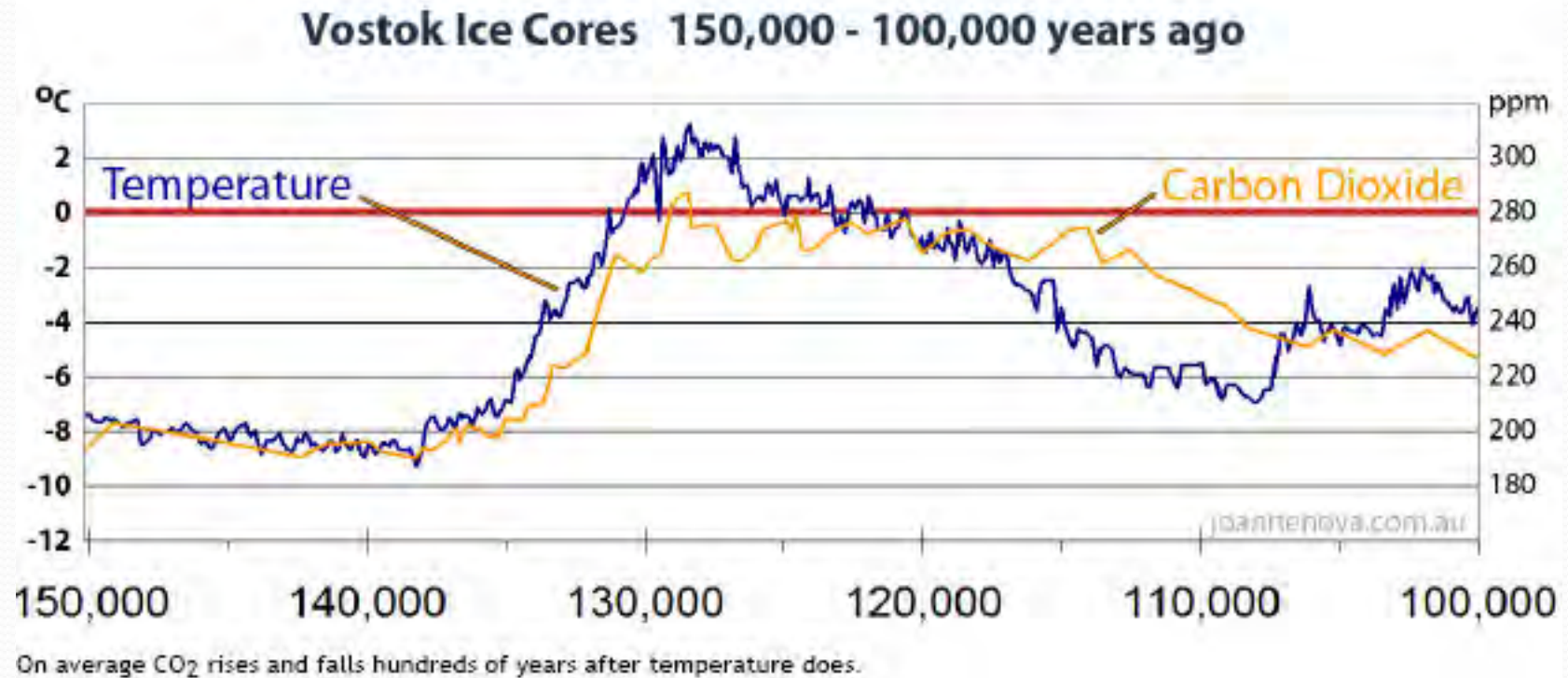
CO2 Effect on Temperature: Small



- CERES Satellite data measures the change in the Greenhouse Effect
- Doubling of CO₂ leads to about 0.5 °C temperature change (197 yrs.)
- 0.27 °C change to year 2100.

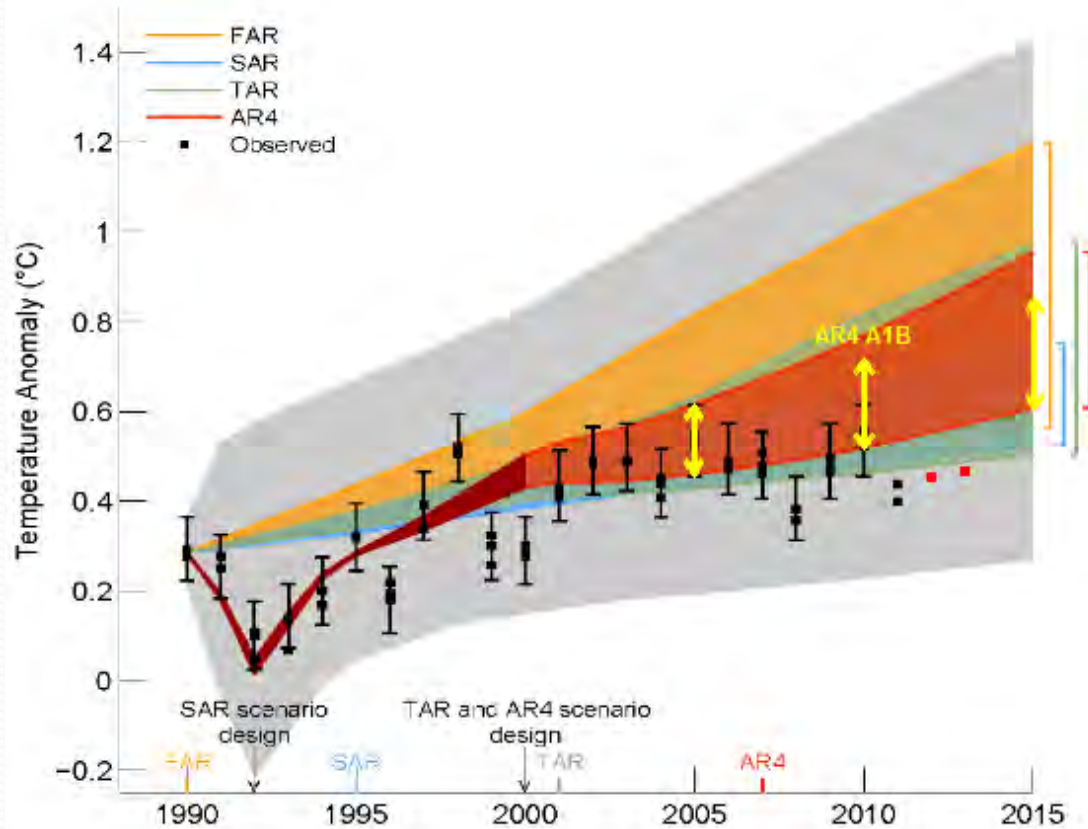


CO₂ Lags Behind Temperatures



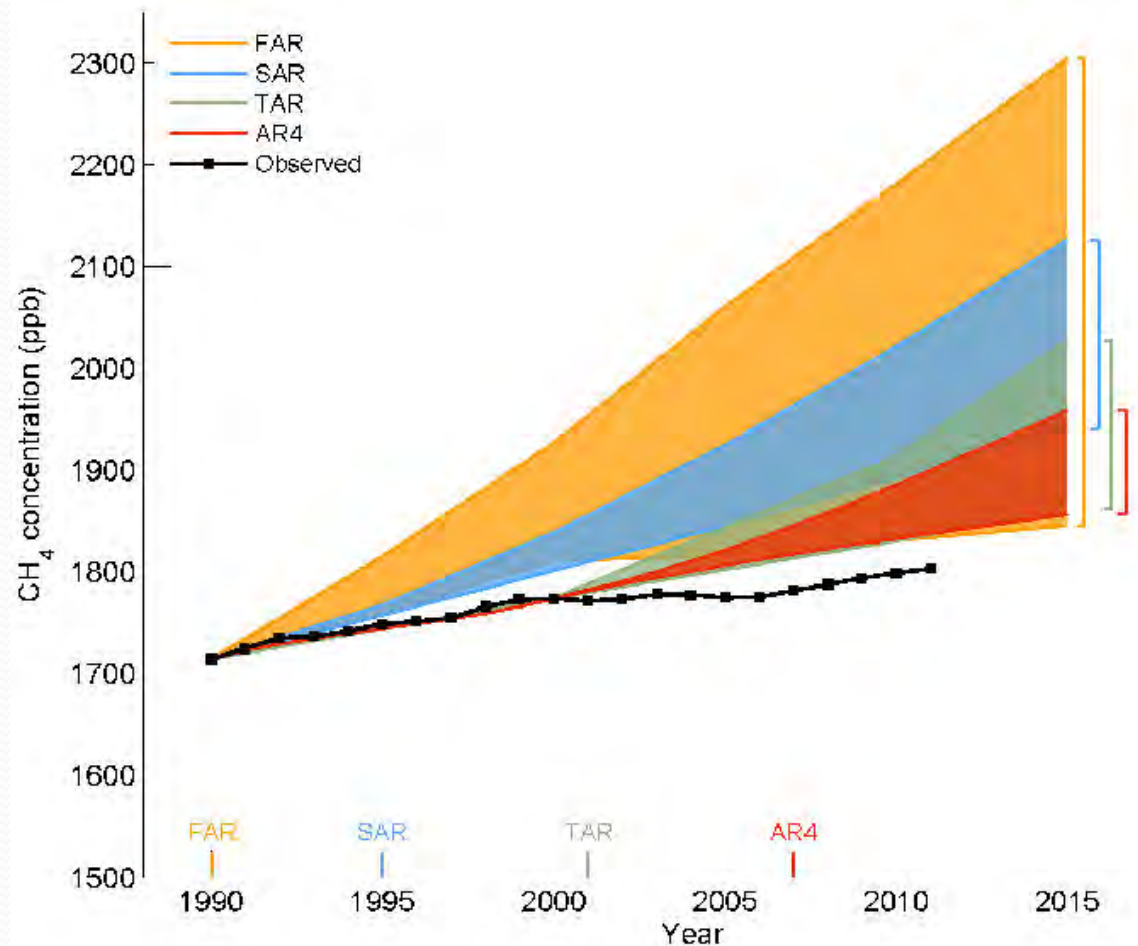
Temperatures change first, CO₂ changes 800 years later, so can't be a significant cause of warming. The Sun caused the temperature change which forced CO₂ out of the oceans to the air.

Bad IPCC Predictions – Global Temperatures



- IPCC temperature projections ranges are above the observations.

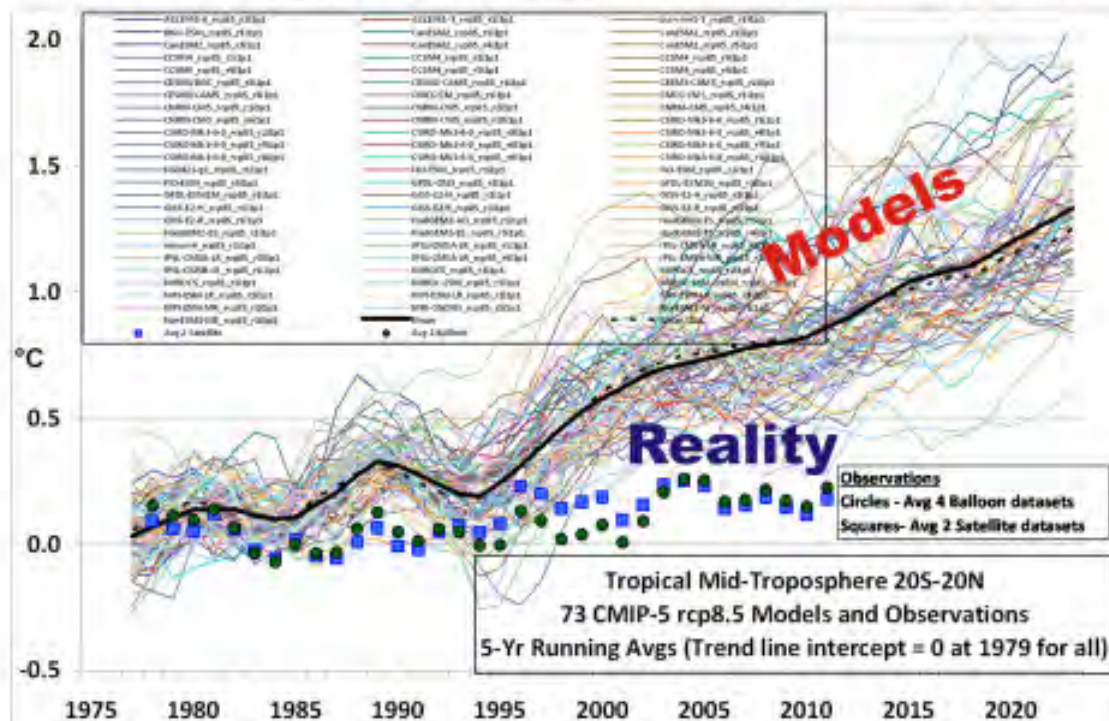
Bad IPCC Predictions - Methane



- CO₂ is so weak, modelers have to add a huge methane increase to make scary forecasts.
- Actual trend is below the bottom of all ranges.

Epic Fail: Climate Models vs Observations

Global warming **EPIC FAIL** 73 climate computer models vs. observations

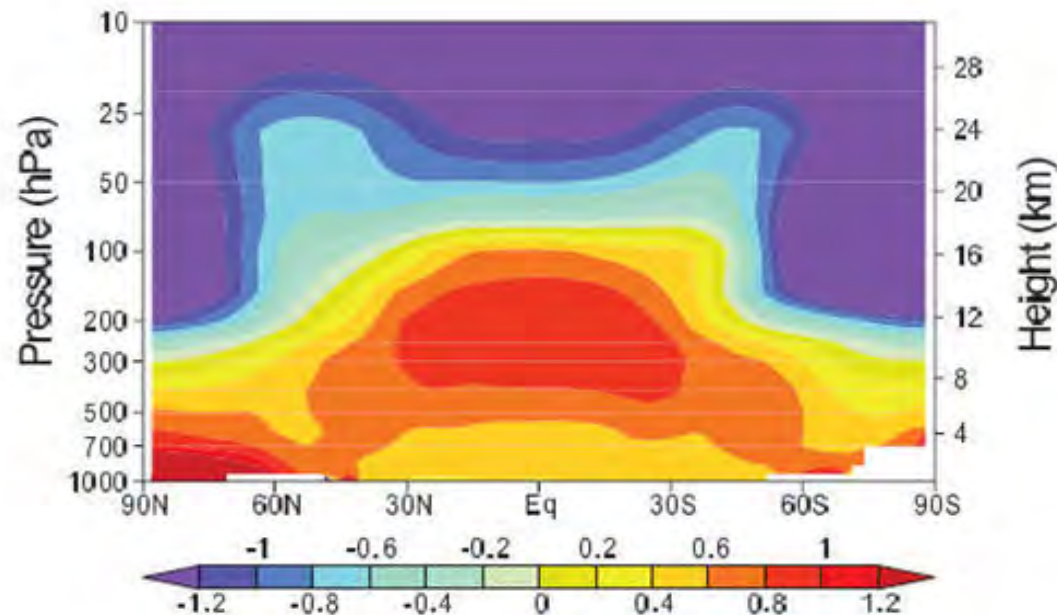
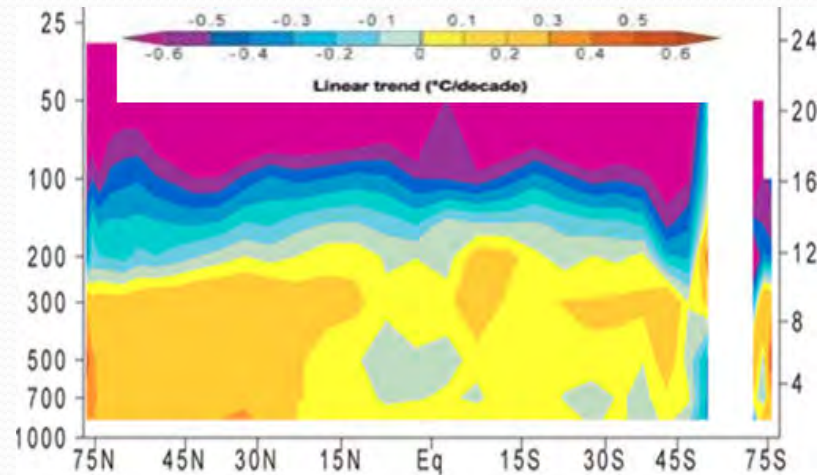


- New climate models fail to match last four decades.
- Tropical mid-troposphere

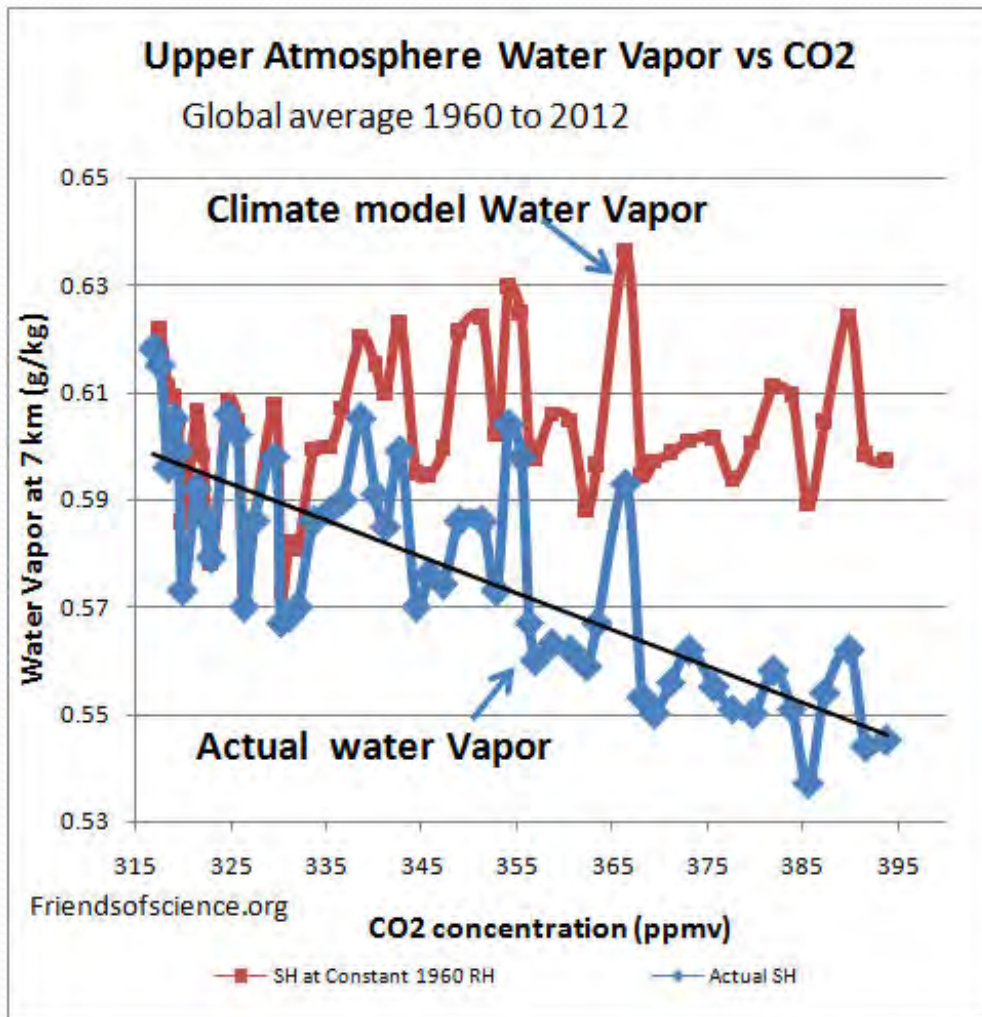
The Hot Spot is Missing

- Actual temperatures
- The predicted hot spot is missing.
- Why? No water vapor increase.

Model Predictions

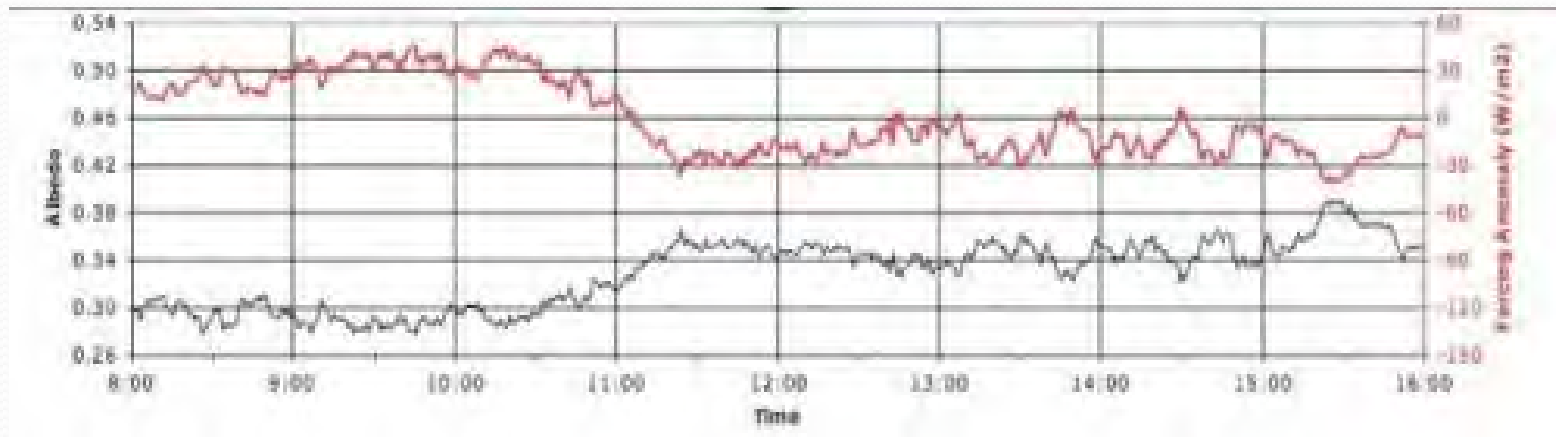


Water Vapor Offsets CO2 Effect



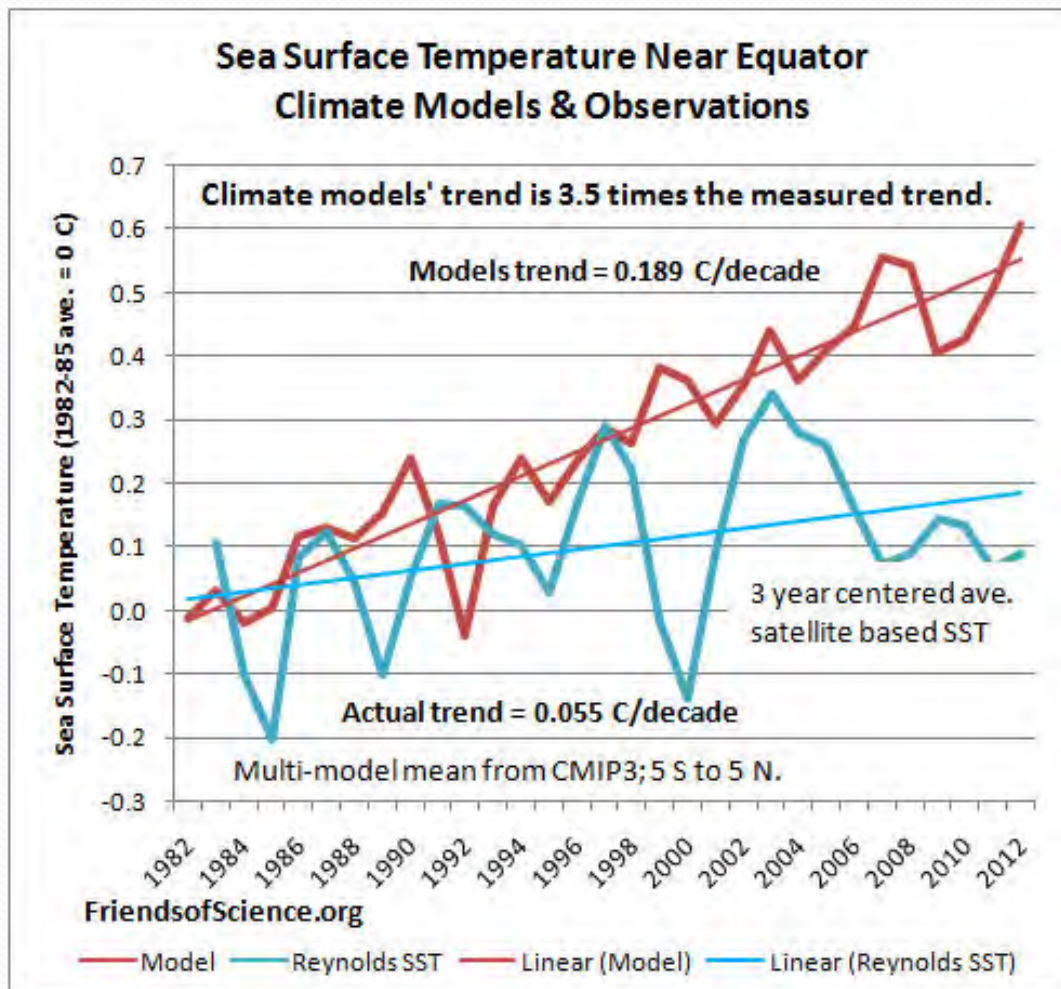
- The greenhouse effect is mainly determined in the upper atmosphere, where water vapor declines.
- Water vapor is 6 times stronger than CO₂.
- Climate models falsely forecast that water vapor increase in the upper atmosphere.
- Declining water vapor allows heat to escape

Tropical Clouds Regulate the Climate



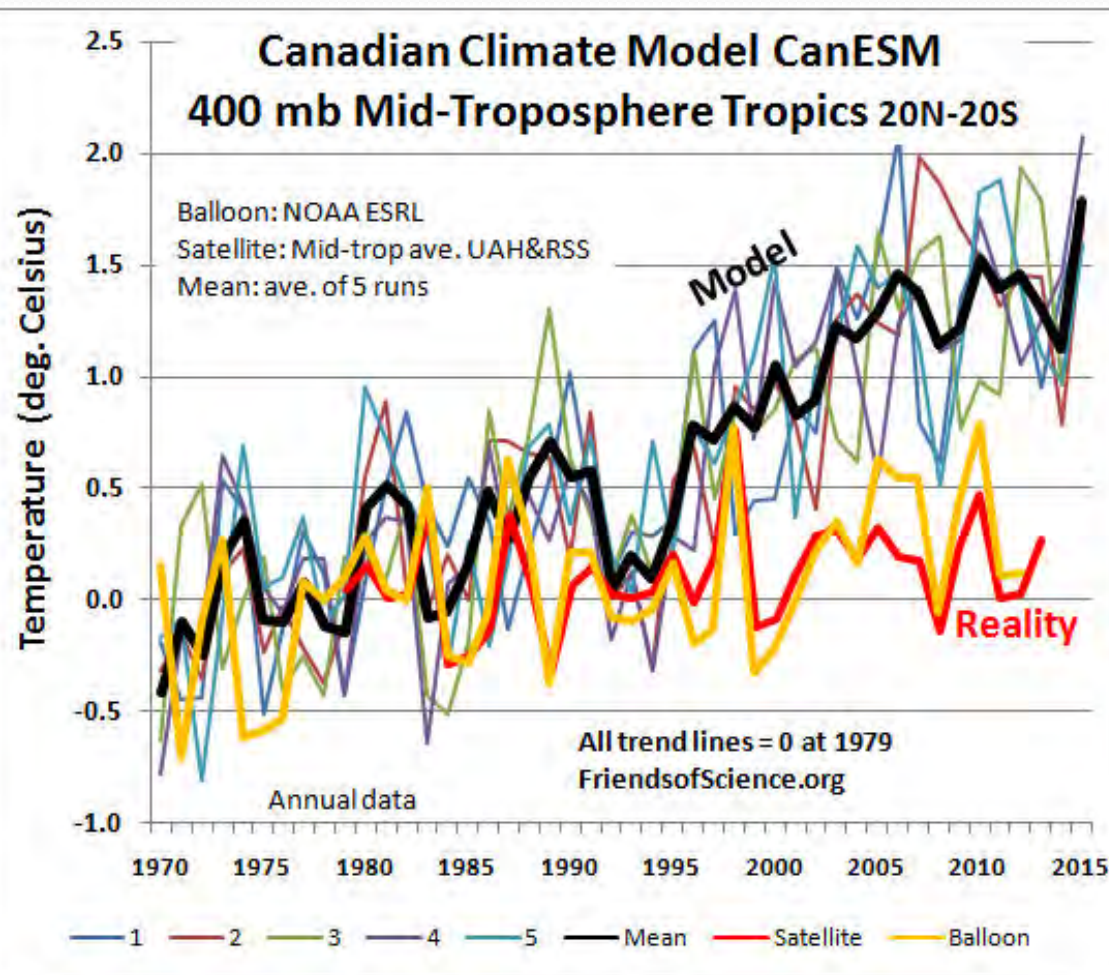
- There are few clouds in the morning.
- Insolation declines 60 W/m^2 between 10:00 AM and noon due to clouds and thunderstorms.
- If it is warmer, clouds form earlier, reflecting more solar energy.

Climate Model Fail in the Tropics



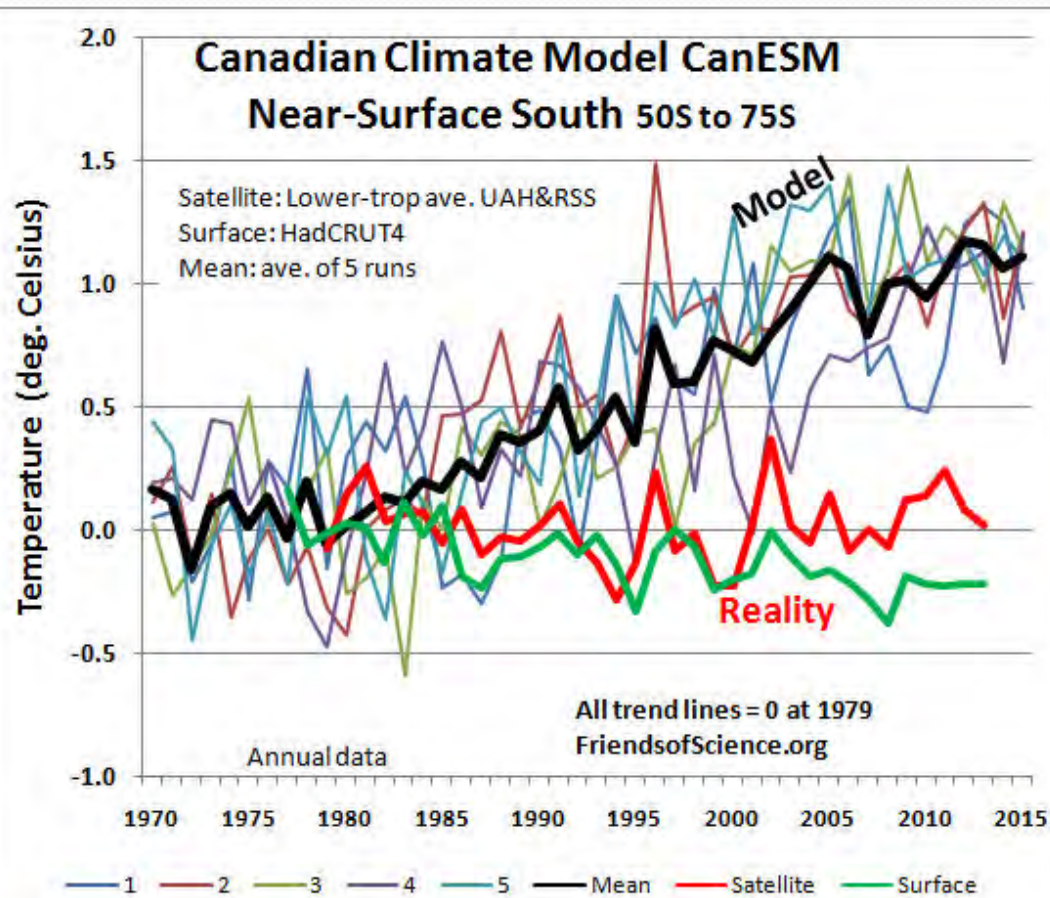
- There is a 3.5 fold discrepancy between temperature trends near the equator.
- Models fail to replicate clouds and thunderstorms behavior.

Canadian Climate Model : World's Worst



No match to measurements because the model does not include natural climate change.

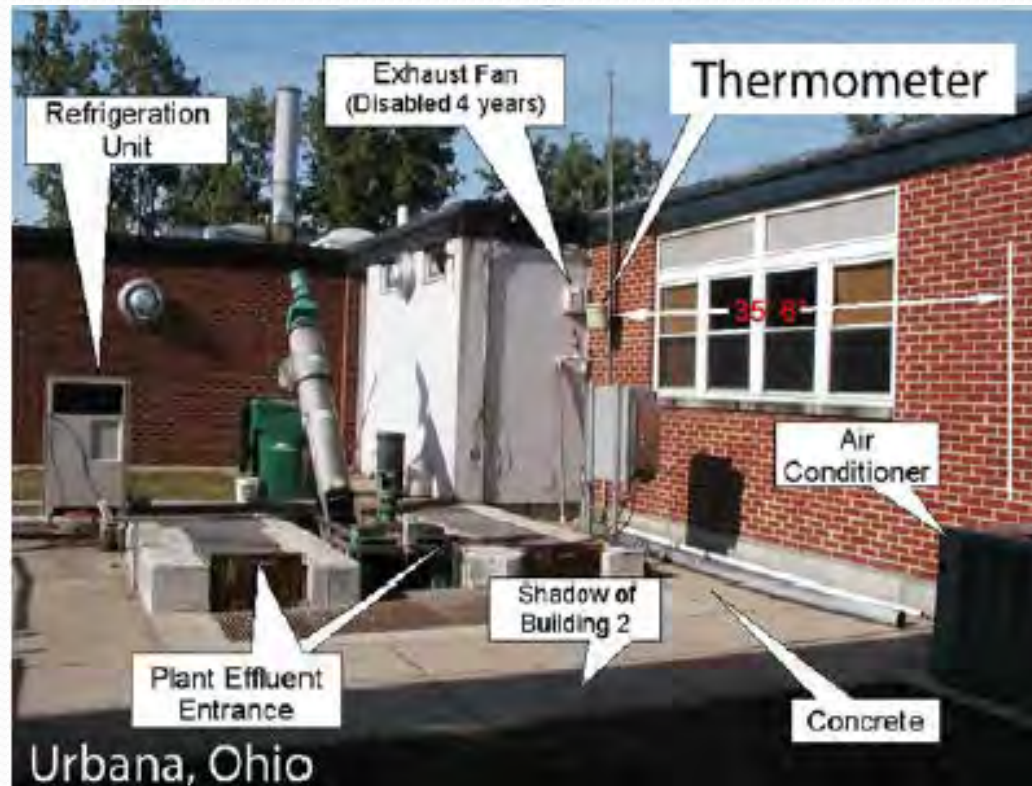
Canadian Climate Model



The model and observations are in opposite directions over a large part of the southern hemisphere.

Urban Heat Island Effect

- Correcting surface temperatures for the UHI effect would reduce the warming trend over land by half.
- In the USA, only 11% of stations are in suitable locations, 69% are within 10 m of an artificial heat source.



Cheap energy from fossil fuels make us wealthy



The Environment is the Best Ever

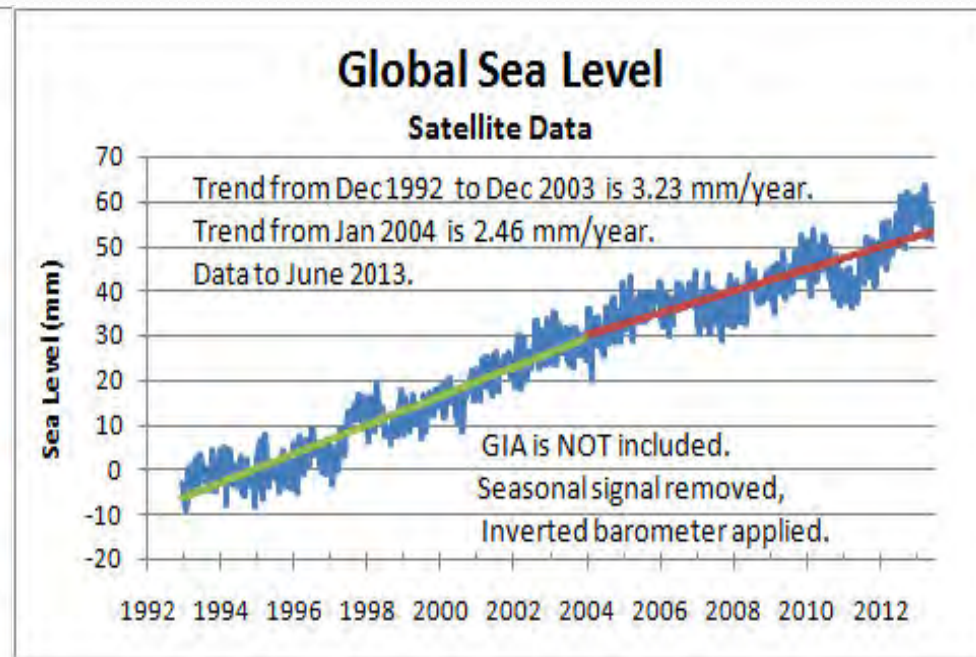
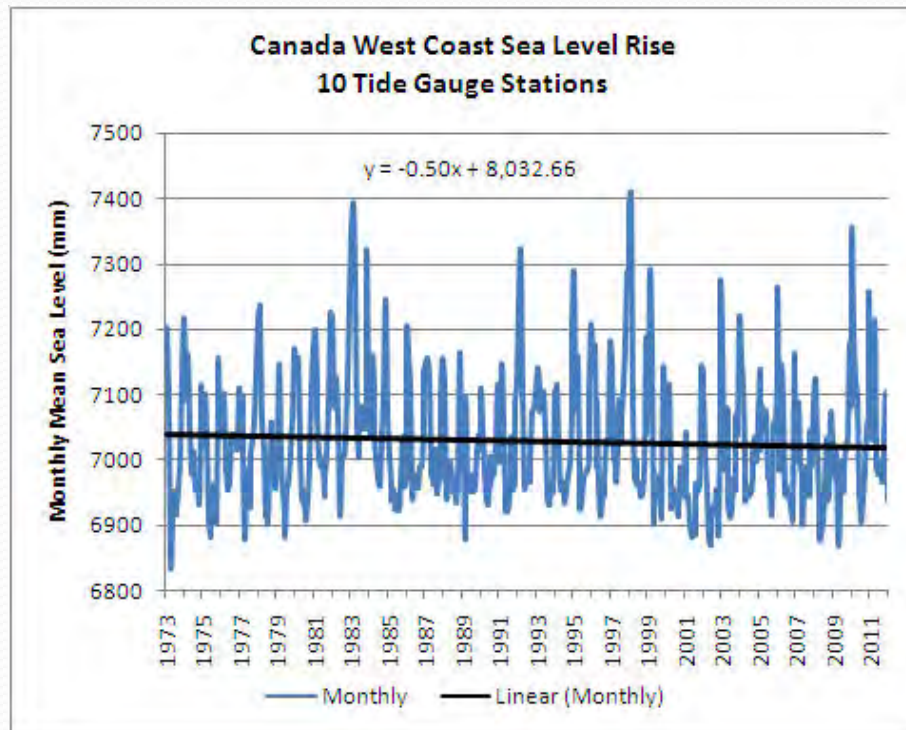
- SO₂ in air has declined by 80% since 1974 in Canada
- NO₂ declined by 60%
- CO declined by 93%
- Particulate emissions PM_{2.5} from coal plants are only 0.4% of total and has no harmful effects on health. All other pollutants are also insignificant.
- CO₂ increases plant growth, not a pollutant.
- People in developing countries die by age 40 from pollution due to lack of fossil fuel-fired electricity.



Spending \$ Trillions to Prevent a Benefit

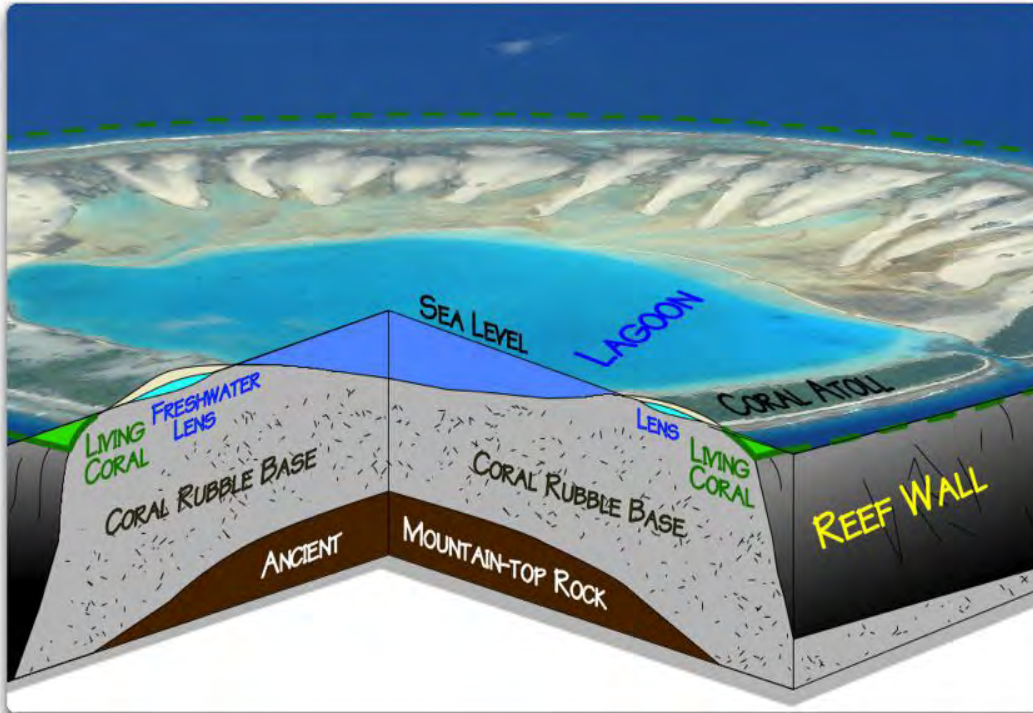
- Cost: World has spent \$1.6 Trillion to end 2012 in renewable investments to reduce CO₂ emissions.
- All was a waste of money that could have been spent to save and improve lives.
- Alleged costs of warming are:
 - Sea Level Rise: Very minor costs
 - Extreme Weather: Getting less extreme
 - Food Shortages: Warming help agriculture
 - Health impacts: Warming is much better that cooling

Sea Level Rise: Little Impact



- No sea level rise on Canada's west coast in 40 years.
- Global sea level rise by satellite data is 2.5 mm/yr before GIA.

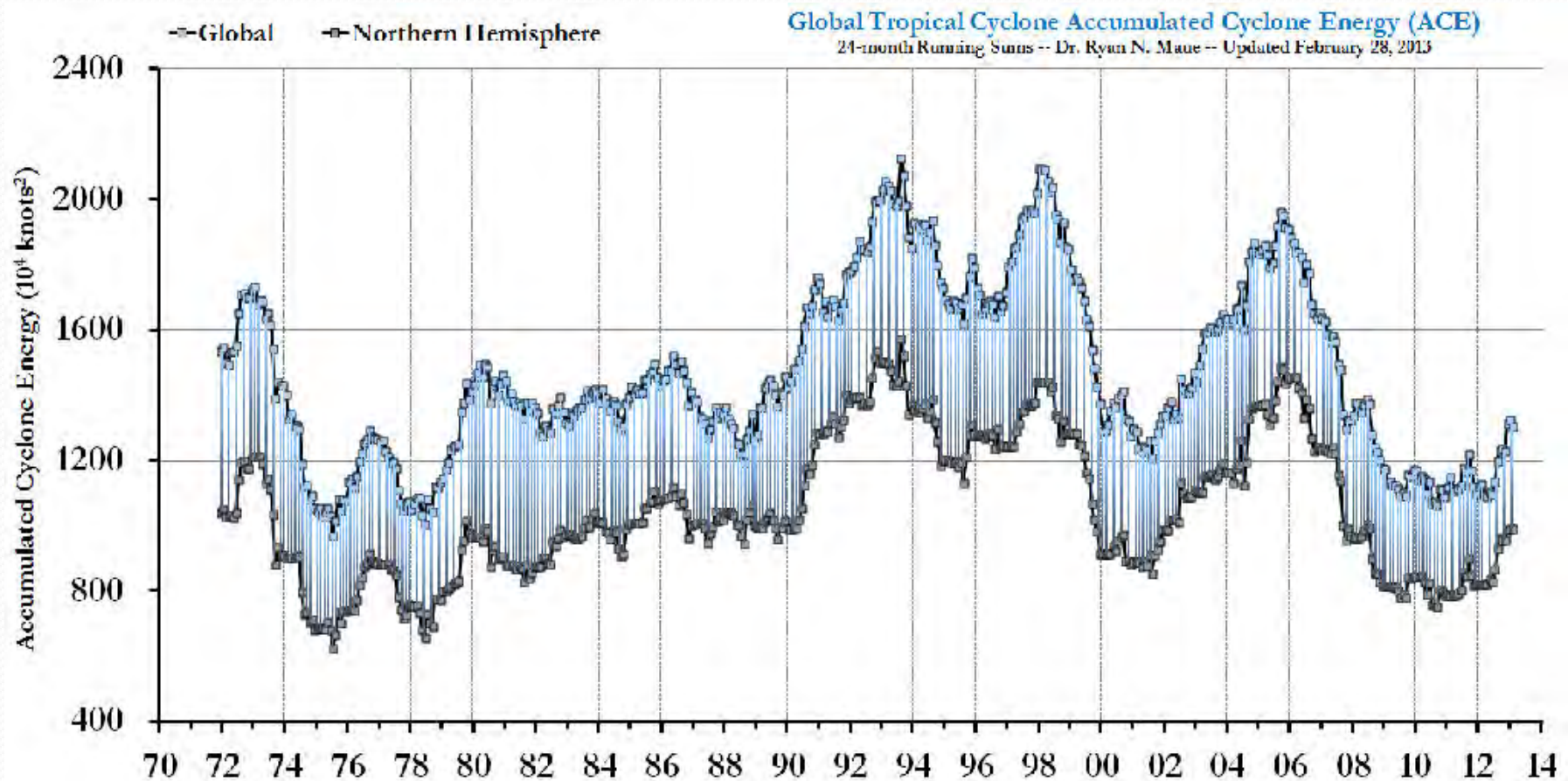
Tropical Coral Islands Not at Risk from SLR



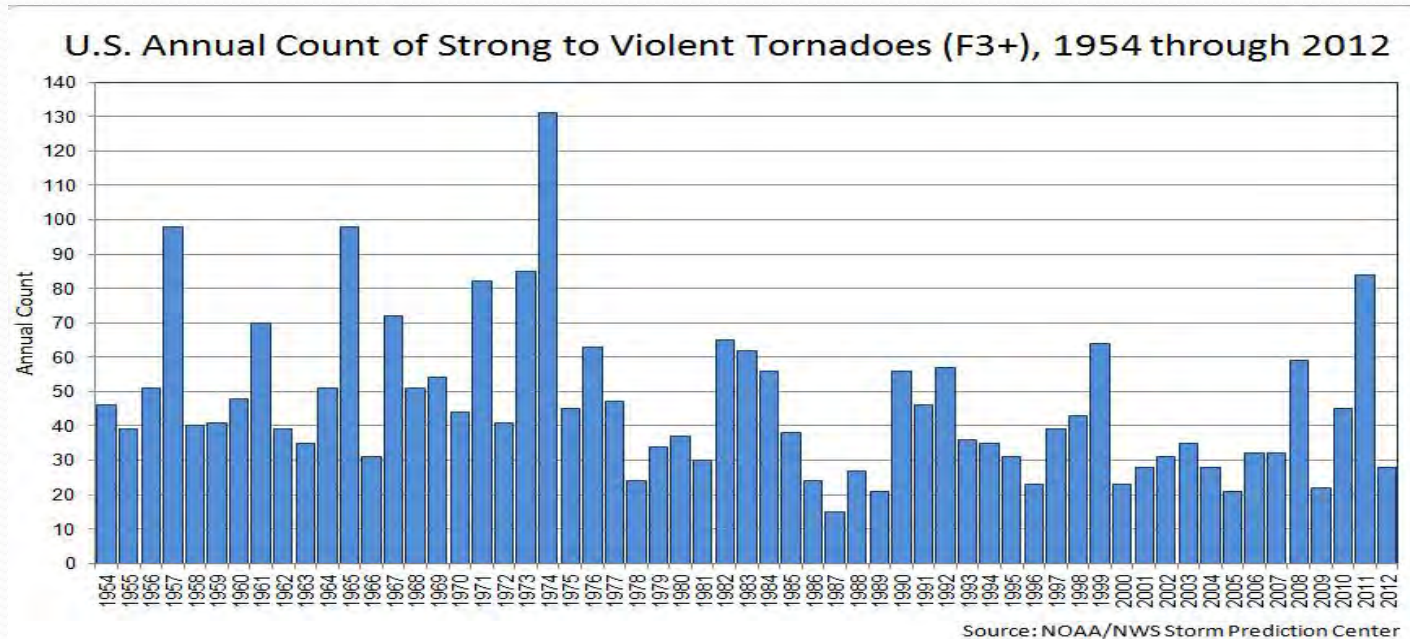
- Tropical coral islands grow as fast as SLR.
- Aerial photos show that 23 of 27 islands grew or stayed the same area since 1950.
- Island atolls rise with sea levels.

Hurricanes: No Relation to Temperature

Hurricane energy had declined 40% since 1998.



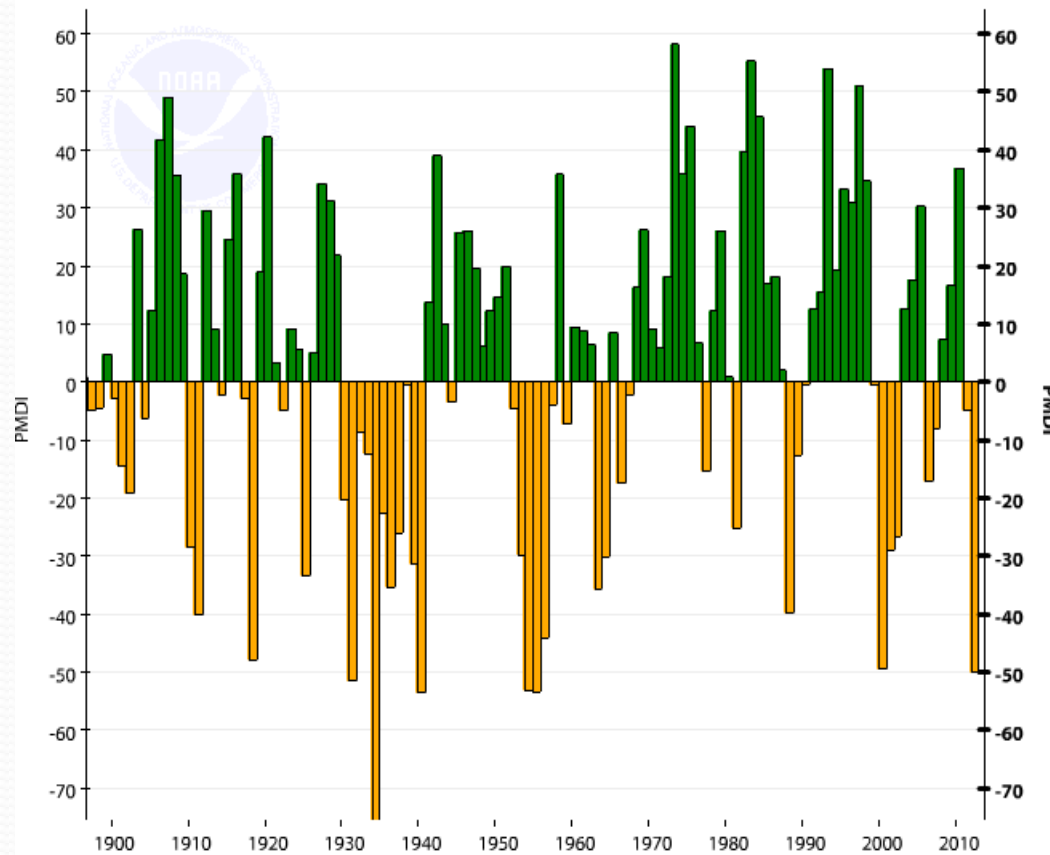
Tornado Trend Declines with Warming



Tornadoes require a cold front colliding with warm air. Northern warming makes tornadoes less likely.

U.S. Drought

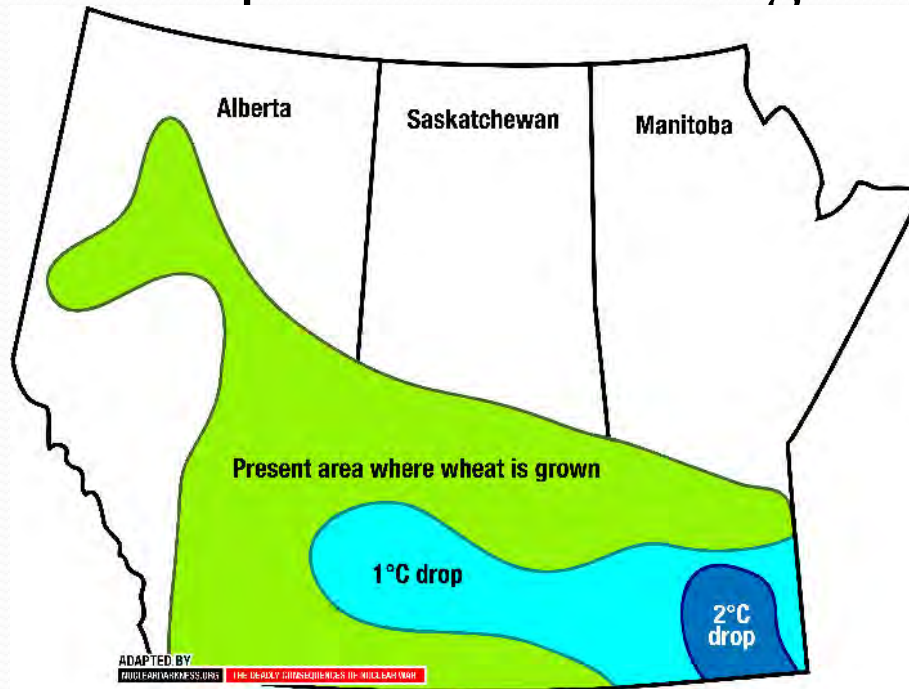
Contiguous U.S., PMDI, January-December



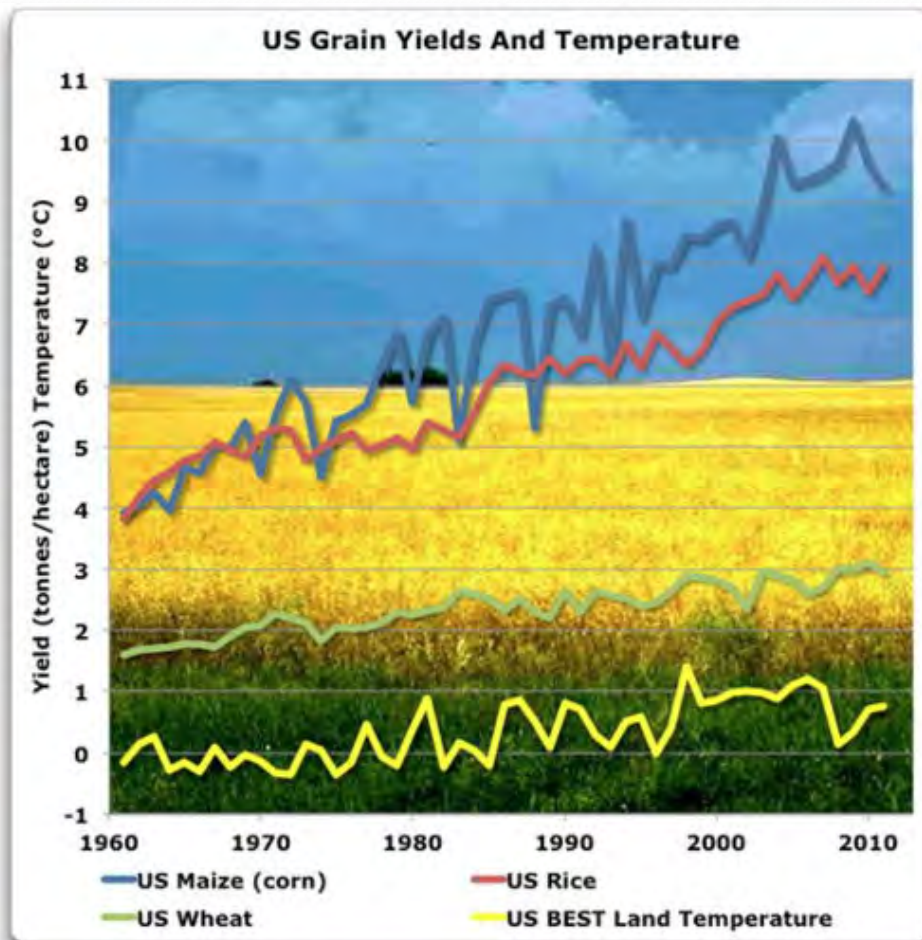
- No correlation of temperature to drought.
- The most severe droughts in U.S. were in the 1930s and 1950s.

1970 Global Cooling: Crop Failures

- 1974 NCAR: “There is mounting evidence that the bad [cold] climate” will lead to “less favorable crop years” and “widespread food shortages”.



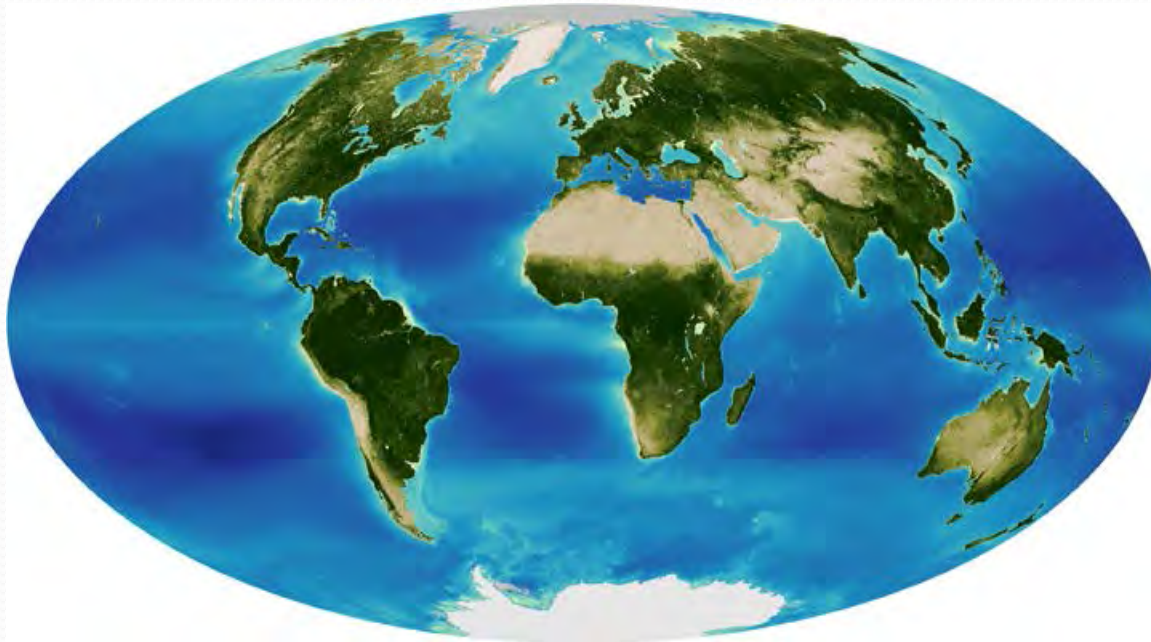
Crop Yields Rise with Temperature and CO2



- US Corn, wheat and rice yields have increased with temperatures.
- Temperature increase of 1 deg. C caused no harm.
- Corn yields up 130% since 1960.
- Warming increases arable area and crop yields.

CO2 Makes Arid Regions Greener

- Satellite images show an 11% increase in foliage of arid regions from CO₂ fertilization from 1982 to 2010 when CO₂ increased by 14%. (May 31, 2013)
- “Trees are re-invading grass lands” due to CO₂ fertilization.
- Sea-viewing Wide Field-of-view-Sensor, or SeaWiFS



CO₂ is Plant Food

- CO₂ increases since 1950 have enhance crop yields by 16%.
- Field experiments show a 50% increase in CO₂ increases wheat yield by 23% in dry conditions.
- A 300 ppm CO₂ increase would raise the productivity of woody plants by about 50%.
- CO₂ fertilization added \$3.2 Trillion to global crop yields 1961 to 2011. Will add \$9.8 Trillion value by 2050.



Canada's GDP = \$1.8 Trillion



Warming Reduces Deaths

- Cold winters kill 100,000 people annually in Europe & Russia.
- In U.K., death records show that a 2 °C temperature rise would decrease deaths by 20,000 in winter and increase deaths by 2,000 in summer. Cold kill 10X as many as heat.
- Last winter, cold weather is blamed for 30,000 deaths.
- In U.S.A, cold kill twice as many as heat.

CO2 Warming is Small and Beneficial

- Sea Level Rise: Small, not accelerating, hasn't caused any problems.
- Extreme Weather: Warming reduces costs.
- Food Shortages: CO₂ fertilization and warming increases crop yields.
- Health: Warming reduces deaths and improved health.
- There is no net social cost, but a benefit.
- **Carbon dioxide is a wonderful by-product of fossil fuel use.**



Climate Policy in Europe

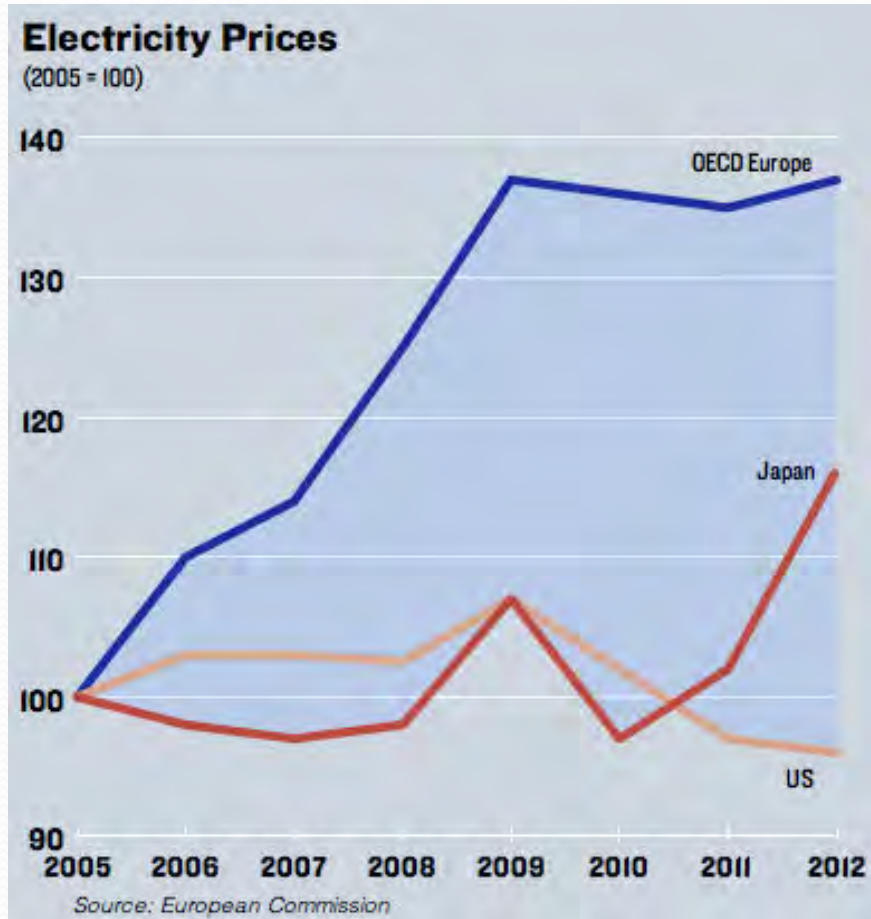
- Dr. Benny Peiser presentation on FoS website.
- Europe pays >1 Billion Euros/day on energy imports
- Germany plans to start-up 18 coal-fired power plants by 2020: 2 in 2012, 6 in 2013, 6 by 2020.
- Renewables cost one trillion euros in two decades.
- In the UK, home heating costs tripled in 8 years.
- 9 million UK families in fuel poverty by 2016.
- EU trading scheme cost \$284 billion for zero benefit.



Wind Power Doesn't Reduce Fuel Usage

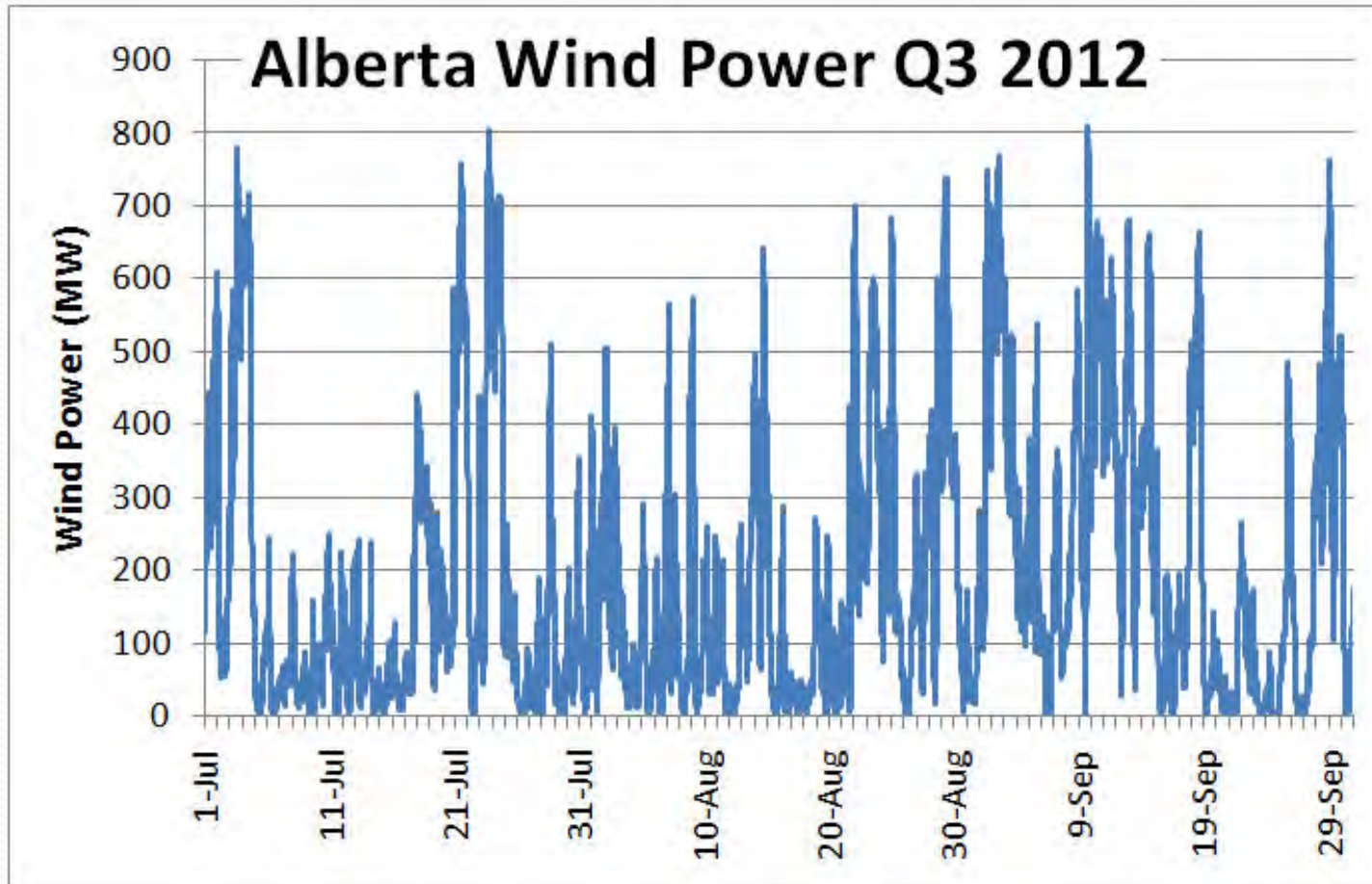
- Studies for the Netherlands and U.K.; wind power causes extra fuel usages compared to gas turbines.
- Cycling of back-up generators reduces efficiency
- Replacement of efficient generators with low-efficiency fast reacting open-cycle gas turbines (OCGT).
- OCGT consumes 69% more fuel than CCGT.
- If wind capacity is small, extra wind power will cause a small fuel savings.

Europe Electricity Prices



- Europe's electricity prices have increased by 37% from 2005 due to the rush to renewables.

Alberta Wind Power – Extreme Variability



Average Q3 2012 total demand = 8415 MW.

Alberta School Boards Buy Wind



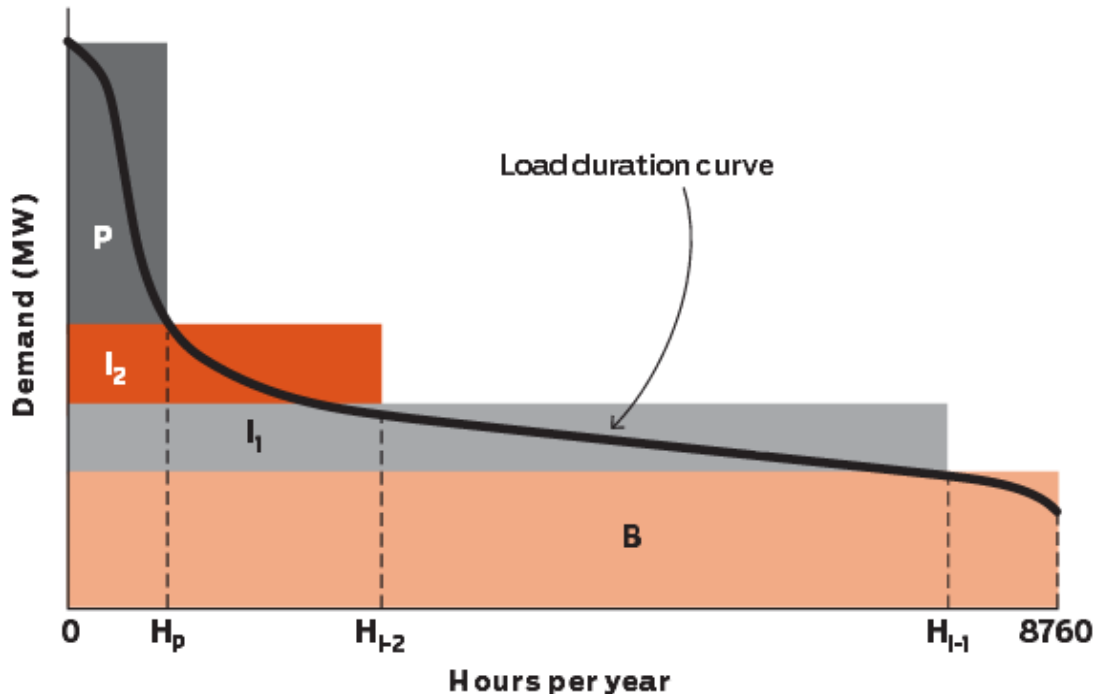
- 25 year wind power purchase deal with BluEarth Renewables, Inc.
- BluEarth says “wind is free!” but it is very expensive
- UK on-shore windfarms produce 11% of rated power at age 15 years.
- Most operate 12 – 15 years.
- Wind power is least available when demand is greatest.
- Wind is variable, imposing large costs on conventional generators.
- Windmills are dangerous
- Windmills kill millions of birds.



Ontario Wind Power

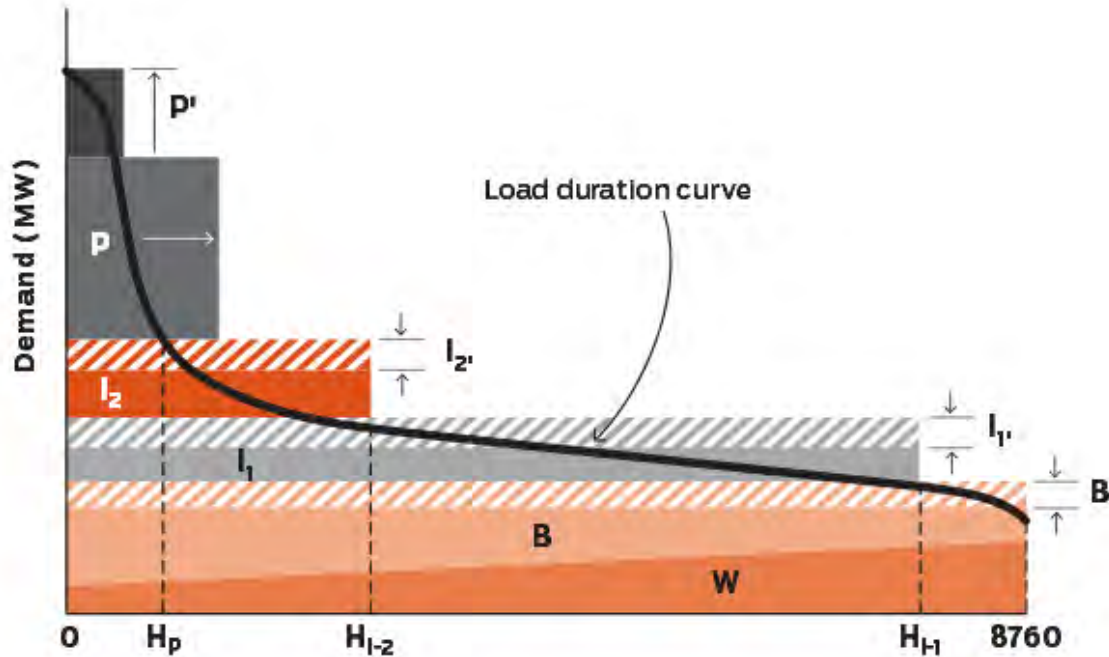
- Wholesale electricity price 2.8 ¢/kWh. Retail electrical power costs 11.5¢/kWh (Sept. 2013)
- Ontario pays wind farms NOT to produce.
- 80% of wind power is sold at a loss.
- Contracted for another 4,300 MW wind power. Will pay them not to produce.

How Does Wind Affect Power Costs?



- Peaking plants have high operating costs.
- Value of power depends on ability to supply when needed.
- Wind farms reduce market prices when wind blows.
- Wind power is very diffuse, unreliable.

Wind: More High-cost Peak Generations.



- Low prices when wind blows reduces base plant returns.
- More high-cost peaking plants required.
- Overall prices increase.

Wind power results in less low-cost, more high-cost conventional power.



Why is Wind so Expensive?

- U.K. targets require £120 billion for wind turbines, including back-up.
- The same power from gas-fired plants would cost £13 billion.
- Wind is 9 times more expensive.
- Wind power storage is impractical
- Needs 100% back-up
- Generates 10 – 20% of capacity
- Imposes costs on conventional generators
- Intermittent and unreliable
- Life 10 – 15 years, not 25 years.

Neodymium Miners: China's Wind Victims



- Rare metal for the wind turbine magnets cause devastated farmland and ruined people's health.
- six-mile-wide toxic lake in Baotou, China

Wind Turbines Kill Birds and Bats



- Windfarms kill 1.5 million birds and bats annually in the USA.
- In Altmont Pass, Calif., 4000 birds killed annually.
- In Wolfe Island facility, Kingston, Ontario, reported 602 bird and 1,270 bat fatalities.
- Half of bat fatalities caused by direct blade contact, half by exploding lungs due to rapid pressure decline.

Friends of Science

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