

HONR 229L: Climate Change: Science, Economics, and Governance

Discussion #6: Roadmaps for Success or Failure

Ross Salawitch

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Class Web Site: <http://www.atmos.umd.edu/~rjs/class/honr229L>

ELMS Page: <https://myelms.umd.edu/courses/1269254>



<http://www.mattmcwilliams.com/wp-content/uploads/2013/08/failure-success-road.jpg>

19 September 2019

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AT 5, Q 1: Describe the geography and diverse habitat of China, and relate the geography and diverse habitat of China to the themes of Diamond's book.

China is an immense country, both in terms of actual size and diversity of habitats within its borders. China contains geographical features ranging from glaciers to deserts, and from plateaus to mountains. Jared Diamond's book focuses on how environmental sustainability is necessary to prevent societal collapse, so **China's incredibly diverse geography allows for plenty of opportunities to analyze their treatment of the ecosystem ... this chapter allows for a broader sense of the impacts of climate change and environmental destruction.**

China's 26 provinces span almost 10 million kilometers of land which contain diverse geography, including high mountain ranges, rivers, lakes, coastlines, and wetlands. Additionally, the climate in China varies in the north versus the south in regard to rainfall, wind, and droughts. Various habitats exist such as **rainforests, glaciers, grasslands and deserts.** This variance relates to the themes of Diamonds book because they are another example of a society intertwined with many others via globalization that are facing vast environmental issues while also trying to preserve resources and change their ways.

China can be viewed as a microcosm of the world. Or perhaps a macrocosm, given its size.

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AT 5, Q 2: It is widely known that the government of China had implemented rather strict measures to limit population growth. Less widely known is the evolution of the China's households during the time of low population growth.

Describe the evolution of China's households and the impact on society and the environment.

The Chinese government instituted a mandatory fertility control that decreased population growth but did not stop the growth of households. As a result of the fertility control and **social changes**, household size (how many people are in the family) decreased but the **number of households** (how many families there are) continued to **increase rapidly**. At the same time, house sizes tripled. More families and bigger houses lead to the clearing of more land (deforestation) to build more houses. It also leads to the growth of cities, increasing number of cars that contribute to air pollution, etc.

Combined, the increasing number of families and the building of bigger houses makes China have a huge human impact on the environment despite having low population growth.

The expansion of household area has indeed created considerable stress on the environment via the associated construction, demand for materials, goods and services, etc.

While population control is “part of the climate change solution”, other factors such as lifestyle and prosperity are often more important considerations.

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AT 5, Q 3: Diamond quotes impressive statistics on the scale and growth of China's economy. But behind this growth lurks the fact that much of it is based on _____ ?

By this statement, Diamond is saying that China is currently using poor technology in their quest to become a first world country and this poor technology is making things harder for China and could potentially have damaging effects for the rest of the world via the spread of pollution. As mentioned in the book, China is extremely inefficient in their production of many different goods. For example, the production of paper in China requires twice as much water as in the first world and the production of coal (the main source of energy in China) requires 42 times more water the production of natural-gas-based anomia in the first world. Thus, Diamond implies that is important for China to become more energy efficient as they attempt to become a first world country in order to preserve their own resources and to prevent unnecessary pollution of the Earth. While it is especially important for China to become energy efficient as they account for one-fifth of the world population, this same sentiment can be applied to the entirety of the Earth and as a general theme of this class. If there is a simple way to make a process more energy efficient and healthier for the environment, we must work to do this to do our part to preserve the environment as best we can for future generations to come.

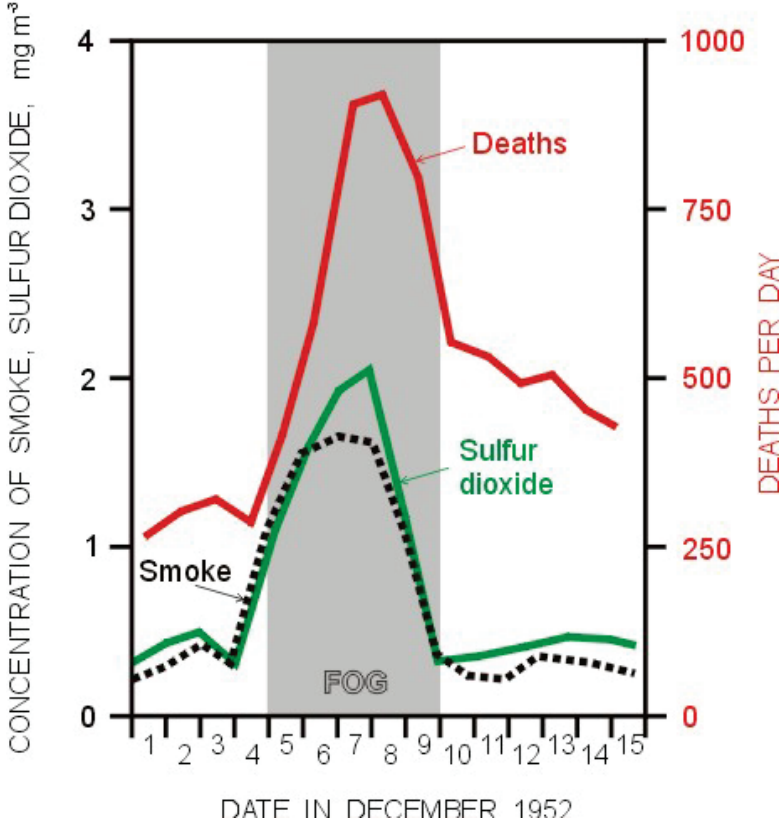
Fortunately China is now much better with respect to the technology it employs:

<https://www.iea.org/policiesandmeasures/energyefficiency/?country=China>

with respect to the technology it employs. Believe it or not, the early technology used in China was better in terms of efficiency and environmental havoc as that used during the same stage of development in Europe and the US, despite what was written in the book.

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Many thousands of deaths attributed to London Smog of 1952:



<http://www.ems.psu.edu/~lno/Meteo437/Smoglond.jpg>

<http://www.nickelinthemachine.com/wordpress/wp-content/uploads/smog-d.jpg>

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) Smog Deaths In 1948 Led To Clean Air Laws • 3:38

ANN MURRAY

Sixty years ago, an environmental disaster in southwestern Pennsylvania shocked the country. It forever changed the way Americans think about industrial pollution and their health.

On Oct. 27, 1948, the people of Donora, Pa., woke up to a thick yellow blanket of smog. Charles Stacey, who was a senior at the local high school then, remembers his walk to class that day.

"The smog created a burning sensation in your throat and eyes and nose, but we still thought that was just normal for Donora," Stacey says.

Back then, smog often hung on until late morning in Donora, a small mill town about 25 miles south of Pittsburgh. The town's zinc plant and steel mill belched out endless streams of toxic smoke.



The mill town of Donora, Pa., seen Jan. 1, 1948. On Oct. 27 of that year, a smoky, lethal smog killed 20 people. The air was polluted by local steel plants, railroad yards and zinc works.

Alfred Eisenstaedt/Time & Life Pictures/Getty Images

<https://www.npr.org/templates/story/story.php?storyId=103359330>

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AT 5, Q 4: Using the book as a starting point and supplementing based on your own short internet-based research, briefly summarize some promising signs emerging from China during its rapid growth phase.

In 2013, the government released its first "Air Pollution Prevention Plan" that required cities like Beijing to reduce air pollution by 33%, and in 2018 launched its second plan to reduce air pollutions even further.

China *banned types of TVEs* (township and village enterprise) which were polluting at a rate much higher than that of other types of businesses. ... More recently, China has enacted The Green Building Action Plan, along with other governmental policies, seek to improve energy efficiency in residential and commercial buildings.

China announced their "Made in China 2025" program, aiming to modernize their manufacturing process in ten years. China is such a global player in terms of trade, this is a good step in reducing air emissions, improving air quality, and becoming more economically efficient.

China committed to improving their impact on the environment in 2019 (back in the *Central Economic Work Conference* in 2018). They did this in large part by condemning old, inefficient factories such as the Hengshui Baili Rubber Products Co.'s outdated rubber factory. Their goal is to remain uncompromising on their standard of economic growth, while also bringing their standards of environmental protection up to a comparable level.

China is starting to make a big effort to protect its environment including policies for reforestation, such as giving subsidies to farmers who convert cropland to forest land.

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China is actually the owner of half of the world's electric cars and the **owner of 99% of electric buses**, which all compounds on the number of promising signs of hope for China and the world, as the actions taken by China magnify and cause great impact around the whole world.

Another promising sign is that **China phased out lead in their gasoline within a year**. It took Europe and the U.S multiple years in order to accomplish this.

China has reduced their use of coal ... Beijing's air quality has improved with the closure of some coal-reliant plants in the major city. China is also building more wind and solar energy-reliant power plants in place of new coal power plants.

China has been instituting policies to clean up its air pollution; **one example from March 2019 saw Beijing's sulfur dioxide levels reduced by 70% and particle pollution reduced by 36%** <https://www.theguardian.com/environment/2019/mar/14/pollutionwatch-china-shows-how-political-will-can-take-on-air-pollution>

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In 2017 China invested in 8,000 water clean-up projects (worth a total of \$100 billion) to improve water quality. China has recently switched more of their energy source from coal to natural gas, which has less CO₂ emissions. An air purification tower was built in Xian, China, which works by drawing in air and passing it through greenhouses and multiple filters.

China has joined the WTO (World Trade Organization) which has environmental restrictions and has also made massive investments into renewable energy in recent years. They are the **world's largest consumer of solar energy**, and have some of the largest wind farms in the world.

President Obama and President Xi of China have both agreed to enter into the Paris Agreement, an international agreement of a large majority of the world's countries to curb greenhouse gas emissions. While the U.S. has since planned to leave the agreement, it appears. **China will remain in the agreement and will work with other countries to attempt to curb their greenhouse gas emissions.**

Ultimately, government pressure on private industry to innovate environmentally friendly solutions and widespread policy changes to limit environmental destruction has positioned China as an international leader for climate action.

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This past January, the Chinese government passed the *Soil Pollution Prevention and Control Law* to *prevent soil erosion*, one of the biggest environmental challenges that China faces.

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Roadmaps for Success or Failure: Last Word

Peter Marx

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Roadmaps for Success or Failure: Last Word

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First Learning Enrichment Event

Event: [Carbontech on the Hill](#)

Date: Thurs, September 26 Time: 4:30 to 7:30 pm

Location: U.S. Capitol Visitor Center, First St NE, HVC 201, Washington, DC 20515

Speakers: Dr. Marcius Extavour, Carbon XPRIZE, Roxanne Brown, United Steelworkers, and John Litynski, U.S. Department of Energy

Website: <https://www.eventbrite.com/e/carbontech-on-the-hill-registration-70805843183?aff=ebdssbdestsearch>

All non-congressional attendees must be registered.

Third Way, Carbon180, and XPRIZE are excited to host the second annual “Carbontech on the Hill” event, which brings together carbontech innovators from across the country to share their work and progress toward building a new carbon economy.

From jet fuel to plastics and building materials, the carbontech sector is turning the carbon equation on its head; helping to create a world where we remove more carbon than we emit. Not only is the carbontech sector good for climate, it can create and preserve high-paying jobs and secure U.S. leadership in lucrative new industries.

Please join us for a briefing where we’ll explore the tremendous opportunity for carbontech in the United States, and what it could mean for American businesses, workers, and climate efforts.

Sponsors: [Third Way](#), [Carbon180](#), and [XPRIZE](#)

<https://www.thirdway.org/about>

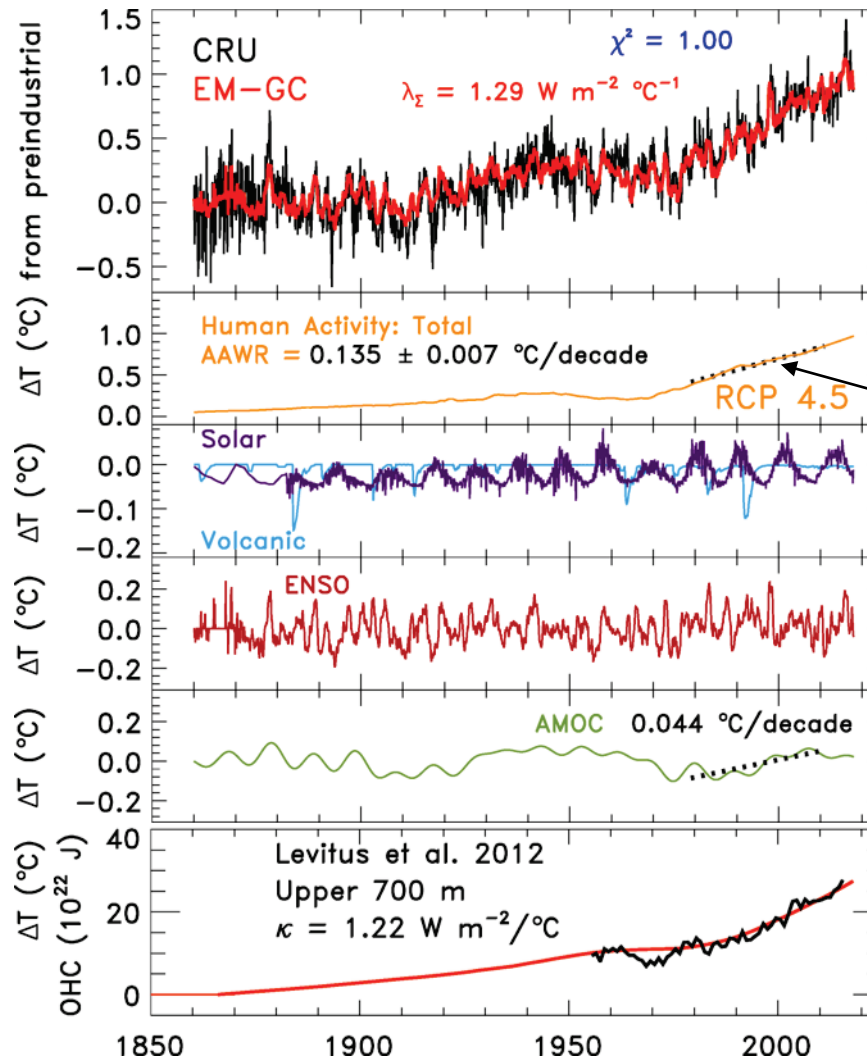
<https://carbon180.org>

<https://www.xprize.org/prizes/carbon>

If you would like to attend, please register! Can find this link on the class website I maintain.

Diamond states “the commonest circumstance under which societies fail to perceive a problem is when it takes the form of a slow trend concealed by wide up-and-down fluctuations”

Detailed model of effects on global temperature of variations in solar output, major volcanic eruptions, natural events such as ENSO and variations in the strength of the Atlantic Meridional Overturning Circulation (AMOC), as well as human activity shows close quantitative agreement between modeled and measured rise in global temperature



Top panel:
RED is model
BLACK is data

AAWR: Attributable
Anthropogenic
Warming Rate

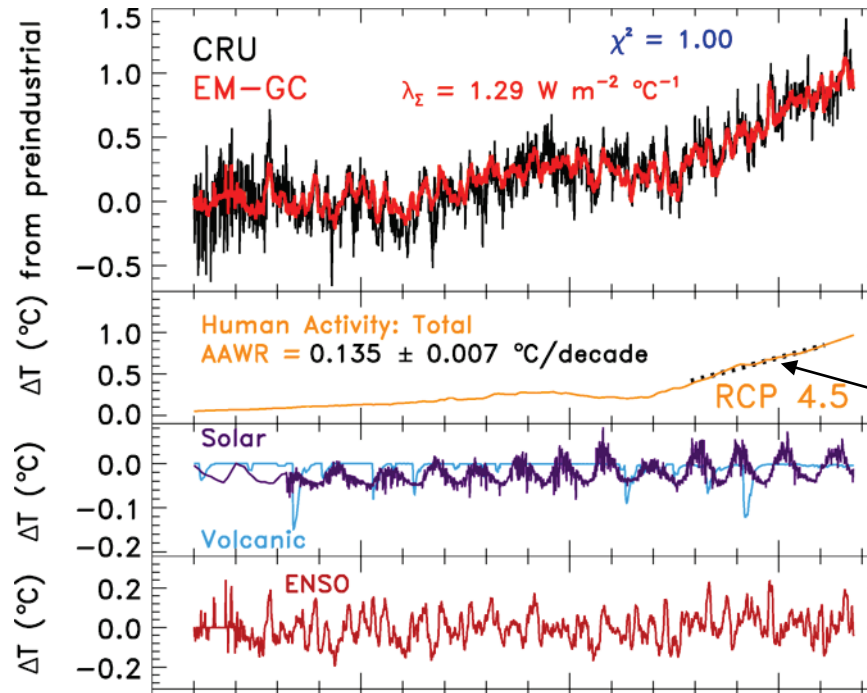
AAWR is found from the
slope of the black
dotted line

AAWR = $0.109 \pm 0.01 \text{ }^\circ\text{C/decade}$

Figure 3.3 of 2017 US National Climate Assessment Report <https://science2017.globalchange.gov> is based on results from the University of Maryland Empirical Model of Global Climate (EM-GC)

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Does anyone remember the numerical value for global warming given in the reading ?

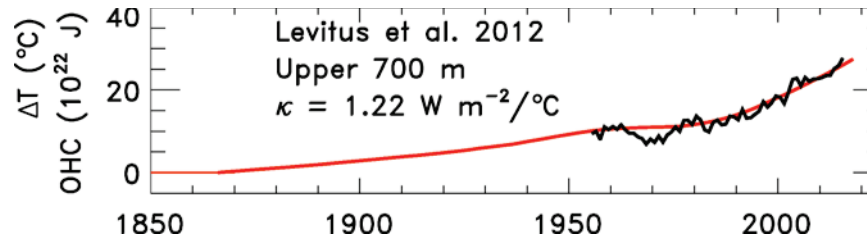
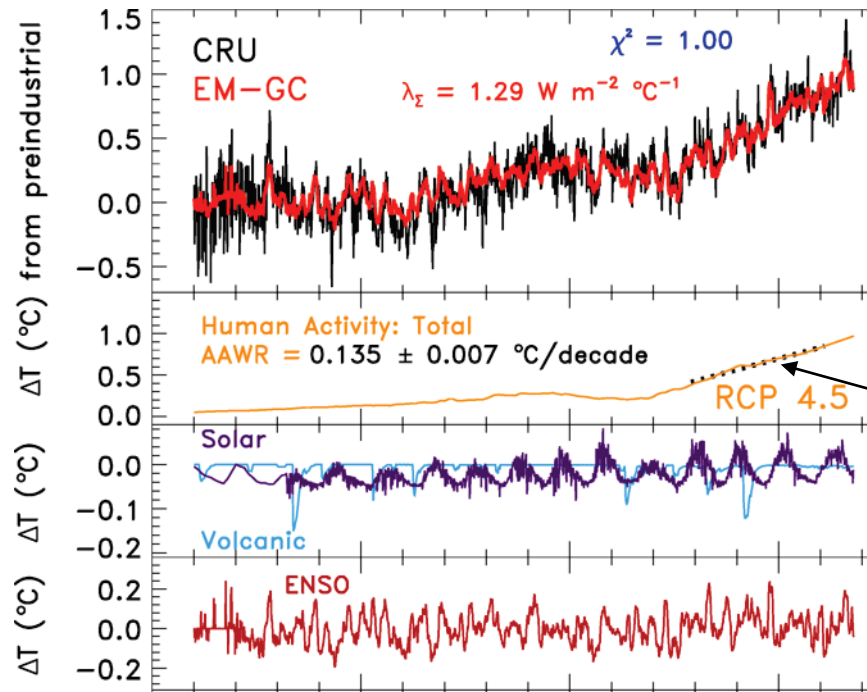


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“It has taken a long time to discern the average upwards trend of 0.01 degree per year within that noisy signal”

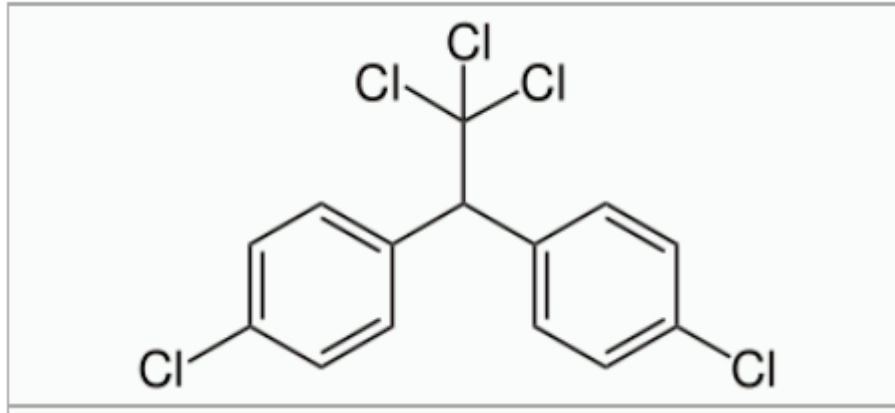
pg 425

Figure 3.3 of 2017 US National Climate Assessment Report <https://science2017.globalchange.gov> is based on results from the University of Maryland Empirical Model of Global Climate (EM-GC)

What was the world's first modern, global environmental crisis?

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DDT : dichloro-diphenyl-trichloro-ethane



As early as the 1940s, scientists in the U.S. had begun expressing concern over possible hazards associated with DDT, and in the 1950s the government began tightening some of the regulations governing its use.[18] However, these early events received little attention, and it was not until 1957, when the New York Times reported an unsuccessful struggle to restrict DDT use in Nassau County, New York, that the issue came to the attention of the popular naturalist-author, **Rachel Carson**. William Shawn, editor of The New Yorker, urged her to write a piece on the subject, which developed into her famous book **Silent Spring**, published in 1962. The book argued that pesticides, including DDT, were poisoning both wildlife and the environment and were also endangering human health. **Silent Spring** was a best seller, and public reaction to it **launched the modern environmental movement in the United States**.

<https://en.wikipedia.org/wiki/DDT>

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DDT : dichloro-diphenyl-trichloro-ethane



Bald eagles found dead and studied for pesticide residue in 1963, soon after the debut of *Silent Spring*. As national icons, their fall in numbers was worrisome. Carson blamed DDT. (Seney Natural History Association/CC BY)

<http://policu.com/cms/?p=346>

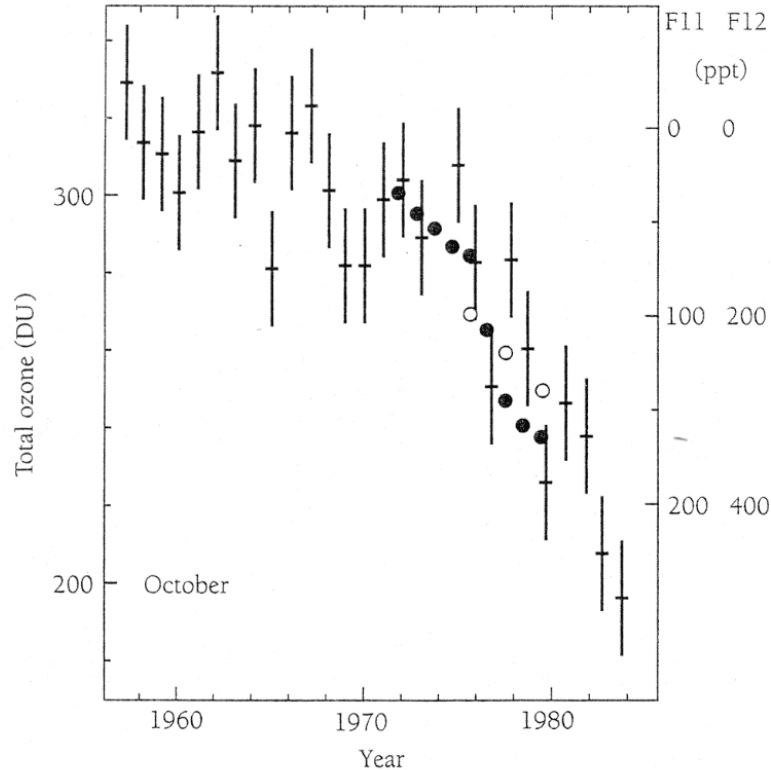
What was the world's second modern, global environmental crisis?

<http://policu.com/cms/?p=346>

What was the world's second modern, global environmental crisis?

Antarctic Ozone Hole

Halley Bay (76°S)
October Mean

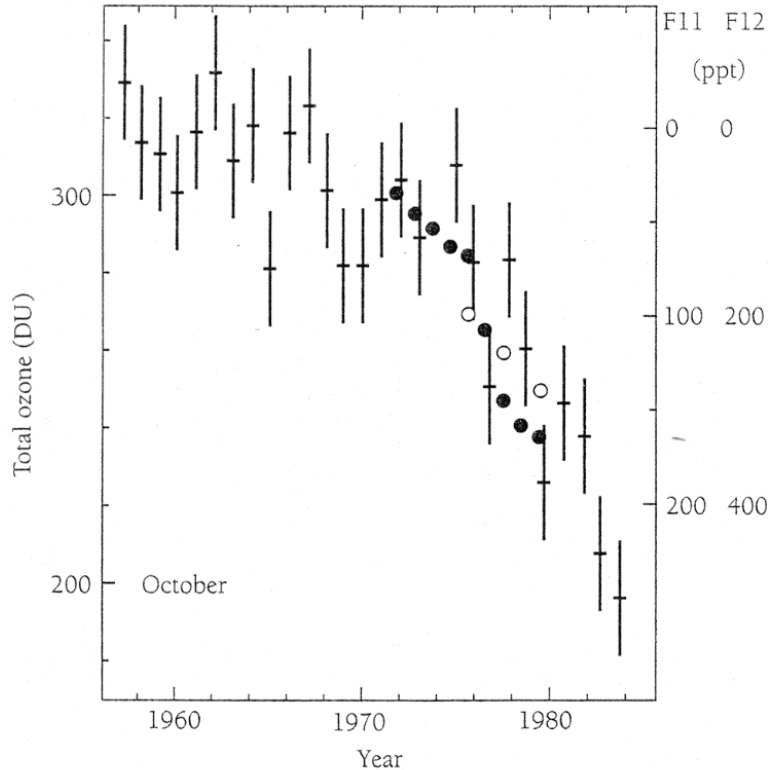


Farman *et al.*, Large losses of total ozone in Antarctica reveal seasonal ClO_x/NO_x interaction, *Nature*, 315, 207, 1985.

What was the world's second modern, global environmental crisis?

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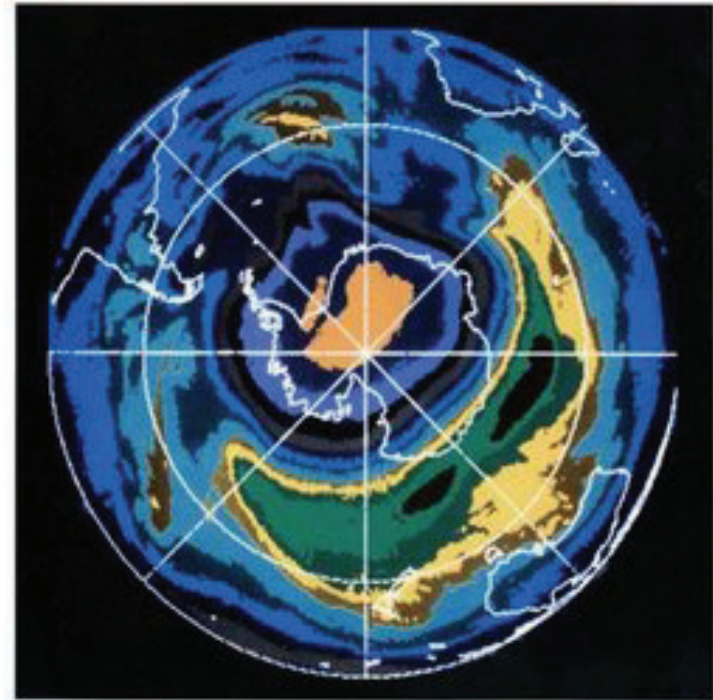
Halley Bay (76°S)
October Mean



SCIENTIFIC AMERICAN

JANUARY 1988
\$2.50

*Killer cells fight disease by drilling holes in their targets.
Coming soon: a radio telescope 5,000 miles wide to probe the cosmos.
When the tide ebbs, some fishes crawl and breathe air to survive.*

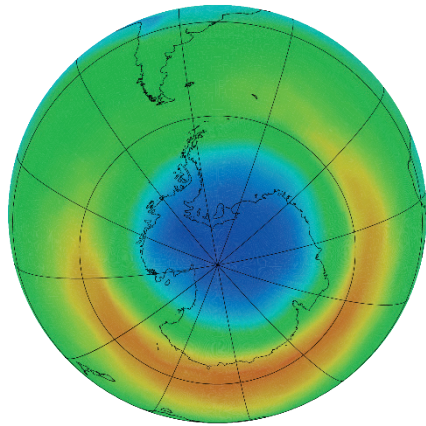


Ozone Hole over Antarctica. Does it mean the stratospheric layer that screens out dangerous solar ultraviolet rays is in jeopardy?

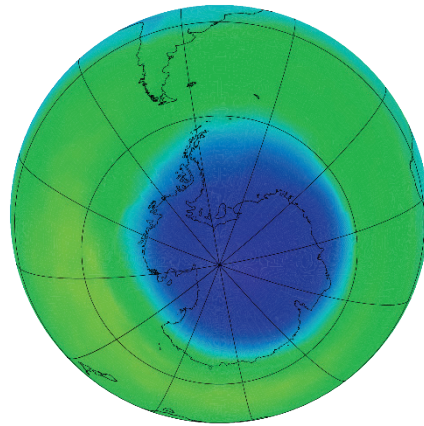
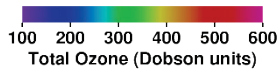
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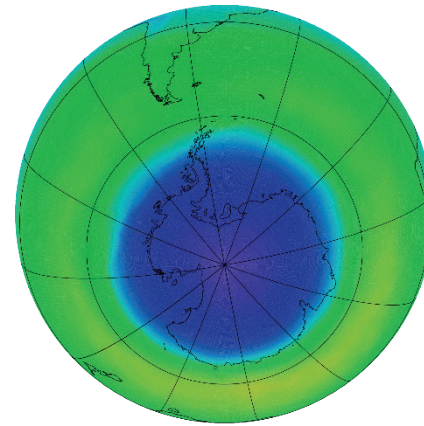
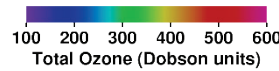
What was the world's second modern, global environmental crisis?



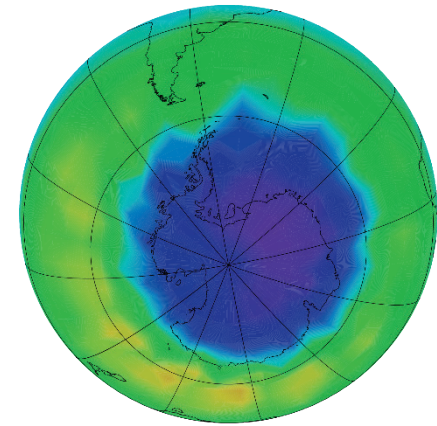
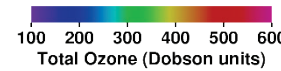
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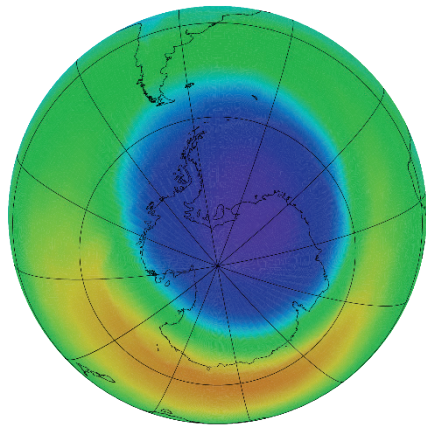
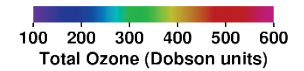
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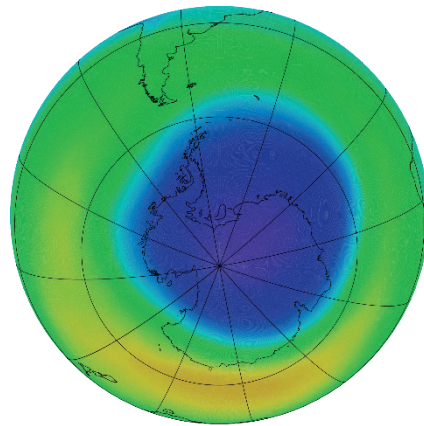
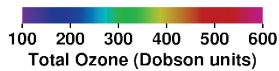
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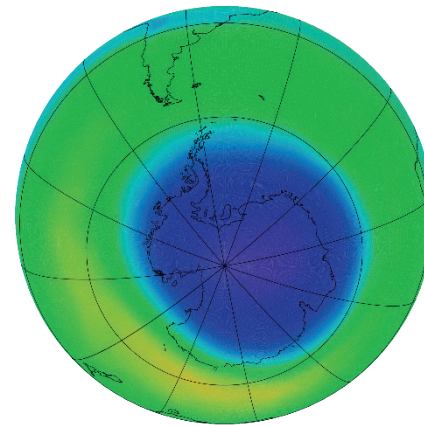
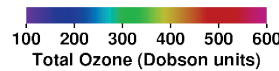
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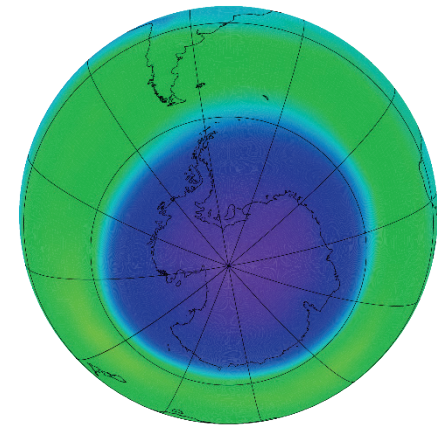
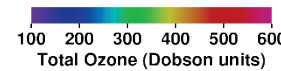
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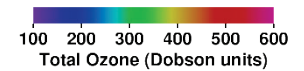
October 2005



October 2010



October 2015



Climate change is the world's third global environmental crisis.
How can we combat “creeping normalcy”?

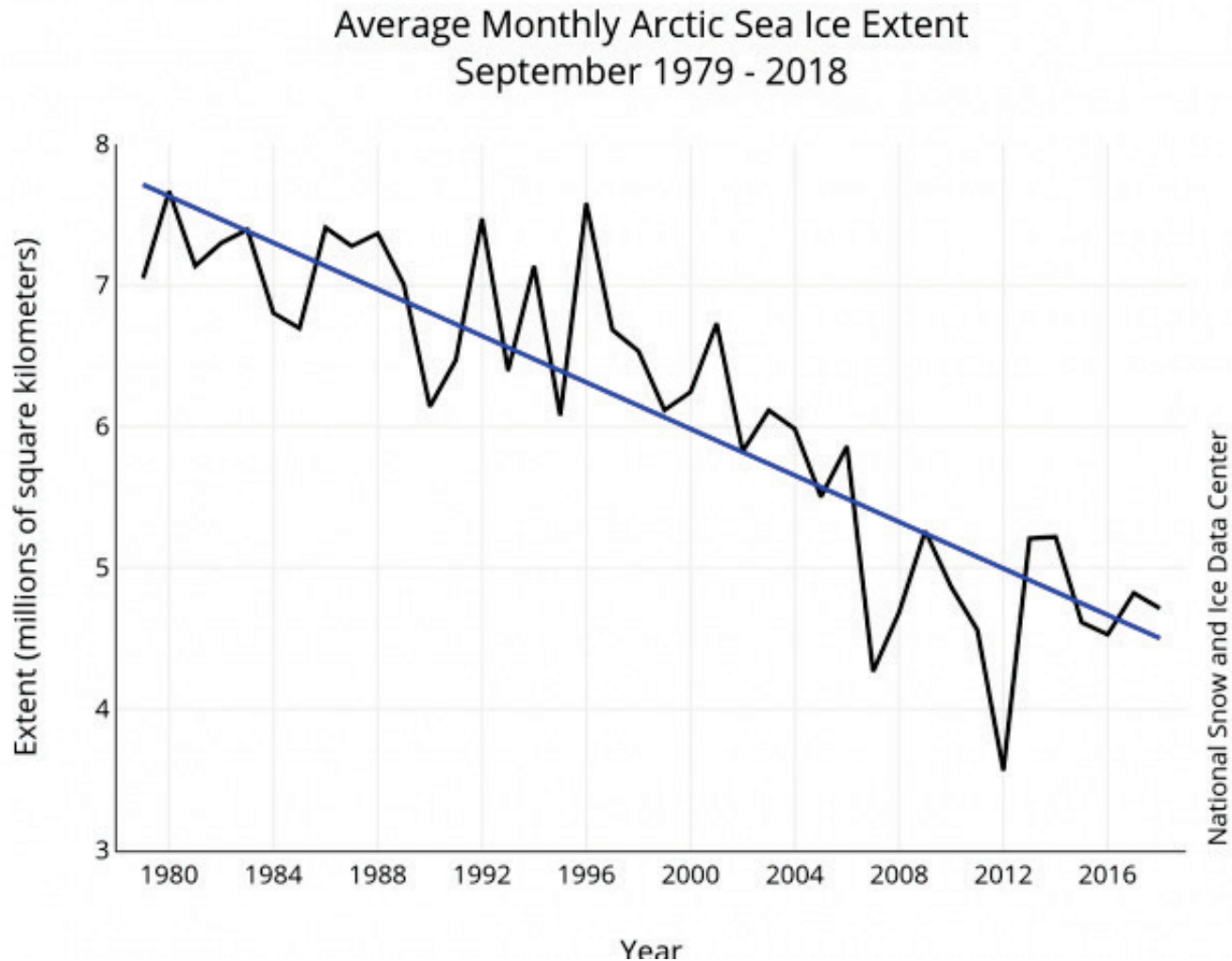
Climate change is the world's third global environmental crisis.
How can we combat “creeping normalcy” & “landscape amnesia”?

Glacier National Park, Montana



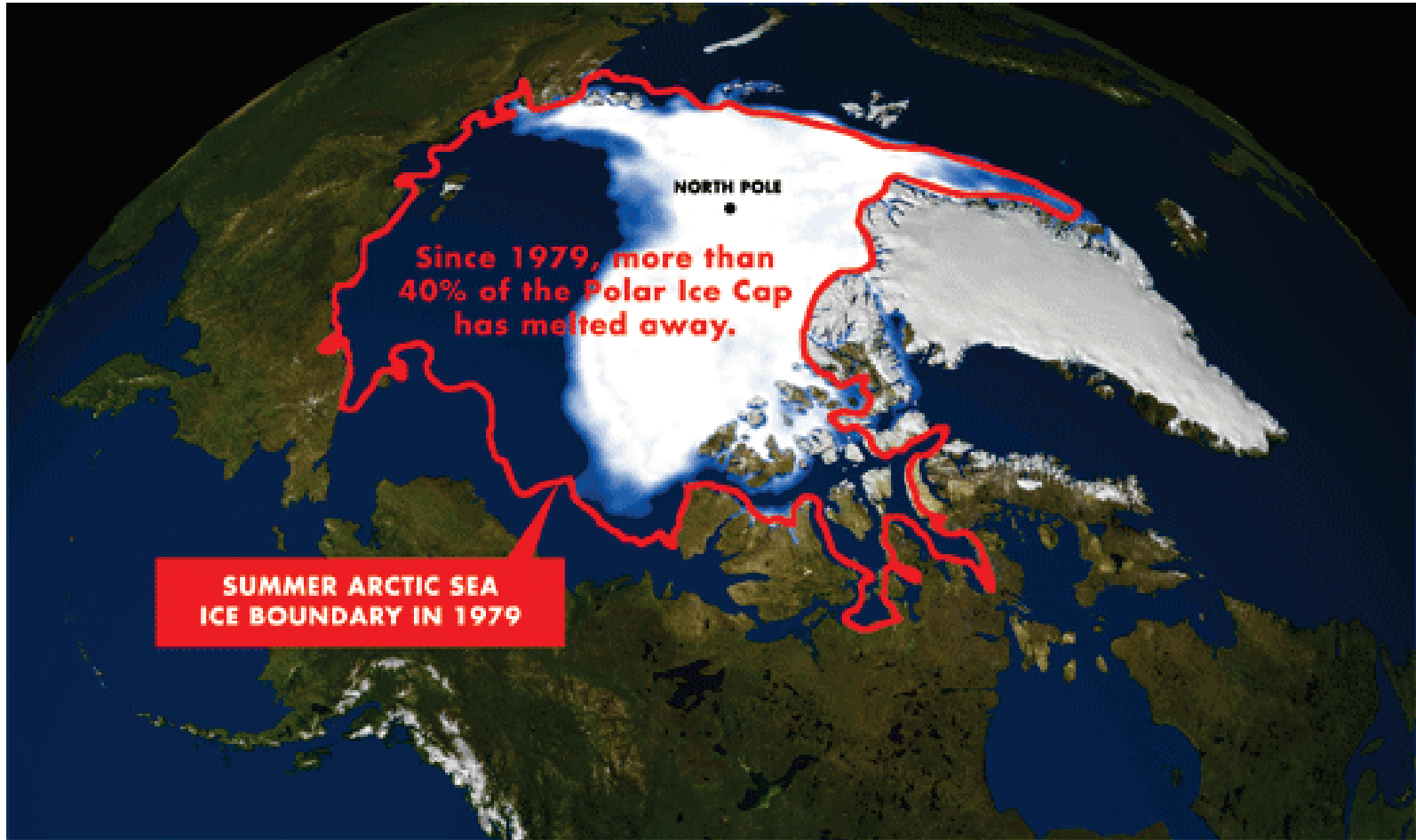
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<http://nsidc.org/arcticseaicenews>

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<http://www.geoengineeringwatch.org/the-ice-melts-into-water/>