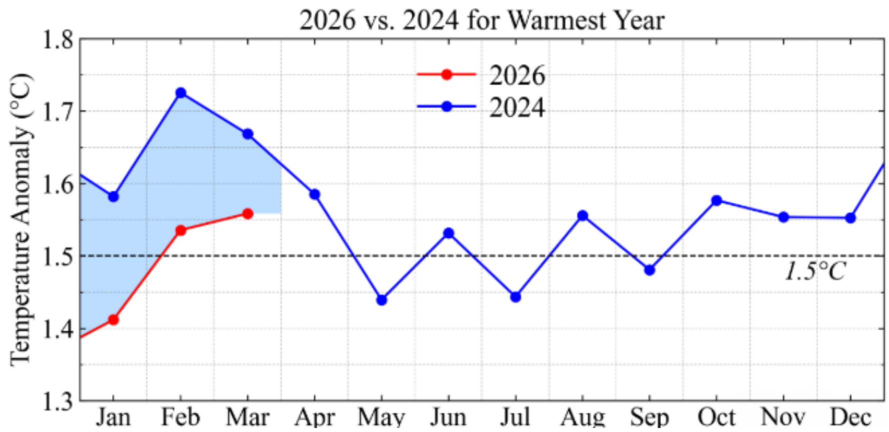

Fig. 1. Global surface temperature anomaly in GISS analysis[1] relative to 1880-1920 mean.

2026 On Track for Warmest Year

30 April 2026

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Abstract. We infer that 2026 is likely to be the warmest year in the period of instrumental data, based on a physics-based approach with identifiable assumptions. This approach may help us learn something in 2026 about the mechanisms of climate change.

The figures in this post and our other current papers will be continually updated on our website,[2] when they remain relevant. We are also now on Substack[3].

A Carbon Brief article last week ("Strong El Nino Puts 2026 on Track for Second Warmest Year")[4] makes us wonder about the basis for such expert projection. We are reminded of IPCC (Intergovernmental Panel on Climate Change) expert projections with unstated assumptions and whose physical basis is inscrutable to the public. Organized climate model runs for the Climate Model Intercomparison Project (CMIP) are valuable for climate analyses, but the fog of all model results should not be misinterpreted as a probability distribution for the real world.

As an alternative, let's try a physics-based approach, with the hope to learn something from it by the end of the year. Specifically, let's assume that the budding El Nino will have strength at least comparable to the 2023-24 El Nino. We assume that global temperature change is caused by climate forcings (imposed changes of the planet's energy balance) and that "Nino" variability is the only substantial source of global "noise," i.e., unforced global temperature change.

Why is this exercise of interest? Because, as we discussed in prior posts, the main issue is not El Nino, but the need to understand accelerated warming, unprecedented marine heat waves, and increasing climate extremes. The high rate of global warming acceleration was not anticipated by IPCC because their best estimate for climate sensitivity (3°C for 2×CO_2) was an underestimate. We have shown in four independent ways, with greater than 99% confidence, that climate sensitivity is substantially higher, 4-5°C for doubled CO_2.[5] IPCC compensated for low climate sensitivity by failing to recognize that aerosol cooling increased during 1970-2005. Since then, especially since 2015, a reduction of aerosols and their cooling effect has caused the decadal growth rate of net climate forcing to be about double what it was in 1970-2005.[6] This increased net forcing combines with high climate sensitivity to cause recent global warming acceleration.

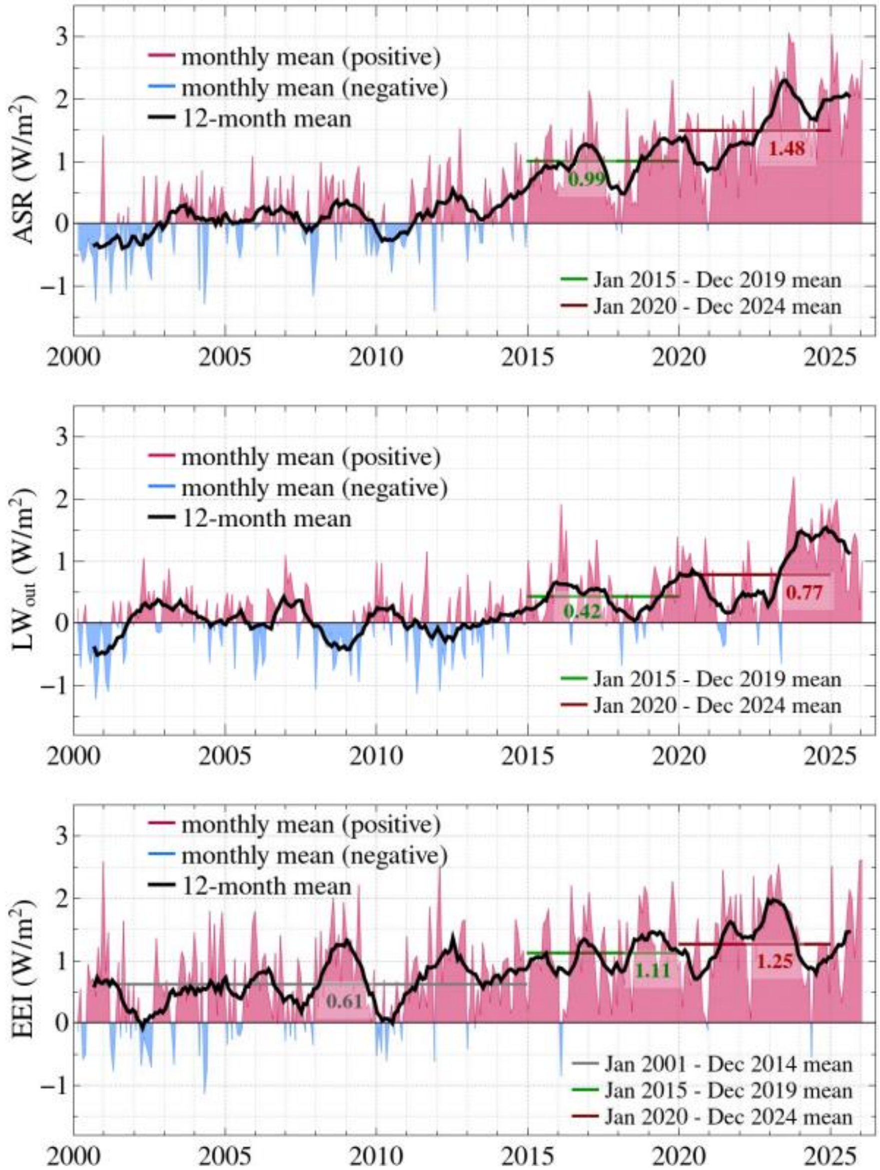

Fig. 2. Earth's satellite-observed absorbed solar radiation (ASR) and longwave (thermal) emission to space (LW),[7] both relative to their 2000-2010 averages, and the absolute Earth energy imbalance (EEI) calibrated with aid of Argo-measured heat storage in the ocean.[8]

Outline of discussion: (1) we look at up-to-date data for Earth's energy imbalance, which is the ultimate drive of global temperature change, (2) we discuss ongoing changes of climate forcings, (3) we look at changing global SST (sea surface temperature), a useful, stable diagnostic, (4) we project likely 2026 temperature based on these data. As 2026 progresses, we will update the data for the sake of learning something relevant to longer-term climate change.

Earth's energy imbalance. Precise measurement of changes in absorbed solar radiation (ASR) and emitted longwave radiation (LW), when calibrated with measured changes of the ocean's heat content, yield Earth's absolute energy imbalance (EEI), as shown in Fig. 2. An EEI of about 0.6 W/m² is required[9] to account for the observed global warming rate of 0.18°C per decade in 1970-2010 (Fig. 3). ASR and EEI are good indicators of when – between 2010 and 2015 – a major change of climate forcing was concentrated. Not surprisingly, the rate of global warming

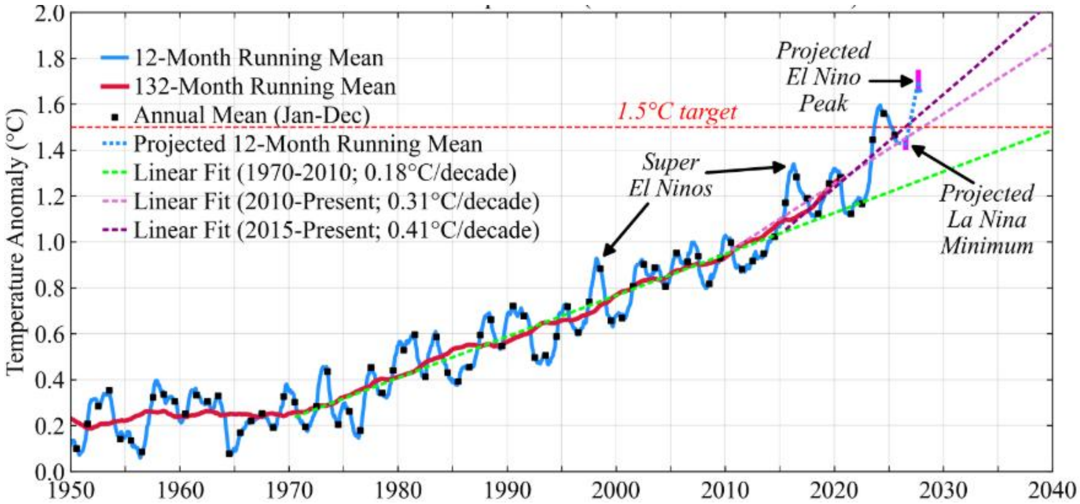

Fig. 3. Global surface temperature (relative to 1880-1920 base period).[1]

approximately doubled, to 0.3-0.4°C per decade, with the new rate depending on whether we take 2010 or 2015 as the change point for a linear fit to the data beginning on the 1970-2010 trend line (Fig. 3). If the accelerated warming rate continues, global warming of 2°C will be reached as soon as the 2030s, but it depends on the continued growth of climate forcing.

There are many reasons to suspect that the rate of change of the net climate forcing will diminish in the near-term, as we will discuss. However, the best measure of the situation at this time is provided by the Earth's radiation balance data (Fig. 2). During the 10 years 2015-2024, Earth's energy imbalance (EEI), the drive for global warming, was about double the 0.6 W/m^2 mean of 2000-2014.[10] In the 13 months January 2025 through January 2026 the mean EEI is 1.5 W/m^2. Thirteen months is too short a period to judge trends in EEI because of the impact of cloud variability, but the fact is that, as yet, there is no slowdown in this drive of climate change.

Climate forcings. For the sake of brevity, let's defer quantitative discussion and graphs of climate forcings to a future communication and restrict ourselves here to a few comments. There are several reasons to anticipate a slowdown in the growth of the net climate forcing in the near future. (1) Solar irradiance was at a peak during the 2023-24 El Nino, but is now declining, which will significantly depress growth of net climate forcing during the next 6-8 years. However, the solar effect during 2026 should be small relative to the present EEI; evidence for long-hypothesized amplifications of solar variability is still wanting. (2) Greenhouse gas (GHG) forcing, which has an accelerated growth rate since 2010-2015, could move toward a lower growth rate as clean energy use increases, but we need more data to assess trends, (3) Aerosol change seems unlikely to continue with its recent strong rate of change as, for example, ship emissions of aerosol precursors already have been largely eliminated, and China's emissions have decreased ~75% since peaking in 2006. The effect of increased forest fires has yet to be well quantified and there is always the possibility of a large volcanic eruption. Stay tuned for a quantitative discussion about changing climate forcings.

Sea surface temperatures. SSTs are especially helpful for assessing the status of the global response to climate forcings because the thermal inertia of the surface wind-mixed layer of the ocean minimizes weather noise. The upper graph in Fig. 4 shows that 2026 (the red curve) has been substantially cooler than 2024 (heavy grey curve) for the first four months of 2026 and the

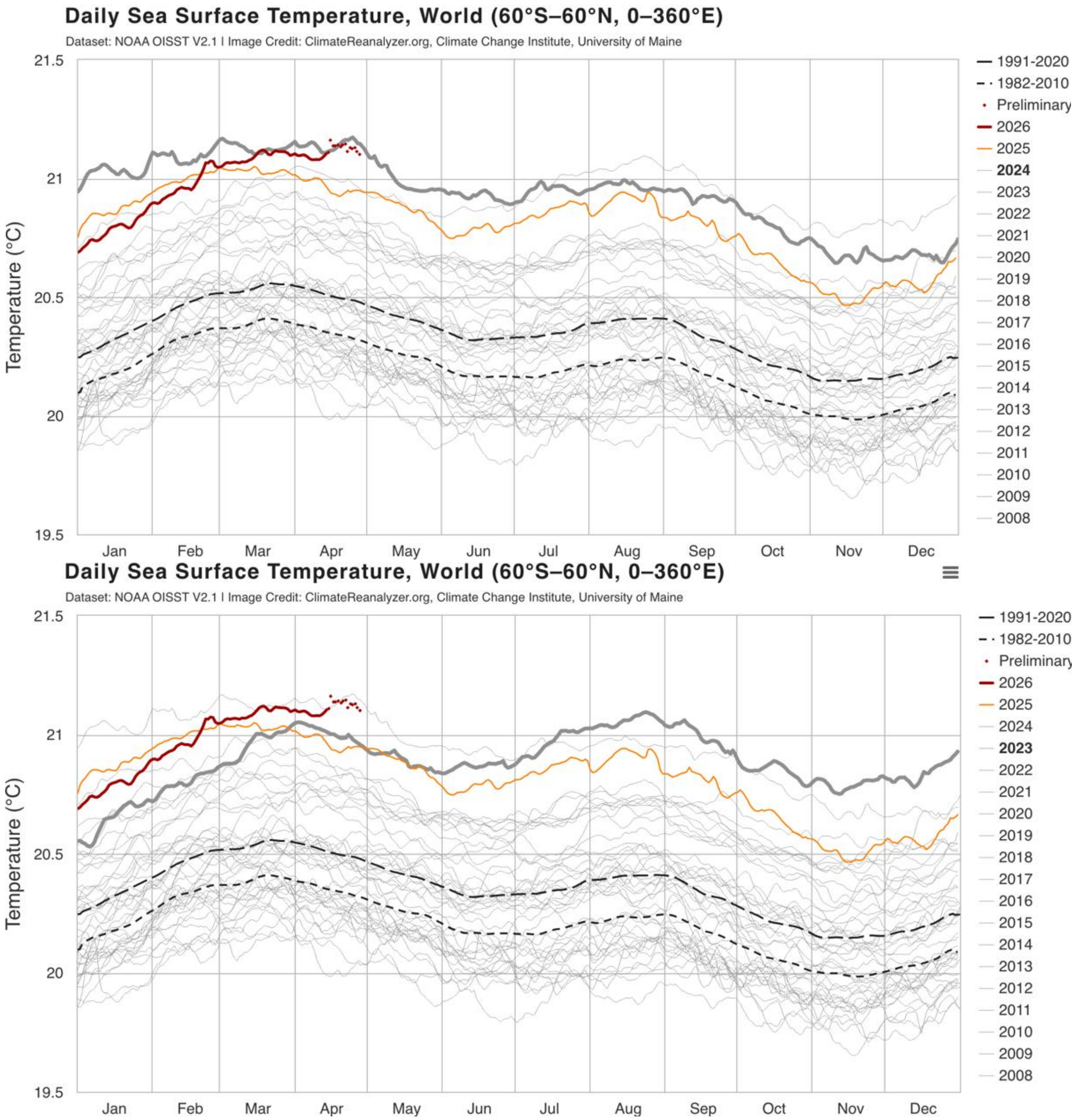

Fig. 4. NOAA OISST V2.1 Image Credit: ClimateReanalyzer.org, Climate Change Institute, University of Maine. The red curve is 2026; the heavy grey curves are 2024 (upper figure) and 2023 (lower figure).

gap is larger for global surface air temperature (Fig. 1), the first three months of 2026 averaging 0.16°C colder than in 2024. Thus, for 2026 to be the warmest year in the record, many of the remaining months in 2026 must be substantially warmer than prior records. That is why a prognosticator shuns a prediction of record annual warmth in 2026.

On the other hand, we have knowledge of exceptional, ongoing, acceleration of global warming. Comparison of 2026 with 2023, the Nino-origin years, shows 2026 SST as consistently about 0.13°C warmer than 2023. Given our assumption that the present El Nino will be of similar strength to that in 2023, we expect the 0.13°C temperature gap to be maintained. Temperature change over land exceeds that over ocean by a factor of 2 (Fig. 5), so, given that land covers 30%

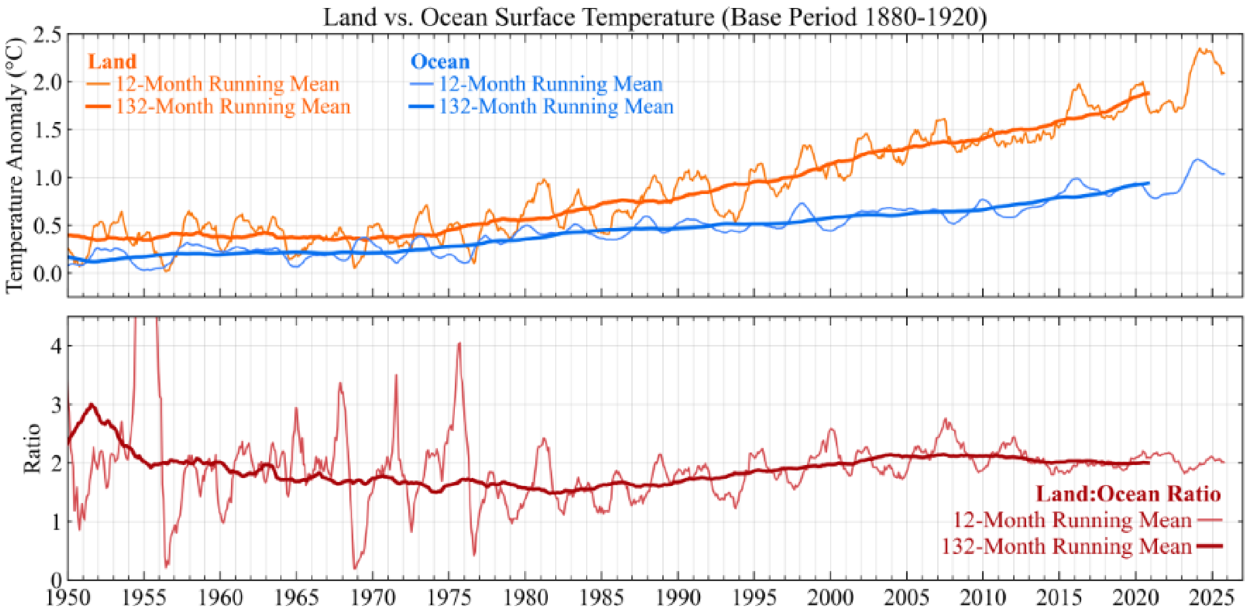

Fig. 5. Comparison of land and ocean temperature anomalies relative to 1880-1920 (see our data page).

of the globe, the ocean gap of 0.13°C implies a global warming of 2026 relative to 2023 of 0.17°C – in fact, the 2026 warming relative to 2023 in the GISS analysis is 0.17°C.

Global temperature in 2024 was 0.11°C higher than in 2023. Thus, if 2026 ultimately exceeds 2023 by 0.17°C, it would break the 2024 global temperature record by 0.06°C. That margin is wide enough that we are willing to make the prediction that 2026 will be the warmest year in the period of instrumental temperature measurements. Of course, 2027 will be still hotter.

We will update Fig. 1 monthly, anticipating that the 2026 curve will cross the 2024 one and that an eventual red area between the 2026 and 2024 curves will exceed the blue area, as needed for 2026 to be the warmest year.

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[1] Temperature is from Goddard Institute for Space Studies analysis described by Hansen J, Ruedy R, Sato M *et al.* Global surface temperature change, *Rev Geophys* **48**, RG4004, 2010; Lenssen NJL, Schmidt G, Hendrickson M *et al*. A NASA GISTEMPv4 Observational Uncertainty Ensemble, *J Geophys Res Atmos* **129**, e2023JD040179, 2024
[2] Our communications (posts) and data are available now via Hansen's website while we continue to develop and populate our websites and data pages. Figures in communications and papers that remain of current interest will be updated at appropriate intervals, usually monthly, with the most recent date of update indicated on the website.
[3] https://jimehansen.substack.com/
[4] Hausfather Z. Strong El Nino Puts 2026 on Track for Second Warmest Year, Carbon Brief 21 April 2026
[5] Hansen J. A climate talk in Helsinki, 7 November 2025
[6] Hansen JE, Kharecha P, Sato M *et al.* Global warming has accelerated: are the United Nations and the public well-informed? *Environ.: Sci. Pol. Sustain. Devel.* **67(1)**, 6–44, 2025
[7] Loeb NG, Johnson GC, Thorsen TJ *et al.* Satellite and ocean data reveal marked increase in Earth's heating rate. *Geophys Res Lett* **48**, e2021GL093047, 2021
[8] von Schuckmann K, Cheng L, Palmer MD *et al.* Heat stored in the Earth system: where does the energy go? *Earth Sys Sci Data* **12**, 2013-41, 2020
[9] Hansen J, Sato M, Ruedy R *et al.* Forcings and chaos in interannual to decadal climate change. *J Geopys Res* **102**, 25, 679-720, 1997
[10] The value 0.61 W/m^2 (Fig. 2) is for the 15 years from January 2001 through December 2015. The value for the first 15 years of data, March 2000 through February 2015 is 0.60 W/m^2.