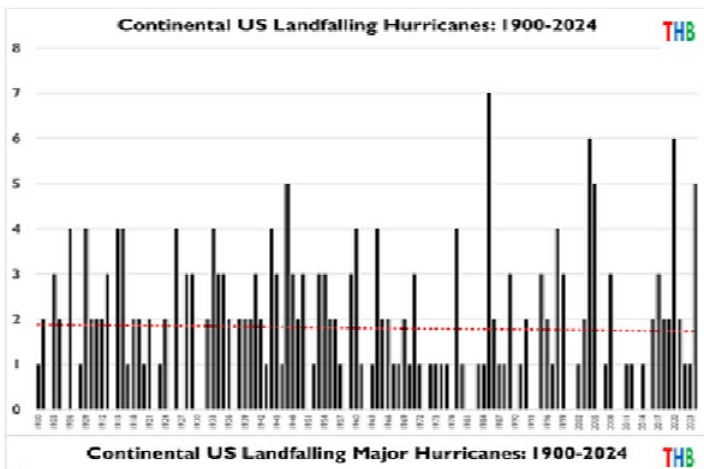


Climate Science and Policy for Nonscientists

One picture is worth a thousand words.



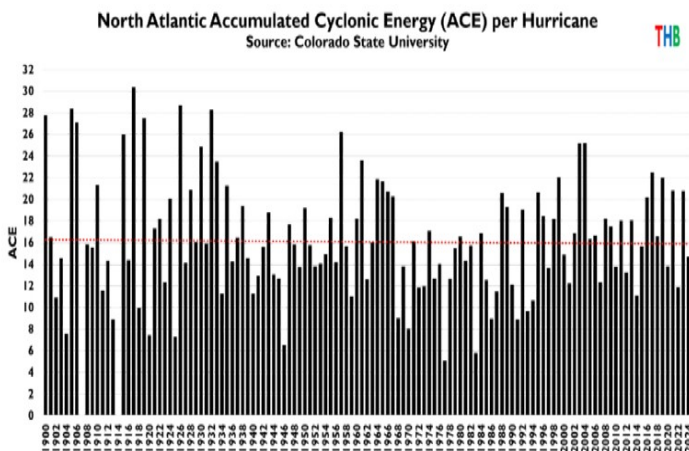
Hurricane scientists track activity in six ocean basins. While the North Atlantic basin was significantly more active than average, based on Accumulated Cyclone Energy (ACE), the world as a whole saw only 77% of normal ACE, 2024 year to date.

Hurricane Season Wrap-Up

The North Atlantic basin hurricane season ended on November 30. It was more active than average: 17 named storms (14 average), 11 hurricanes (7 average), and 5 major hurricanes (3 average). Also 5 hurricanes hit the US versus an average of 2, but the number of US strikes per year varies greatly, and the trend line is still very slightly down, as shown.

2024 Accumulated Cyclone Energy [ACE]

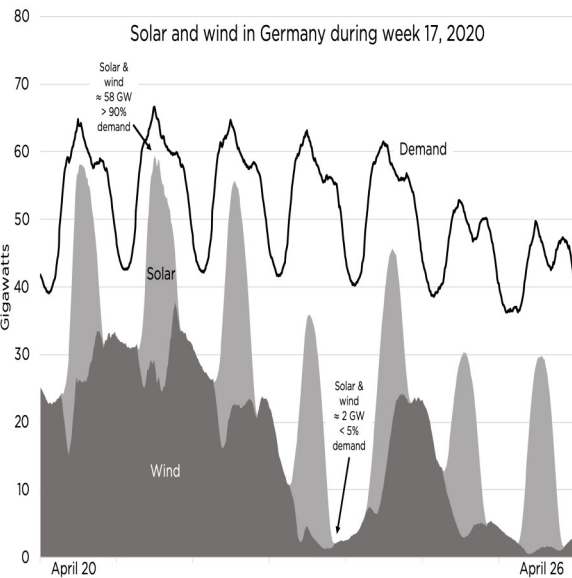
Basin	Current YTD	Normal YTD	% of Normal YTD
Northern Hemisphere	463.4920	557	83%
Western N Pacific	206.762	300	68%
Eastern + Cent N Pac	83.2400	137	60%
North Atlantic	165.96	102	162%
North Indian	7.53	16	47%
Southern Hemisphere	160.035	233	68%
Global	586.6620	753	77%



In the North Atlantic basin the average ACE per hurricane did not increase. The most recent IPCC assessment report found: (1) low confidence in trends in the frequency of all-category hurricanes, (2) the total global frequency of hurricane formation will decrease or remain unchanged with increased warming, (3) low confidence in past trends in the number of strongest storms over the Northern Hemisphere, and (4) no trend in frequency of US landfalls. [AR6 WGI p. 9, 71, 1585 (2021)]

Solar Panel Damage

When a gale wind with speeds in the 90s mph ripped through a solar farm in North Wales, hundreds of panels were blown off their mountings. For comparison 94 mph is the dividing line between Cat.1 and Cat.2 hurricanes. This solar farm was only two years old. No one knows how much damage will be done when a hurricane hits an offshore wind farm along the US East coast.

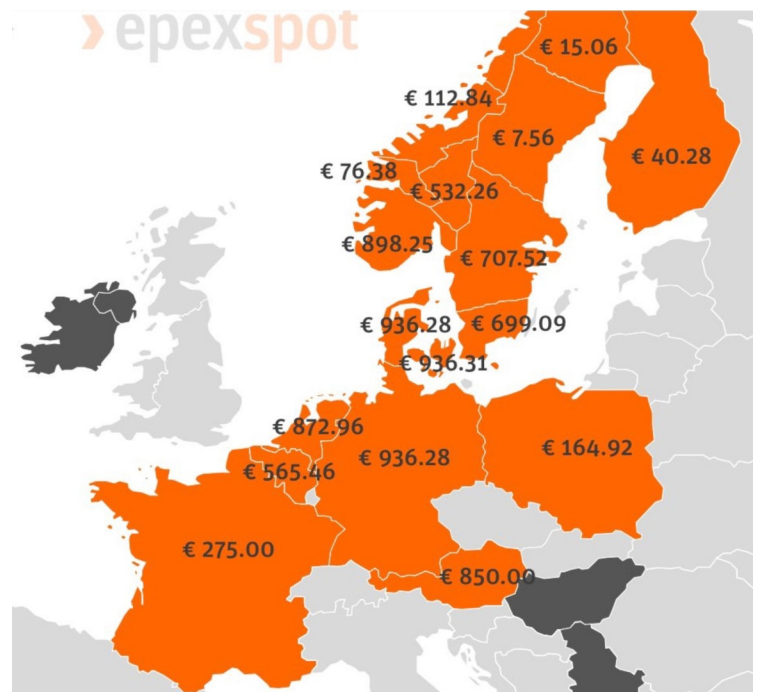


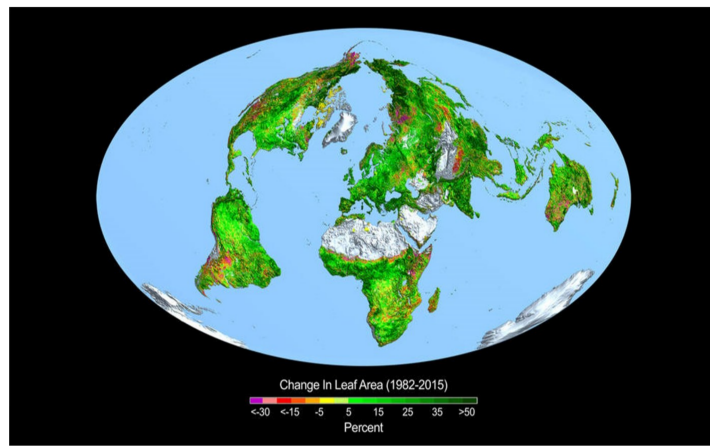
Too Much Solar

The electricity produced by solar panels rises rapidly in the morning, assuming the sun is shining, spikes in the middle of the day, and then falls off rapidly in the afternoon. Most all of the production occurs in only about 8 hours of the 24 hour day, whereas demand for electricity is much more steady throughout the day, as shown by this graph covering a week in Germany. California now has a problem. So much solar is installed that the mid-day peak is often higher than demand, and operators have to pay neighboring states to take the surplus power. This is one of the reasons that Californians pay around 2-3 times as much for power as the US average.

Wind Drought

On December 12, 2024, Germany was hit by a wind drought for the second time in a month. Germany has shut down its nuclear power plants and relies primarily on wind. The wholesale price of electricity in Germany shot up to 936 Euros per megawatt-hour versus 275 Euros in France, which relies mostly on nuclear power. The high costs of energy is driving industry out of Germany.

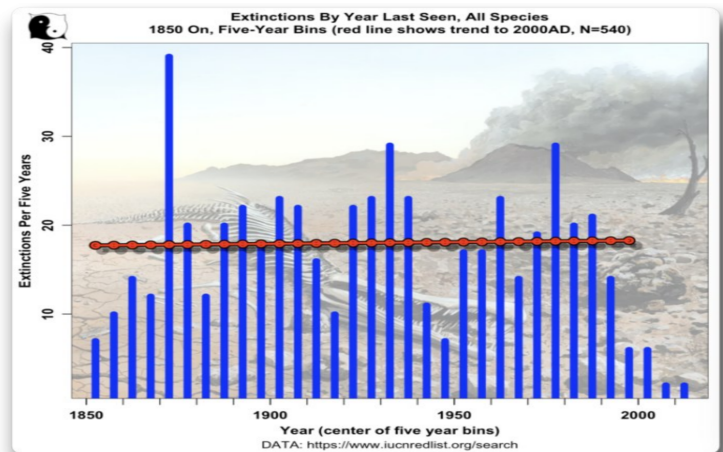




Greening World and Extinctions

The world is greening as temperatures and atmospheric CO₂ levels slowly and steadily rise, as discussed more fully in the CliSciPol Science Post: Greening World. The Unified Conservative Party, which controls the legislature in Canada's province of Alberta, has adopted a resolution, rejecting the government's net zero policy, rejecting CO₂'s designation as a pollutant, and recognizing CO₂ as a "foundational nutrient for all life on Earth."

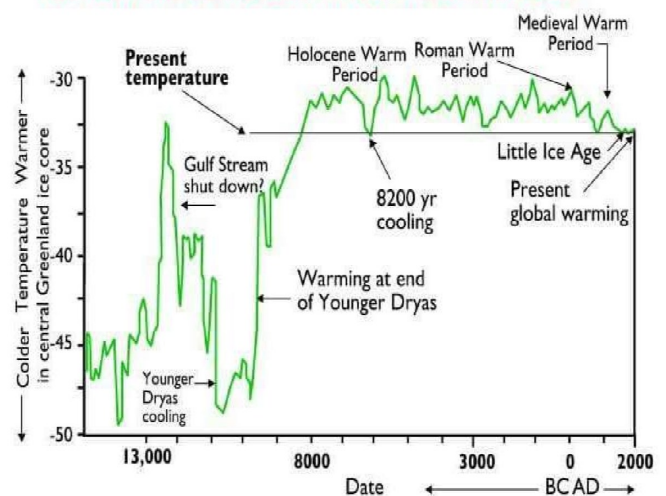
Extinction rates, as measured by the International Union for Conservation of Nature (IUCN) show minimal increase from 1850 to 2020. In general, a warming, greening world promotes life and biodiversity. Nevertheless scientists keep publishing computer models projecting large and growing numbers of extinctions. Recently a professor at the University of Connecticut Department of Ecology and Evolutionary Biology published a meta-study analyzing 485 other studies. He concluded that there is an accelerating risk of extinctions rising from the current rate of 2% to as high as 30%.



Just 20,000 years ago a massive ice sheet covered all of Canada and significant parts of what is now the Northern US. Obviously there was very little life of any sort in these areas, much as there is very little life today in Greenland or in Antarctica.

Then from about 15,000 to 10,000 years ago there was massive global warming and cooling that dwarfs the warming of recent years, and that dwarfs the global warming projected in the foreseeable future. Most all of the species alive today have existed for more than 20,000 years, and hence have demonstrated resilience in surviving these massive temperature swings. There is no reason to expect large numbers of these species to be driven to extinction by the presently foreseeable, relatively small temperature rises. (For a more detailed discussion see the CliSciPol Science Post: Extinctions).

TEMPERATURE CURVE LAST FIFTEEN THOUSAND YEARS

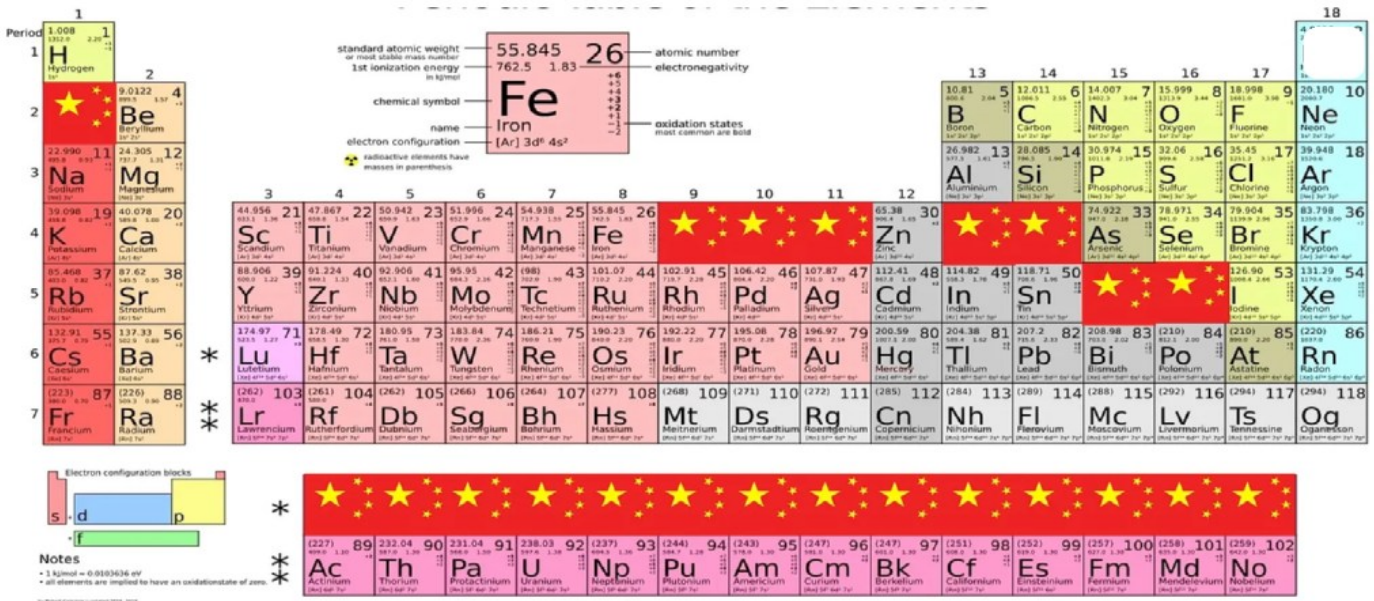


Sea Level Rise - Bangladesh

The media continues to warn about the dangers of sea level rise. Bangladesh is supposed to be at particular risk, because it is mostly flood plane and hence very flat and potentially vulnerable. But a recent study has concluded that Bangladesh's coastal regions expanded in area from 1990 to 2022. No coastal populations were displaced by rising sea levels. (For a more detailed discussion and AR6 citations see the CliSciPol Science Post: Sea Levels).



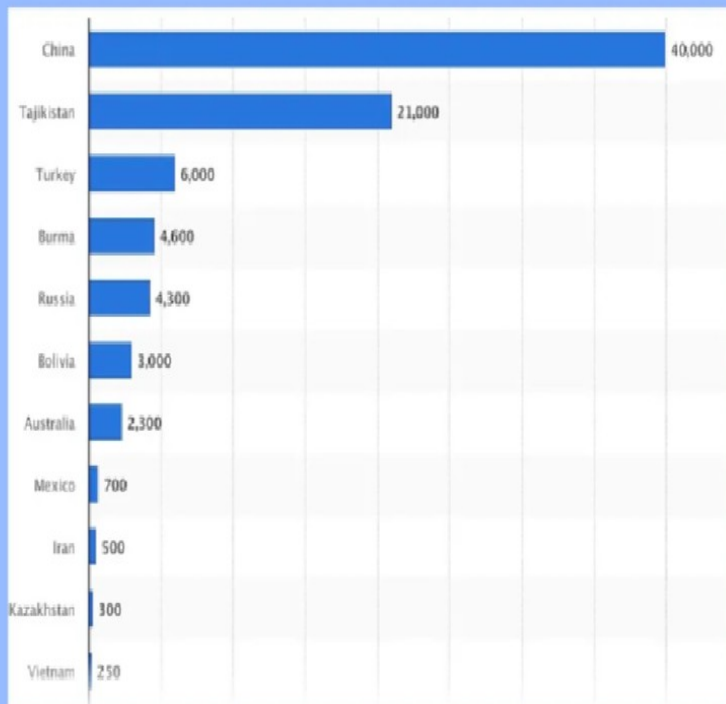
Mining - The China Problem



China has dominant positions in the global markets for numerous strategic elements, including lithium, cobalt, nickel, copper, gallium, germanium, tellurium, antimony, and the rare earth elements.

China has been pursuing a long term strategy to dominate the supplies of elements that are key to a high tech economy. In addition to various metals, these include the rare earths. The US has ample supplies of these key elements, but mining operations in the US have been greatly curtailed by the environmental movement. Chinese minerals, rare earths, and other key products of mining are currently vital for producing solar panels and wind turbines. On December 3, 2024, China banned the export to the US of antimony, gallium, and germanium.

Antimony Production, By Country



Mine production in metric tons, 2023

The graph shows the countries where antimony was being produced in 2023. The top 6 producers in order were China, Tajikistan, Turkey, Burma, Russia, and Bolivia. The US did not make the list.

Antimony is considered a “critical mineral” by the Interior Department. It is used in lead-acid batteries, bullets, missiles, nuclear weapons, night-vision goggles, ceramics, glass, and rubber products. It also acts generally as a flame retardant. . The last major US antimony mine was closed in the 1990s. The US currently imports 100% of its needs, about half from China. The US faces a difficult decision - either to ramp up mining in the US, or to become increasingly dependent on China for vital metals, rare earths, and other chemical elements.



Work Cited

Intergovernmental Panel on Climate Change Assessment Report 6, Working Group I, The Physical Science Basis (2021) (AR6 WGI)

