Super-Duper El Nino

15 April 2026

James Hansen, Pushker Kharecha, Dylan Morgan and Jasen Vest

Abstract. El Ninos have always been important. However, in the context of a warming planet – likely accelerated warming – El Ninos have even greater impact. Moreover, the frequency and nature of El Ninos themselves may be affected by the warming. Media attention to the possibility of an upcoming "Super El Nino" irritates some scientists, given inherent uncertainty in forecasts. We push back gently against that irritation. Predictions in the face of uncertainty are a valuable approach, with the potential to increase our understanding. We take our hats off to ECMWF for their bold prediction. We also suggest an El Nino diagnostic, alternative to the usual diagnostic, that provides an earlier, more meaningful assessment. It is already clear that we will have an El Nino in 2026-27. A little more time is needed to be certain that it will be a Super El Nino, but it looks like it will be a strong one. Let us see what we can learn from it.

The figures in this post and our other current papers will be continually updated on our website,[1] when they remain relevant. We are also now on Substack[2].

The European Center for Medium Range Weather Forecasts (ECMWF) earlier this year issued a forecast of a strong ("Super") El Nino to begin later this year and peak in early 2027, as we have discussed in two earlier posts.[3,4] El Ninos are important because of the large effects that they have on global weather, even though those effects are not always consistent from one El Nino to another. El Ninos have even greater effect in combination with ongoing global warming, e.g., Radfar *et al*.[5] find that the combination of an El Nino with increasingly prevalent marine heat waves results in tropical cyclones consistently producing higher maximum wind speeds, storm surges, and precipitation rates, and Liu *et al*.[6] describe evidence of El Ninos strengthened control over global climate anomalies in a warmer world.

Reid[7] says that the phrase "Super El Nino" makes Australian climate scientists roll their eyes, and advises ignoring El Nino forecasts made during Australian autumn (Northern Hemisphere spring) – suggesting to wait until the end of autumn or early winter (end of spring or early summer in the Northern Hemisphere) before taking forecasts seriously. Reid concludes: "Will we get an El Nino this year? The only scientifically accurate answer as of April 9, 2026, is 'maybe.' It's way too early to say anything other than that an El Nino is more likely to form this year than a La Nina."

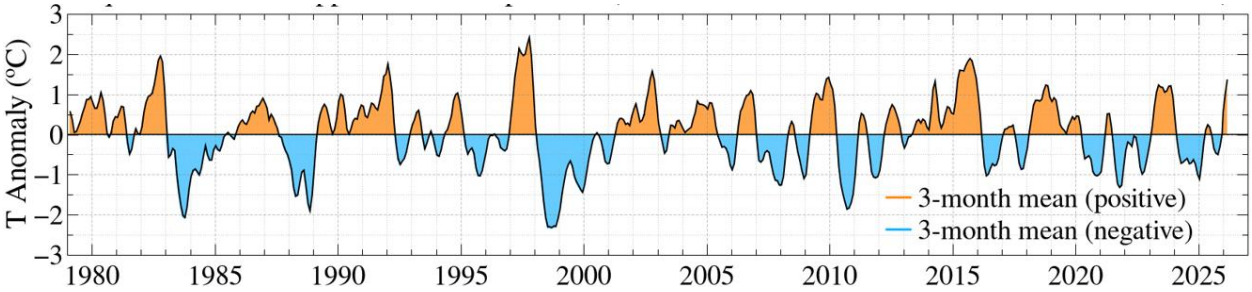

Fig. 1. Equatorial upper ocean (300 m) heat anomaly (°C) at longitudes 180-100W. This is the 3-month running-mean except March 2026, which is a 1-month value.

Our perspective is different. *First*, predictions have the potential to increase understanding. If one believes that he/she has the basis for a prediction, we encourage such prediction and a post-mortem that attempts to get at the physics of what went right or wrong in the forecast – and why. ECMWF is recognized as having a good model and top-notch scientists, so we look forward to their analysis of the forecast/reality comparison. There are inherent limitations on predictability caused by chaotic aspects of atmosphere and ocean dynamics, but that cannot account for the huge range among models. It is common to look at the range of model results and treat this as if it were a probability distribution for the real world. It is not. It is simply the fog of results from all models – the good, the bad, and the ugly – and a rather fruitless comparison. What is needed is analysis of the effect of key processes in the better models. Well observed and analyzed events, such as the upcoming El Nino, provide an opportunity to test simulation of key processes.

Second, we showed in our earlier communications[3,4] that the Nino3.4 (sea surface temperature anomaly in an equatorial strip in the Pacific) is an inferior predictor and measure of El Ninos. The heat content of the upper 300 m of the equatorial Pacific (Fig. 1) is a better measure of El Nino strength; for example, it correctly has the 1997-98 El Nino as the strongest El Nino in the past 50 years, while the Nino3.4 index has the 2015-16 El Nino as stronger. Moreover, the 300 m temperature anomalies are correlated with global temperature change almost as well (53%) as the Nino3.4 index is correlated with global temperature (58%), and the 300 m temperature provides a 4-month longer lead time in its prediction of global temperature change. It is reasonable that the 300 m heat anomaly provides a good indication of future global temperature change and climate change because heat released from this tropical ocean reservoir drives the global warming that occurs with the El Nino.

The 300 m temperature already assures that we will have an El Nino in 2026-27. The March average of the 300 m temperature anomaly exceeds +1°C. At that point, it is consistent with either a Super El Nino (Fig. 2a) or an ordinary El Nino (Fig. 2b). However, in the first week of April, the 300 m anomaly reaches +1.6°C (Fig. 3). This increasing heat anomaly is a result of the reinforcing Kelvin wave (Fig. 4, left) traveling from west to east (see the discussion in our prior El Nino post[4]). This Kelvin wave was boosted by recent westerly wind anomalies (Fig. 4, right).

We will update these figures on our website[1] at weekly and monthly intervals until the magnitude of the El Nino is clear. Graphs of global temperature and other quantities are available at Data and Figures on that website. Figs 3 and 4 here are from the NOAA webpage,[8] which is updated weekly and includes many other figures and climate information.

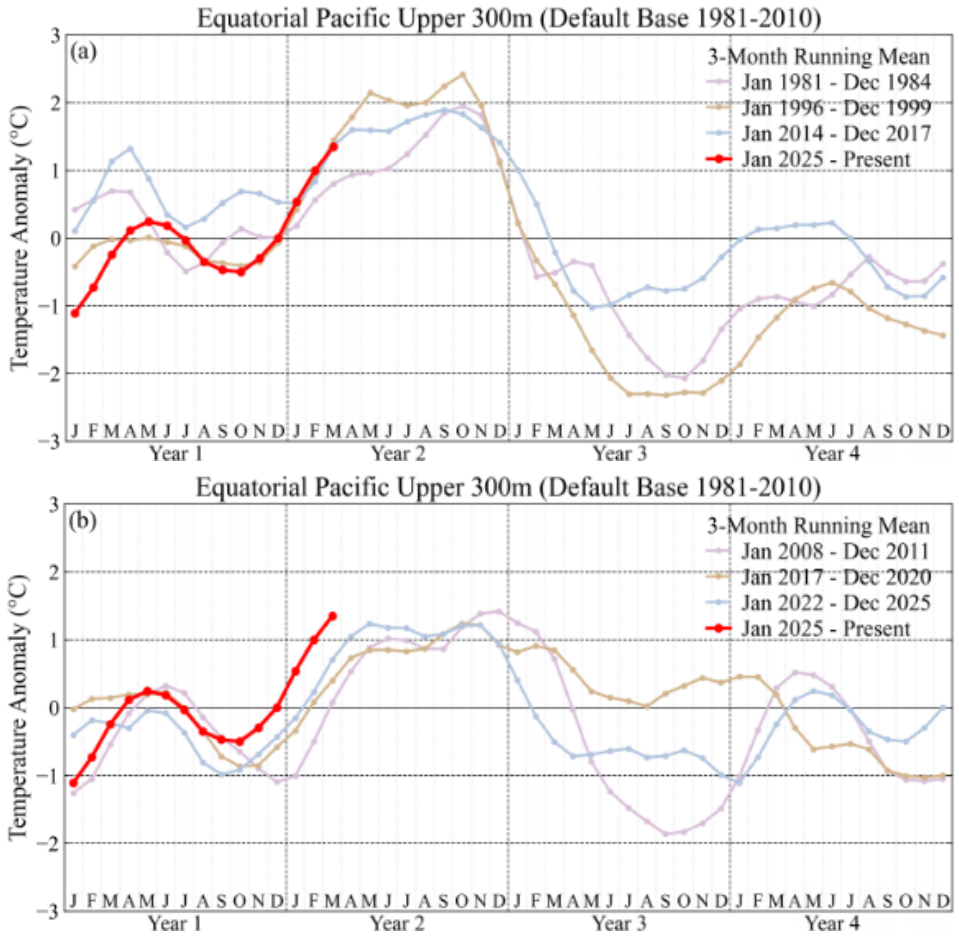

Fig. 2. Ongoing 300 m heat compared to (a) Super El Ninos, and (b) moderate El Ninos.

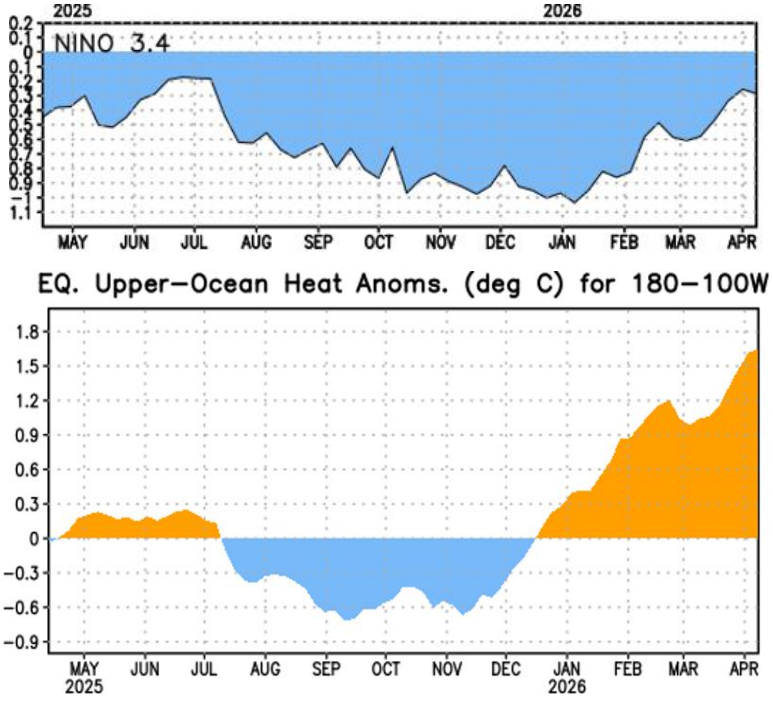

Fig. 3. Nino3.4 and 300m heat anomaly in the past year from NOAA's weekly update.[8]

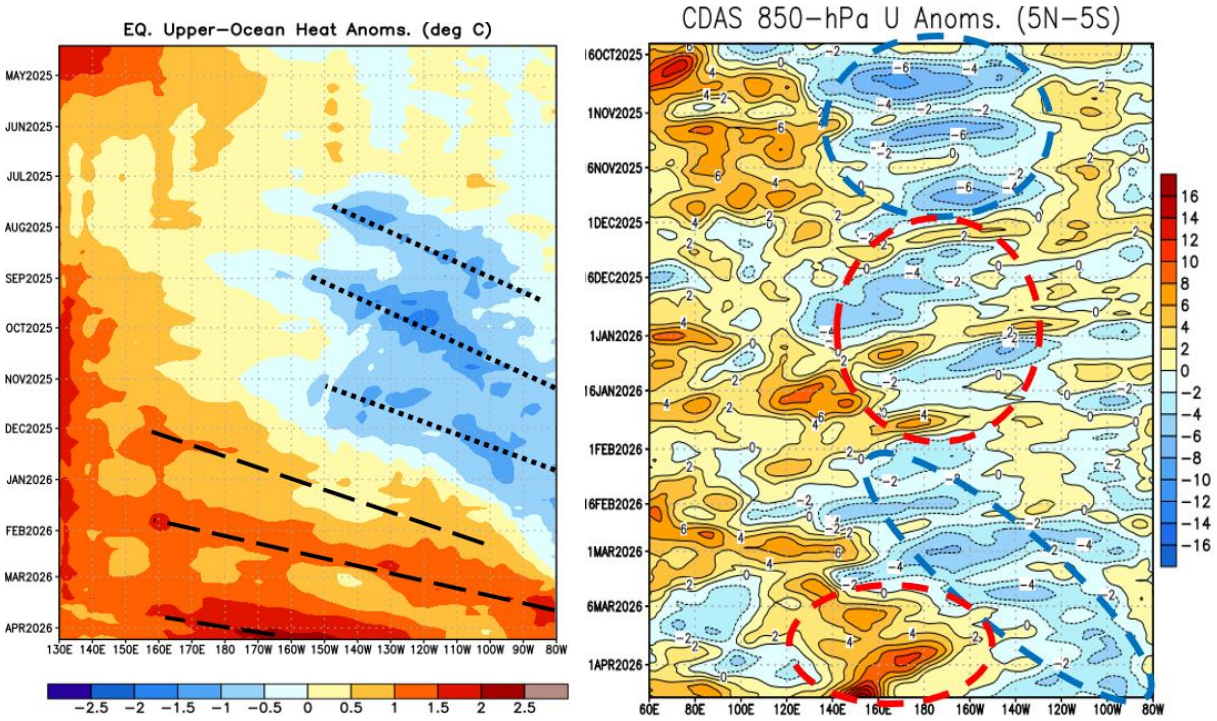

Fig. 4. Upper ocean (300 m) ocean heat versus time (vertical axis) and longitude (left graph). Time runs from May 2025 at the top to April 2026 at the bottom. The similar diagram on the right shows equatorial wind anomalies; yellow-red is increased westerlies, blues are easterlies.[8] The western Pacific is on the left side in both graphs.

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[1] 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.

[2] https://jimehansen.substack.com/

[3] Hansen J, Kharecha P, Morgan D, Vest J. Super El Nino? Super warming is the main issue. 20 March 2026

[4] Hansen J, Kharecha P, Morgan D, Vest J. Another El Nino Already? What Can We Learn from It? 06 February 2026

[5] Radfar S, Foroumandi E, Moftakhari H *et al*. Synergistic impact of marine heat waves and rapid intensification exacerbates tropical cyclone destructive power worldwide. *Sci Adv* **12**, eadu 1733, 10 April 2026

[6] Liu S, Dong L, Song F *et al*. ENSO's strengthened control over global climate anomalies in a warmer world. J Clim 39, 2593-607, 2026

[7] Reid K. Why the phrase 'Super El Nino' makes Australian climate scientists roll their eyes The Conversation 9 April 2026

[8] The NOAA Climate Prediction Center updates El Nino information every week, normally on Monday. Figures 3 and 4 here were copied from their post on 13 April 2026. The NOAA synopsis report of 9 April 2026 notes that Figs. 3 and 4 use the new base period 1991-2020. Figs. 1 and 2 in our present communication uses the base period 1981-2010. One of the merits of using the upper 300 m to characterize the Nino status is that the upper 300 m is less affected by human-made warming than is Nino3.4. In a future post or paper, we will address the issue of how to minimize the effect of long-term warming in assessments of the Nino status.