THE MANMADE GLOBAL WARMING CHALLENGE

By Bob Tisdale

"How inappropriate to call this planet Earth when clearly it is Ocean"

- Arthur C. Clarke

"The Manmade Global Warming Challenge"
is an
Examination of Sea Surface Temperature and Ocean Heat Content Data.

Both Clearly Show the Oceans Have Warmed.

But Was the Warming Caused By Natural or Manmade Factors?

Some People Say Manmade Global Warming Doesn't Exist.

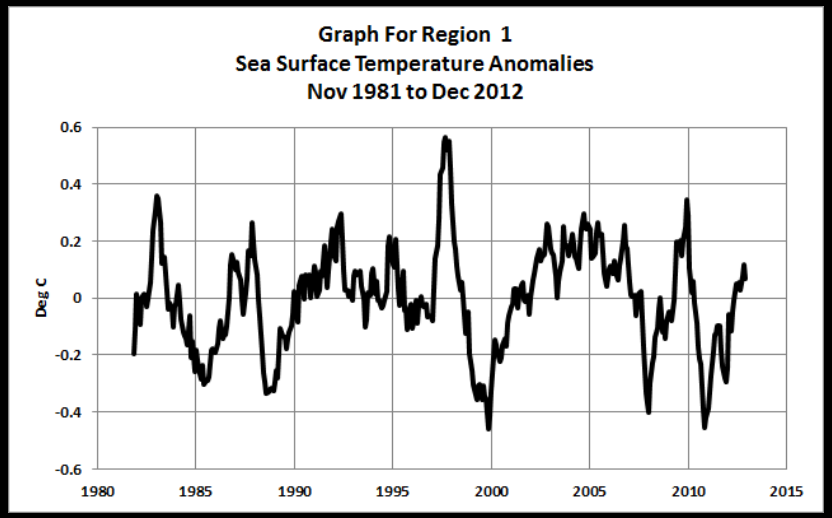
Others Say It's Exaggerated.

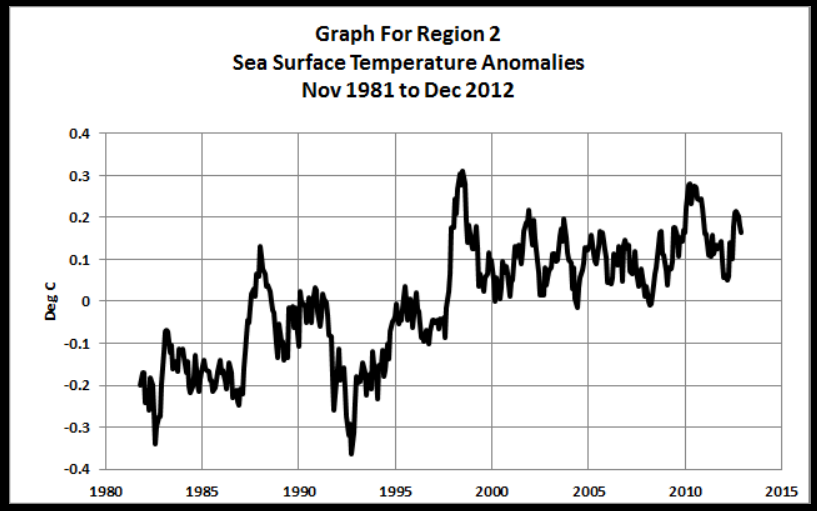
Yet Others Believe All of the Recent Warming Was Caused By Manmade Greenhouse Gases—That Mother Nature Played No Role.

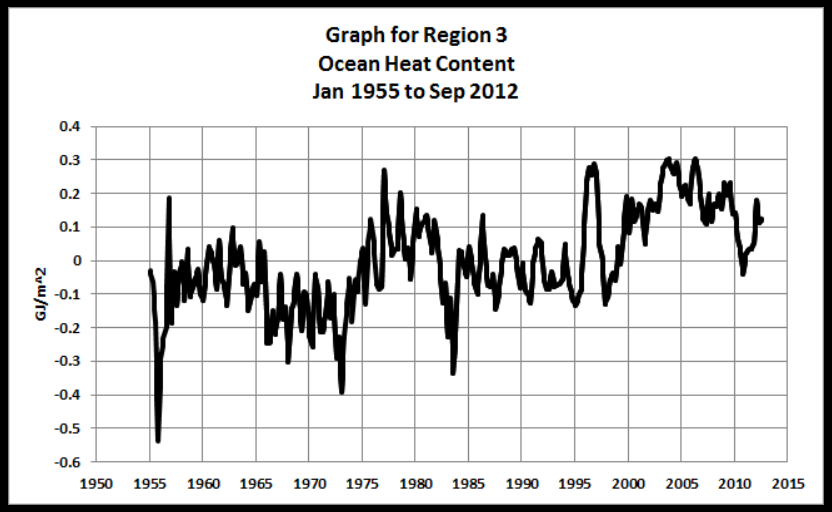
If You Believe Mother Nature Played No Role in the Warming of the Global Oceans, Your Beliefs Are Not Supported by the Sea Surface Temperature and Ocean Heat Content Data.

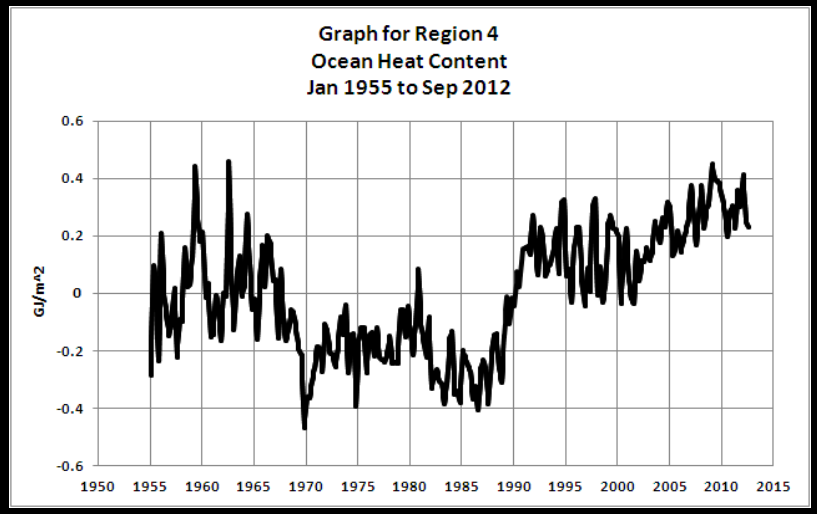
With Your Understanding of the Subject, Can You Find the Manmade Global Warming Component in the Following Graphs?

Here Are Reduced-Size Previews









- A Proponent of Manmade Global Warming Might Say:
  - Anyone Who Can Read a Graph Can See the Oceans Have Warmed.
- And:
  - Climate Models Confirm the Warming Was Caused By Manmade Greenhouse Gases.

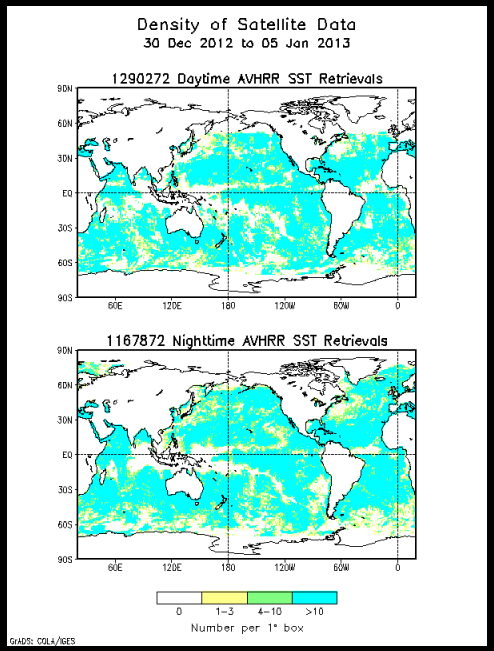
- And Someone Skeptical of Manmade Global Warming Might Reply:
  - There's No Evidence the Warming Was Caused by Manmade Greenhouse Gases.
- And:
  - Climate Models Were Programmed to Show Global Warming Was Caused Primarily By Carbon Dioxide. As a Result, the Models Show No Skill at Being Able to Simulate Sea Surface Temperatures.

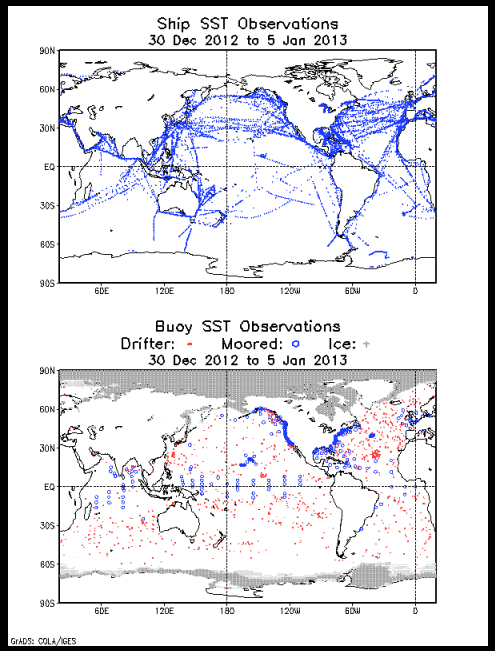
To Cut Through the Chatter, We'll Present and Discuss the Very Obvious Factors That Contributed to the Warming of the Oceans, Using Sea Surface Temperature and Ocean Heat Content Data.

A Description of the First Dataset

The First Few Graphs are of Satellite-Era Sea Surface Temperature Anomalies

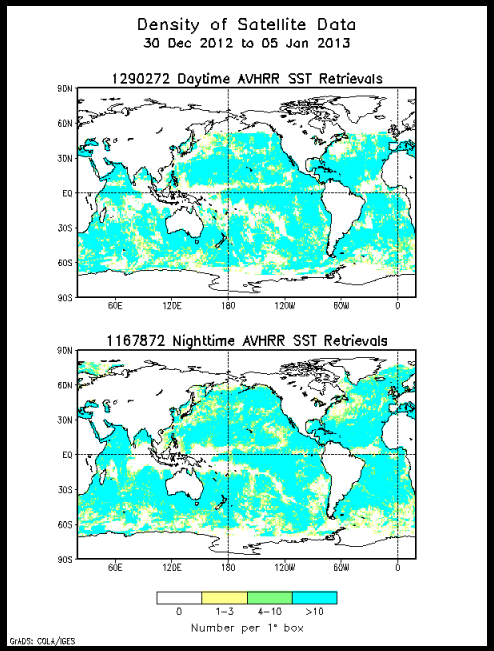
- The Data are Based on Measurements from Satellites, Buoys and Ship Inlets.

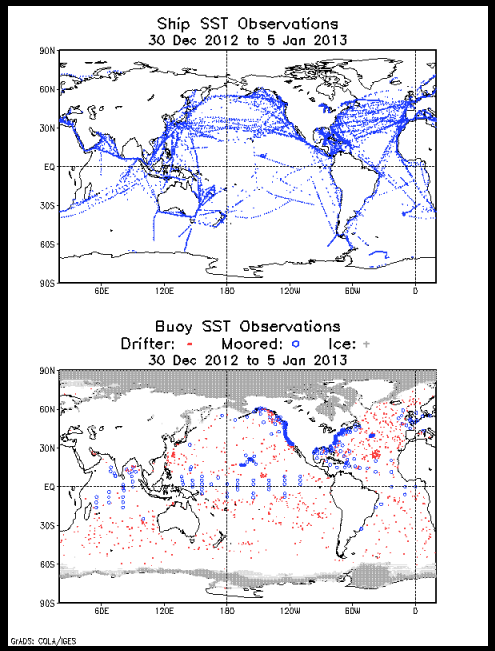




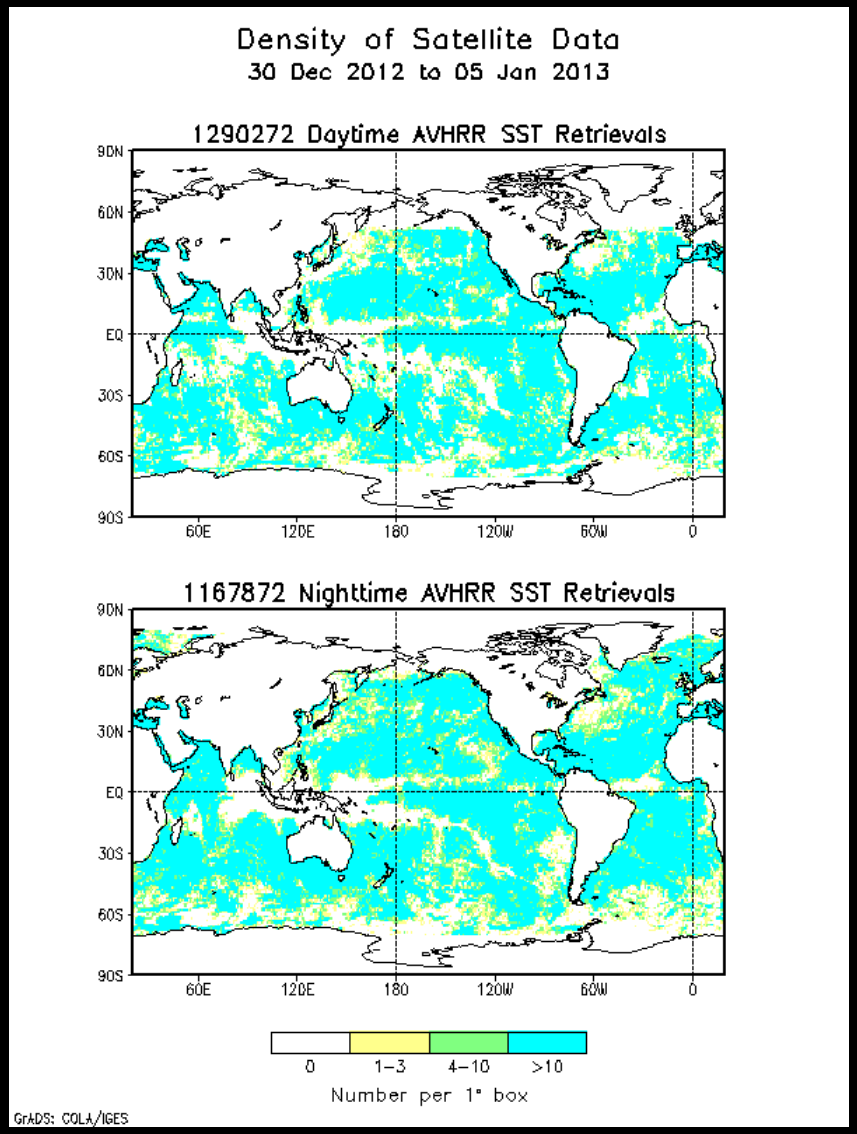
The First Few Graphs are of Satellite-Era Sea Surface Temperature Anomalies

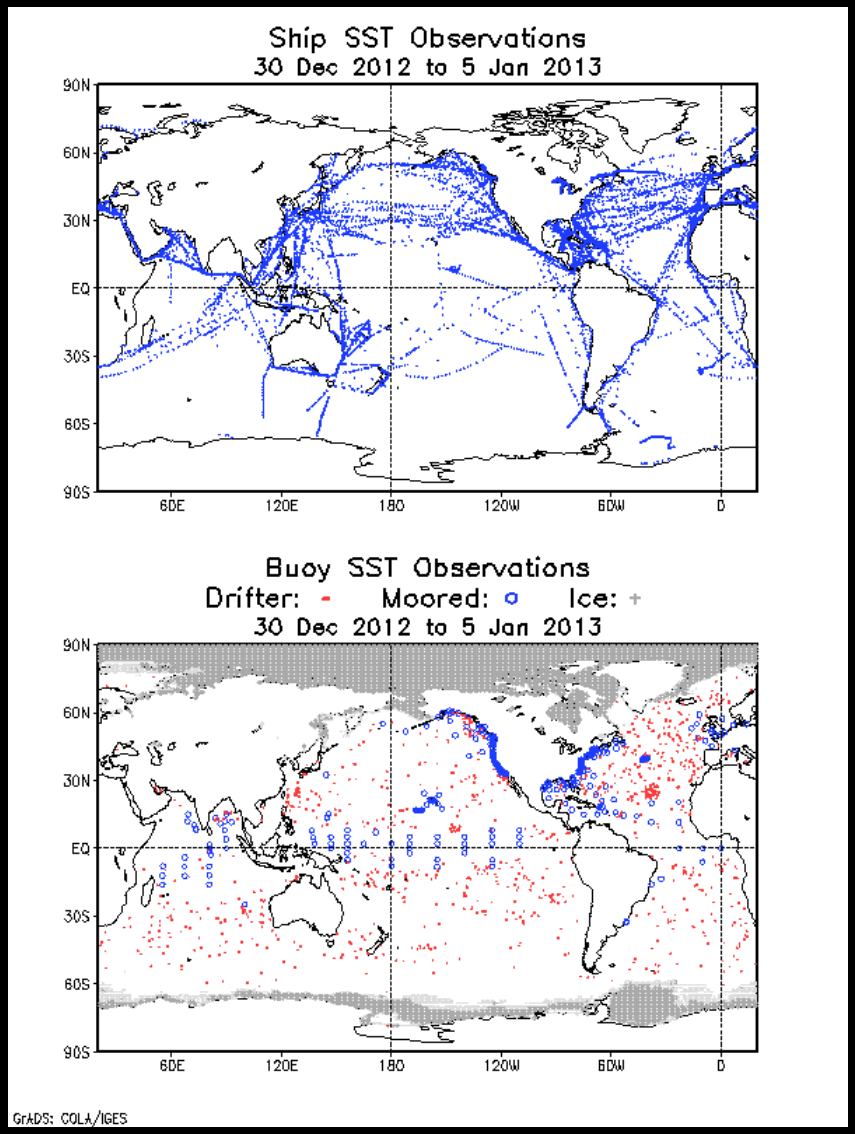
- They Capture the Global Oceans and Seas from Polar Ocean to Polar Ocean.





A Closer Look!

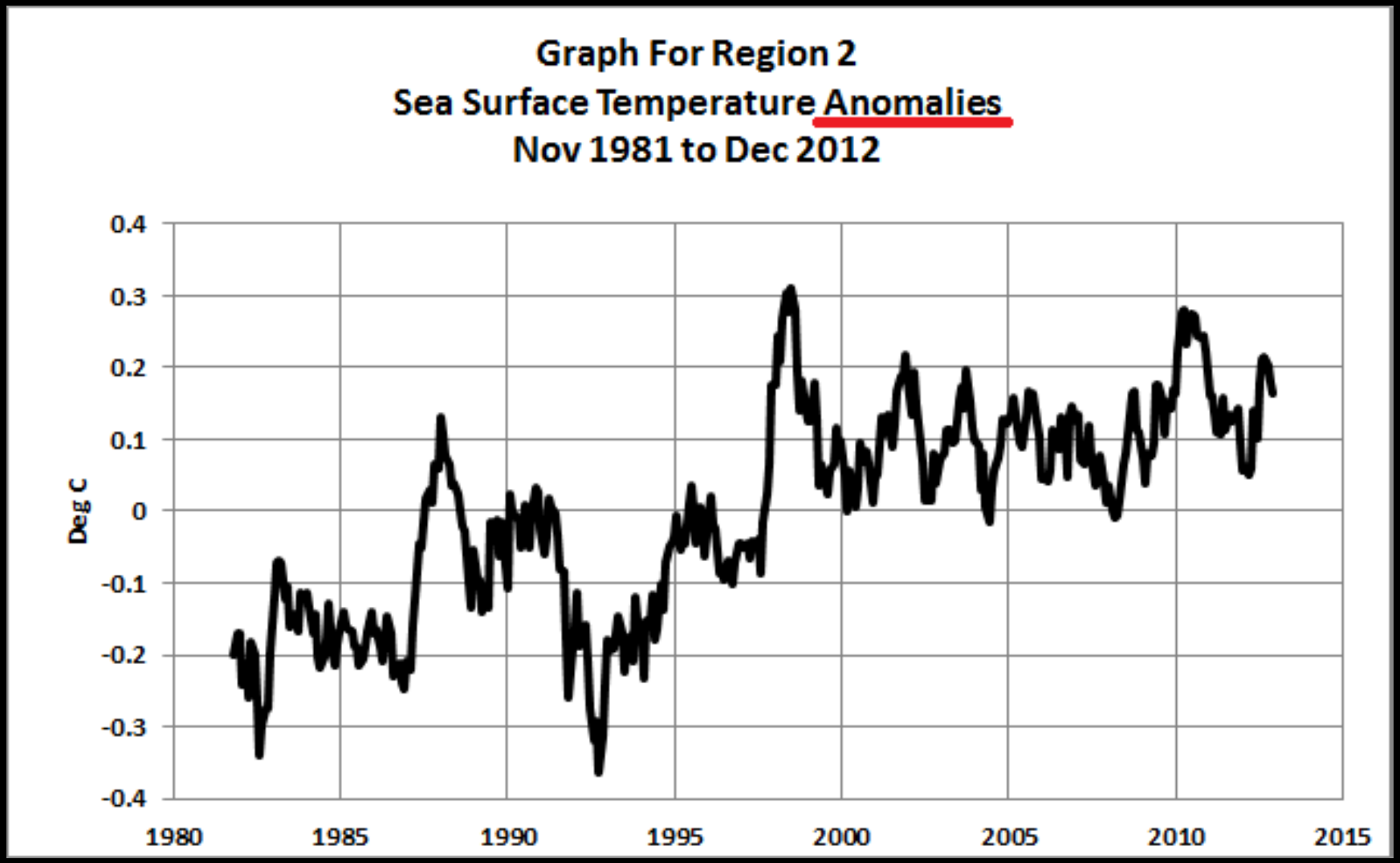




The First Few Graphs are of Satellite-Era Sea Surface Temperature Anomalies

- The Oceans Cover About 70% of the Surface of the Globe. Land Surface Air Temperatures Simply Mimic and Exaggerate the Variations in Sea Surface Temperatures. Therefore, the Causes of Ocean Warming are Very Important.
- We're Using the Best Sea Surface Temperature Dataset Available—NOAA's Optimum Interpolation Sea Surface Temperature Data.
  - Corrections Have Been Made for Satellite Biases.
  - Because This Dataset Is Based Primarily on Data from Satellites, it Starts in November 1981. That Gives Us 31 Years of Excellent Data.

Don't Let the Term Anomalies Concern You



Don't Let the Term Anomalies Concern You

- Anomalies Represent the Difference Between a Monthly Temperature and the Average Temperature for that Month During a Reference Period (1981-2010)

- In Other Words, Anomalies Are Departures from the Averages of a Reference Period—Sometimes Said to be Departures from "Normal".

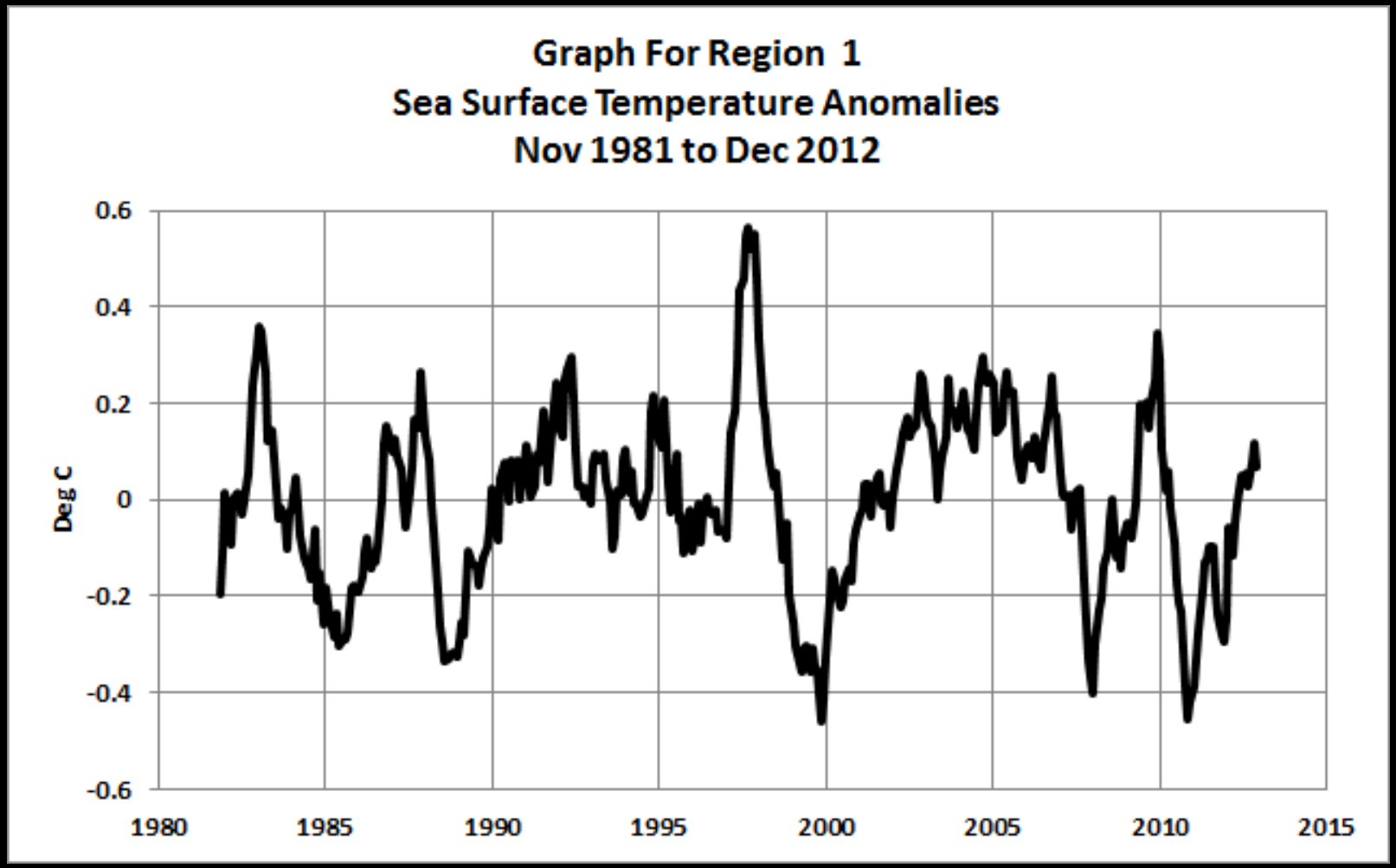
- The Reference Period of 1981-2010 is the Default Base Period at the Data Source—the KNMI Climate Explorer.

One More Note Before We Start

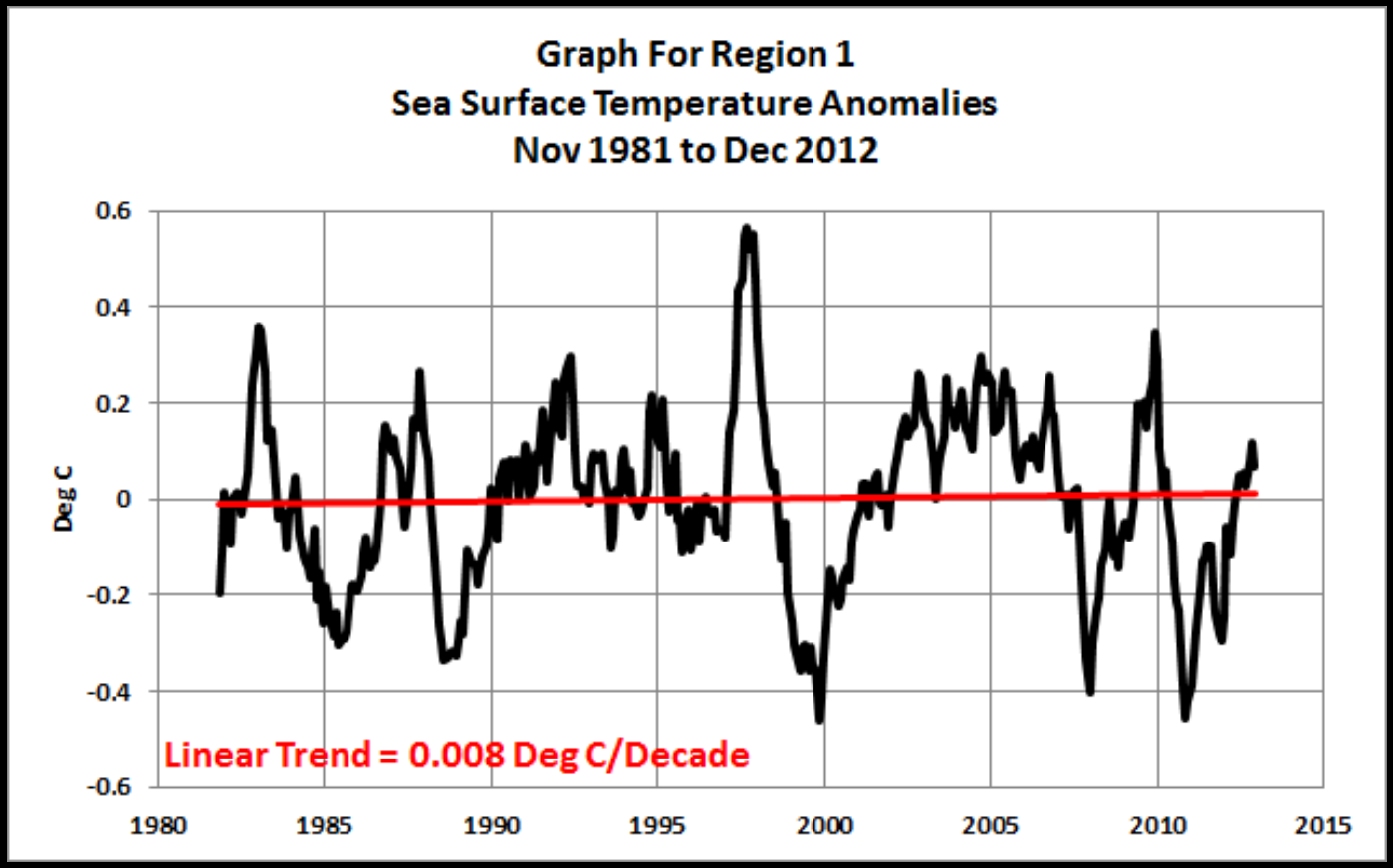
- There Are Additional Links to the Data Source Near the End of the Presentation, and Instructions for Downloading It, So You Can Verify What's Presented in the Graphs

Let's Begin
The Manmade Global Warming Challenge

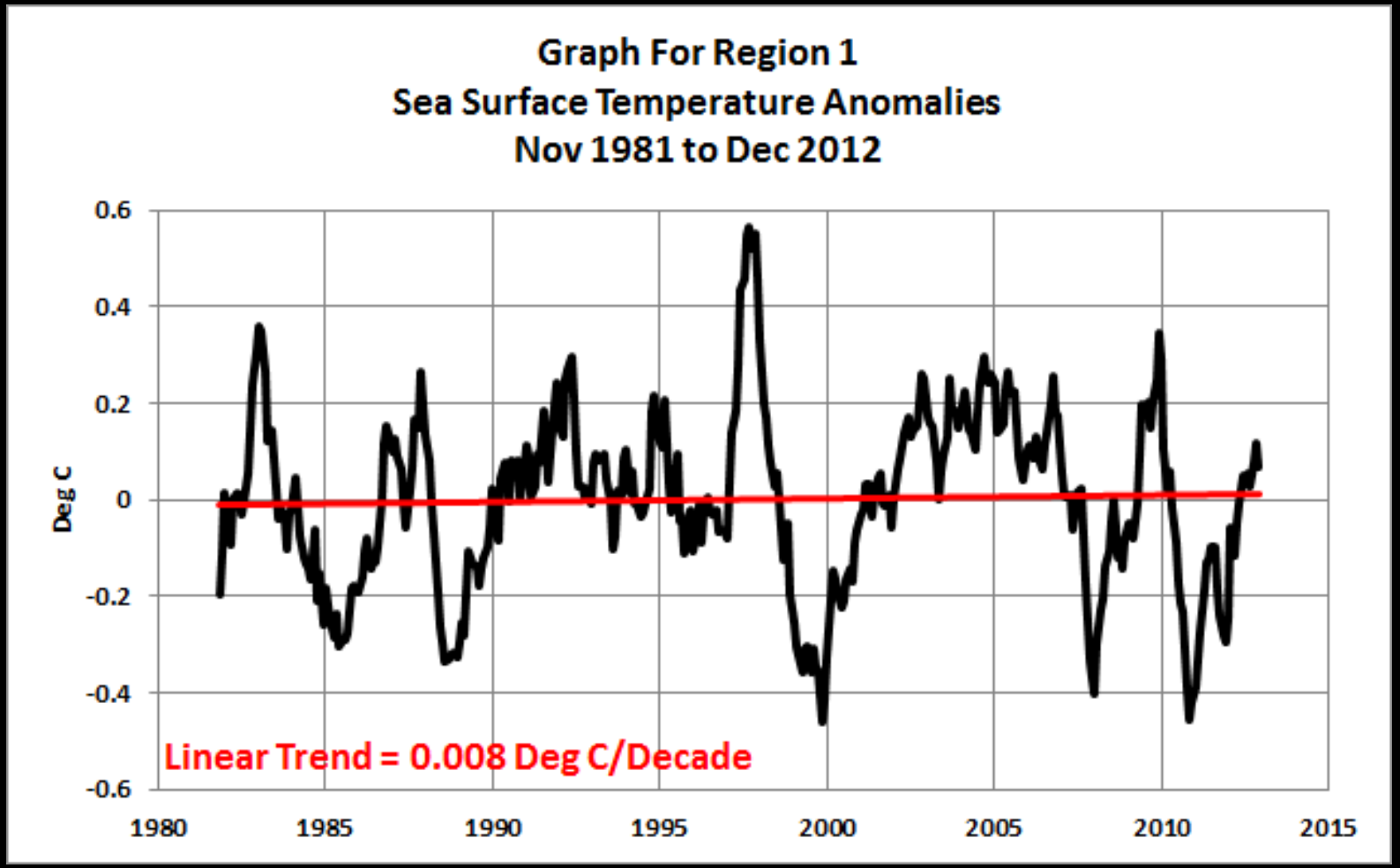
Can You Find the Manmade Global Warming Component Here?



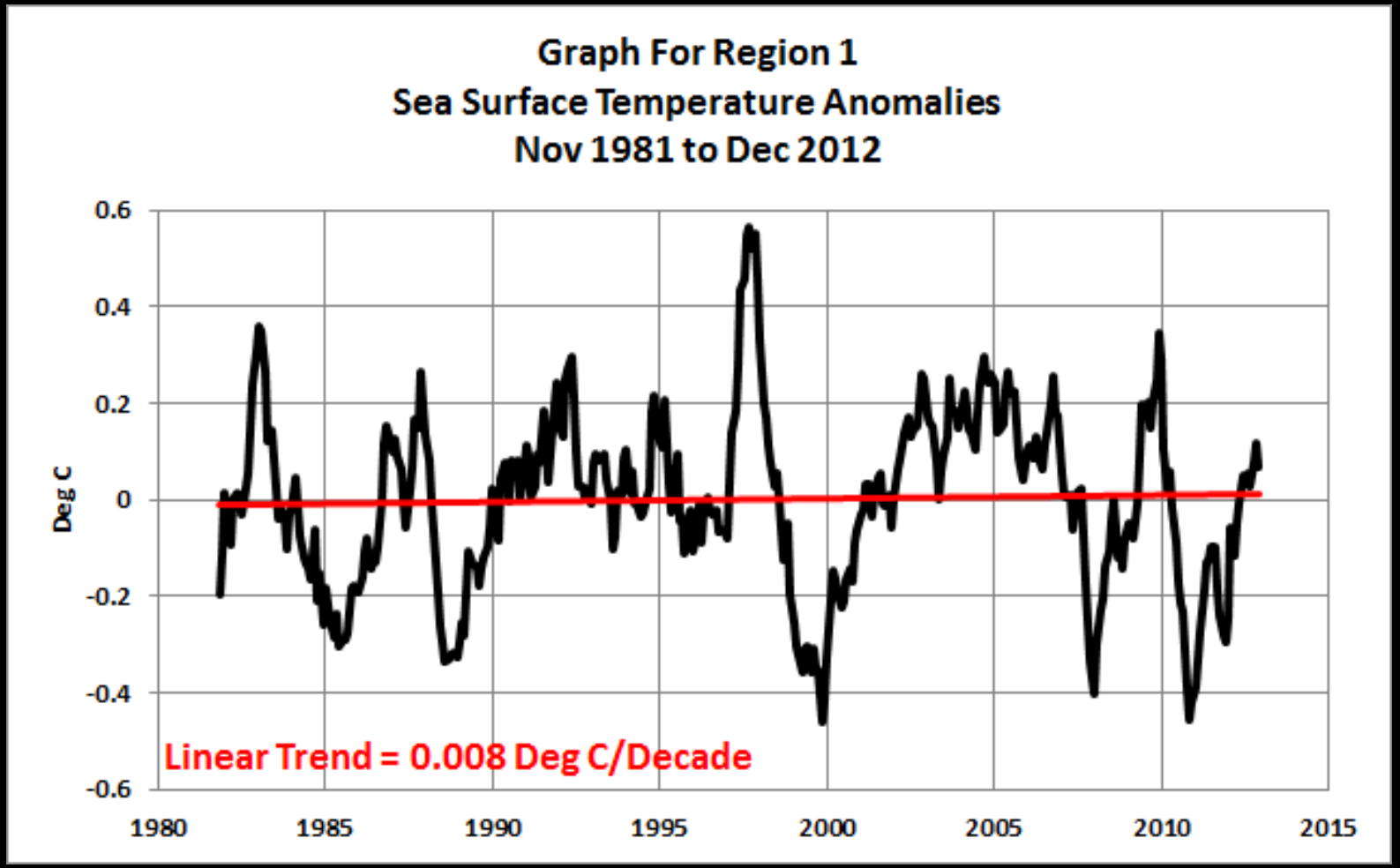
That Would be Very Difficult! Based on the Linear Trend, Sea Surface Temperatures in This Region Have NOT Warmed in 31 Years.



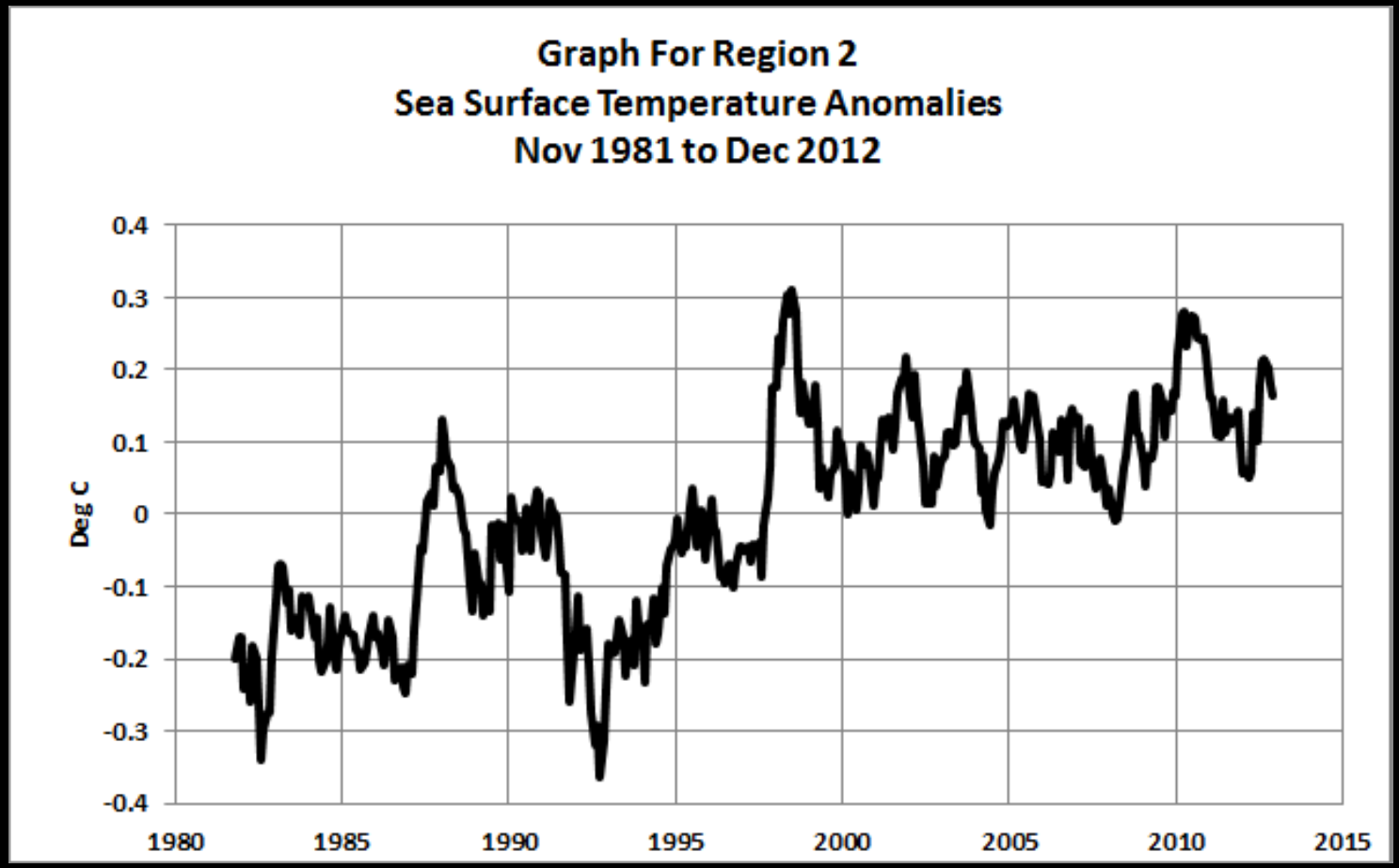
A Linear Trend of 0.008 Deg C/Decade is Basically Flat



Does This Agree with Your Understanding of Manmade Global Warming?

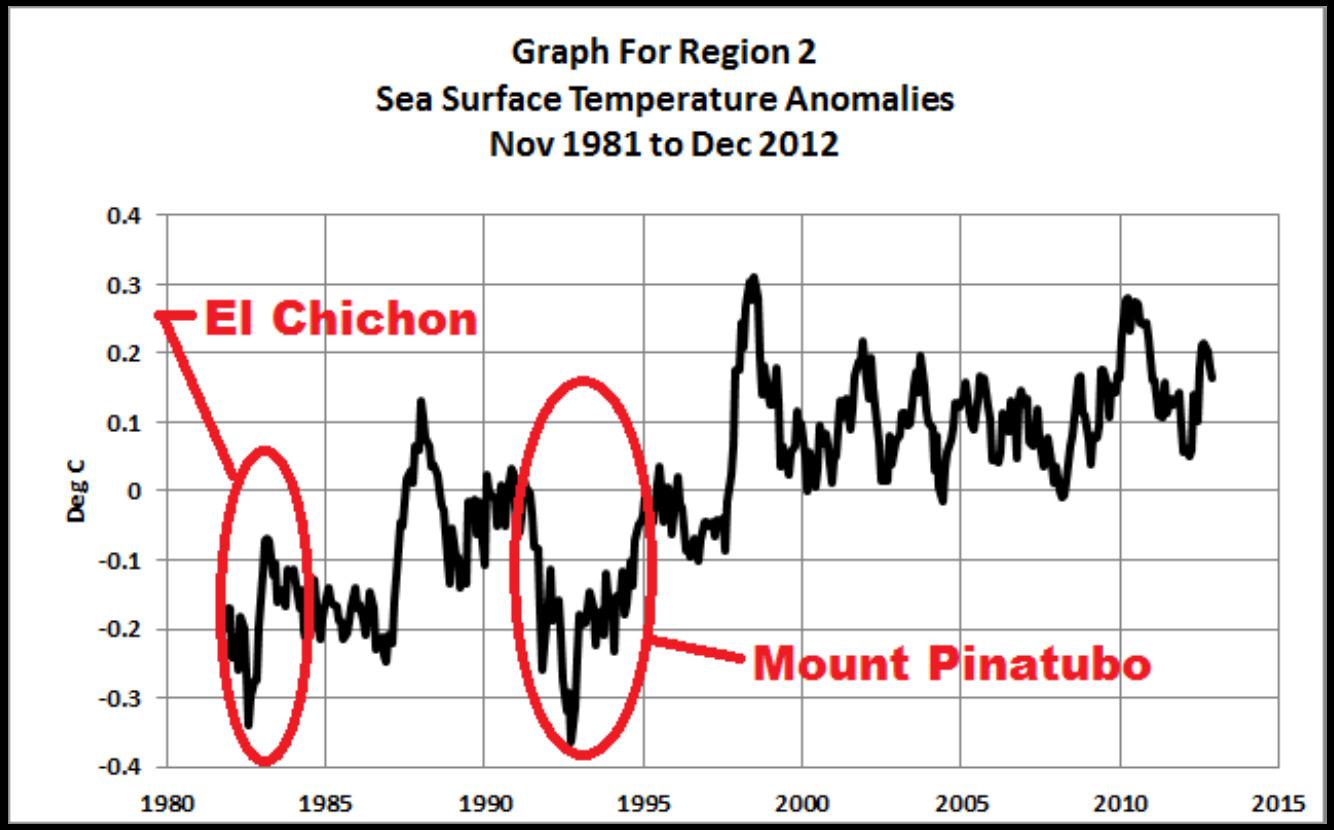


Next Graph - Can You Find the Manmade Global Warming Component Here?

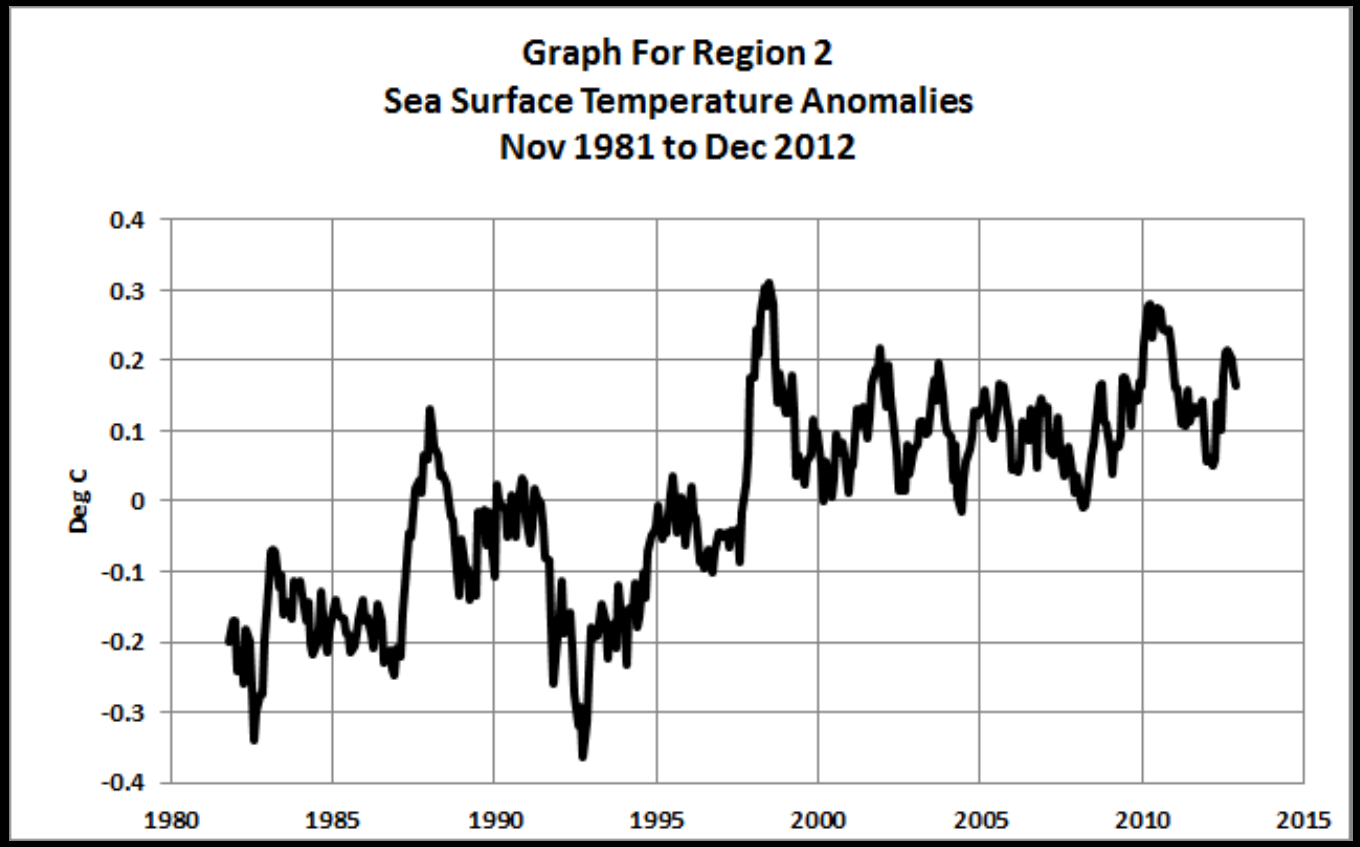


Sun-Blocking Aerosols from Two Volcanic Eruptions Temporarily Cooled the Sea Surface Temperature Anomalies Here

- El Chichon in 1982
- Mount Pinatubo in 1991

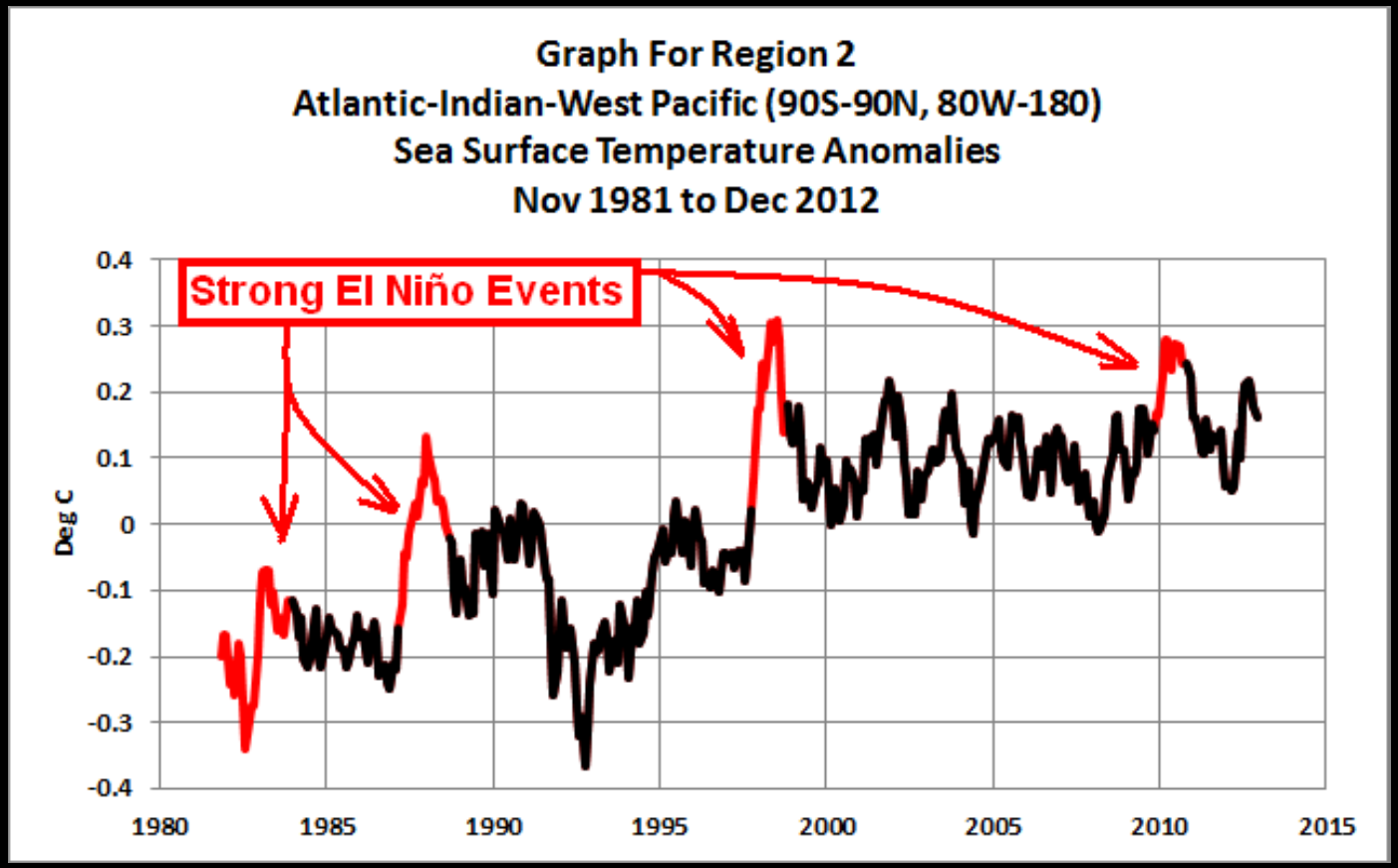


With Those Dips and Rebounds Explained, You Might Be Thinking, This Region Warmed, So Manmade Greenhouse Gases Must Have Caused the Warming

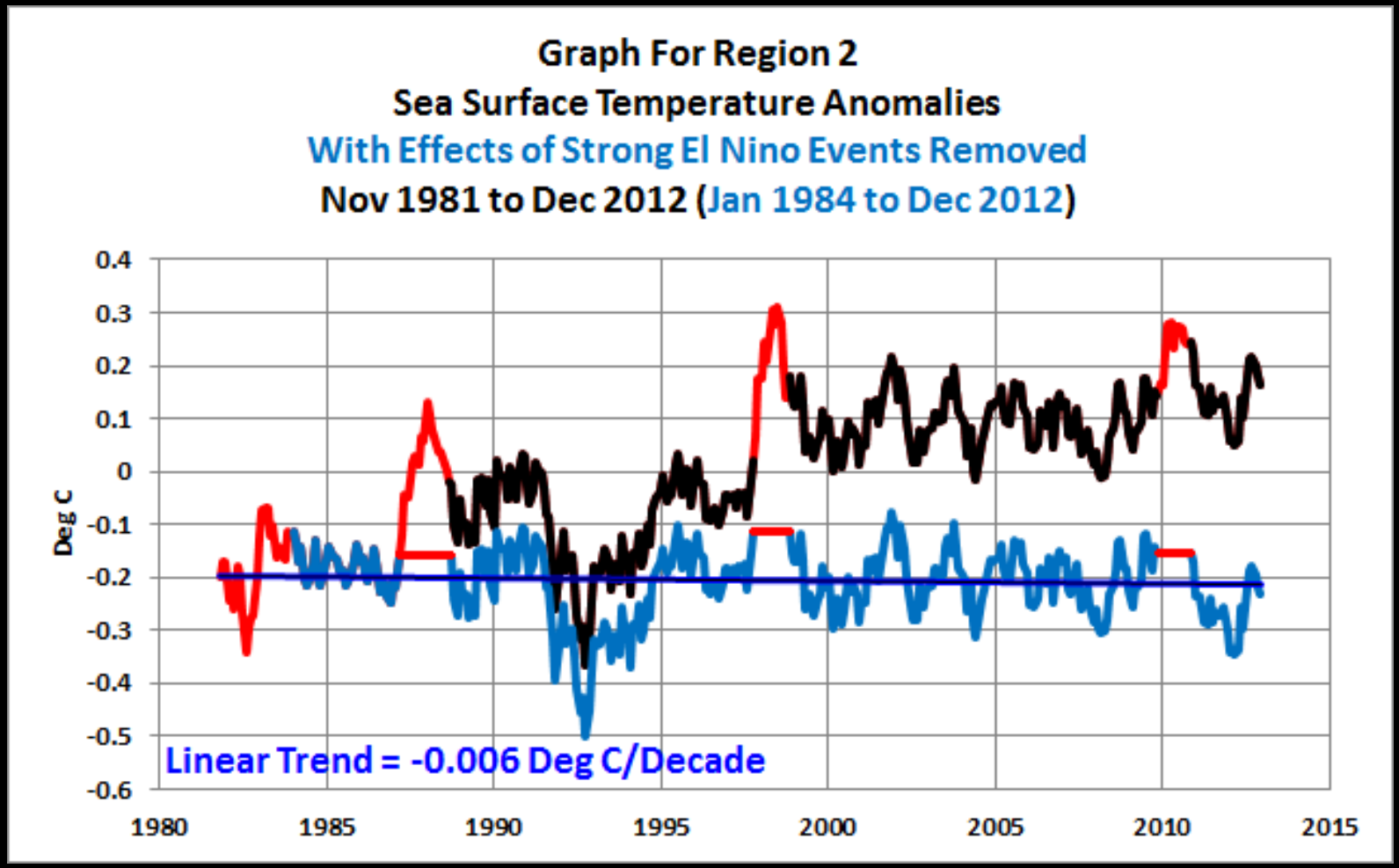


Please Don't Jump to Conclusions!!

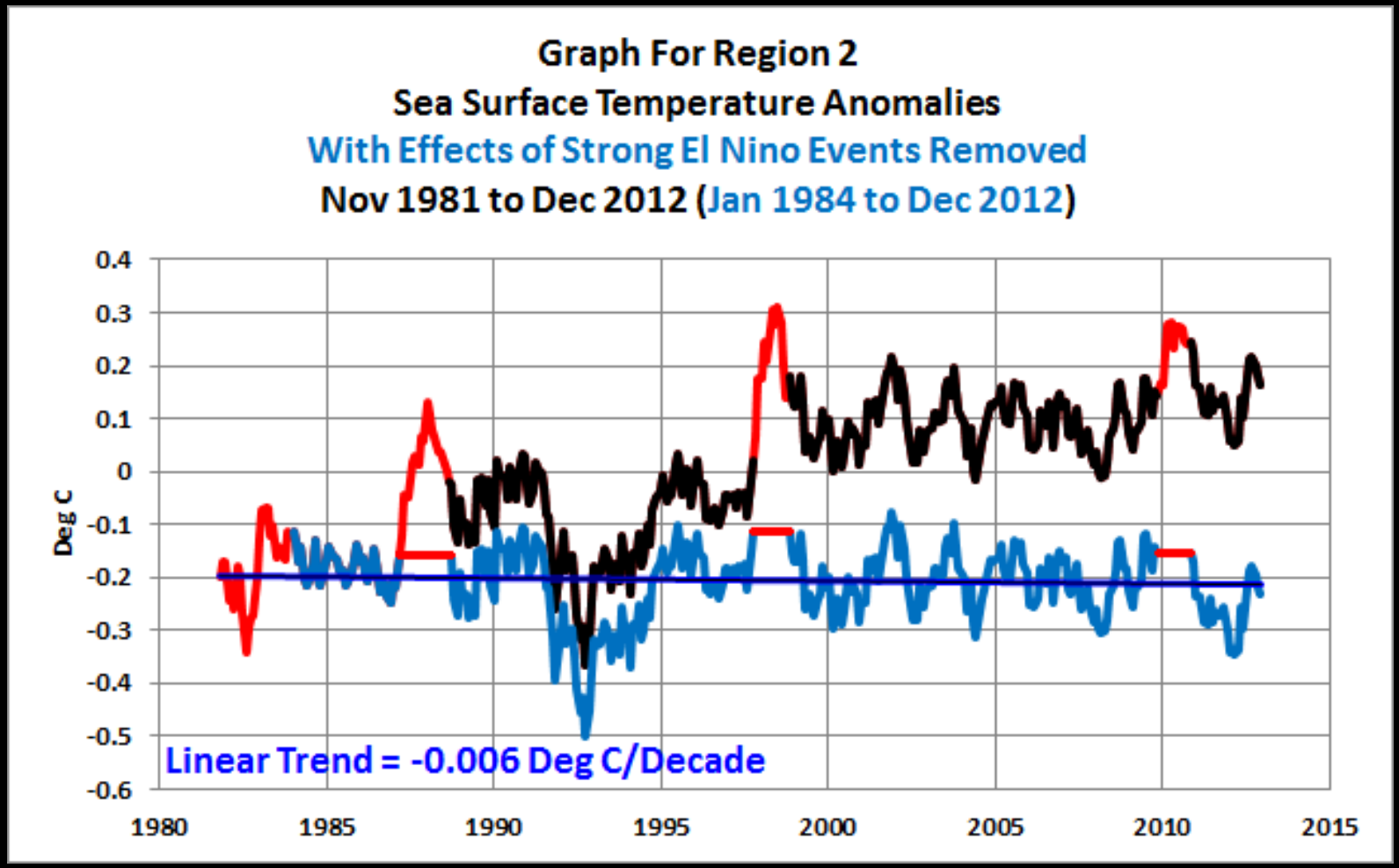
Sea Surface Temperatures in This Region Warmed Only in Response to the Strong, Naturally Occurring and Naturally Fueled El Niño Events



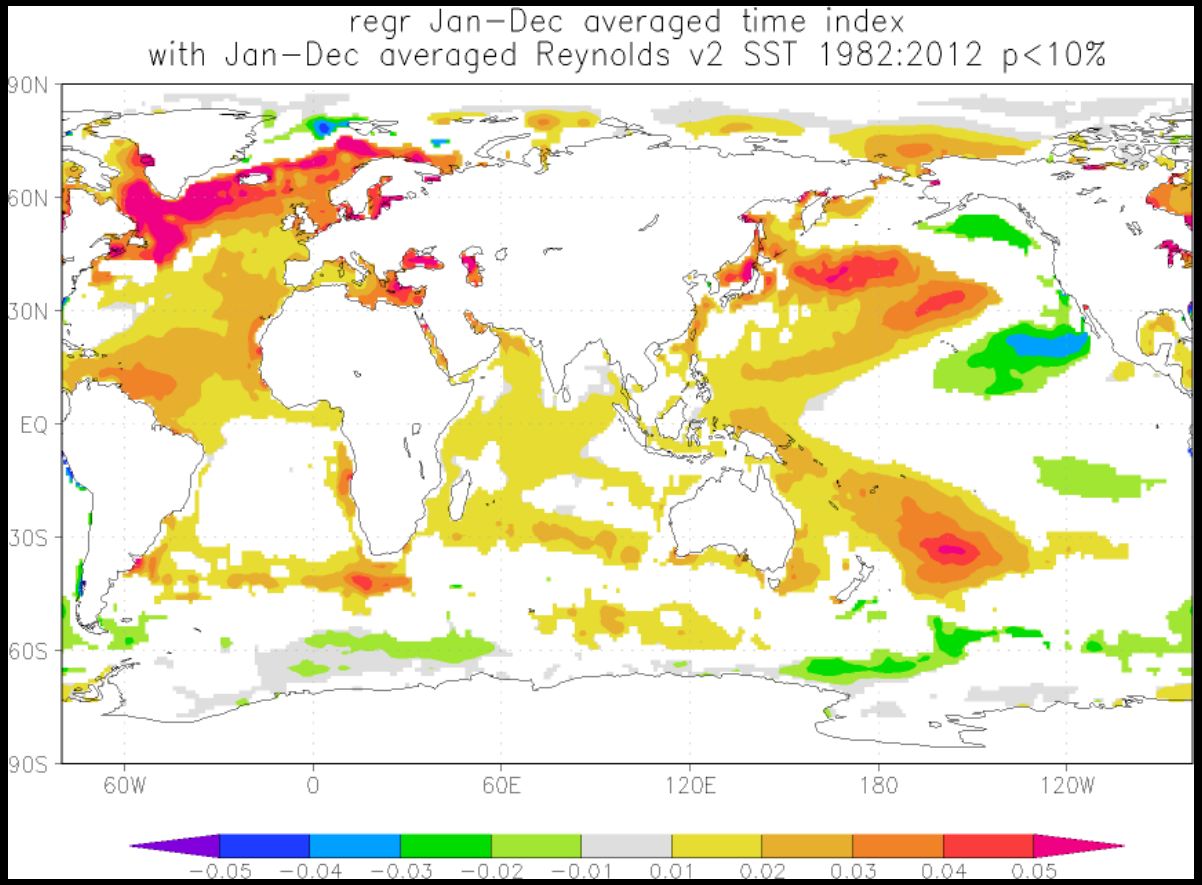
That Fact is Even More Clear if We Remove the Impacts of Those Major El Niño Events



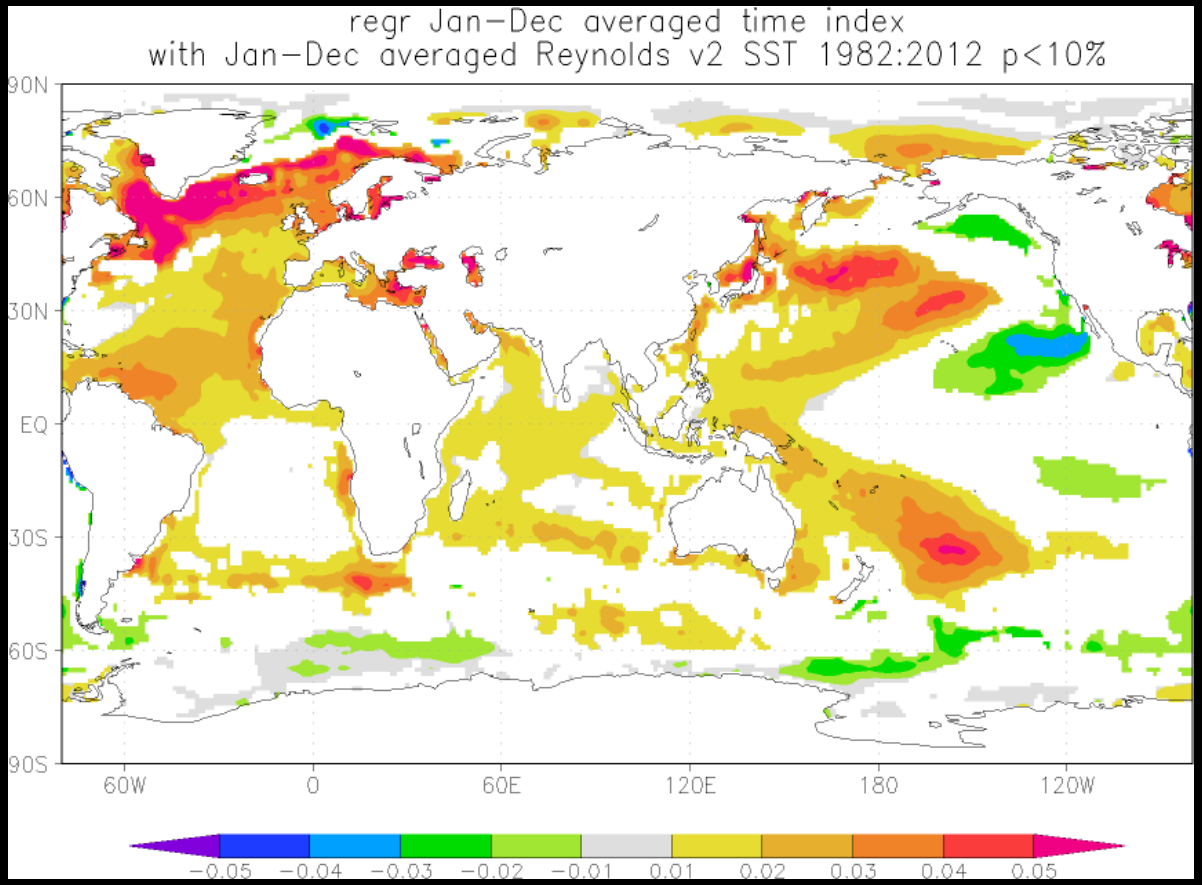
Does This Agree with Your Understanding of Manmade Global Warming?



Those Two Regions Captured the Sea Surface Temperature Data of the Global Oceans from Pole to Pole



So We've Just Illustrated the Causes of the Warming of the Global Sea Surface Temperatures for the Past 31 Years, and They Were Strong Naturally Fueled El Niño Events—Not Manmade Greenhouse Gases.



The IPCC's Climate Models Say Only Manmade Greenhouse Gases Can Explain the Warming During that Period, But the Data DO NOT Agree.

9.4.1.2 Simulations of the 20th Century

There are now a greater number of climate simulations from AOGCMs for the period of the global surface instrumental record than were available for the TAR, including a greater variety of forcings in a greater variety of combinations. These simulations used models with different climate sensitivities, rates of ocean heat uptake and magnitudes and types of forcings (Supplementary Material, Table S9.1). Figure 9.5 shows that simulations that incorporate anthropogenic forcings, including increasing greenhouse gas concentrations and the effects of aerosols, and that also incorporate natural external forcings provide a consistent explanation of the observed temperature record, whereas simulations that include only natural forcings do not simulate the warming observed over the last three decades. A variety of different forcings is used in these simulations. For example, some anthropogenically forced simulations include both the direct and indirect effects of sulphate aerosols whereas others include just the direct effect, and the aerosol forcing that is calculated within models differs due to differences in the representation of physics. Similarly, the effects of tropospheric and stratospheric ozone changes are included in some simulations but not others, and a few simulations include the effects of carbonaceous aerosols and land use changes, while the naturally forced simulations include different representations of changing solar and volcanic forcing. Despite this additional uncertainty, there is a clear separation in Figure 9.5 between the simulations with anthropogenic forcings and those without.

Global mean and hemispheric-scale temperatures on multi-decadal time scales are largely controlled by external forcings (Stott et al., 2000). This external control is demonstrated by ensembles of model simulations with identical forcings (whether anthropogenic or natural) whose members exhibit

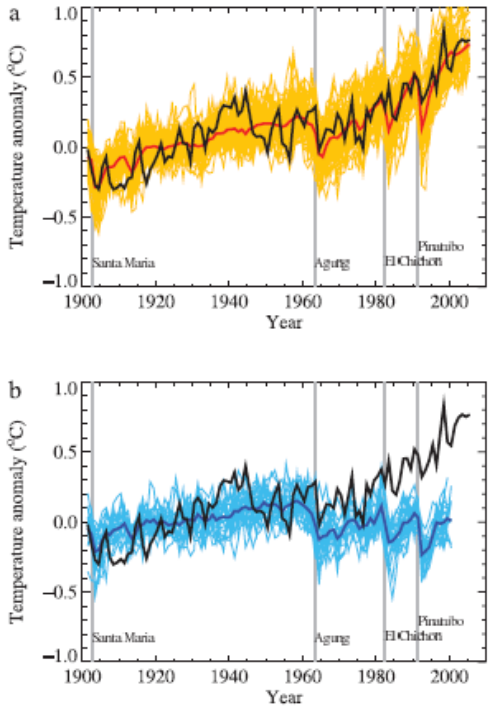
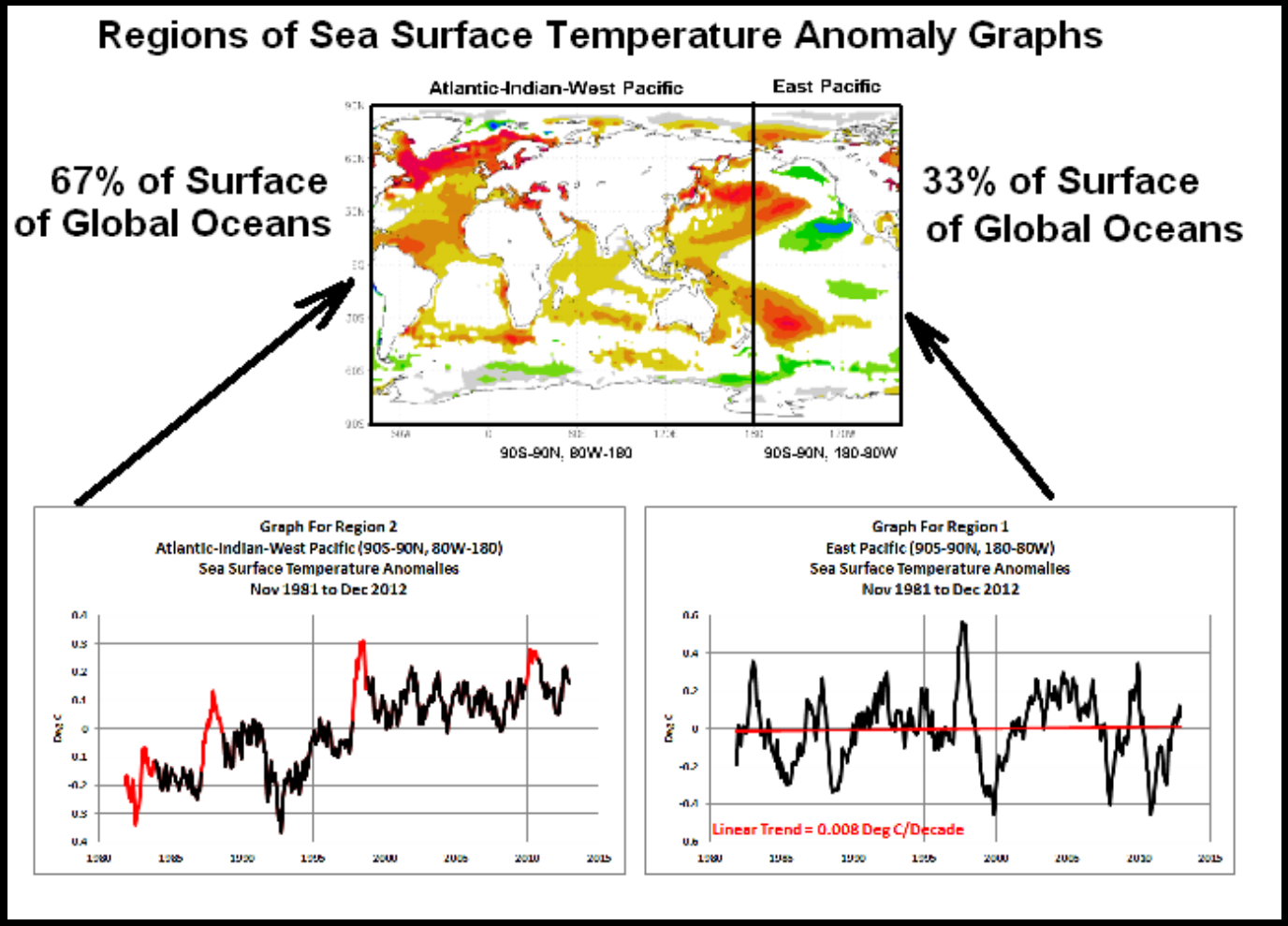
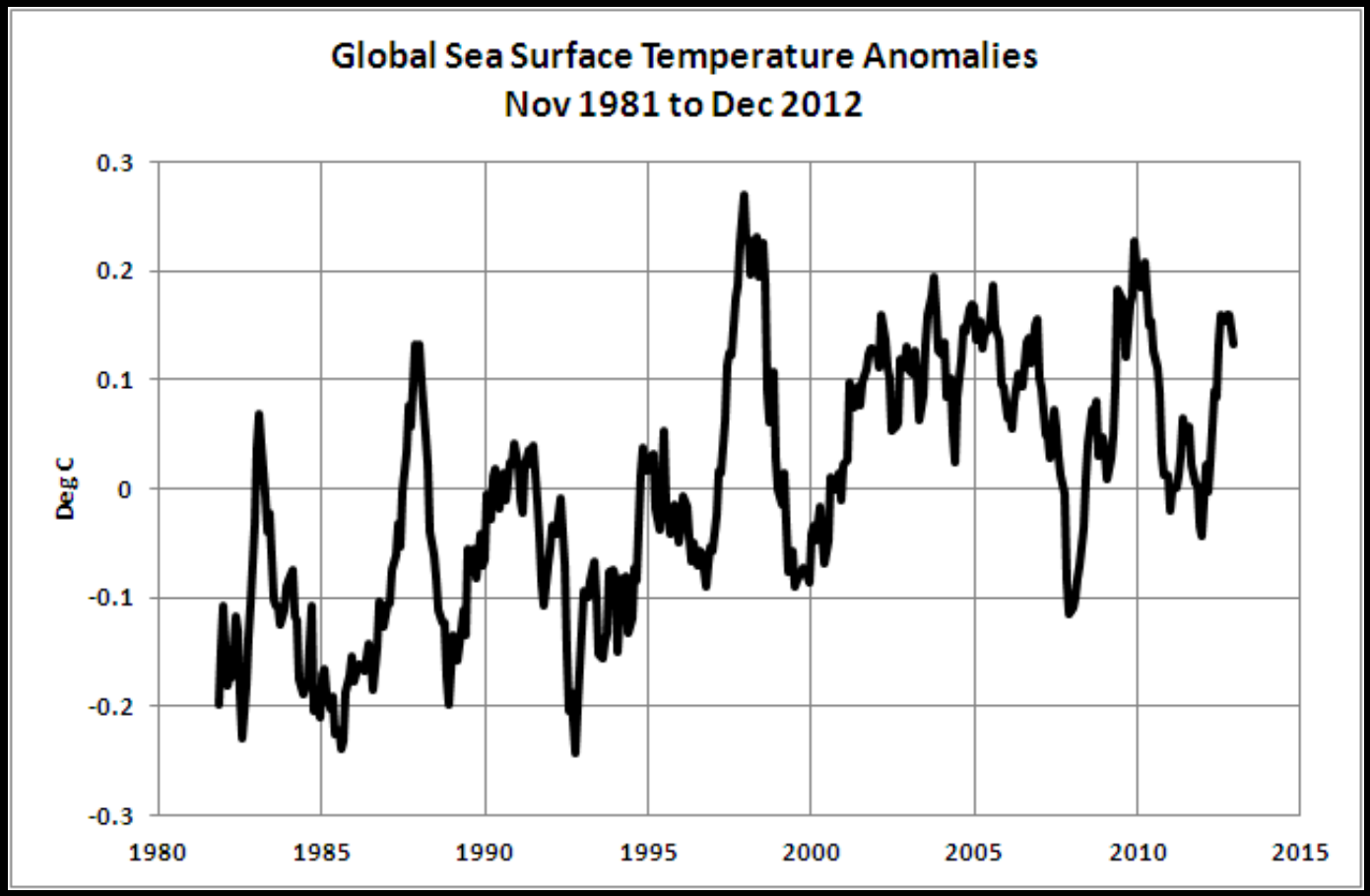


Figure 9.5. *Comparison between global mean surface temperature anomalies (°C) from observations (black) and AOGCM simulations forced with (a) both anthropogenic*

The Two Graphs Represent (From Pole to Pole) the Atlantic, Indian and West Pacific Oceans and the East Pacific Ocean

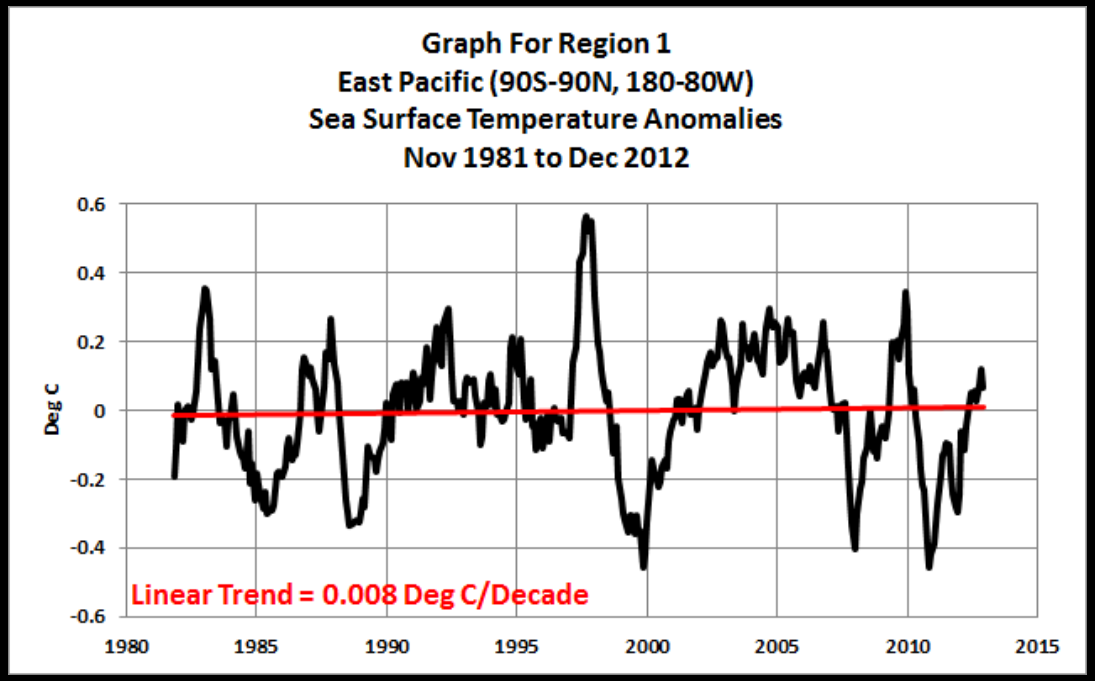


When You Combine the Two Subsets (One Warming Naturally And One Not Warming), the Global Sea Surface Temperature Data Give the MISLEADING APPEARANCE of Manmade Global Warming.



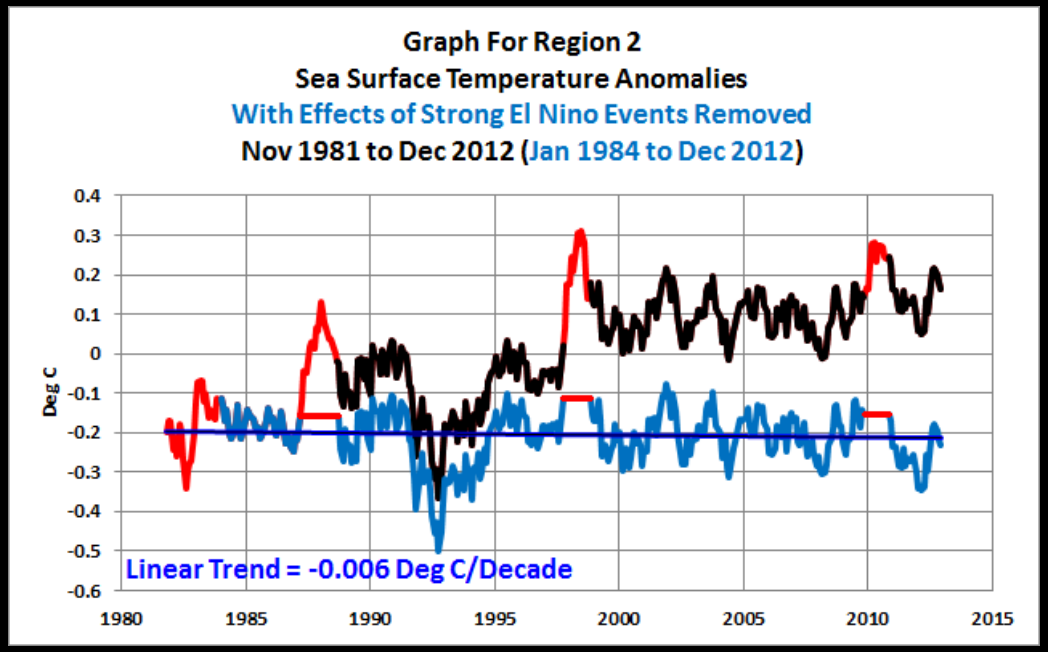
Looking for Something Really Challenging? Try to Find Climate Model-Based Scientific Studies That Explain Specifically:

- Why the Sea Surface Temperatures of the East Pacific Ocean Have Not Warmed in 31 Years



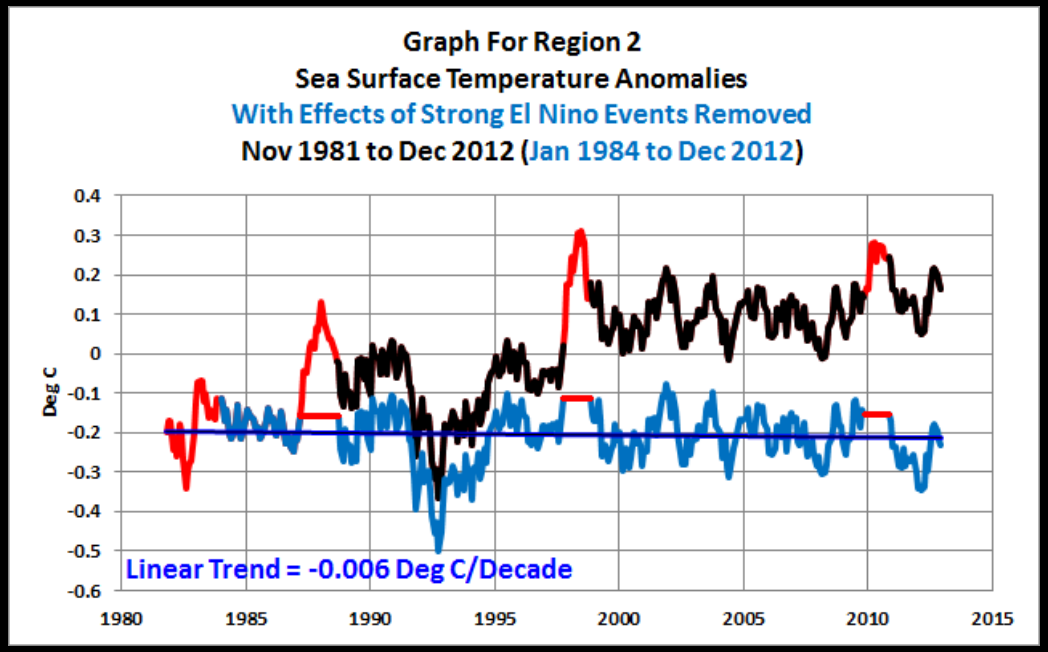
Looking for Something Really Challenging? Try to Find Climate Model-Based Scientific Studies That Explain Specifically:

- And Why the Sea Surface Temperatures of the Atlantic, Indian and West Pacific Oceans Only Warmed During Strong El Niño Events



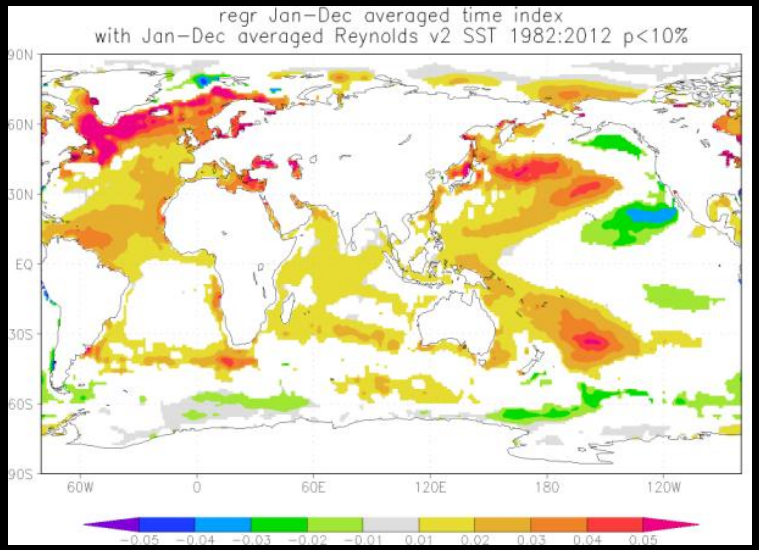
The Upward Shifts Presented by the Data Are Caused by Naturally Fueled Ocean Processes. Therefore, Generalities Such as "Short-Term Noise Versus Long-Term Signal" Are Not Explanations.

- Those Generalities Are Simply Poor Excuses and Failed Attempts at Misdirection!



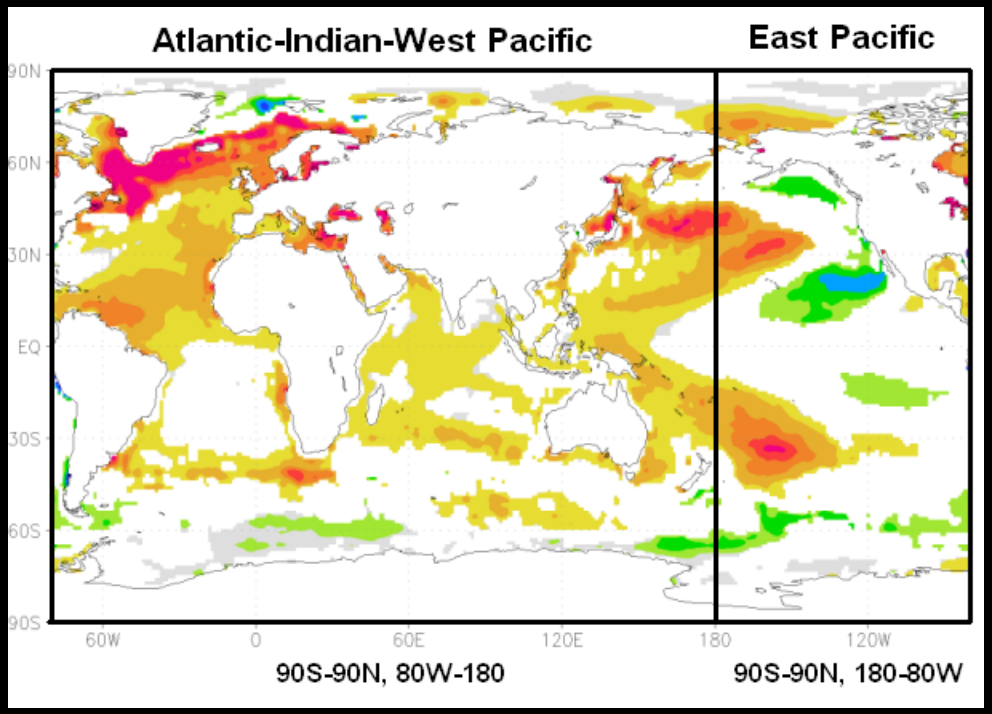
Why Did We Divide the Global Oceans into Two Subsets?

- Researchers Studying Global Warming Often Prepare Maps that Show Where the Sea Surface Temperatures Have Warmed and How Much They've Warmed During Given Time Periods.
  - This Map Presents the Linear Trends from 1982 to 2012. The Scale is Deg C Per Year.



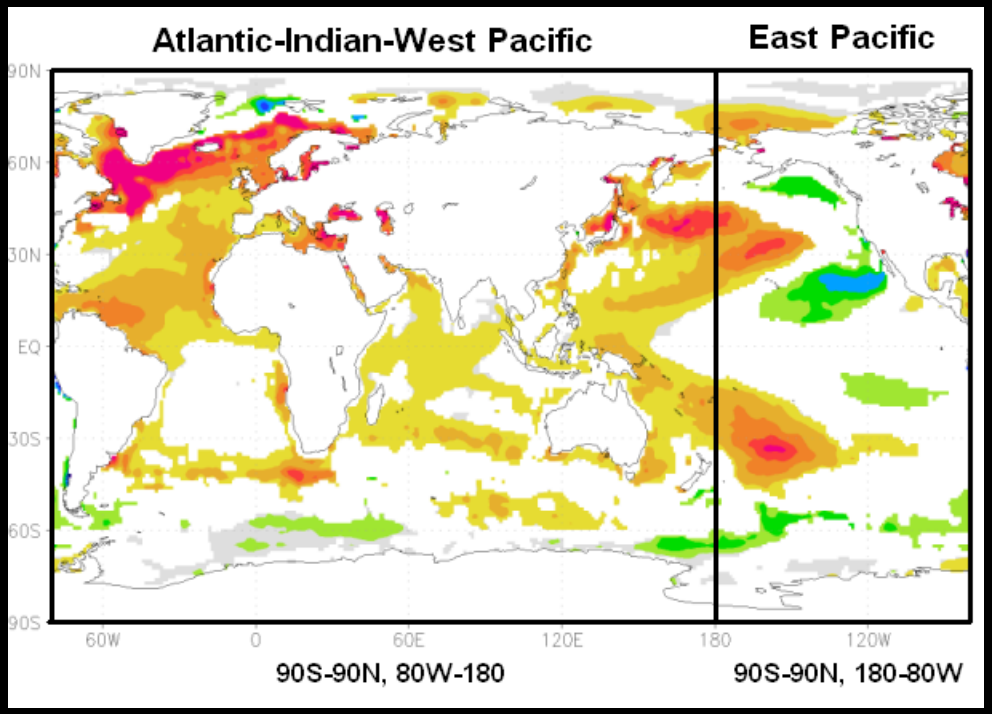
Why Did We Divide the Global Oceans into Two Subsets?

- The Trend Map Clearly Shows that Much of the Eastern Pacific Ocean Has Not Warmed Since 1982, While the Rest of the Global Oceans Have Warmed.



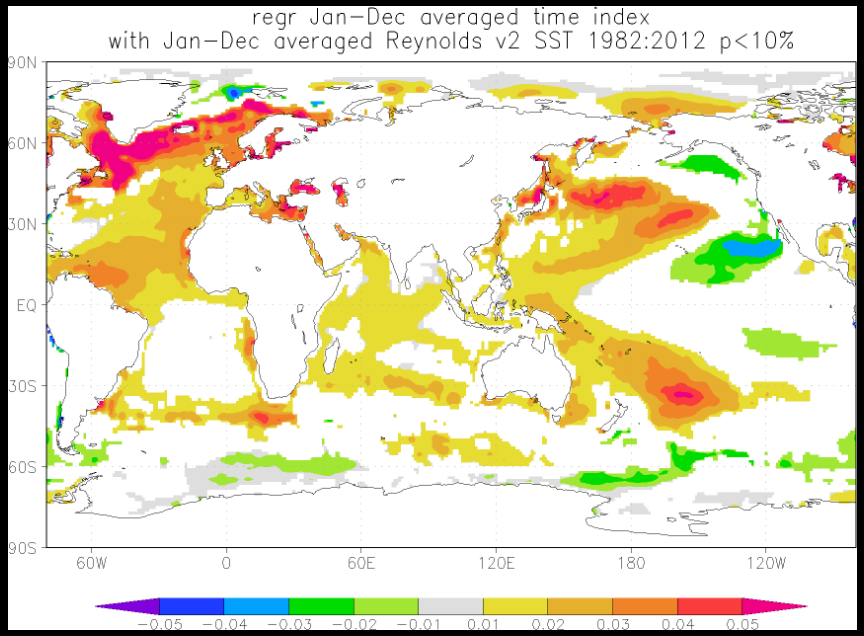
Why Did We Divide the Global Oceans into Two Subsets?

- One Might Think That Climate Modelers Would Be Curious about How and Why And Where the Oceans Have Warmed

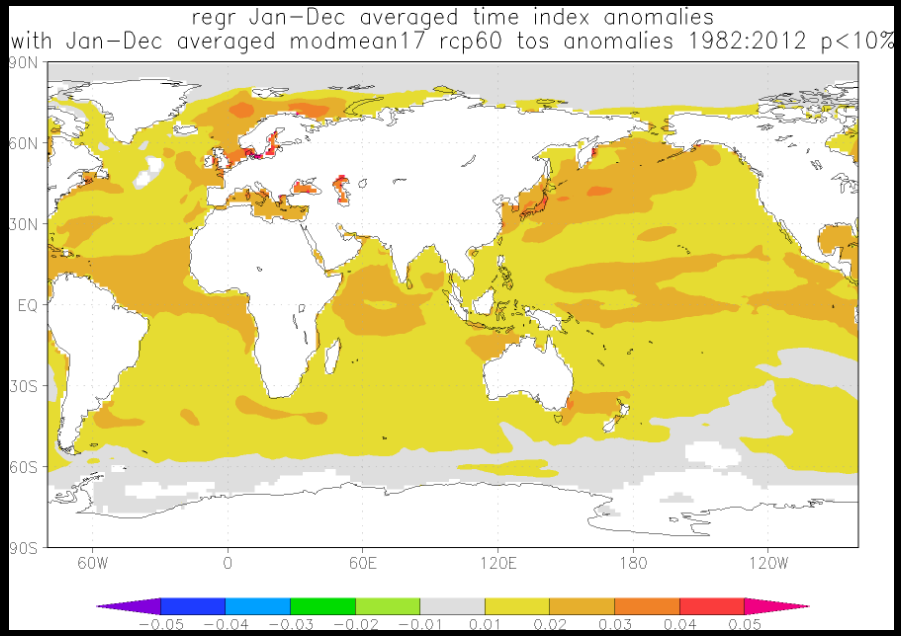


But the Multi-Model Mean of the Climate Models Prepared for the IPCC's Upcoming 5th Assessment Report Shows the Models Have No Skill at Being Able to Simulate the Patterns in Which the Sea Surface Temperatures Have Warmed

OBSERVED TRENDS

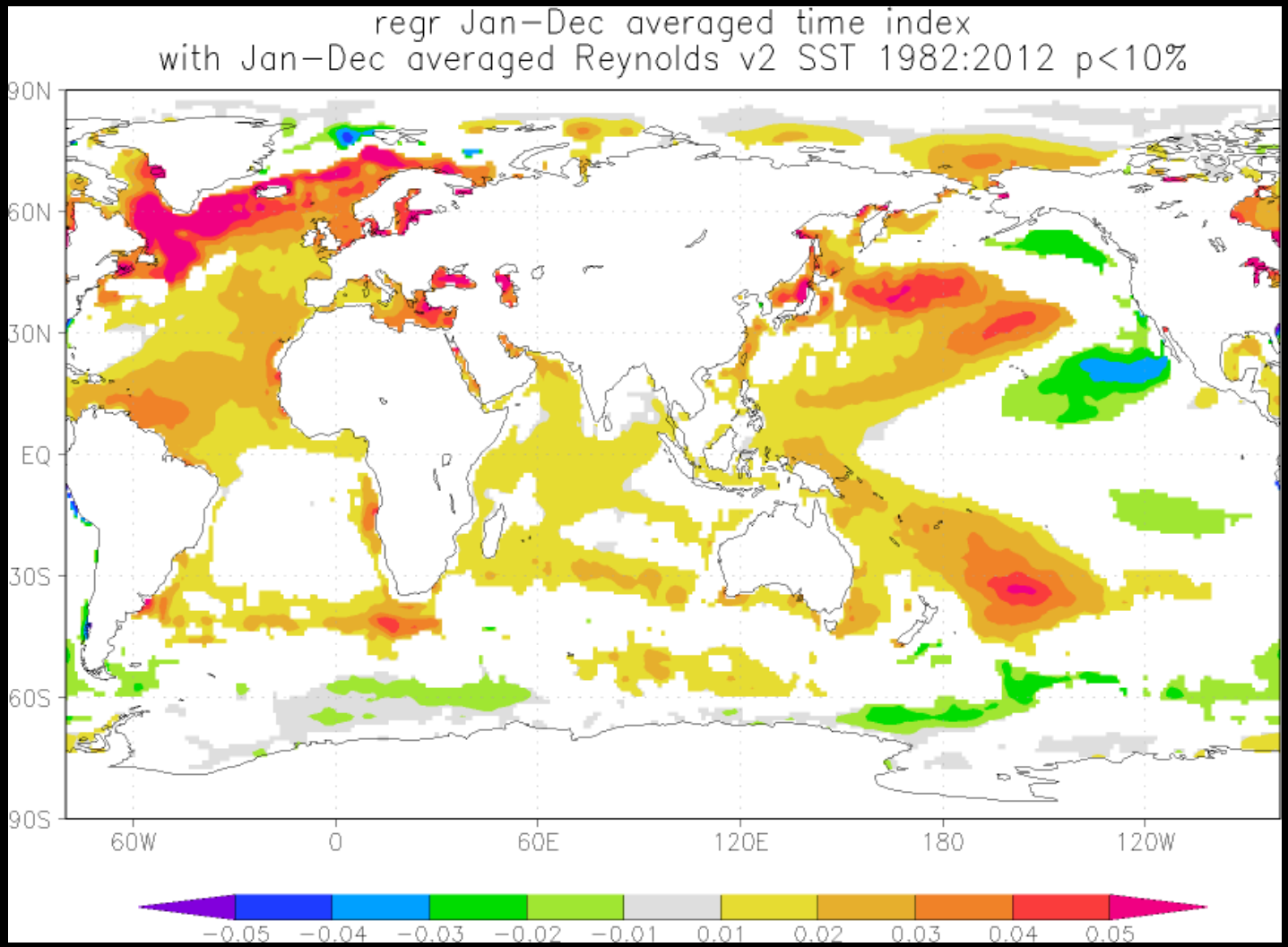


MODELED TRENDS



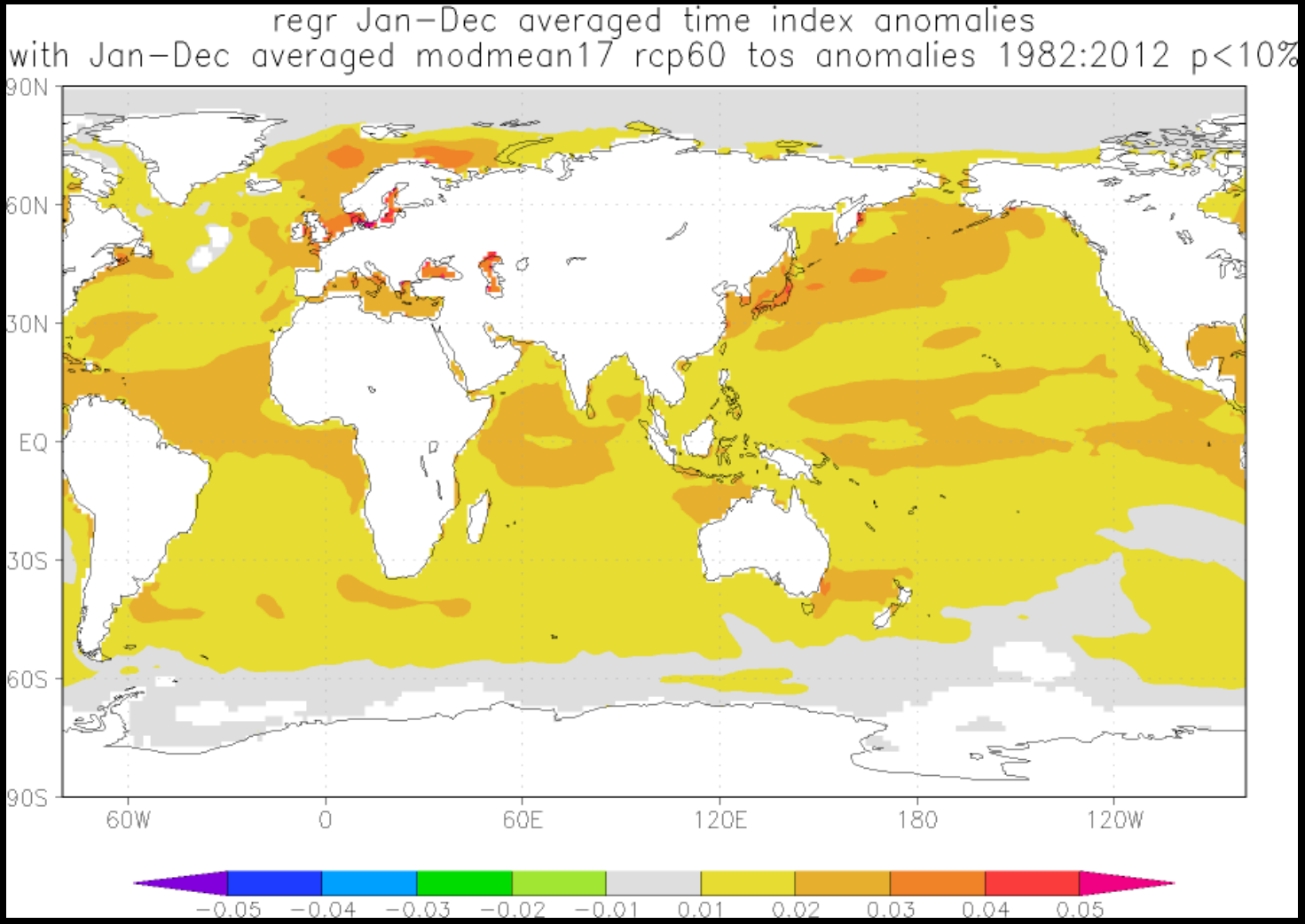
Full Sized

OBSERVED TRENDS



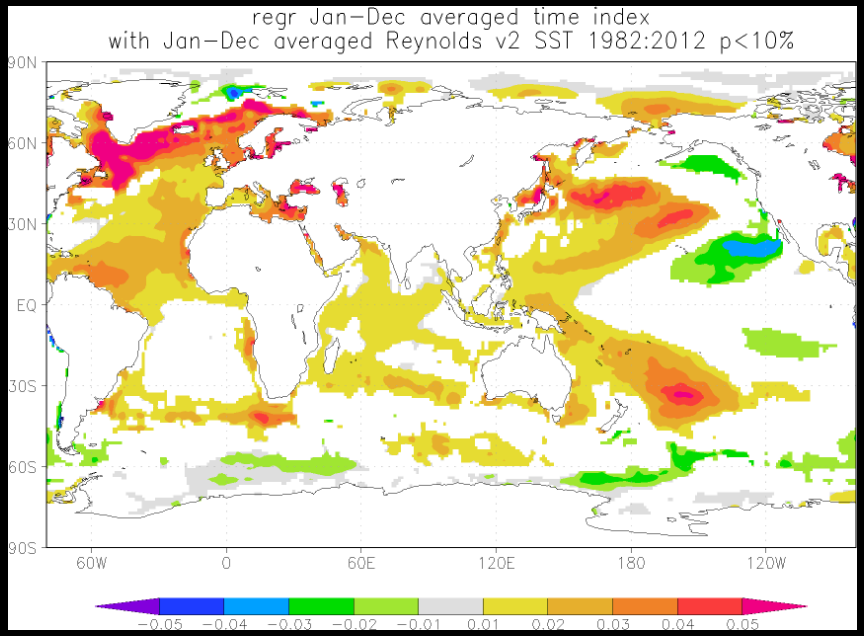
Full Sized

MODELED TRENDS

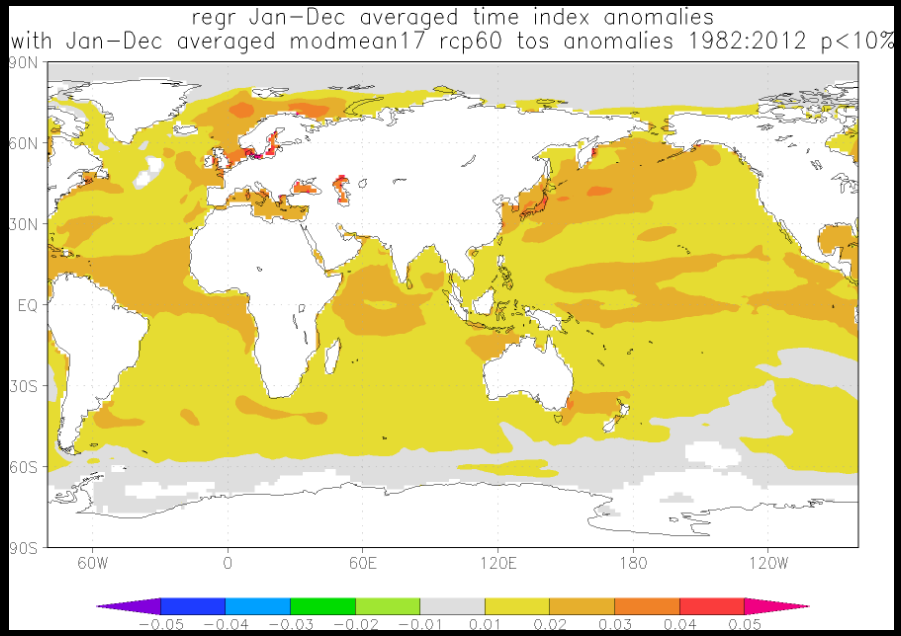


Makes One Wonder How The IPCC Will Be Able to Forecast Regional Climate for the Next Few Decades with Any Confidence

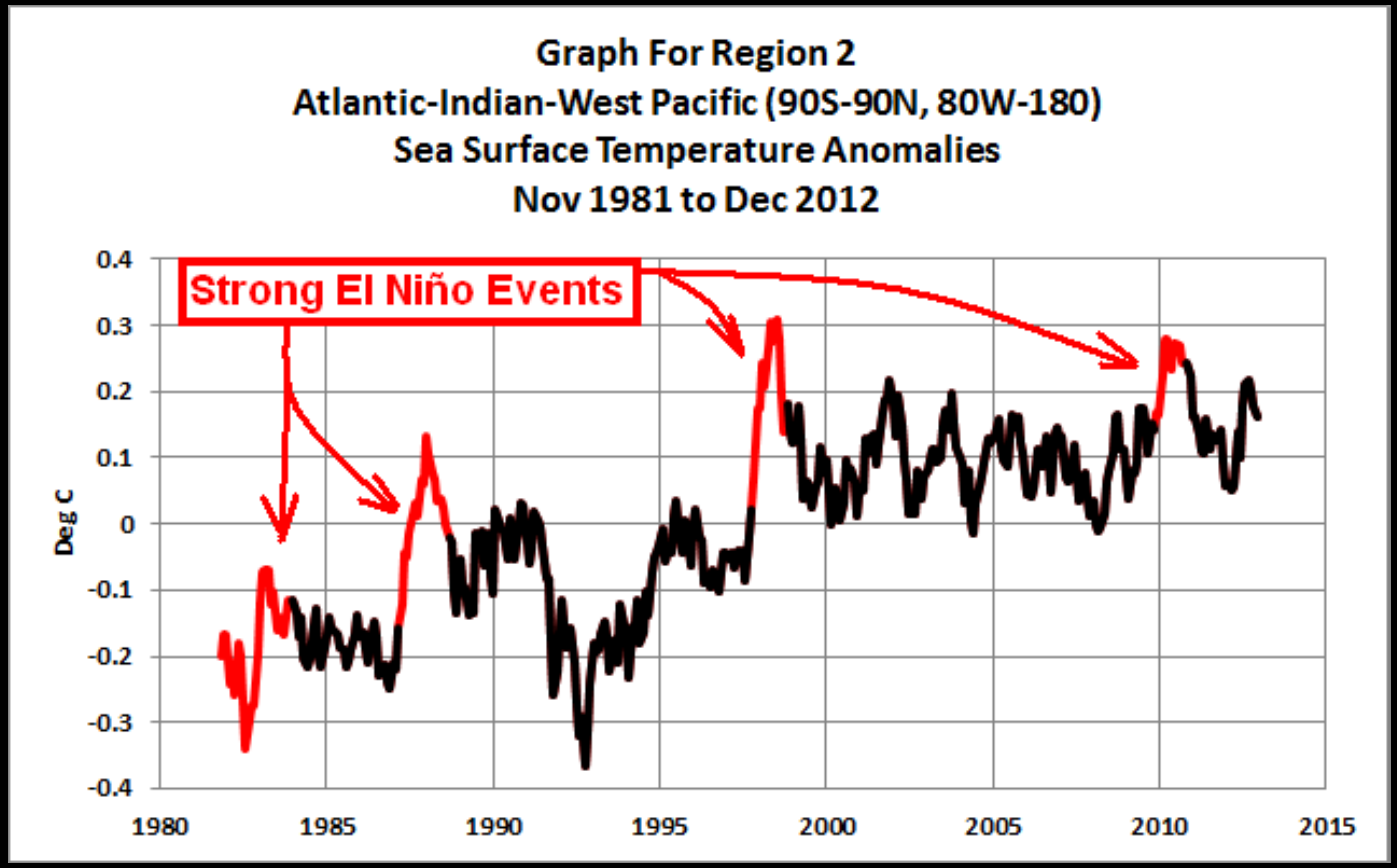
OBSERVED TRENDS



MODELED TRENDS



If El Niño Events Are New to You, You're Likely Wondering How Strong El Niño Events Could Cause Upward Shifts in the Sea Surface Temperatures for Much of the Global Oceans



If El Niño Events Are New to You, You're Likely Wondering How Strong El Niño Events Could Cause Upward Shifts in the Sea Surface Temperatures for Much of the Global Oceans

- First, A Moderately Complex Explanation
- A Strong El Niño Releases A Vast Amount of Naturally Created Thermal Energy, in the Form of Warm Water, from Below the Surface of the Western Tropical Pacific and Spreads that Warm Water Across the Surface of the Central and Eastern Tropical Pacific.
  - Refer to the Animation of Sea Level Anomalies Here. The Animation is Part of a Video (tpglobal.mpeg) Formerly Available from the Jet Propulsion Laboratory.

If El Niño Events Are New to You, You're Likely Wondering How Strong El Niño Events Could Cause Upward Shifts in the Sea Surface Temperatures for Much of the Global Oceans

- That Is, Much of the Warm Water That's Spread Across the Surface of the Eastern Tropical Pacific During an El Niño Had Been Below the Surface Before the El Niño. In Other Words, Before the El Niño That Warm Water Had Been Excluded from the SURFACE Temperature Record. During the El Niño, It's Included.

If El Niño Events Are New to You, You're Likely Wondering How Strong El Niño Events Could Cause Upward Shifts in the Sea Surface Temperatures for Much of the Global Oceans

- The El Niño Does Not Consume All of the Warm Water, and After the El Niño Peaks, the Warm Water That's Left Over from the El Niño Returns to the Western Tropical Pacific, with Much of It Remaining on the Surface. While There, It Counteracts the Effects of the Trailing La Niña.

If El Niño Events Are New to You, You're Likely Wondering How Strong El Niño Events Could Cause Upward Shifts in the Sea Surface Temperatures for Much of the Global Oceans

- Some of the Warm Water That Had Traveled East During the El Niño Remained Below the Surface. It is Returned to the Western Tropical Pacific Via a Phenomenon Called a Rossby Wave. That Leftover Warm Water Rises to the Surface with Time, Also Counteracting the La Nina.
  - Refer to the Second Animation of Sea Level Anomalies Here. The Animation is Also Part of a Video (tpglobal.mpeg) Formerly Available from the Jet Propulsion Laboratory.

If El Niño Events Are New to You, You're Likely Wondering How Strong El Niño Events Could Cause Upward Shifts in the Sea Surface Temperatures for Much of the Global Oceans

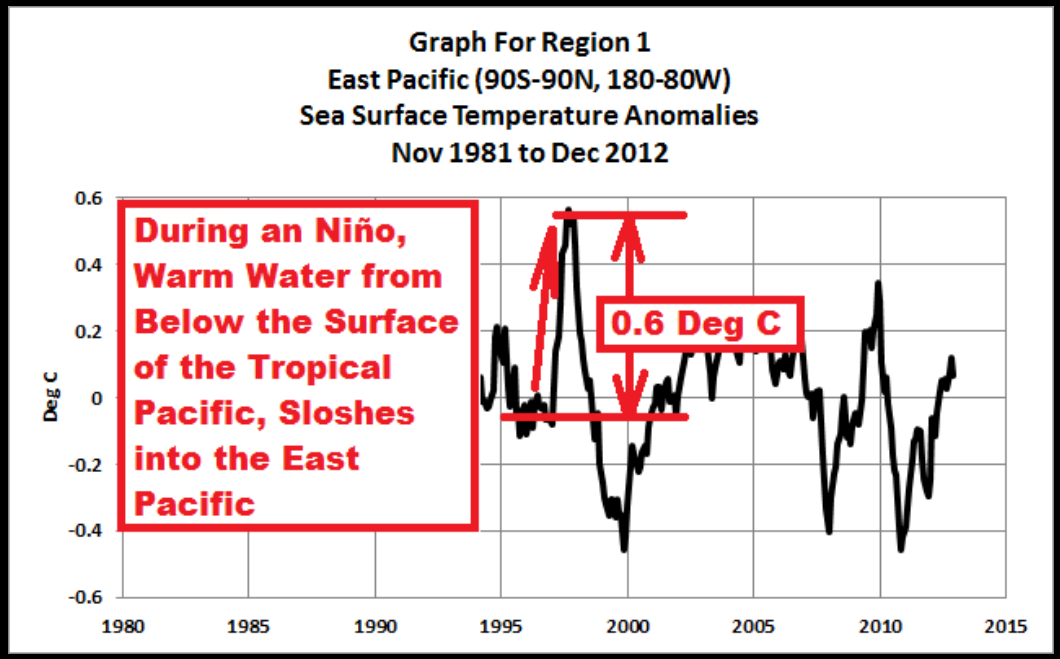
- In Summary, a Strong El Niño Acts as the Discharge Phase of a Recharge-Discharge Oscillator. It Releases Huge Volumes of Naturally Created Warm Water from Below the Surface of the Tropical Pacific and Spreads It Across the Surface, Where It is Redistributed by Ocean Currents.

And Now a Simpler Explanation of How El Niños Caused Upward Shifts in the Sea Surface Temperatures of the Atlantic, Indian and West Pacific Oceans

- We'll Use the 1997/98 El Niño as a Reference
- That El Niño Released A Monumental Volume of Warm Water from Beneath the Surface of the Tropical Pacific.
  - Don't Worry. In a Few Minutes, We'll Discuss When and How the Warm Water was Generated.

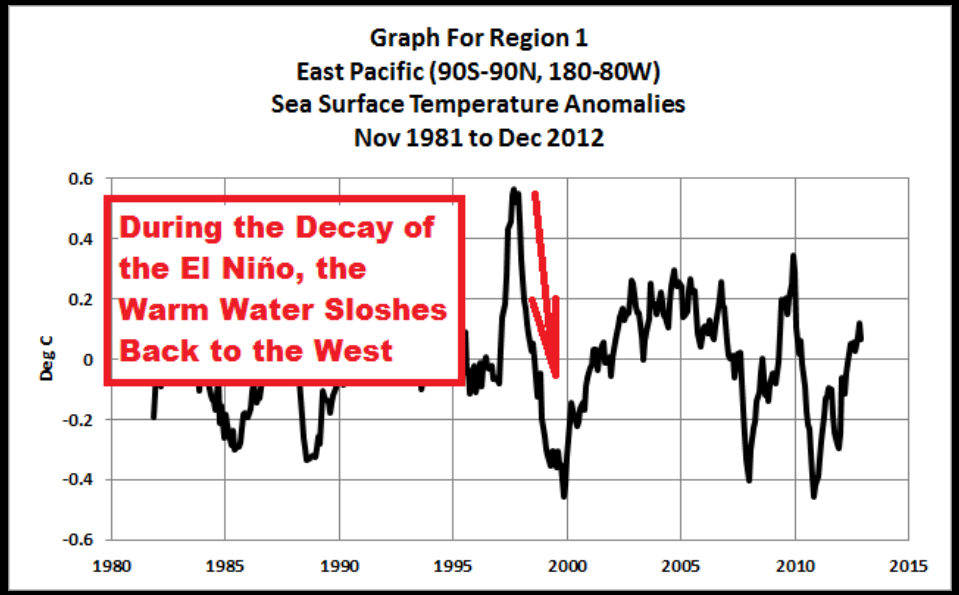
And Now the Simpler Explanation of How El Niños Caused Upward Shifts in the Sea Surface Temperatures of the Atlantic, Indian and West Pacific Oceans

- The Warm Water Sloshed into the East Pacific, Where It Temporarily Warmed the Sea Surface Temperatures about 0.5 to 0.6 Deg C.



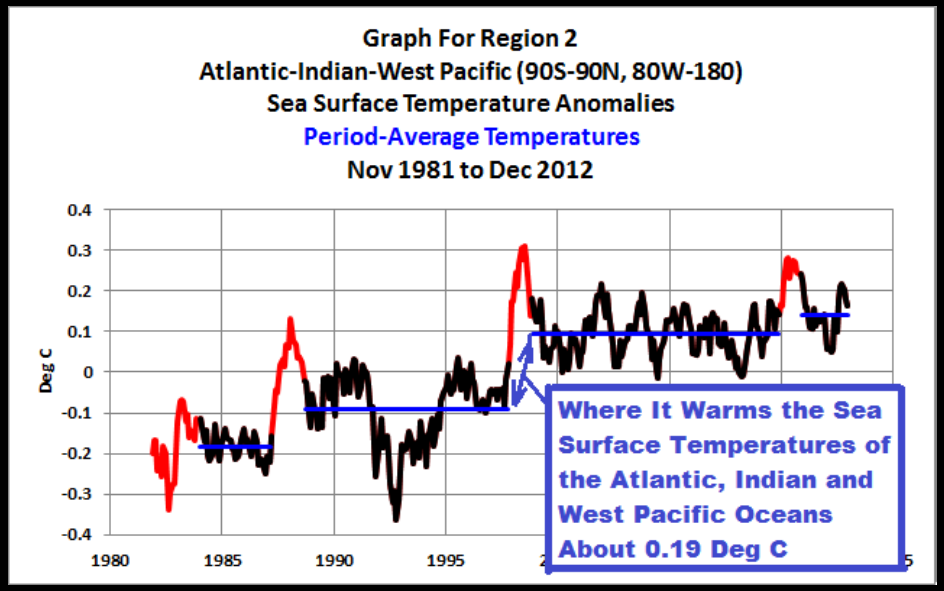
And Now the Simpler Explanation of How El Niños Caused Upward Shifts in the Sea Surface Temperatures of the Atlantic, Indian and West Pacific Oceans

- As the El Niño Decayed, the Warm Water Sloshed Back to the West, Out of the East Pacific. Sea Surface Temperatures in the East Pacific Cooled.



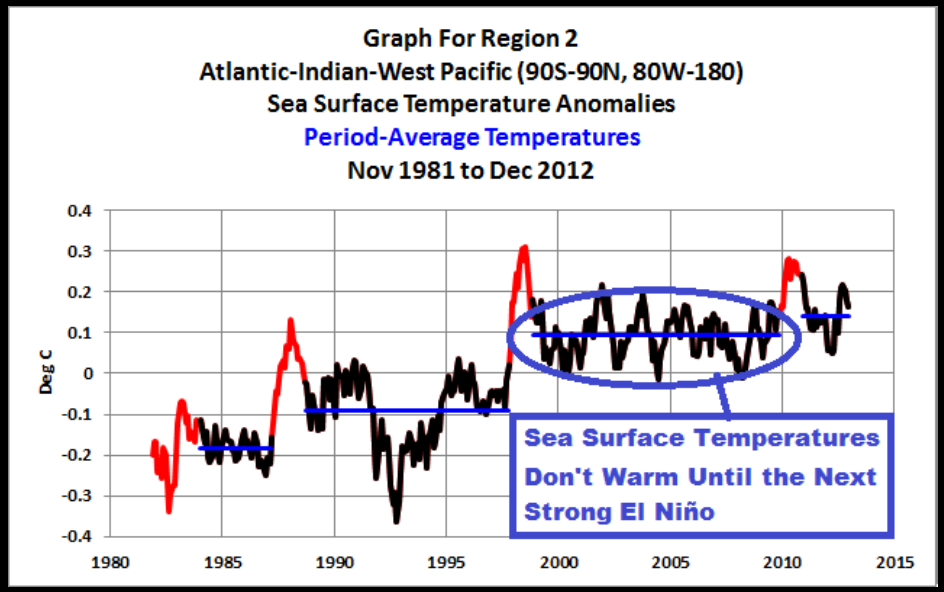
And Now the Simpler Explanation of How El Niños Caused Upward Shifts in the Sea Surface Temperatures of the Atlantic, Indian and West Pacific Oceans

- As the Warm Water Sloshed Back Out of the East Pacific, It Warmed the Sea Surface Temperature Anomalies of the Atlantic, Indian, and West Pacific Oceans About 0.19 Deg C



And Now the Simpler Explanation of How El Niños Caused Upward Shifts in the Sea Surface Temperatures of the Atlantic, Indian and West Pacific Oceans

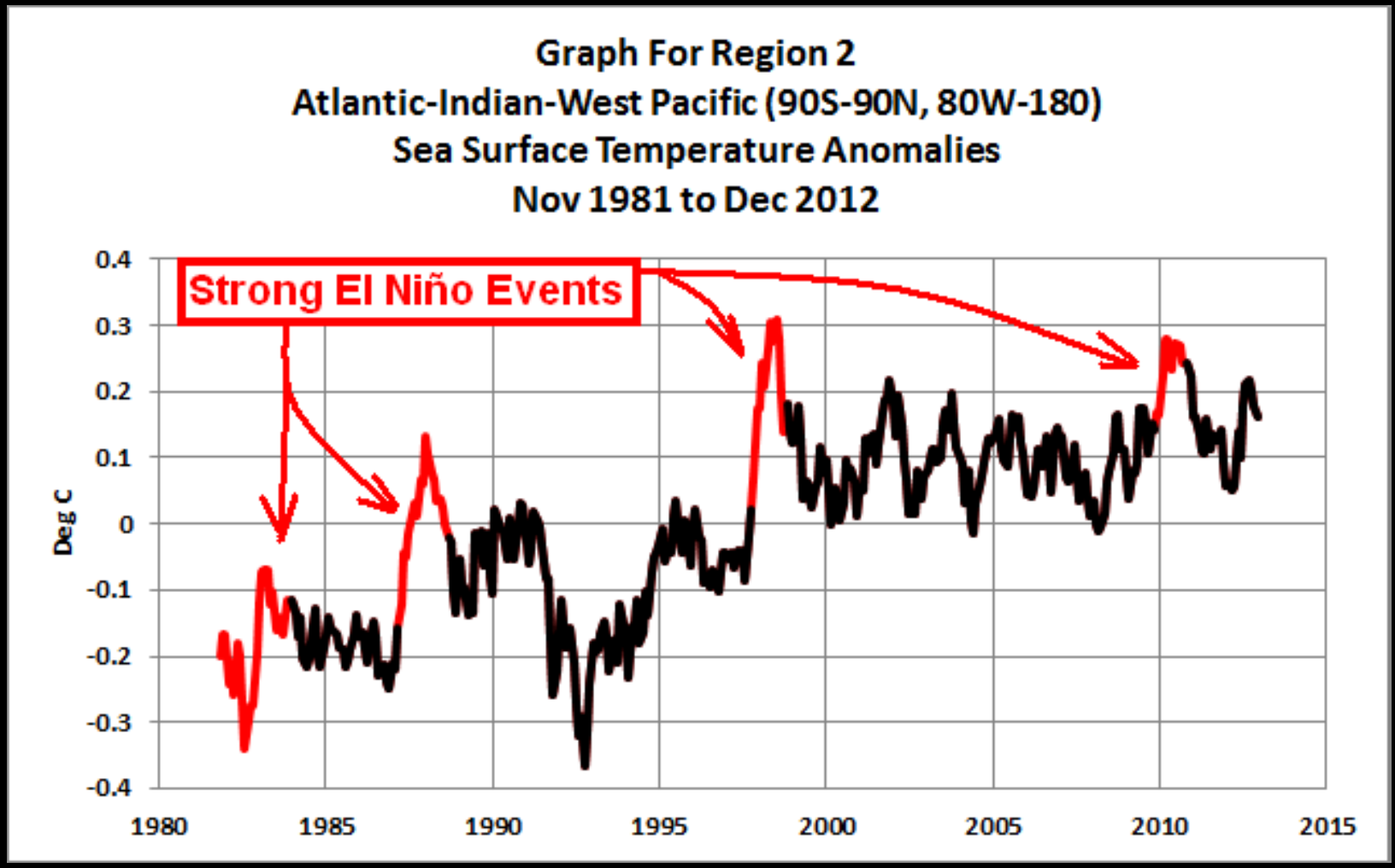
- And the Sea Surface Temperatures of the Atlantic, Indian and West Pacific Oceans Remained at That Temperature, with Minor Variations, Until the Next Strong El Niño



Simplest Explanation

- A Strong El Niño Can Take a Huge Volume of Naturally Created Warm Water (Sometimes as Large as Russia and Up to 1,000 Feet Deep) from Below the Surface of the Tropical Pacific, Where It's Excluded from the Surface Temperature Record, and Relocate that Warm Water to the Surface, Where It's Included in the Surface Temperature Record.
- The Warm Water That's Now on the Surface Does Not Magically Disappear after the El Niño; It Simply Changes Location.

You May Also Be Wondering How the El Niño Periods In Red Were Selected

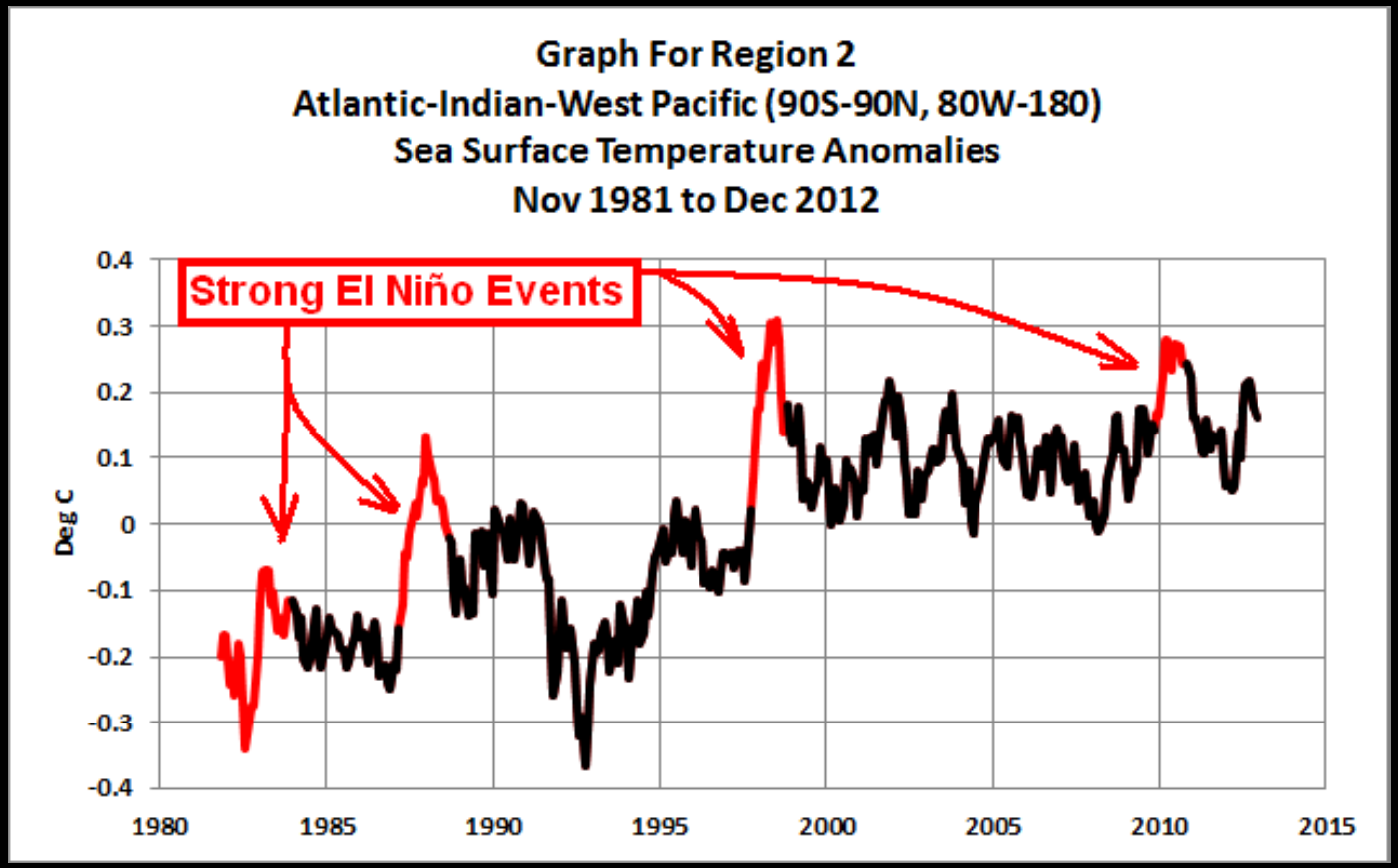


You May Also Be Wondering How the El Niño Periods In Red Were Selected

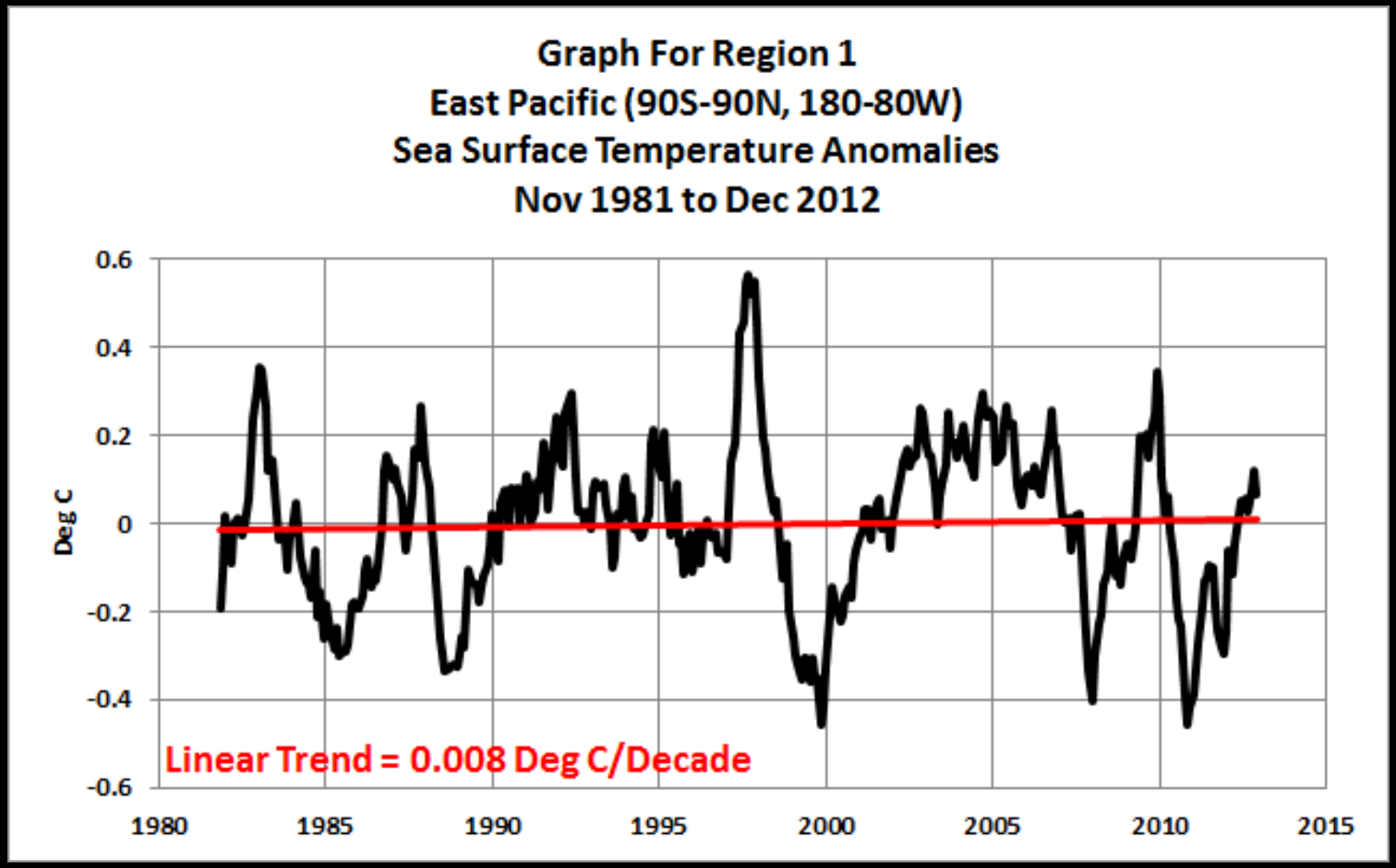
- NOAA's Oceanic NINO Index (ONI-Version 1) Was Used to Determine the "Official" Months of the 1982/83, 1986/87/88, 1997/98 and 2009/10 El Niños.

- They Were Then Shifted 6 Months to Account for the Time Lag Between the Responses of the Oceanic NINO Index Data and the Responses of the Sea Surface Temperature Data for the Atlantic, Indian and West Pacific Oceans to those El Niños.

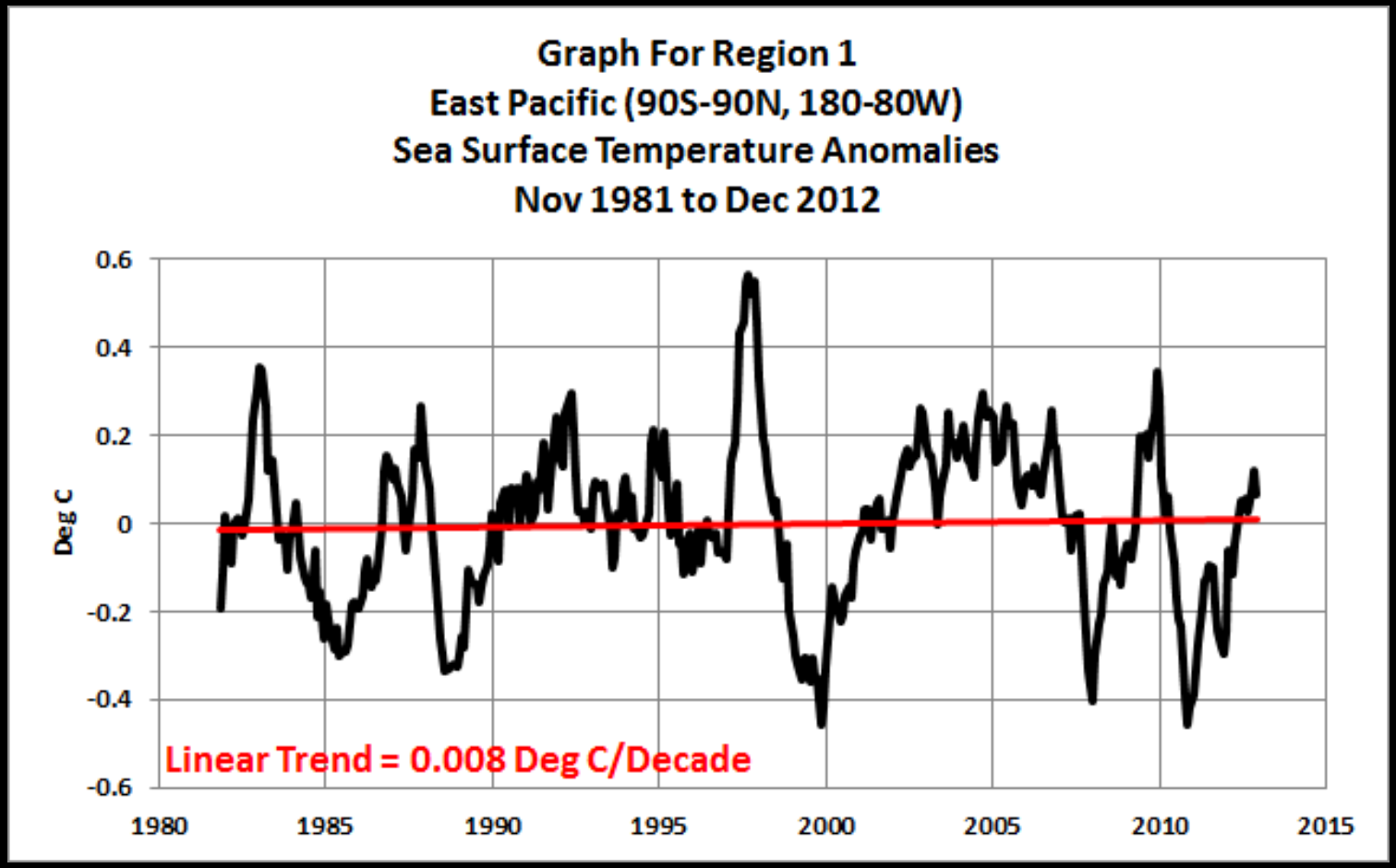
And You May Be Thinking the Graph of Sea Surface Temperature Anomalies for the Atlantic, Indian and West Pacific Oceans Might Show a Manmade Global Warming Signal with El Niños Occurring on Top of It



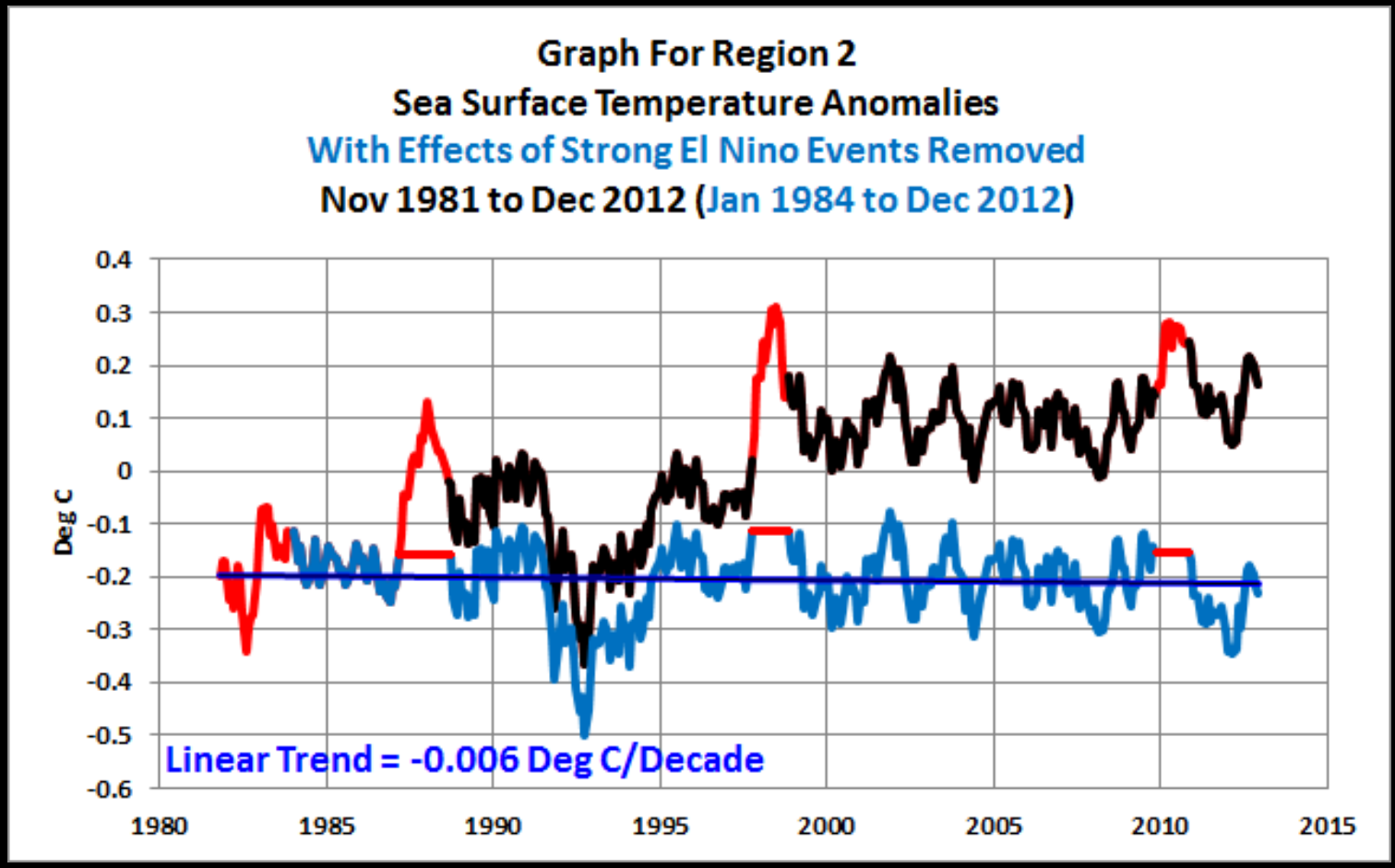
First Thing to Consider: 33% of the Surface Area of the Global Oceans Show No Evidence of Warming for 31 Years



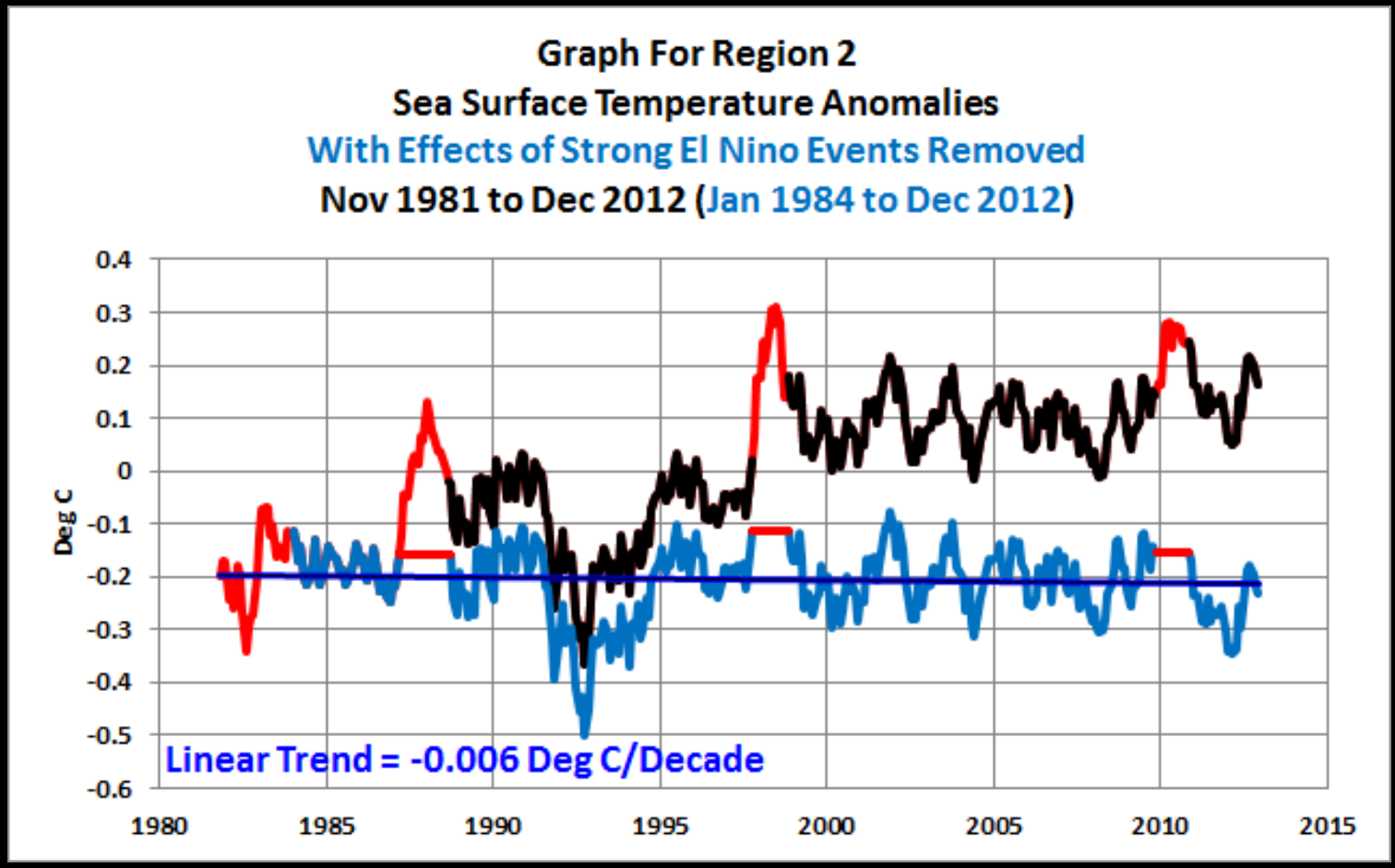
If Manmade Greenhouse Gases DID NOT Warm This Portion, Why Would They Have An Impact Elsewhere?



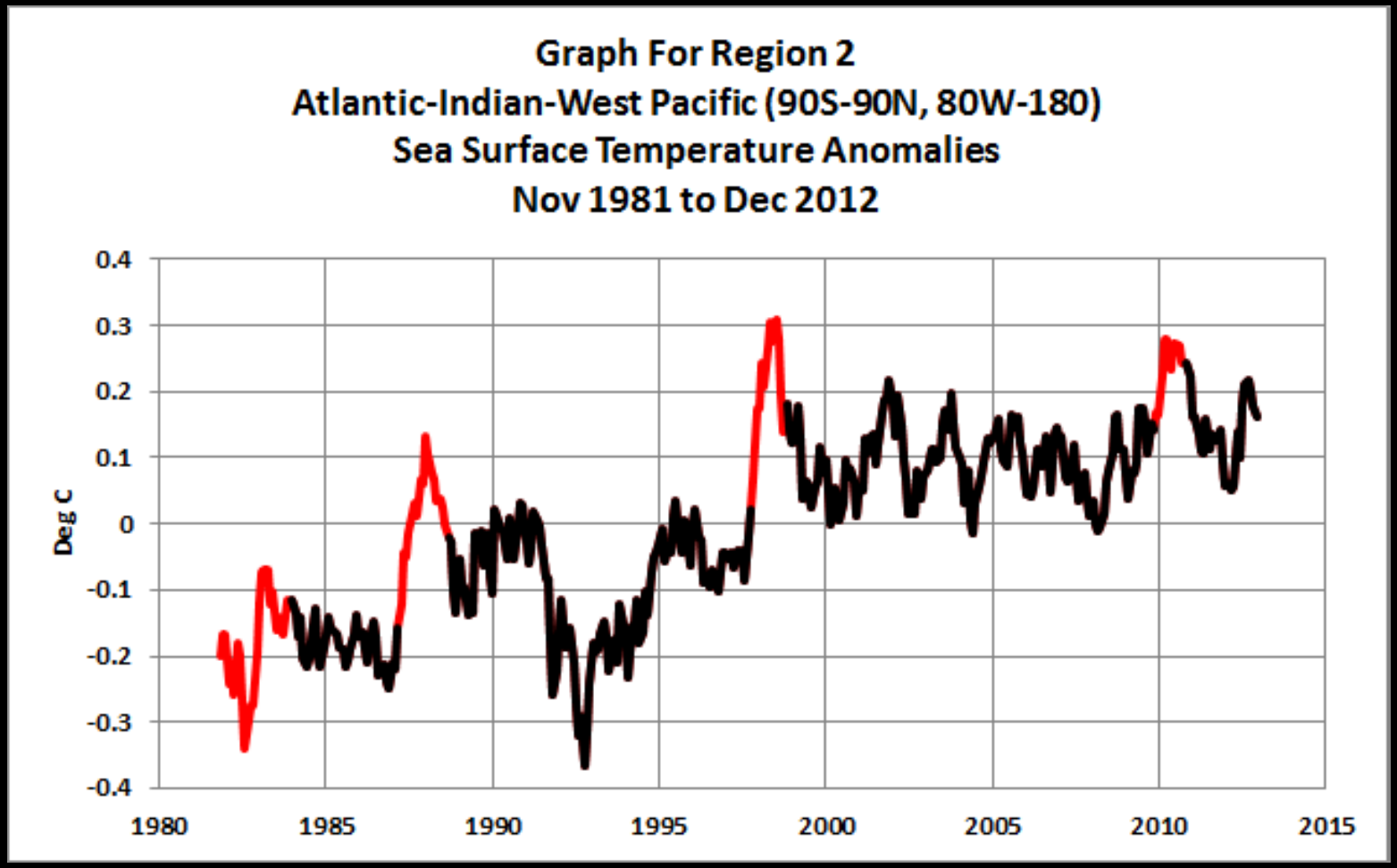
Second Thing to Consider: Without Those El Niños, This Region Would Not Have Warmed Since 1984



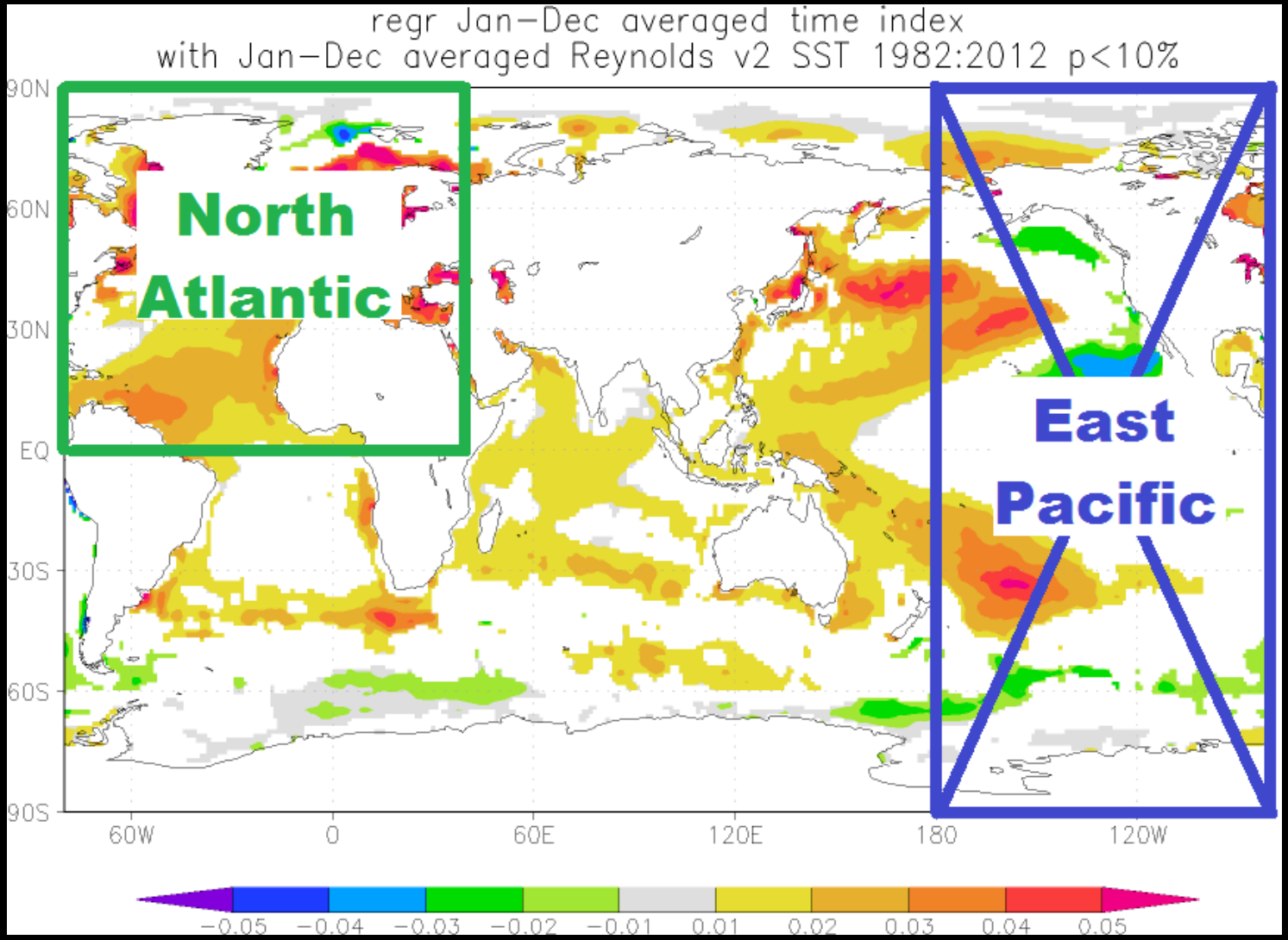
Manmade Greenhouse Gases Would Have to Warm the Oceans Only During Strong El Niños. That's Very Unlikely!



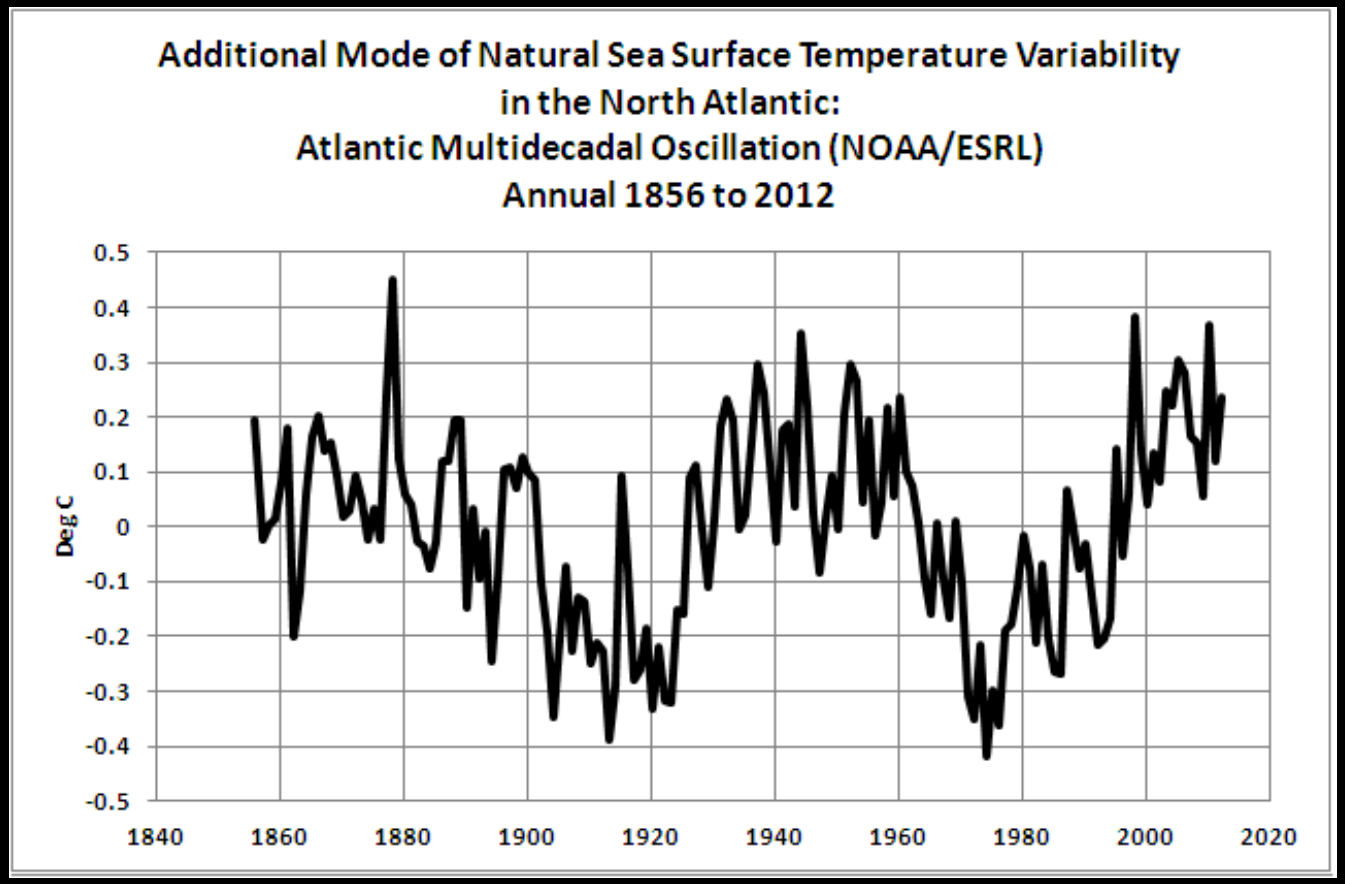
Third Thing to Consider: The Vast Majority of This Region Actually Cools Between Those Major El Niño Events!



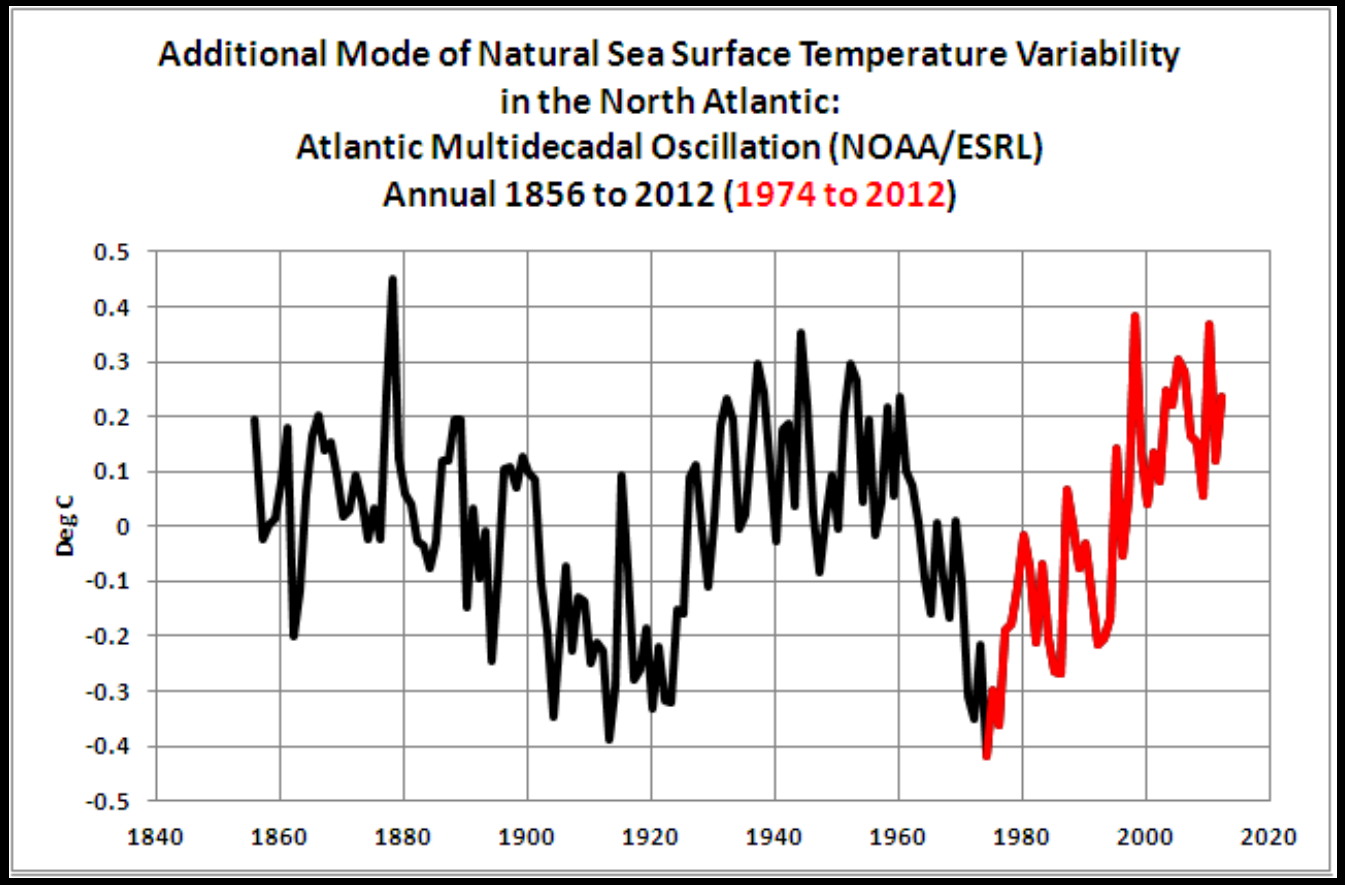
To Show That Cooling, We Also Have to Isolate and Remove the North Atlantic Data.



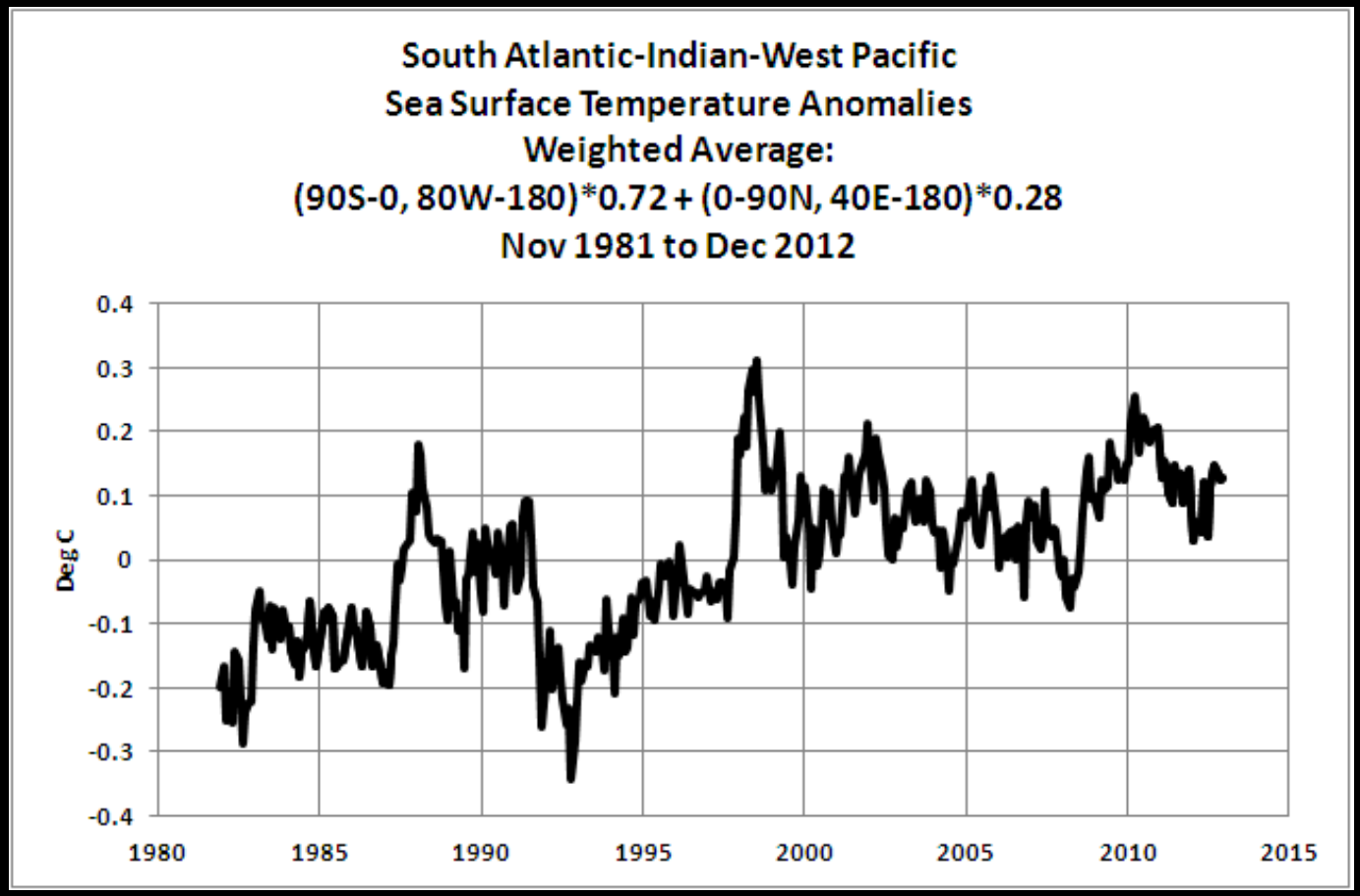
We're Removing the North Atlantic Data Because It Has Another Mode of Natural Variability Called the Atlantic Multidecadal Oscillation.



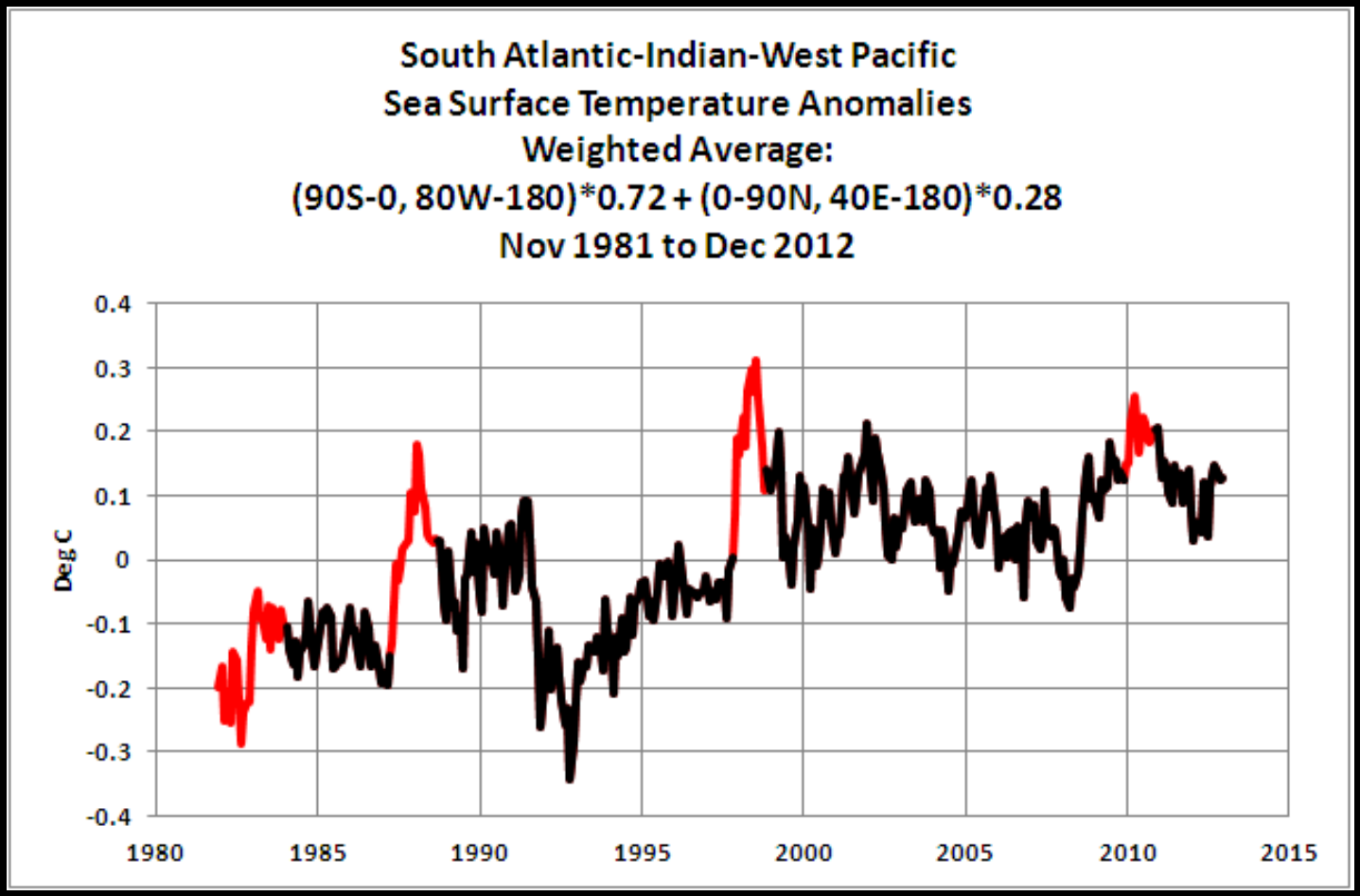
As a Result, Since the Mid-1970s, the Sea Surface Temperature Anomalies of the North Atlantic Have Warmed Naturally at a Faster Rate Than the Rest of the Global Oceans



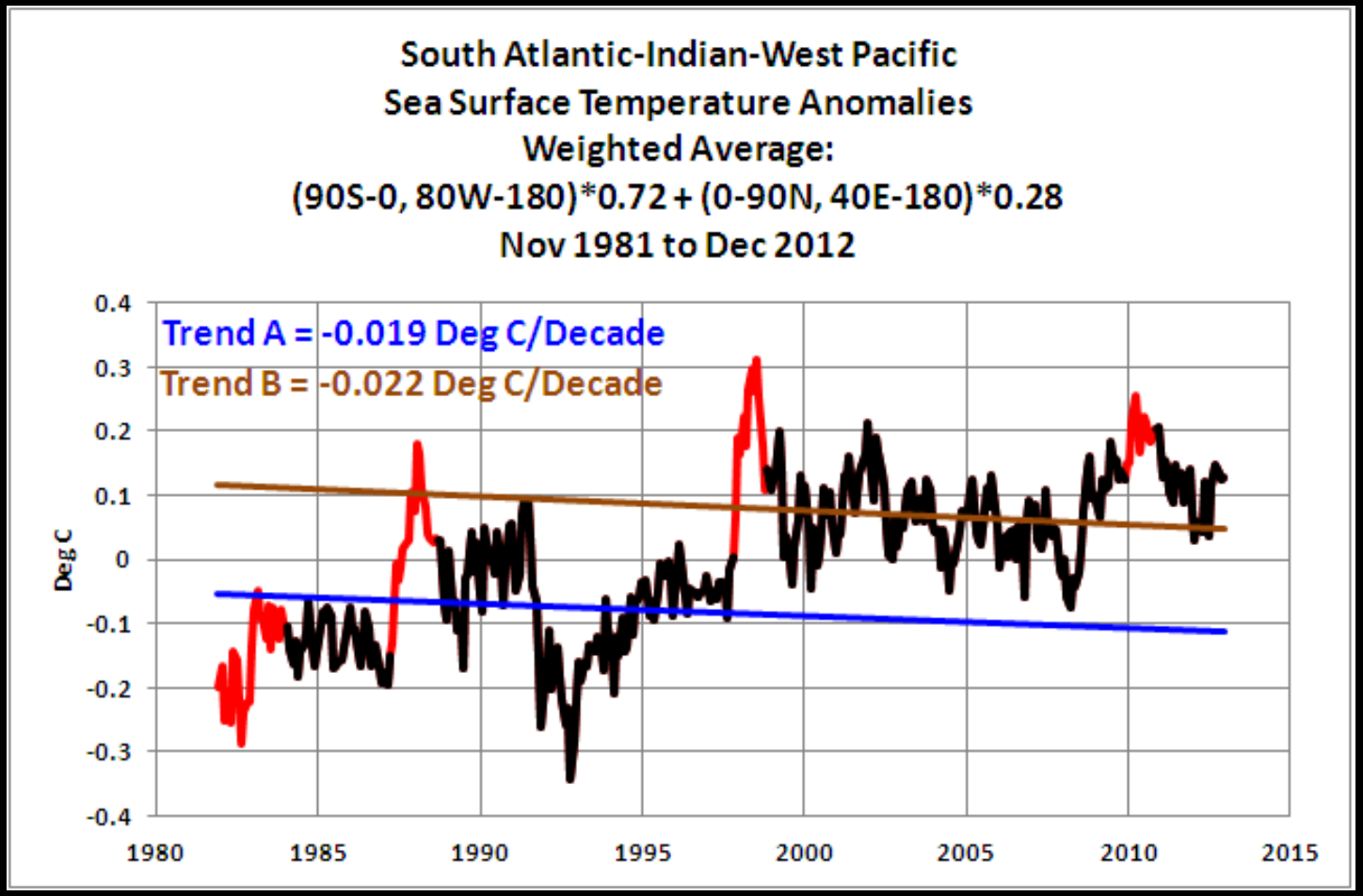
Removing the North Atlantic Data Leaves the Sea Surface Temperature Anomalies for the South Atlantic, Indian and West Pacific Oceans, Which Cover About 53.5% of the Surface of the Global Oceans



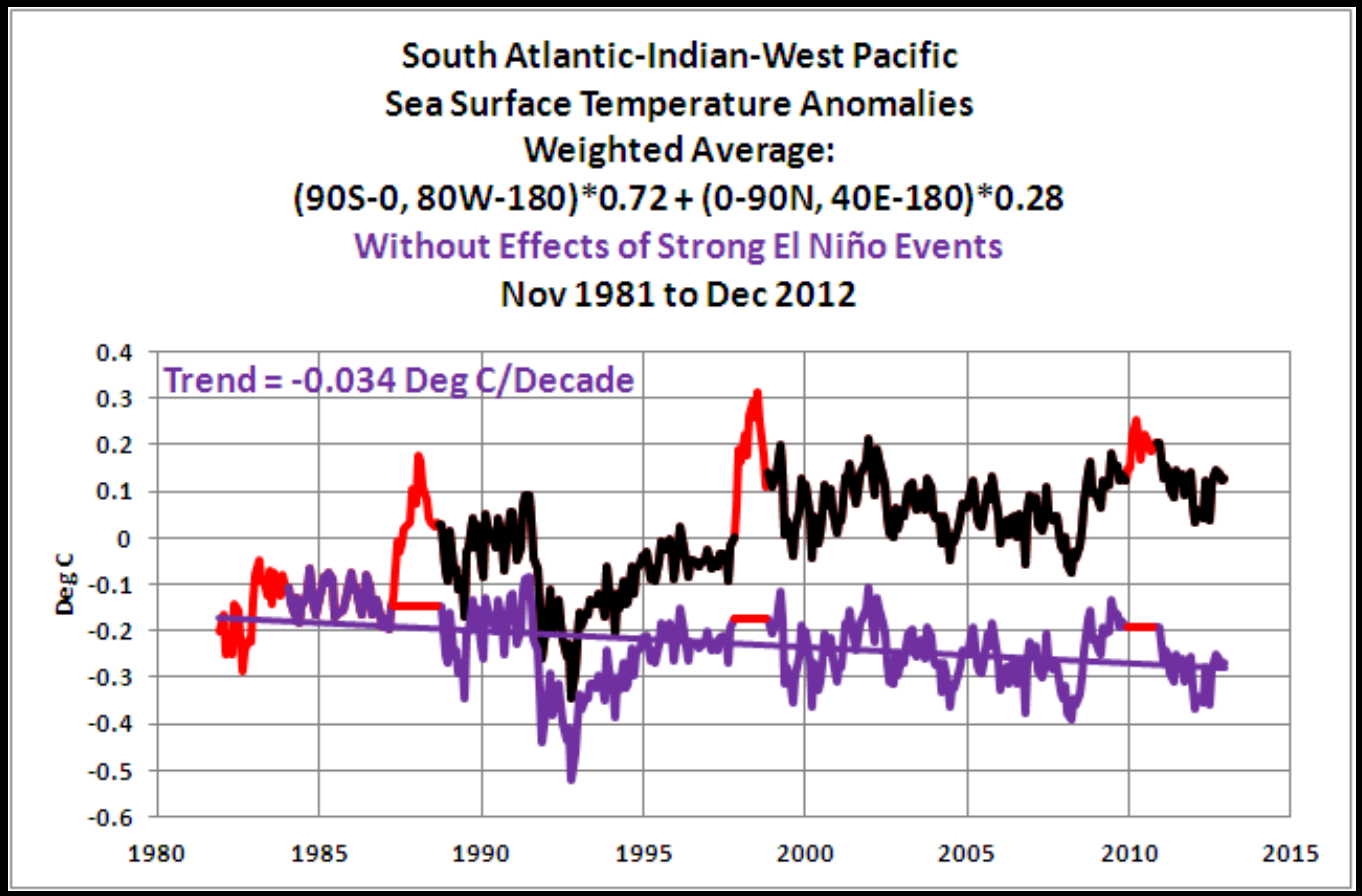
The Sea Surface Temperature Anomalies for the South Atlantic, Indian and West Pacific Oceans Show Similar Warming Responses to the Same Major El Niño Events



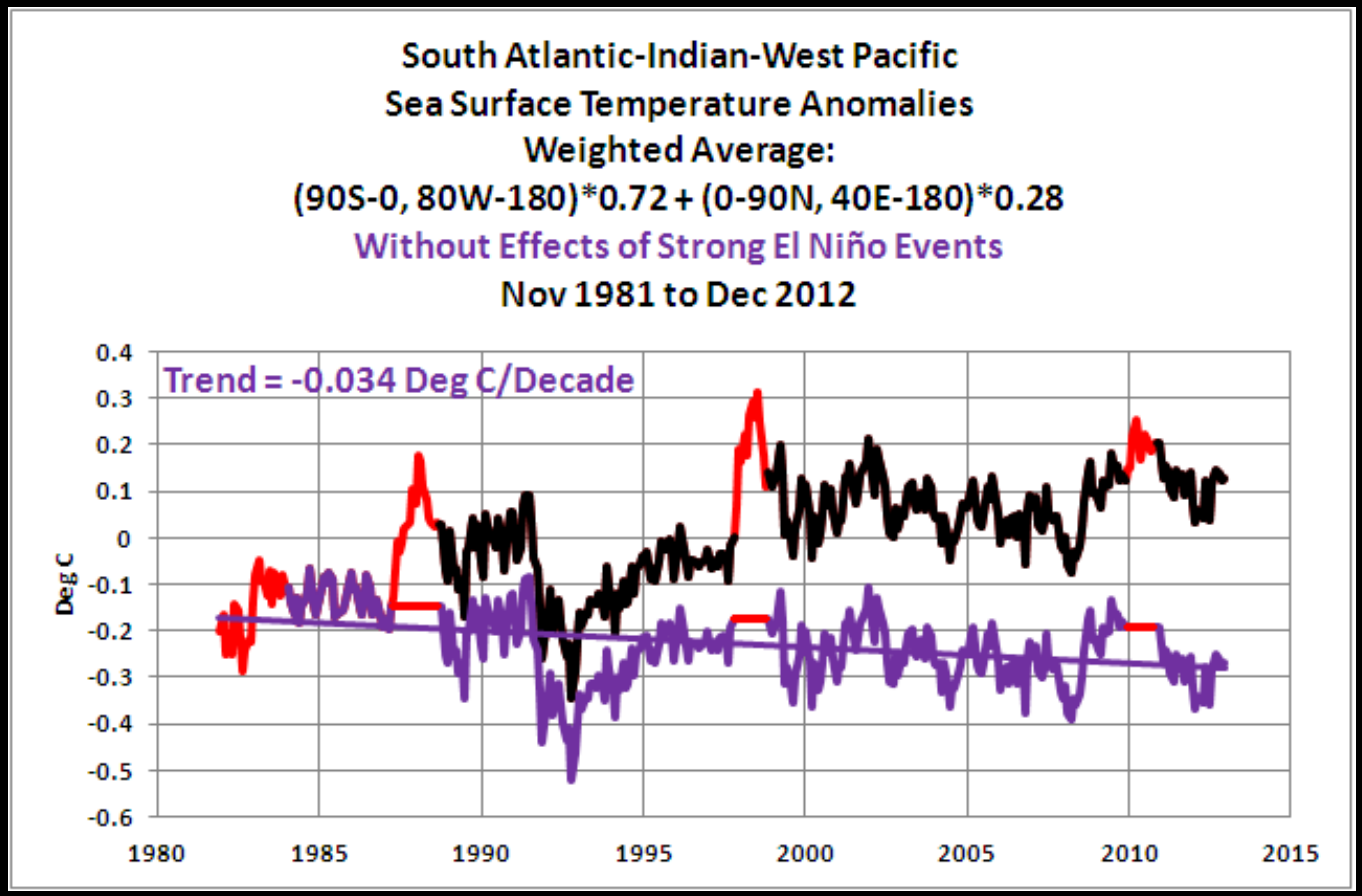
But the Sea Surface Temperatures of the South Atlantic, Indian and West Pacific Oceans Cool Between the Major El Niños



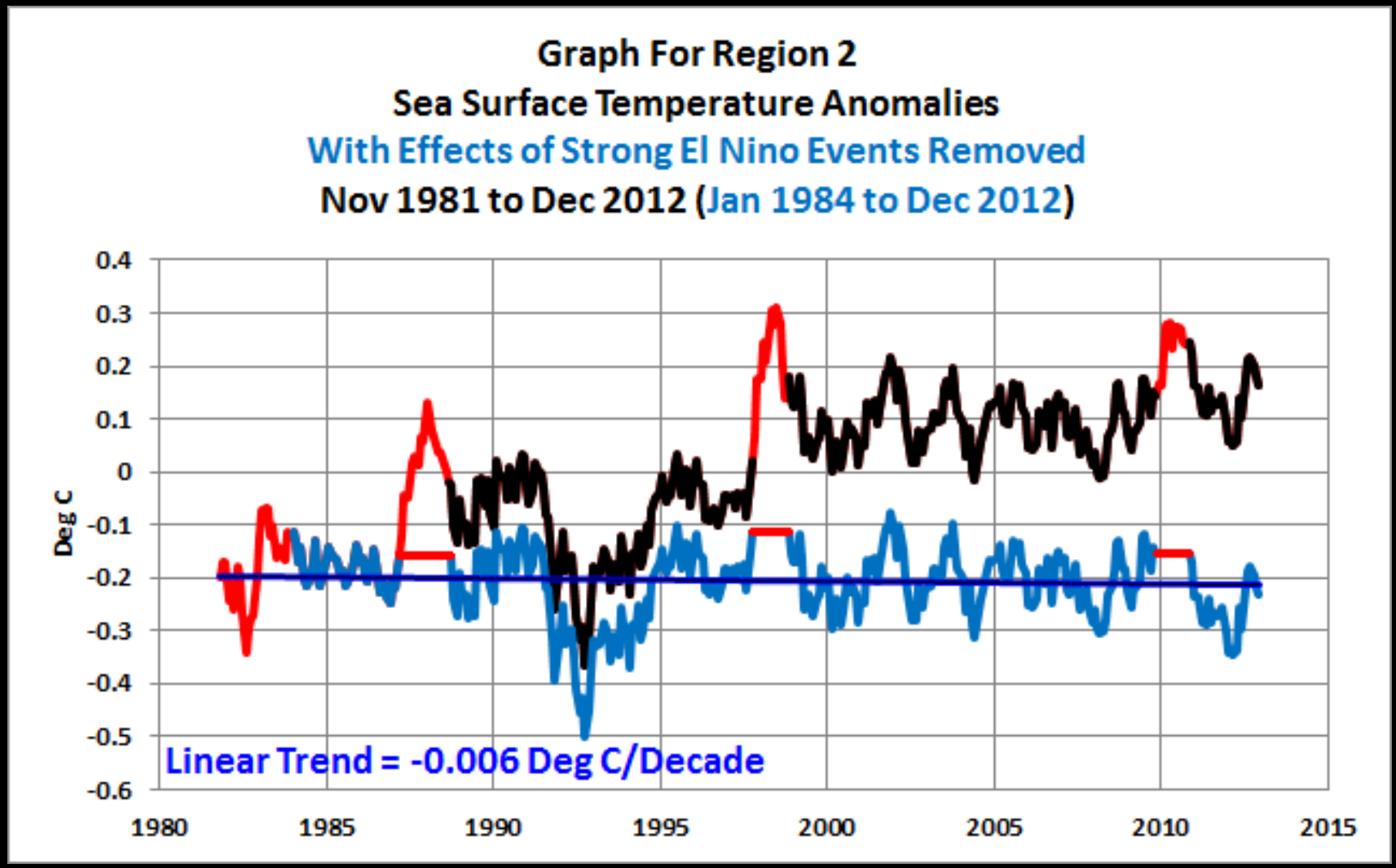
Or, Without the Strong El Niños, Sea Surface Temperatures for the South Atlantic, Indian and West Pacific Oceans Would Have Cooled Since 1984



Does This Agree with Your Understanding of Manmade Global Warming?



There's a Fourth Point to Consider

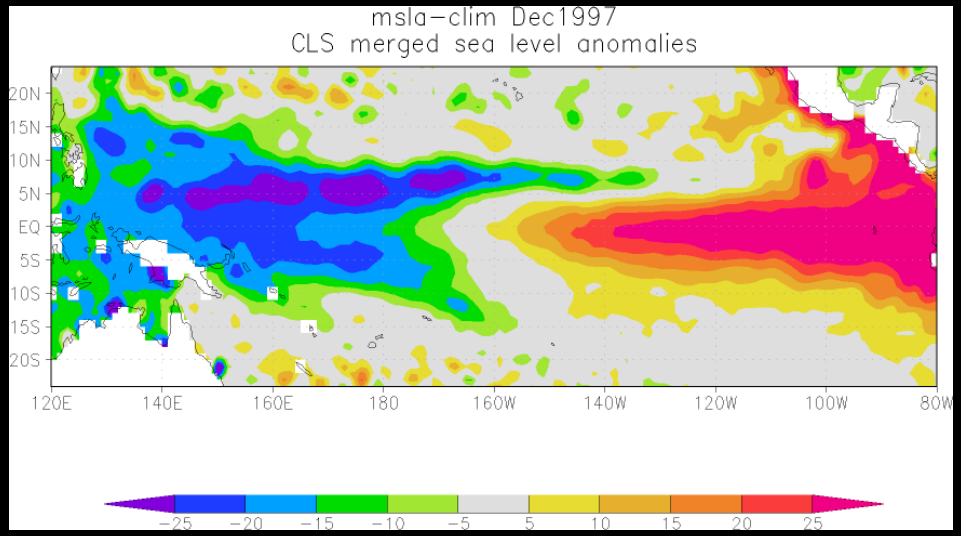


There's a Fourth Point to Consider

- And It's the Warm Water That's Left Over from Strong El Niño Events.
- We've Already Illustrated Those Leftover Warm Waters with the Animation of Sea Level Anomalies Here. So We Know Those Leftover Warm Waters Exist.
- In an Animation of Sea Surface Temperature Anomalies Linked Later in This Presentation, You Will Be Able to Watch an Upward Shift Occur in Response to Those Residual Warm Waters.

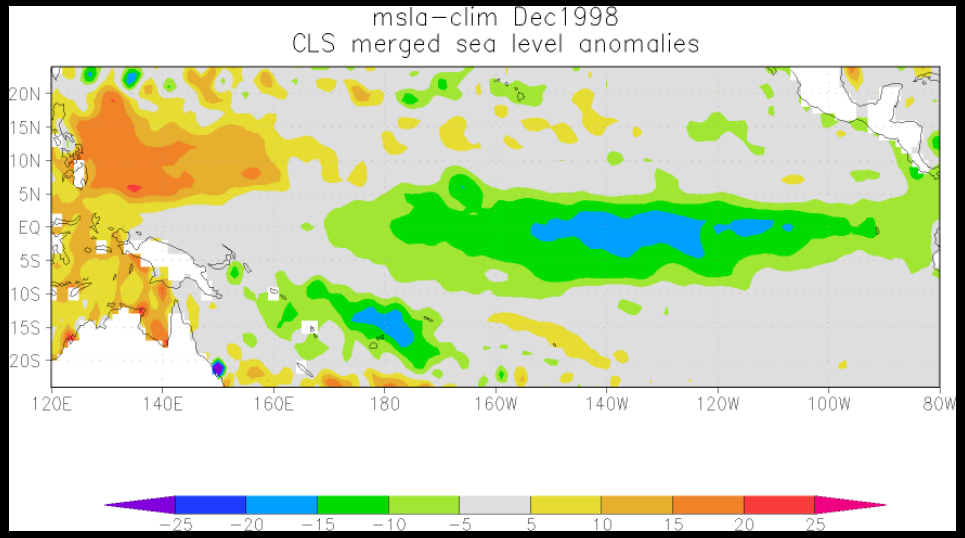
Now You're Probably Thinking, How Do We Know Those Strong El Niños are Fueled Naturally?

- To Answer This
  - We Need To Confirm That El Niño and La Niña Events Take Place in the Tropical Pacific
    - This Can Be Seen Very Clearly with a Map of Sea Level Anomalies at the Peak of the 1997/98 El Nino



Now You're Probably Thinking, How Do We Know Those Strong El Niños are Fueled Naturally?

- To Answer This
  - We Need To Confirm That El Niño and La Niña Events Take Place in the Tropical Pacific
    - And We Can See It Very Clearly with a Map of Sea Level Anomalies at the Peak of the 1998/99 La Niña



Now You're Probably Thinking, How Do We Know Those Strong El Niños are Fueled Naturally?

- Also, To Answer This
  - We Need to Switch Datasets to Ocean Heat Content, and Look at the Ocean Heat Content Data for the Tropical Pacific.
    - El Niños are Fueled By Warm Subsurface Waters There and Ocean Heat Content Captures the El Niño- and La Niña-Caused Variations in Those Subsurface Waters.

Now You're Probably Thinking, How Do We Know Those Strong El Niños are Fueled Naturally?

- As an Example, We'll Determine What Provided the Fuel for the 1997/98 El Niño.
  - The 1997/98 El Niño was the Strongest El Niño Event of the 20th Century
  - It Has Been Called a "Super El Niño".

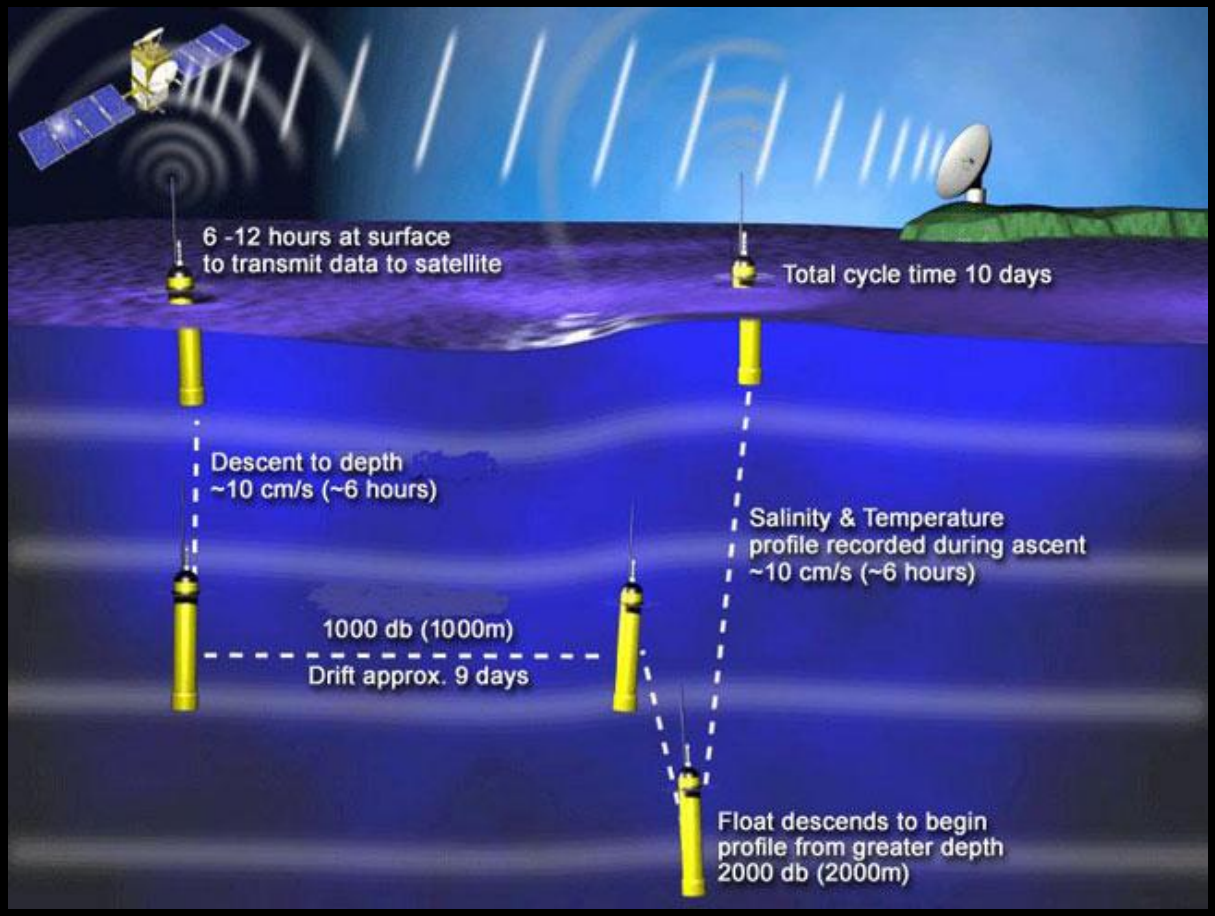
- First, Some Background Information on Ocean Heat Content Data

Introduction to Ocean Heat Content Data

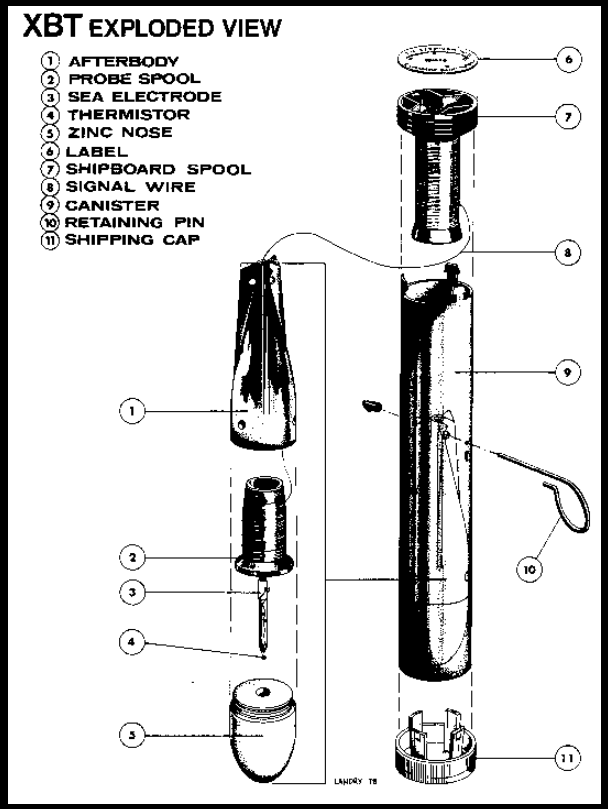
- Ocean Heat Content Data are Based Primarily on Subsurface Temperature Measurements to Depths of 700 Meters (About 2300 Feet).

- And if You're Concerned about the Depth, the El Niño- and La Niña-Related Variations in Tropical Pacific Take Place in the Top 300 Meters, So We're Capturing Them with This Data.

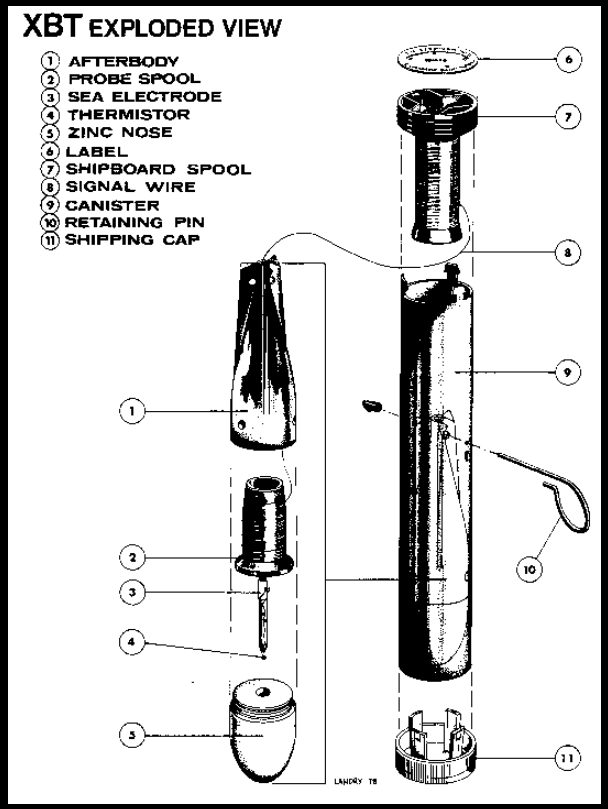
Since about 2003, Temperature and Other Measurements at Depth in the Global Oceans Have Been Made Primarily by ARGO Floats.



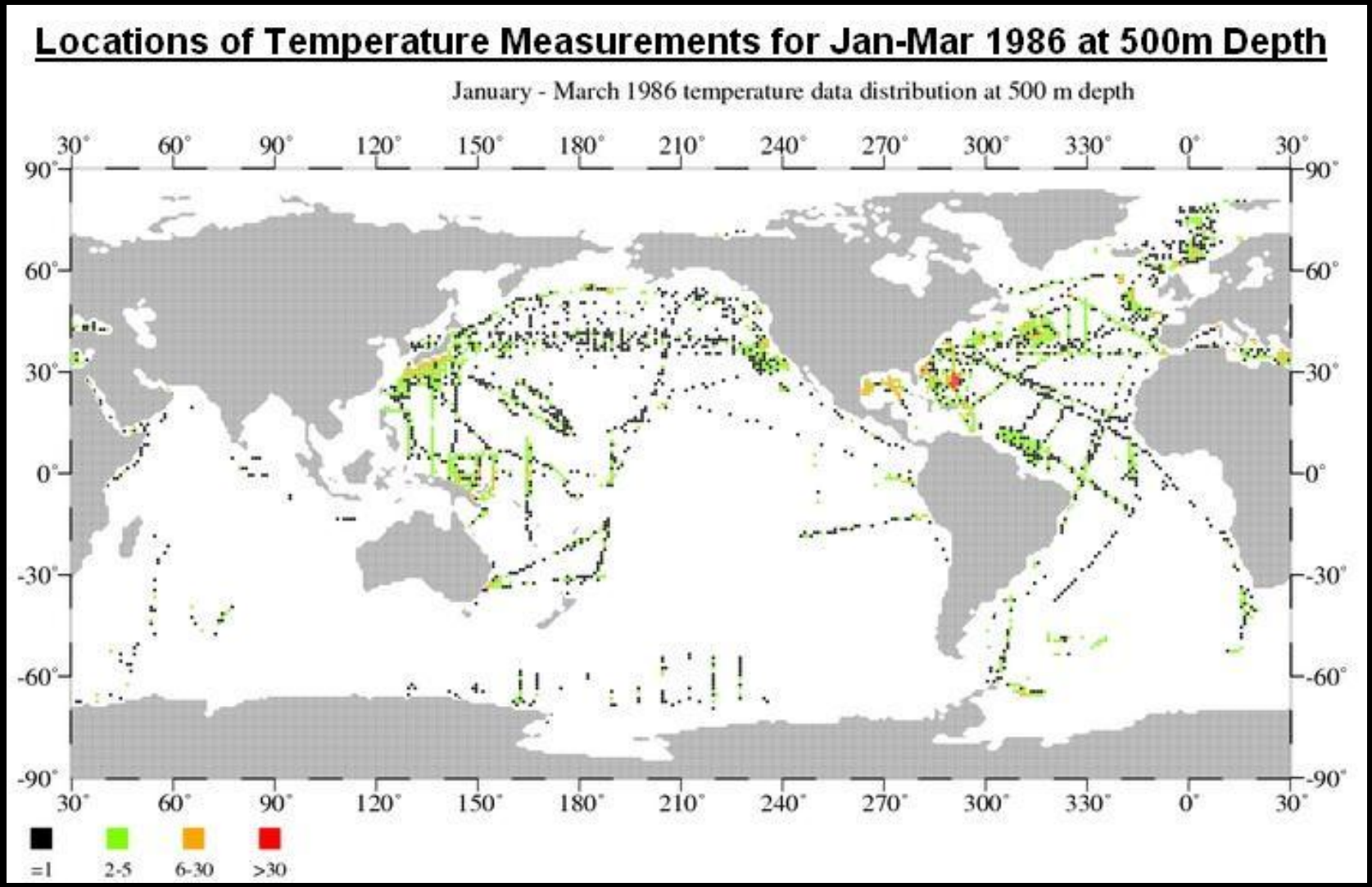
Before the ARGO Floats, Subsurface Temperatures were Sensed by Electronic Thermometers (Attached to VERY LONG, Thin Wires) Called XBTs, Which were Dropped Over the Sides of Ships.



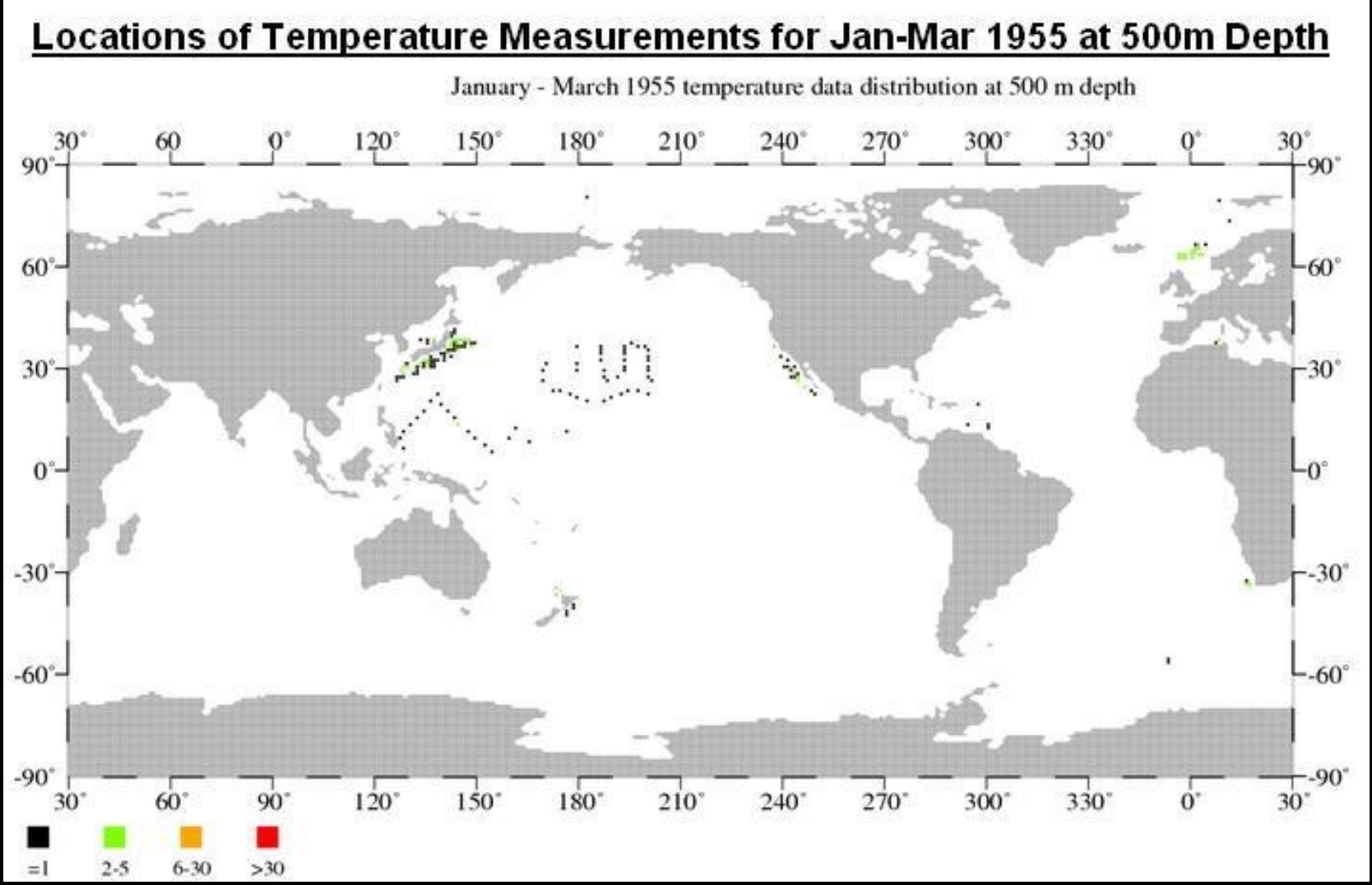
The Locations of Temperature Measurements Before ARGO Depended on Where Studies Were Taking Place at Specific Times



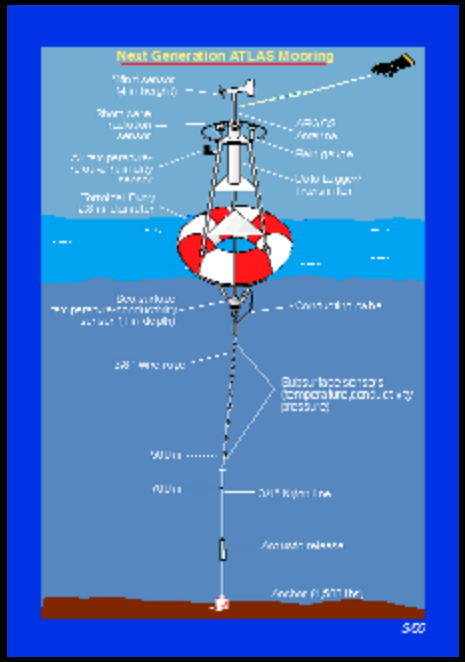
As a Result, the Early Samples Did Not Provide Complete Coverage of the Global Oceans

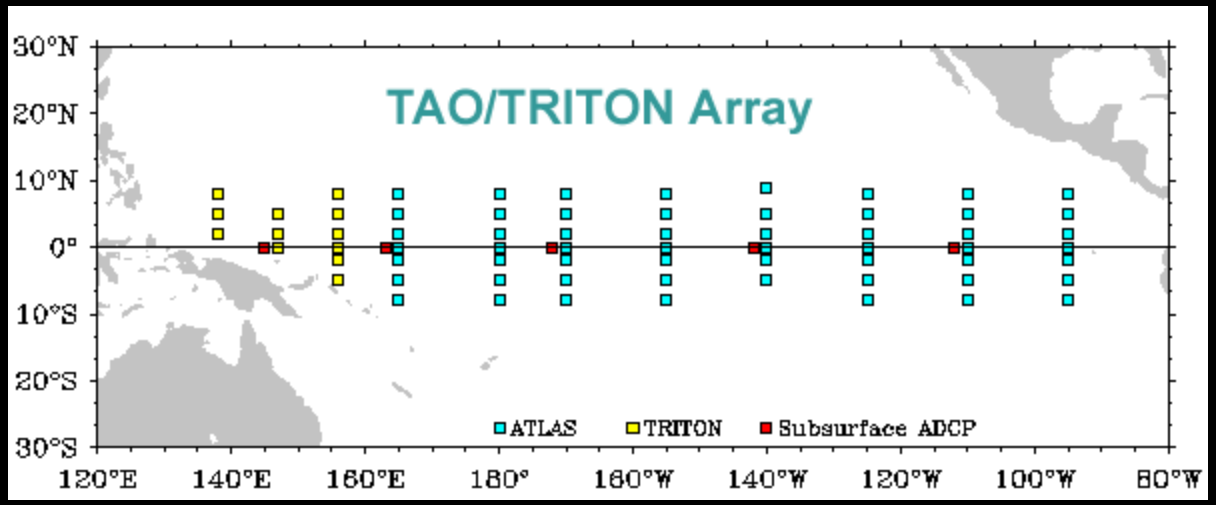


There are Even Fewer Temperature Measurements Earlier in Time



Also, Since the Early 1990s, NOAA's Moored TAO Project Buoys Have Measured Subsurface Temperature and Other Data in the Tropical Pacific





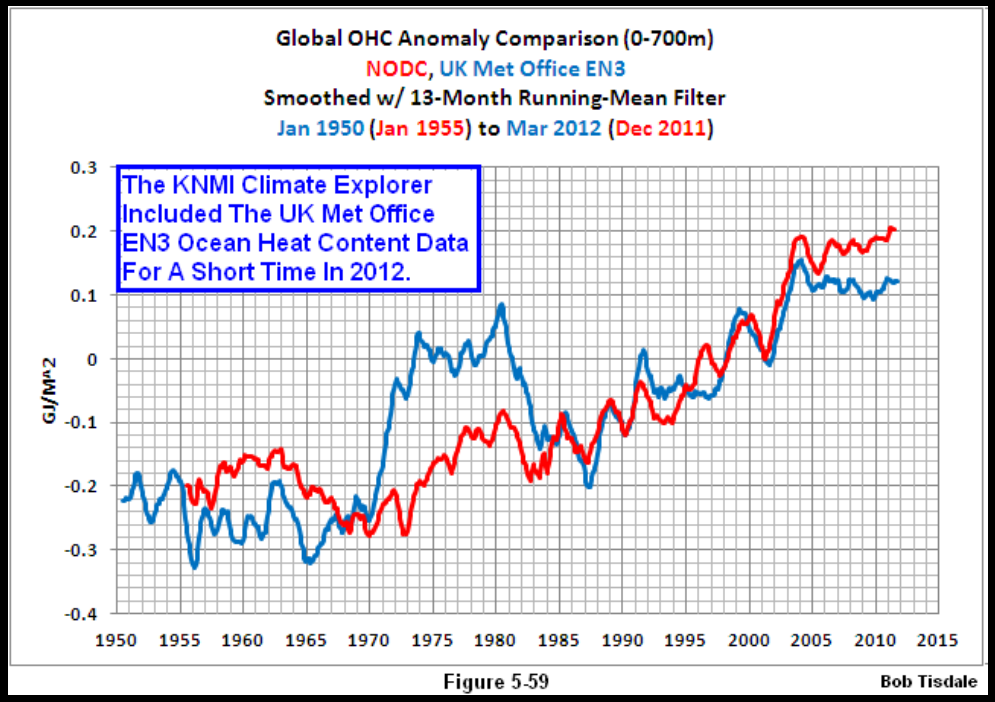
The Ocean Heat Content Dataset is from the NOAA National Oceanographic Data Center (NODC)

- The NODC's Ocean Heat Content Data for the Depths of 0 to 700 Meters is the Only Ocean Heat Content Dataset Available to the Public on a Gridded Basis.
  - That Is, A User Can Select the Coordinates of the Data He or She Wishes to Download from the KNMI Climate Explorer.

- The Units are Gigajoules per Square Meter.

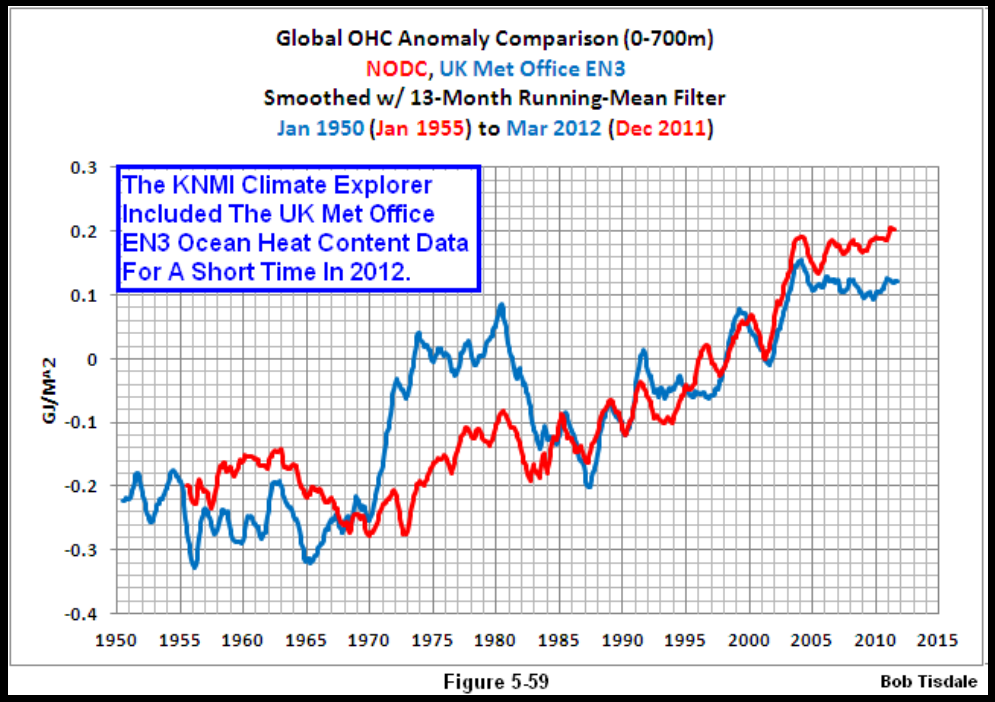
The NODC Made Significant Adjustments to the Ocean Heat Content Data in 2009

- The Blue Curve is an Unadjusted Ocean Heat Content Dataset Available from the UK Met Office, and the Red Curve is the Adjusted Data from the NODC. Adjustments Have Even Been Made During the ARGO Era.



The NODC Made Significant Adjustments to the Ocean Heat Content Data in 2009

- Climate Modelers Could Not Reproduce the "Hump" in the 1970s and 1980s, So Adjustments Were Made Based on Perceived Problems with the XBT Sensors.

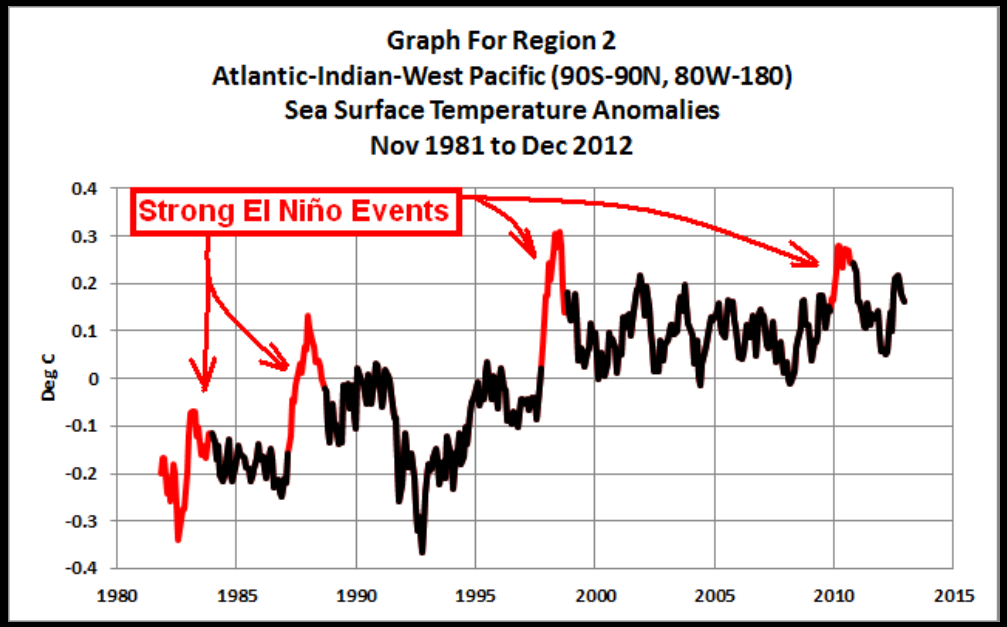


Based on the Very Limited Number of Measurements Before ARGO, and Based on the Magnitude of the "Corrections", Ocean Heat Content Data is Best Viewed as an "Educated Guess".

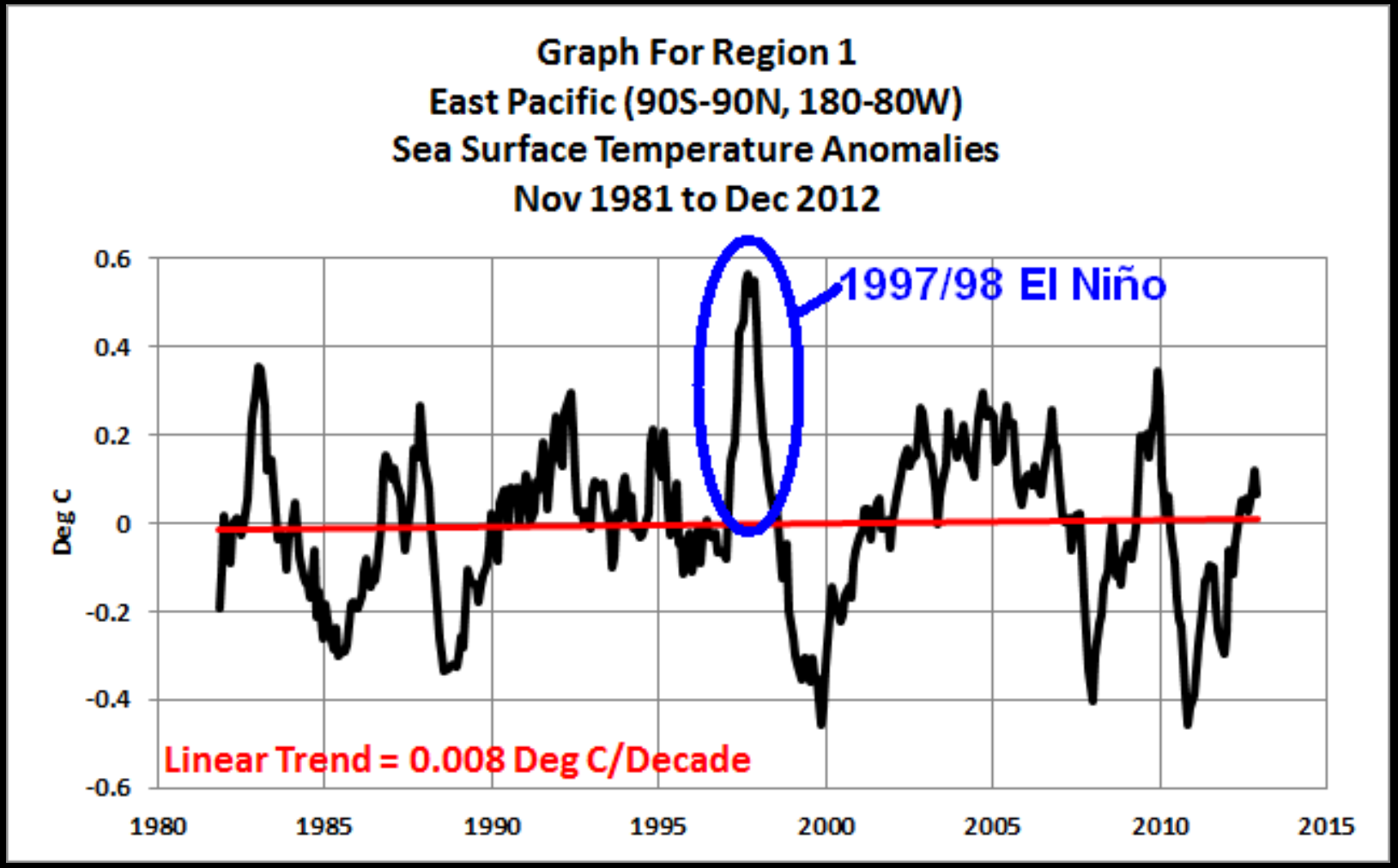
Even So, We Can Determine What Caused the Majority of the Warming Presented by the Ocean Heat Content Data.

It's Obvious, Once You Know What to Look For!

Reminder: We're Going to Look at the Ocean Heat Content for the Tropical Pacific Because Warm Water There Provided the Fuel for the Strong El Niño Events that Shifted Up the Sea Surface Temperatures of the Atlantic, Indian and West Pacific Oceans.

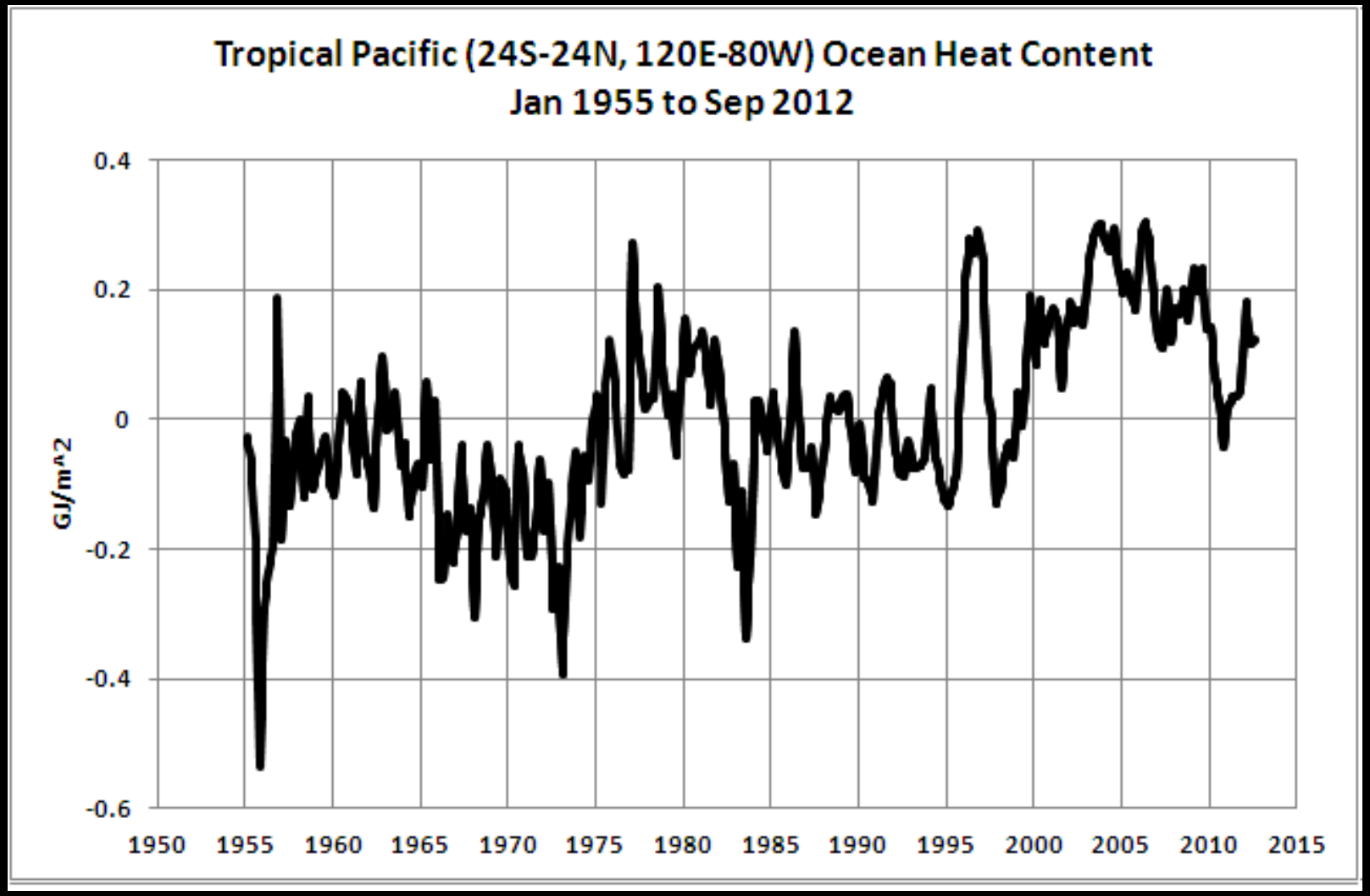


And We're Going to Determine What Provided the Fuel for the 1997/98 "Super El Niño"

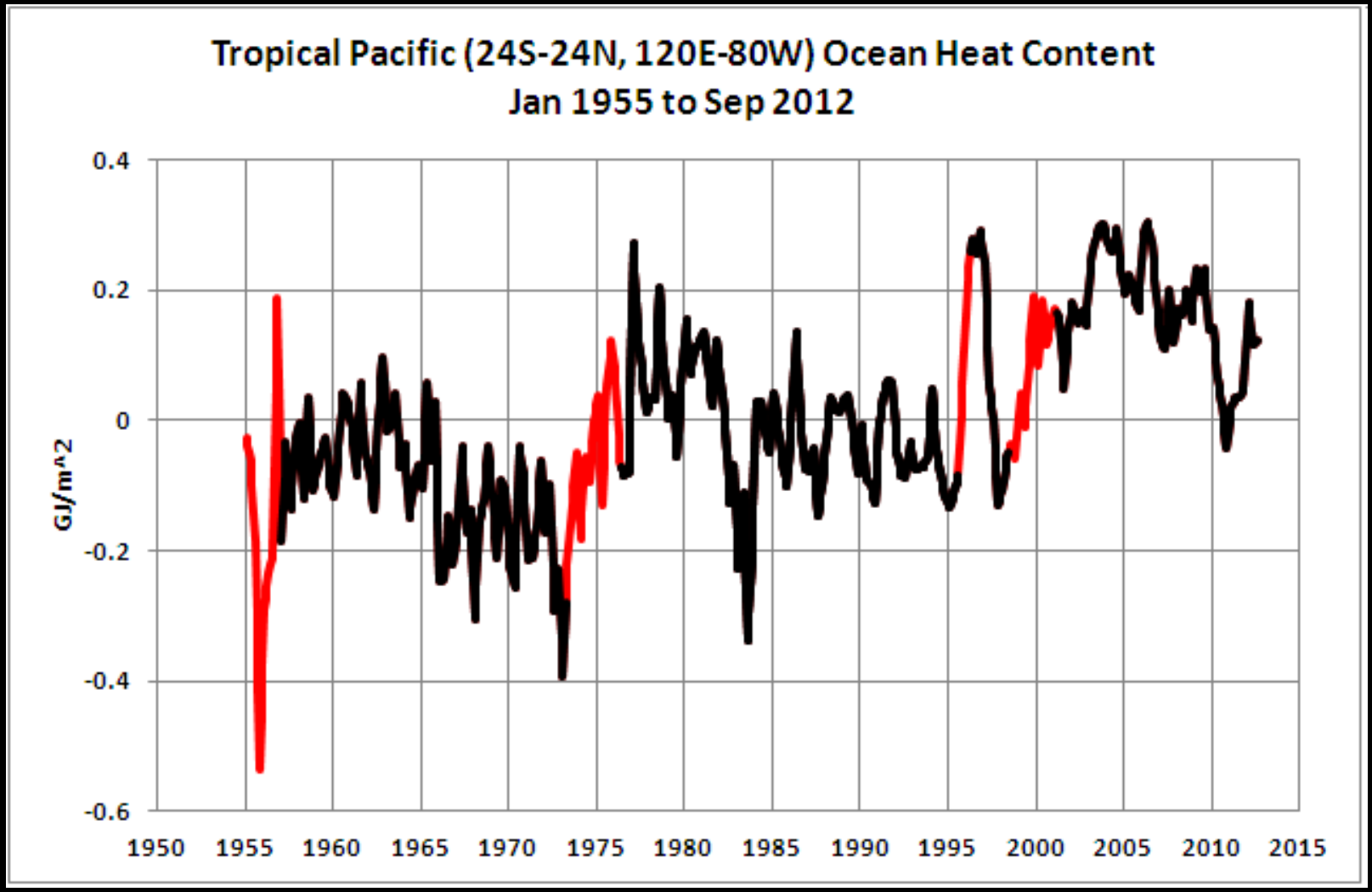


Back to the Manmade Global Warming Challenge

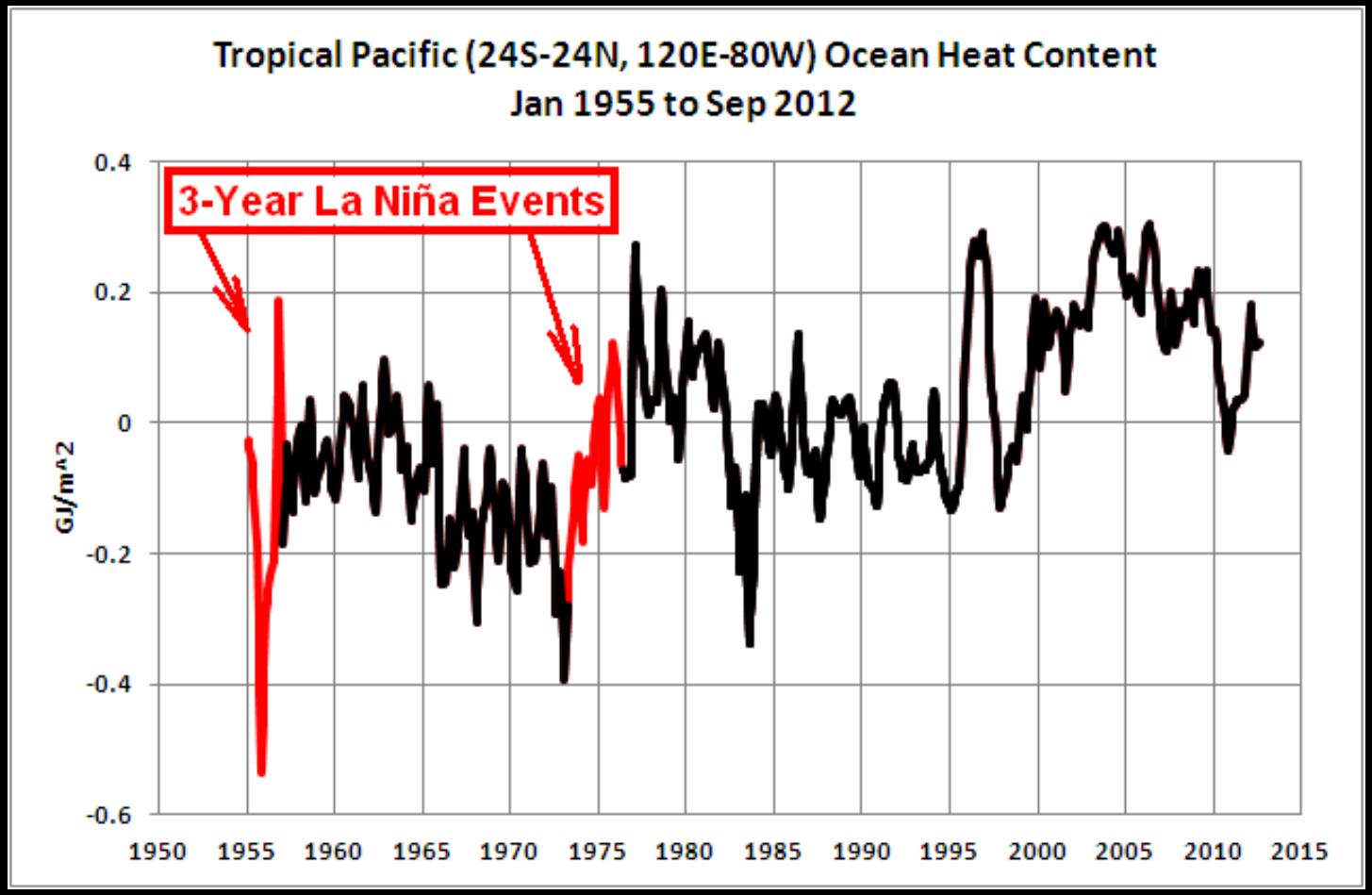
Can You Find the Manmade Global Warming Component Here?



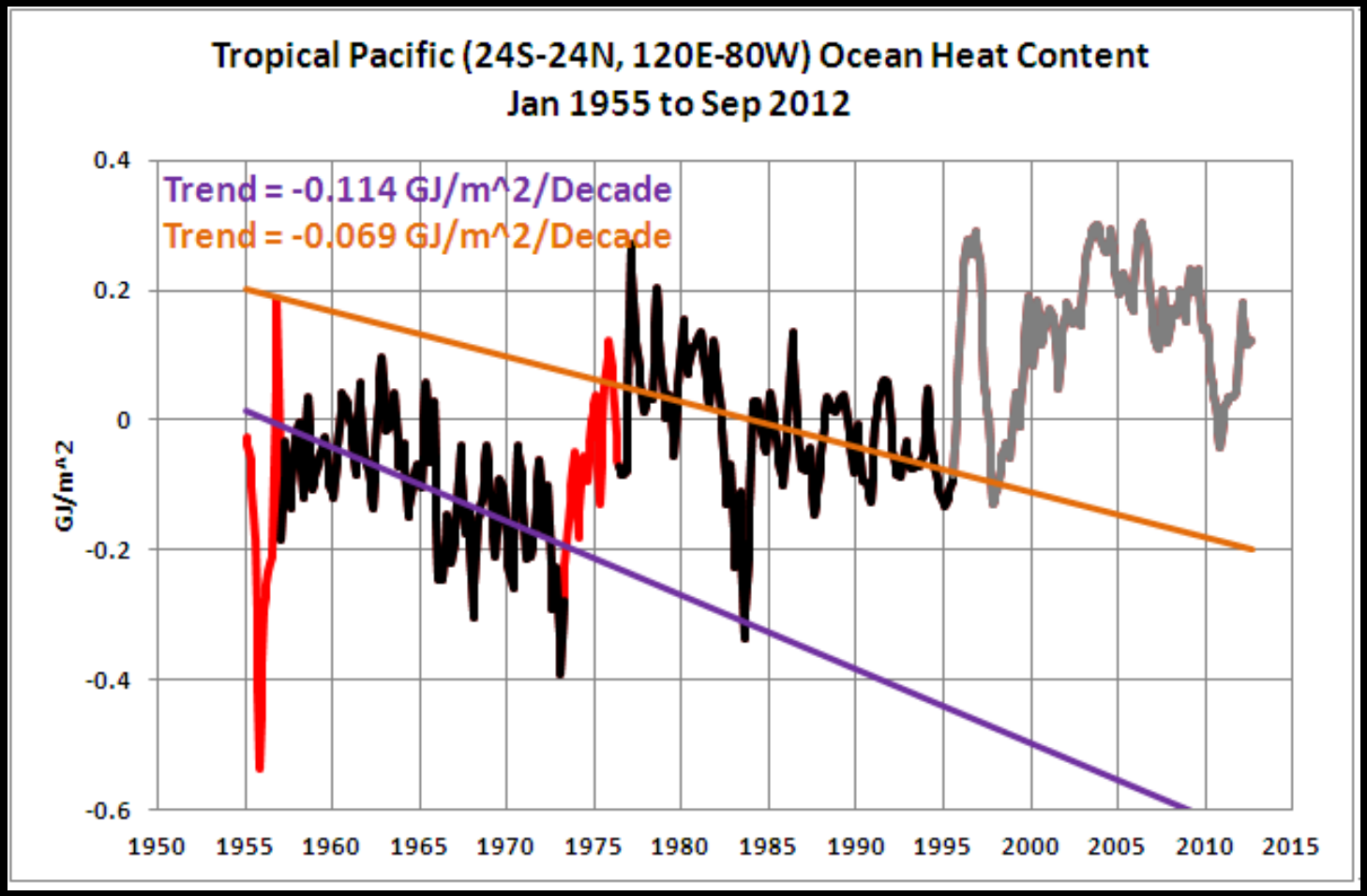
That Would Also Be Very Difficult!



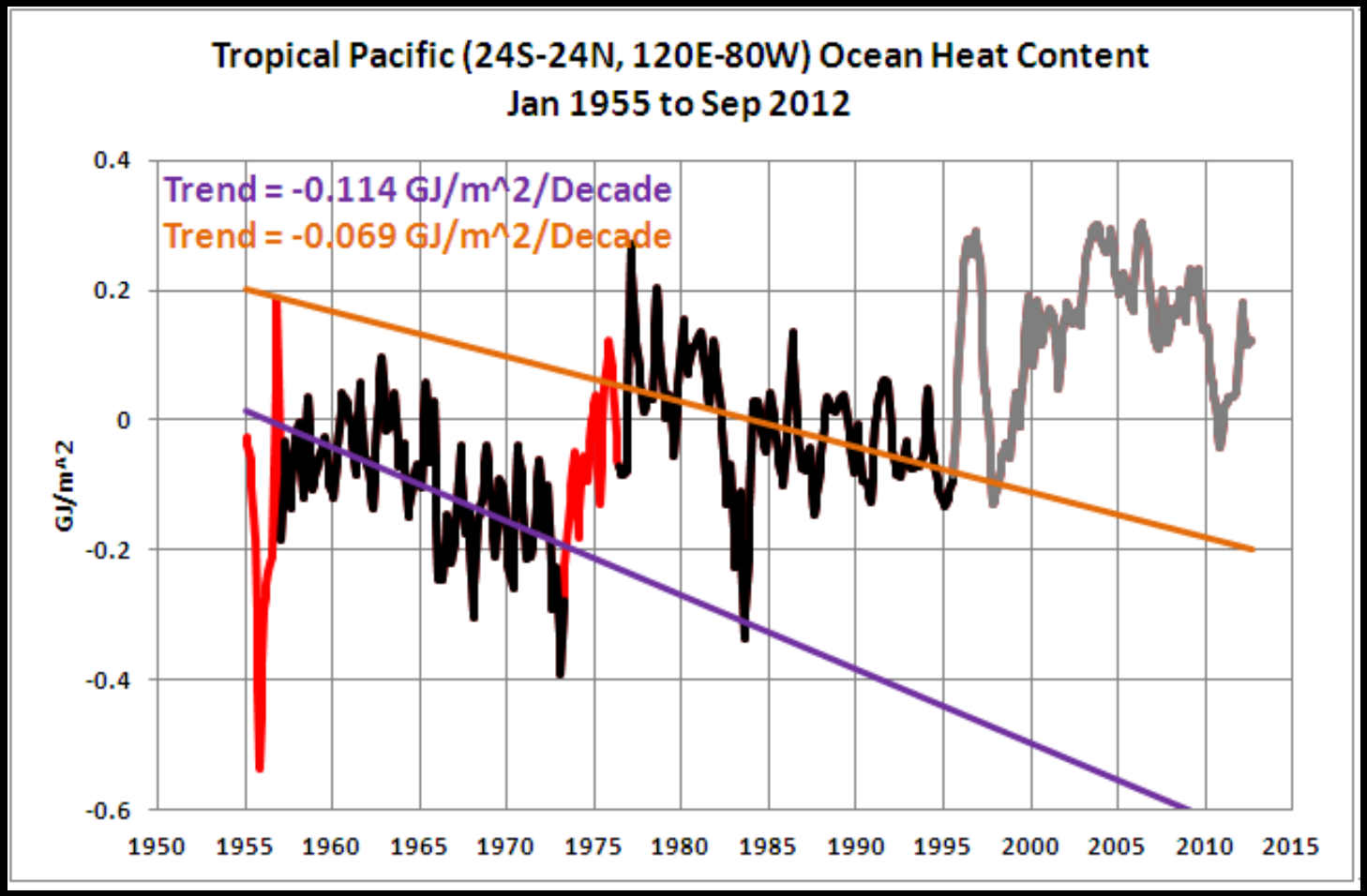
Before 1995, the Most Significant Warming in the Tropical Pacific (0-700m) Took Place During the Naturally Occurring 3-Year La Niña Events of 1954-57 and 1973-76.



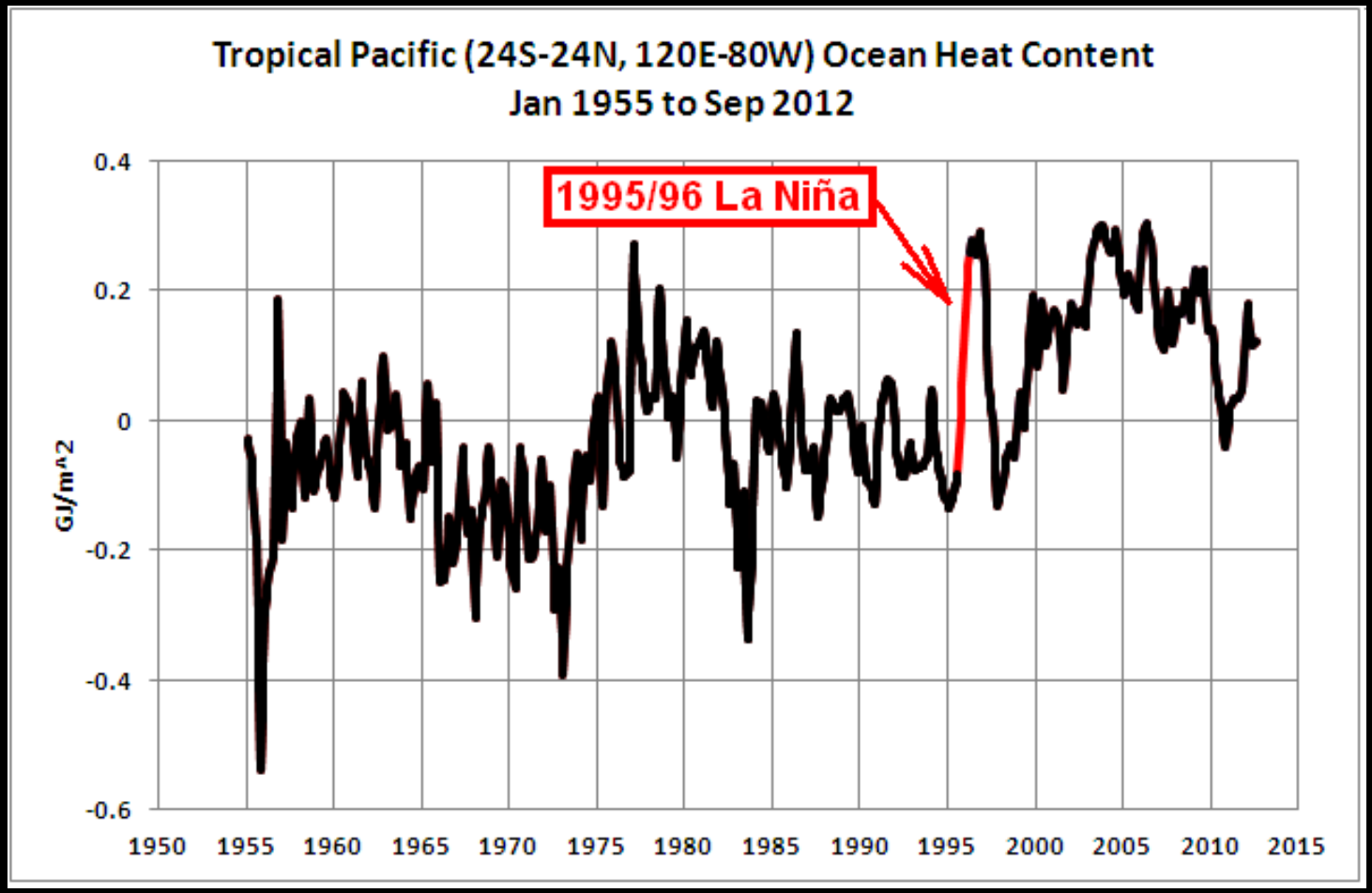
Between and After Those 3-Year La Niña Events, Ocean Heat Content in the Tropical Pacific Cooled Rapidly



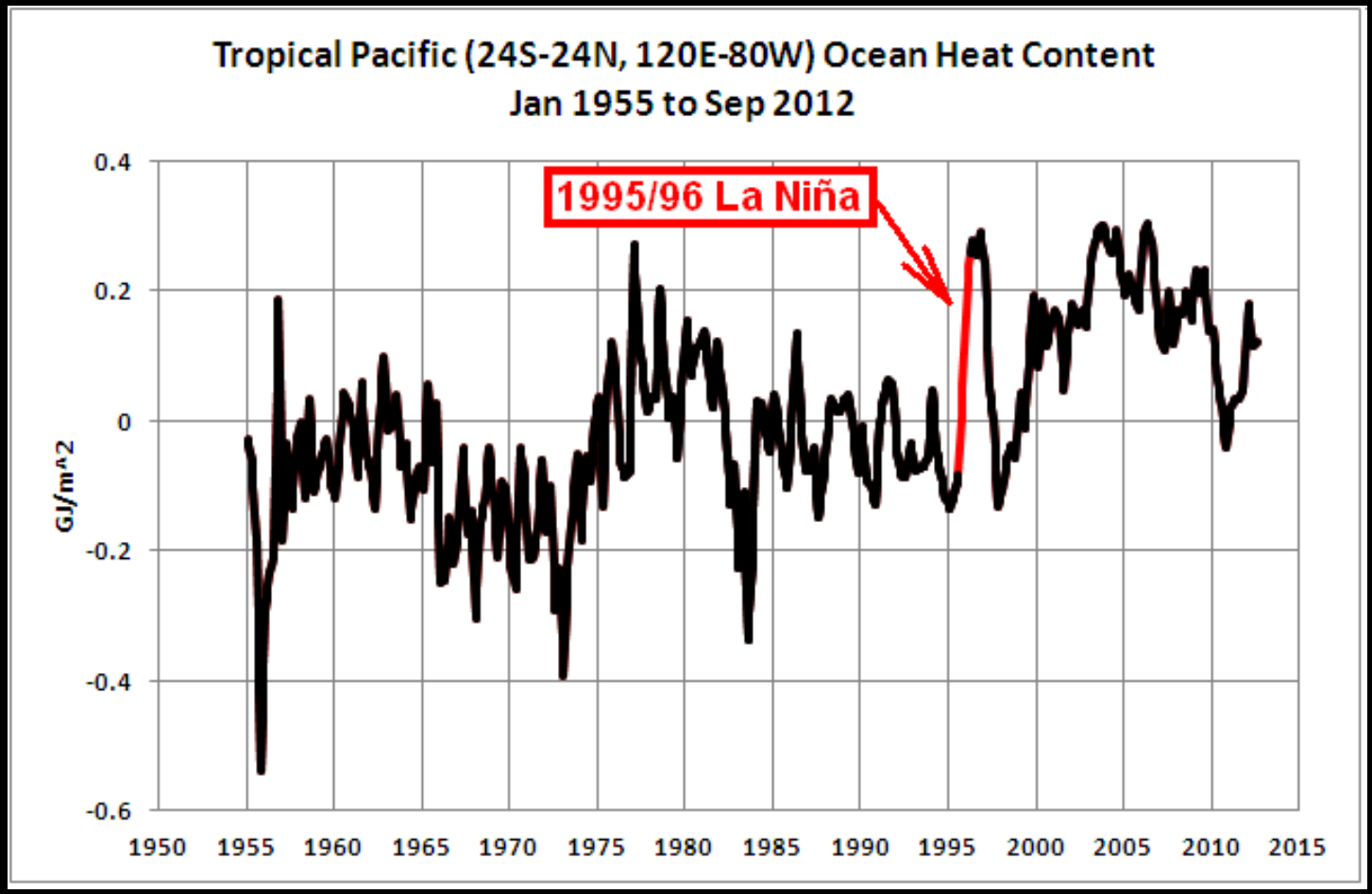
It's Difficult to Claim Manmade Greenhouse Gases Were Responsible for Warming During Multidecadal Periods When the Tropical Pacific Was Cooling



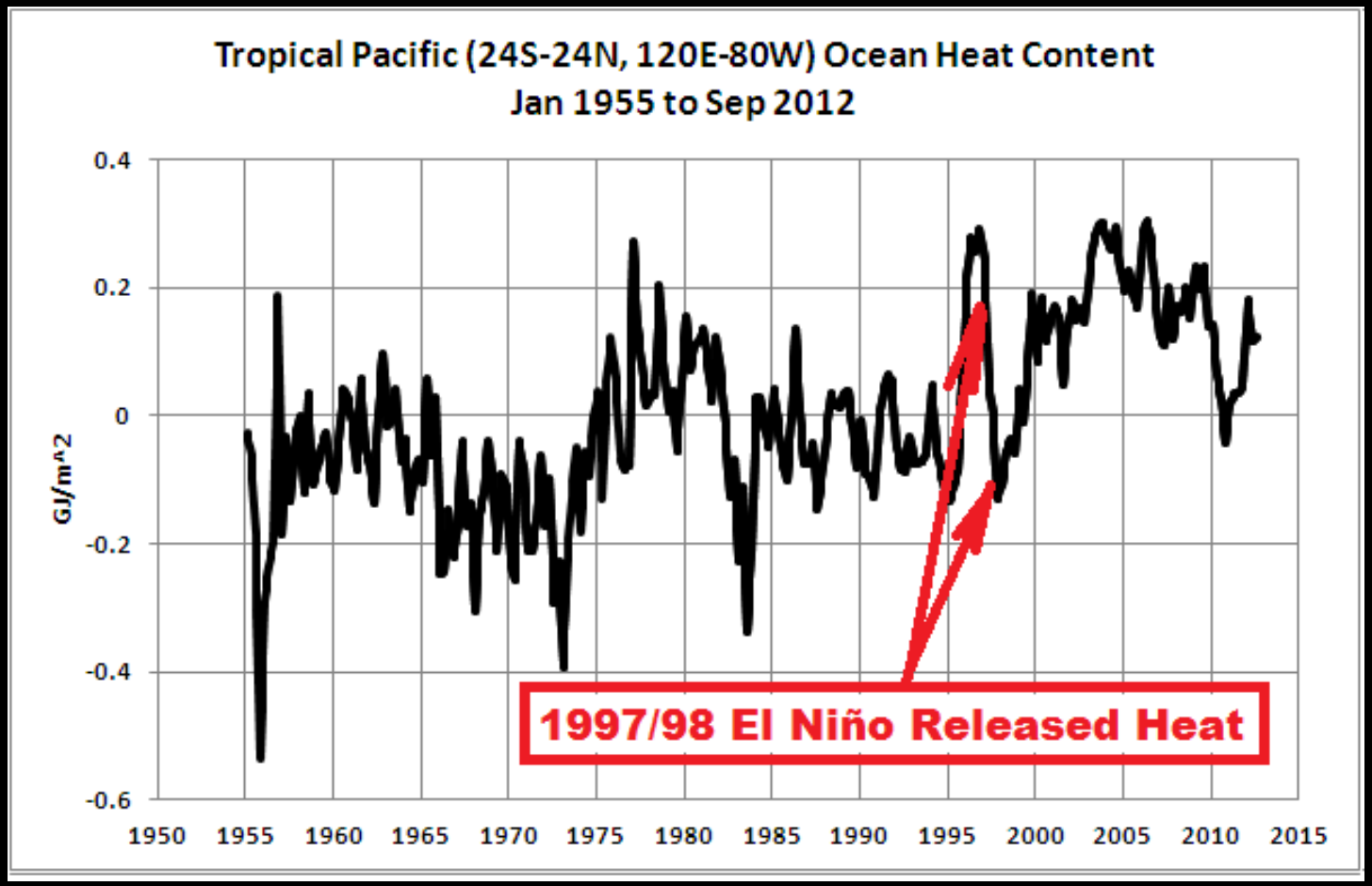
The Tropical Pacific Warmed Again Quickly and Naturally During the 1995/96 La Niña.



Returning to Our Question:
What Provided the Fuel for the 1997/98 "Super El Niño"?
Answer: The 1995/96 La Niña

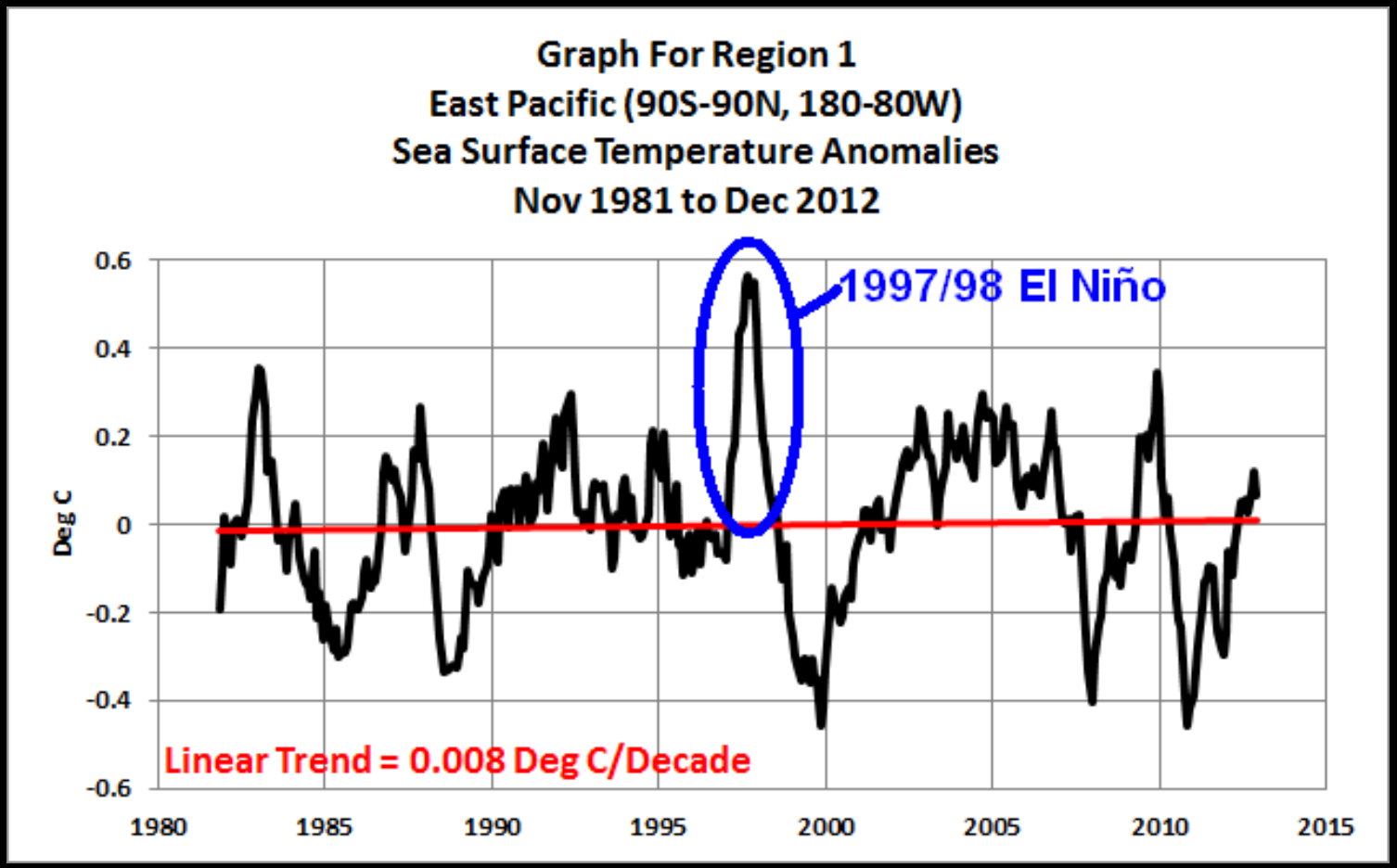


Then the 1997/98 “Super El Niño” Released Heat from the Tropical Pacific

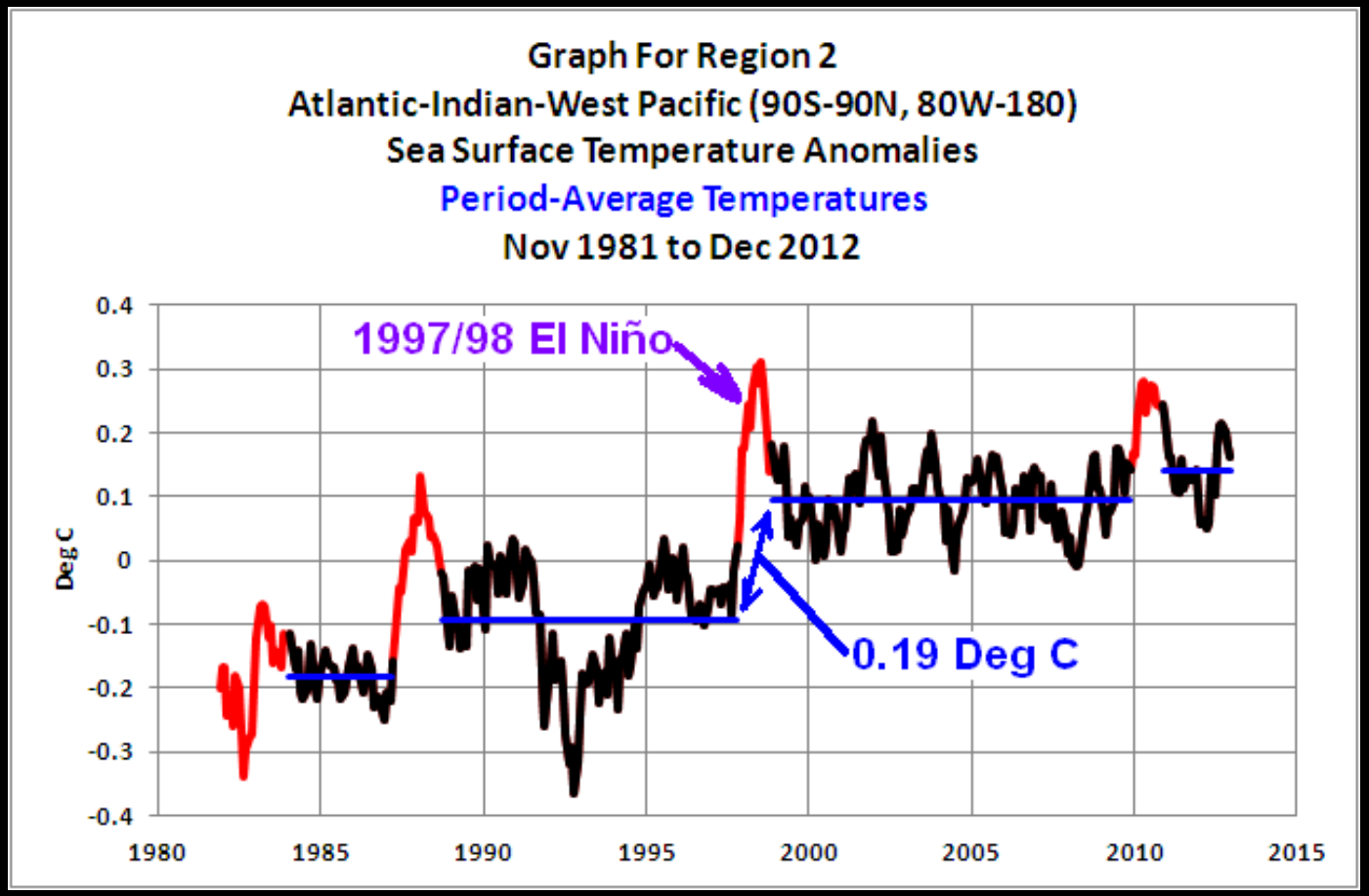


(We've Switched Back to Sea Surface Temperature Data Here)

The 1997/98 El Niño Temporarily Warmed the Sea Surface Temperatures of the East Pacific

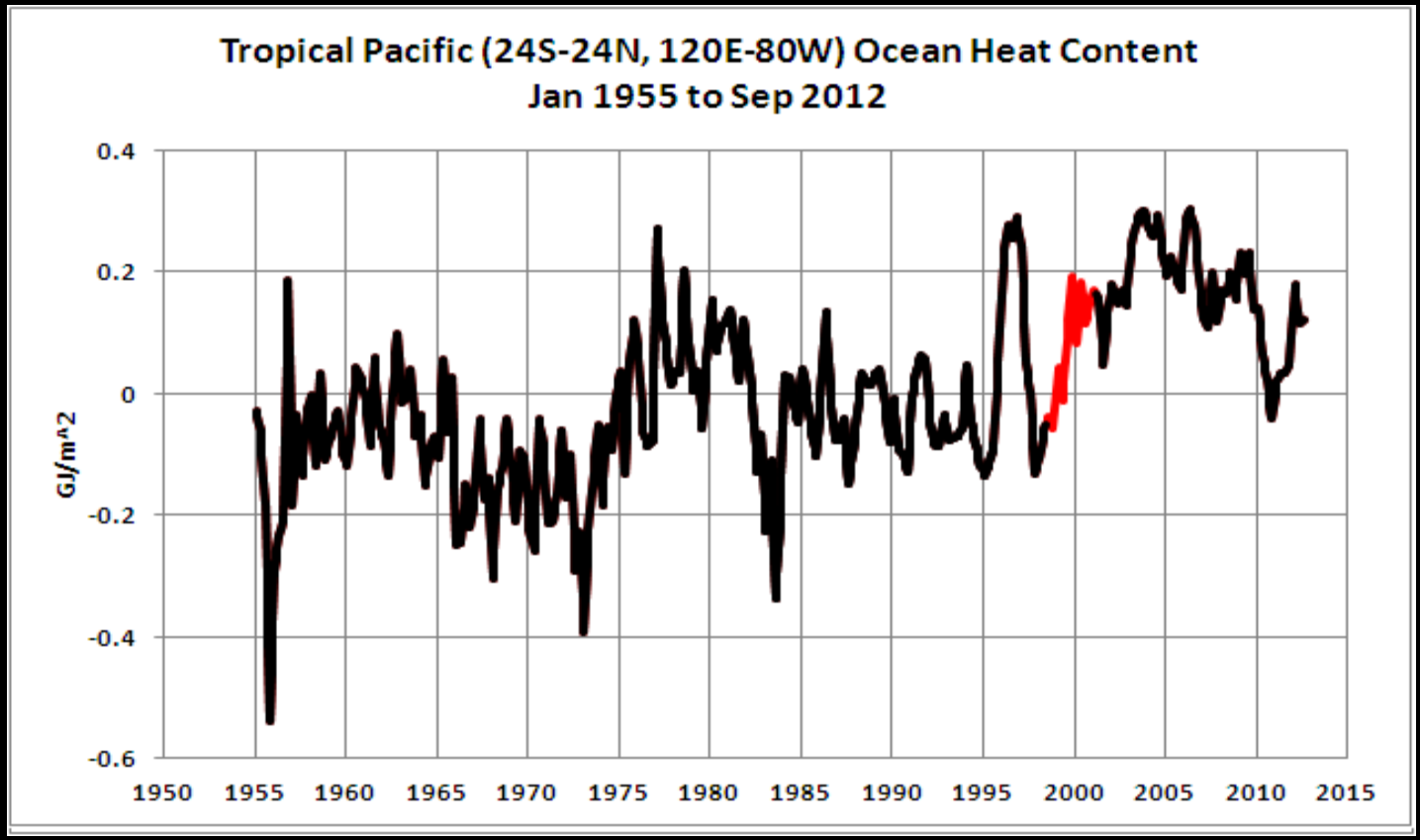


And the Residual Warm Waters Raised the Sea Surface Temperatures (for 67% of the Surface Area of the Global Oceans) about 0.19 Deg C.

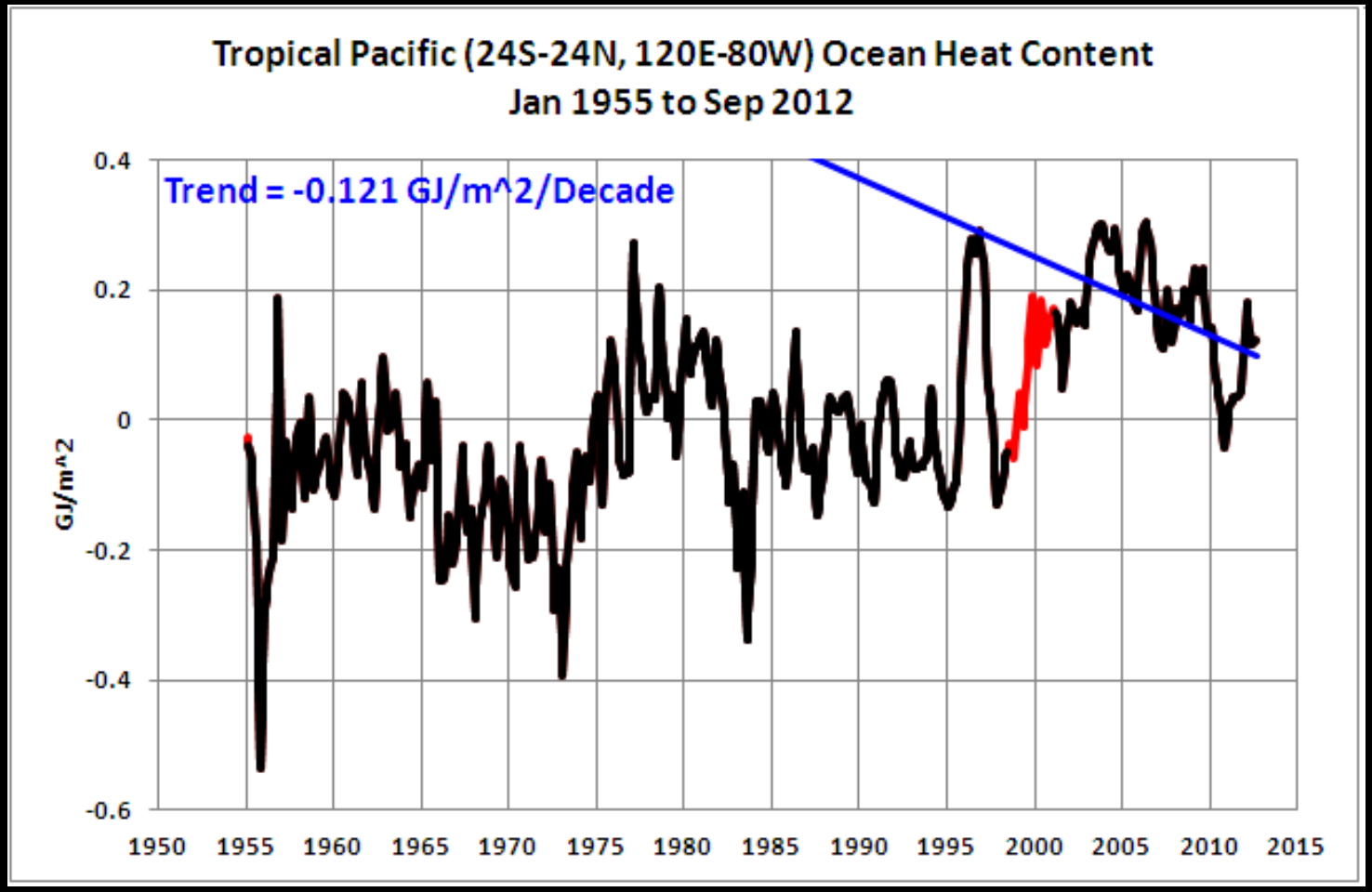


(Back to Ocean Heat Content)

The 1998-01 La Niña then Recharged the Tropical Pacific Ocean Heat Content

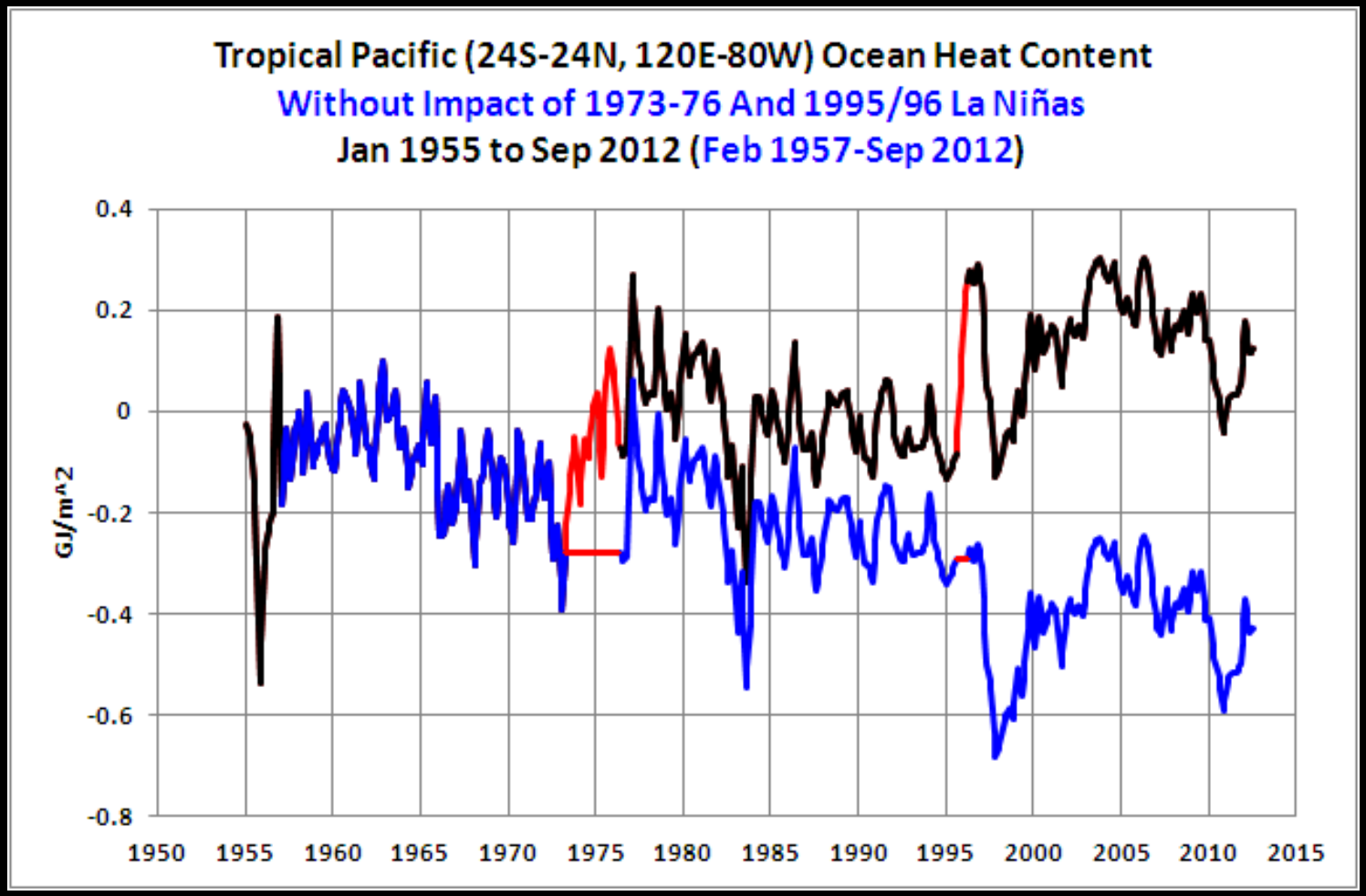


And the Ocean Heat Content for the Tropical Pacific Has Been Cooling Since Then

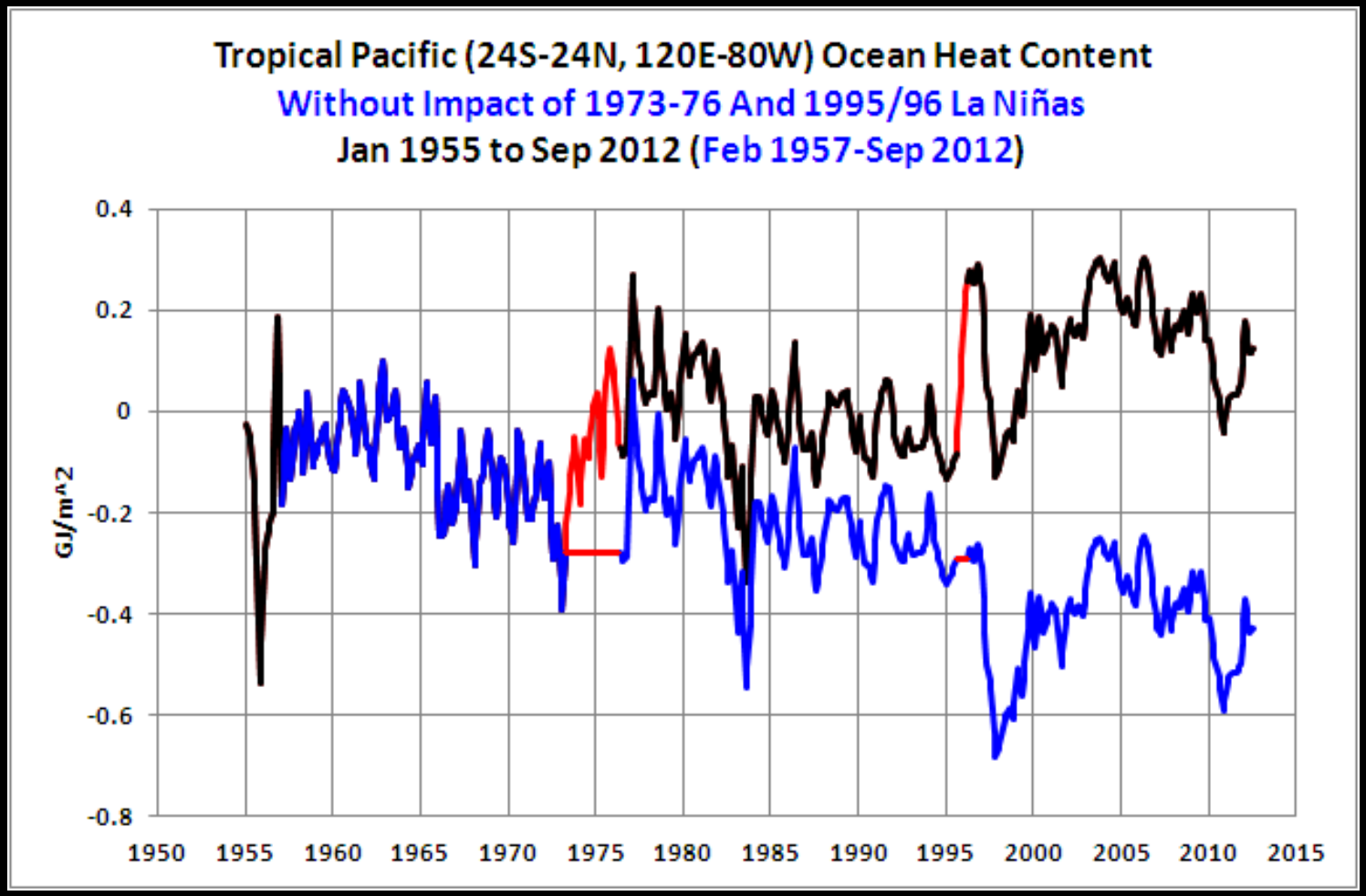


Let's Return to the Manmade Global Warming Challenge

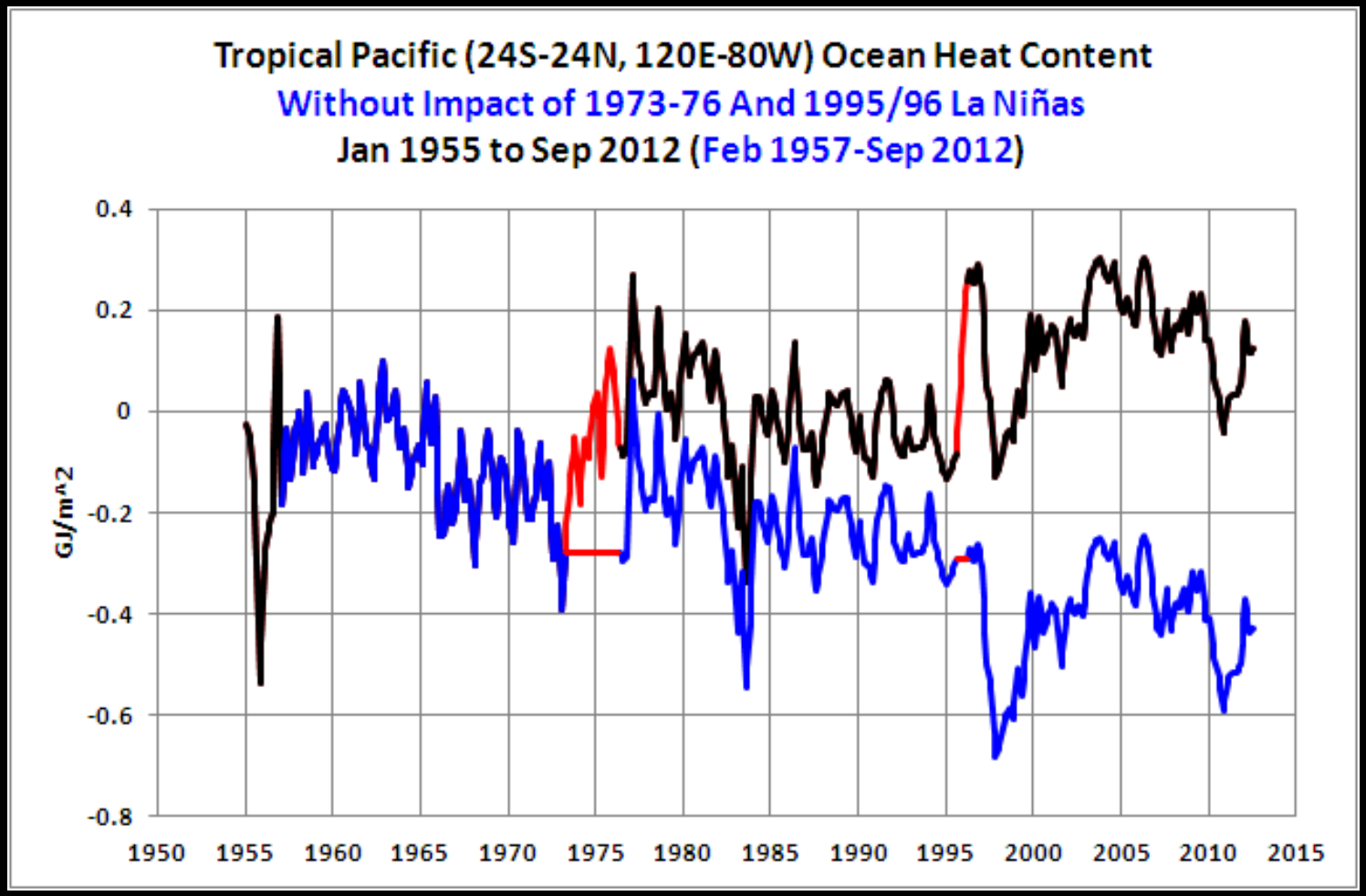
Without the 1973-76 and 1995/96 La Niñas, Tropical Pacific Ocean Heat Content Would Have Cooled Since 1957



In Other Words, The Warming Since February 1957 (About 55 Years) Relies on Less Than 4 Years of Data

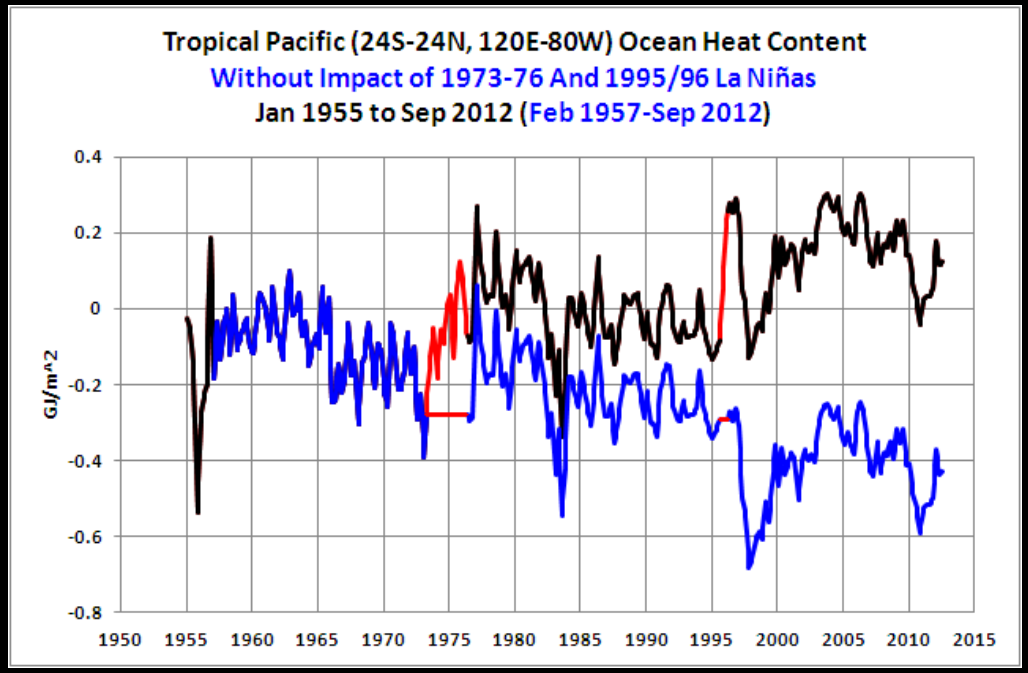


Does This Agree with Your Understanding of Manmade Global Warming?



Looking for Something Else Really Challenging? Try to Find Climate Model-Based Scientific Studies That Explain Specifically:

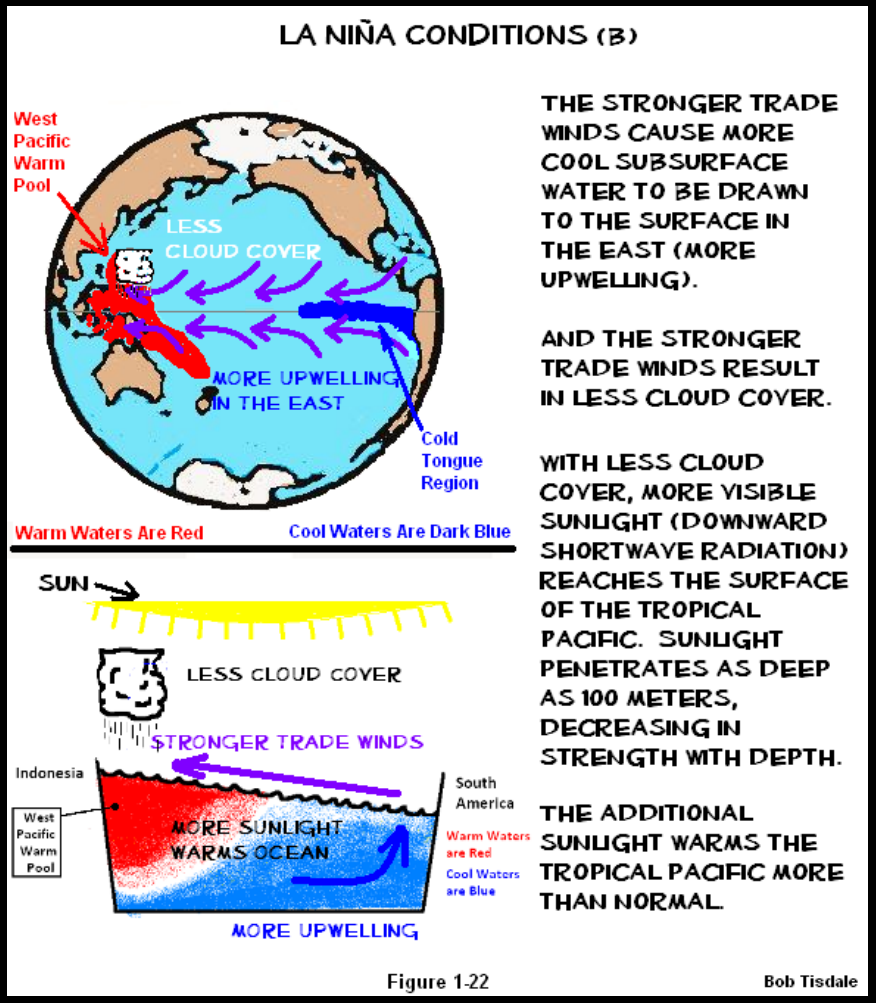
- Why the Warming of the Ocean Heat Content for the Tropical Pacific (0-700m) Depends on the 1973-76 and 1995/96 La Niña Events

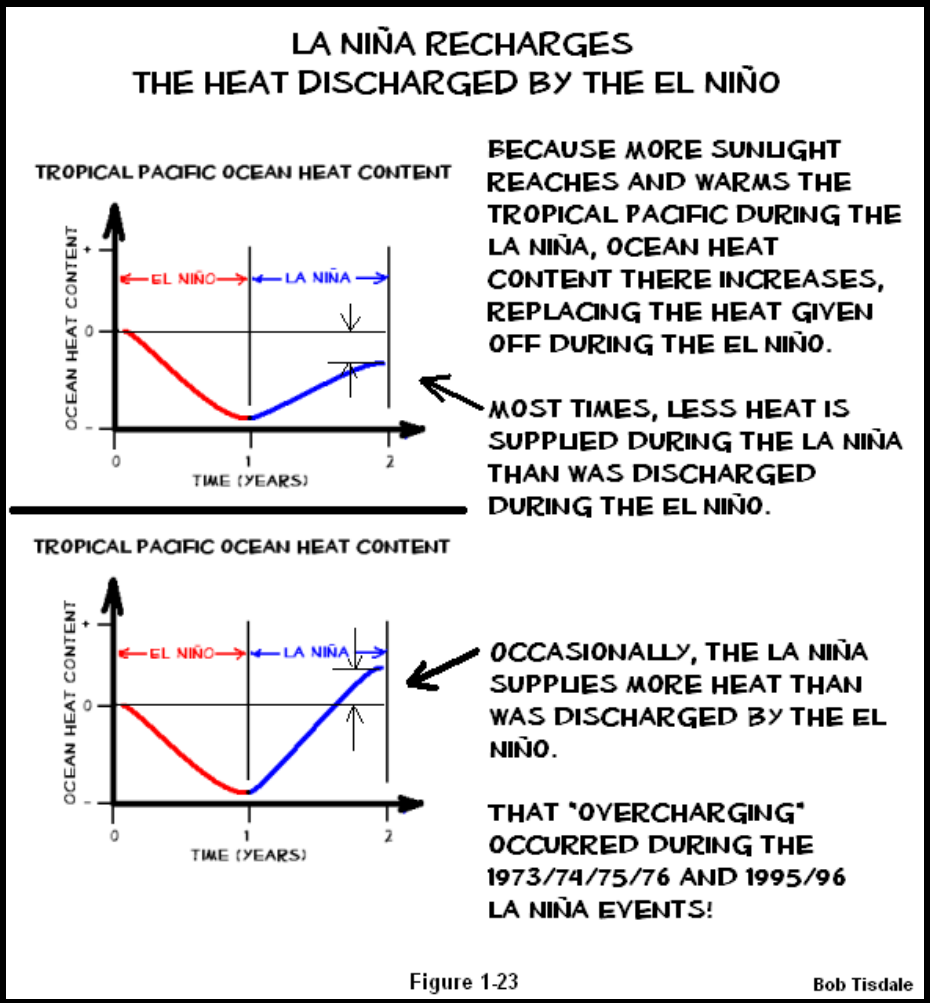


What You Will Find is a Data-Based (Not Climate Model-Based) Study

- The 1995/96 La Niña Was Relatively Weak By Most Standards.
- Refer, However, to McPhaden (1999) **Genesis and Evolution of the 1997/98 El Niño**
- **McPhaden Writes:**
  - "For at least a year before the onset of the 1997–98 El Niño, there was a buildup of heat content in the western equatorial Pacific due to stronger than normal trade winds associated with a weak La Niña in 1995–96."
  - McPhaden Further Describes the Weather Conditions Leading Up to That El Niño

If You're Wondering How La Niñas Can Cause a Buildup in the Ocean Heat Content of the Tropical Pacific, Here are 2 Illustrations from My eBook *Who Turned on the Heat?*

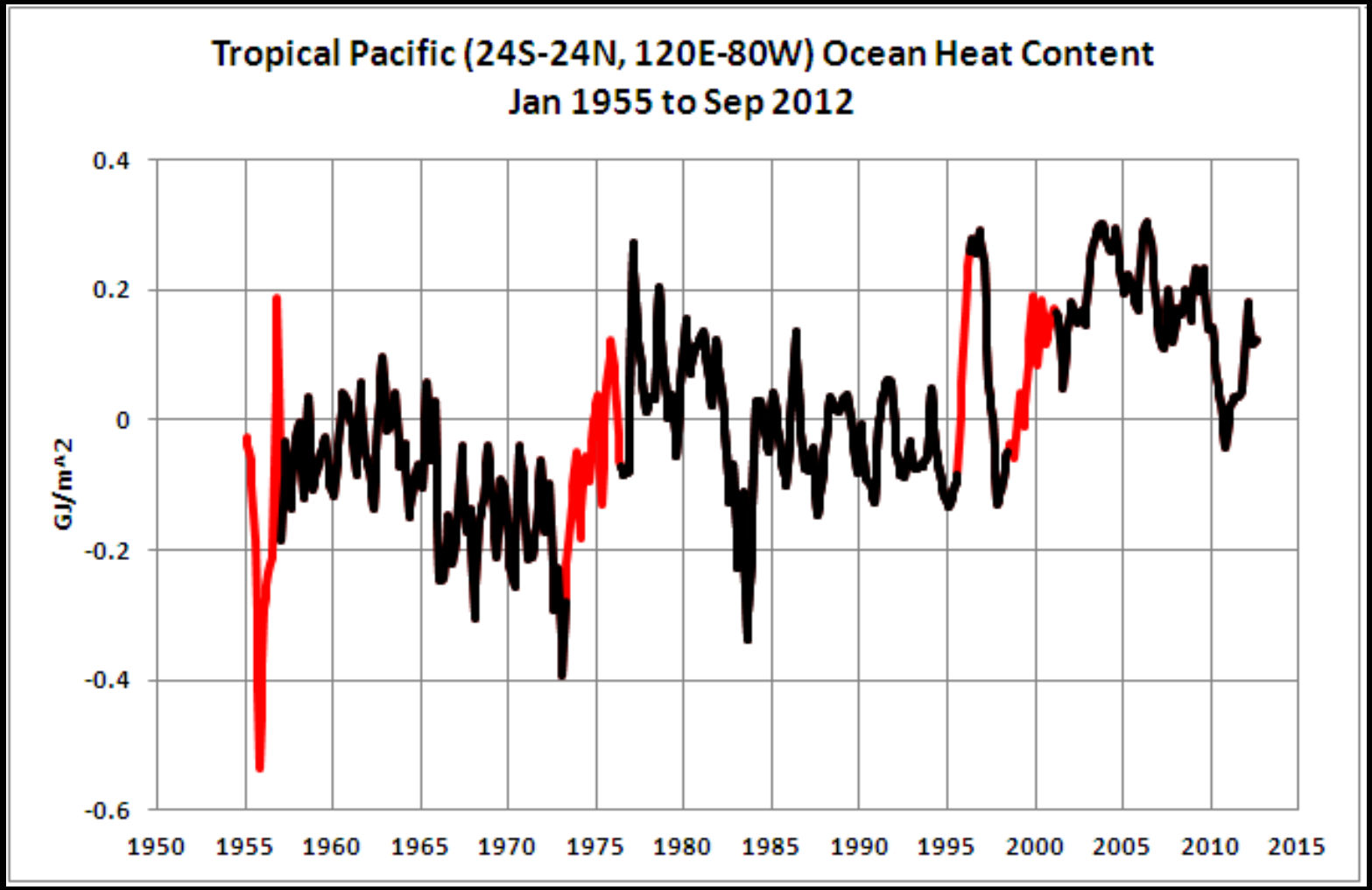




Interested in a Scientific Paper that Describes the Relationship between Cloud Amount and Downward Shortwave Radiation (Visible Sunlight) over the Tropical Pacific in Response to El Niños and La Niñas?

- Refer to Pavlakis et al (2008) ENSO Surface Shortwave Radiation Forcing over the Tropical Pacific.

And If You're Wondering How the La Niña Months In Red Were Selected…



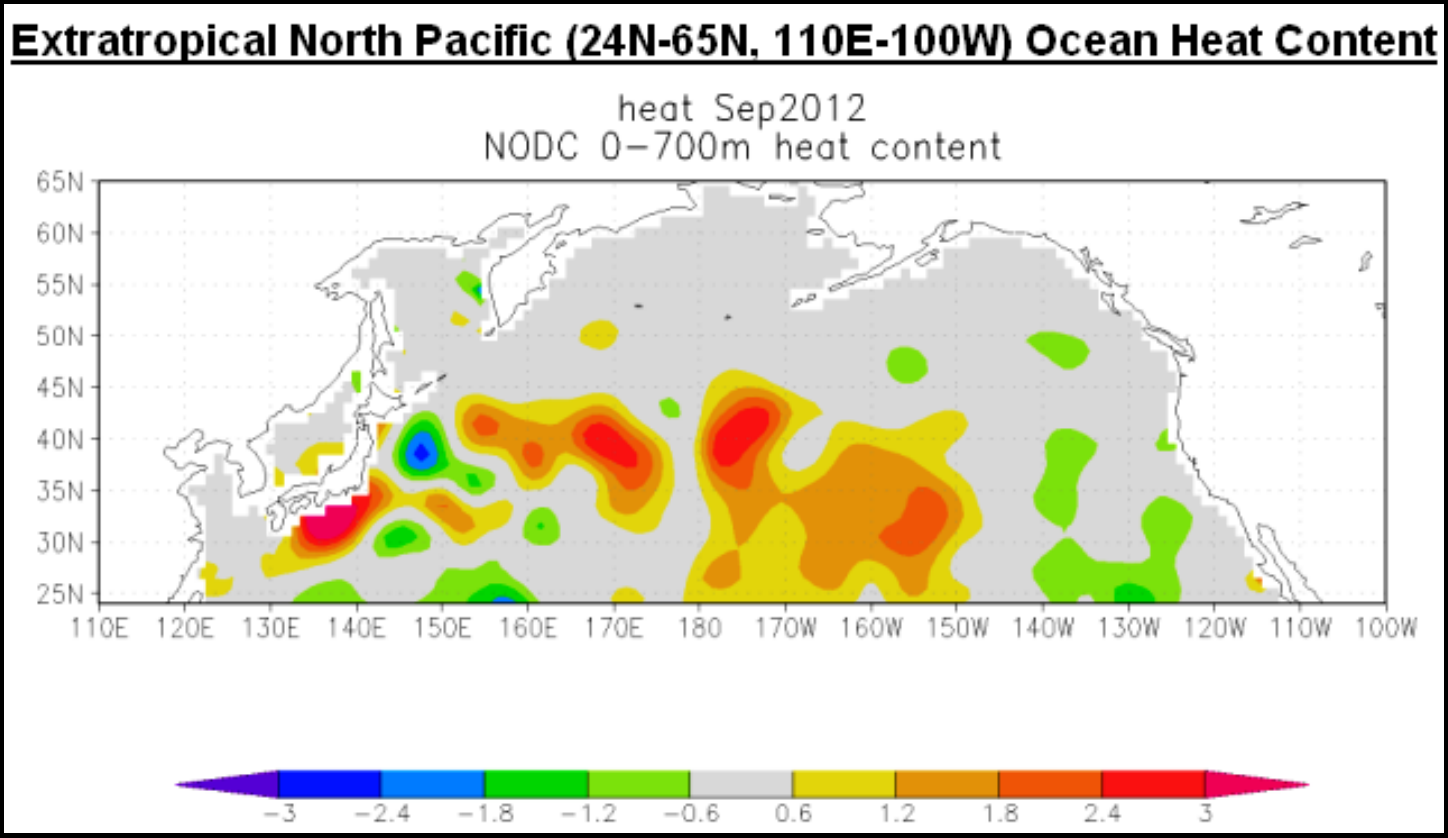
And If You're Wondering How the La Niña Months In Red Were Selected…

- NOAA's Oceanic NINO Index (ONI-Version 1) Was Used to Determine the "Official" Months of the 1954-57, 1973-76, 1995/96 and 1998-2001 La Niñas.

- The Months Were Not Shifted in Time Because the El Niño and La Niña Events Take Place in the Tropical Pacific and There's No Time Lag.

While We're Discussing Ocean Heat Content…

- …Let's Look at the Data for the North Pacific, North of the Tropics.



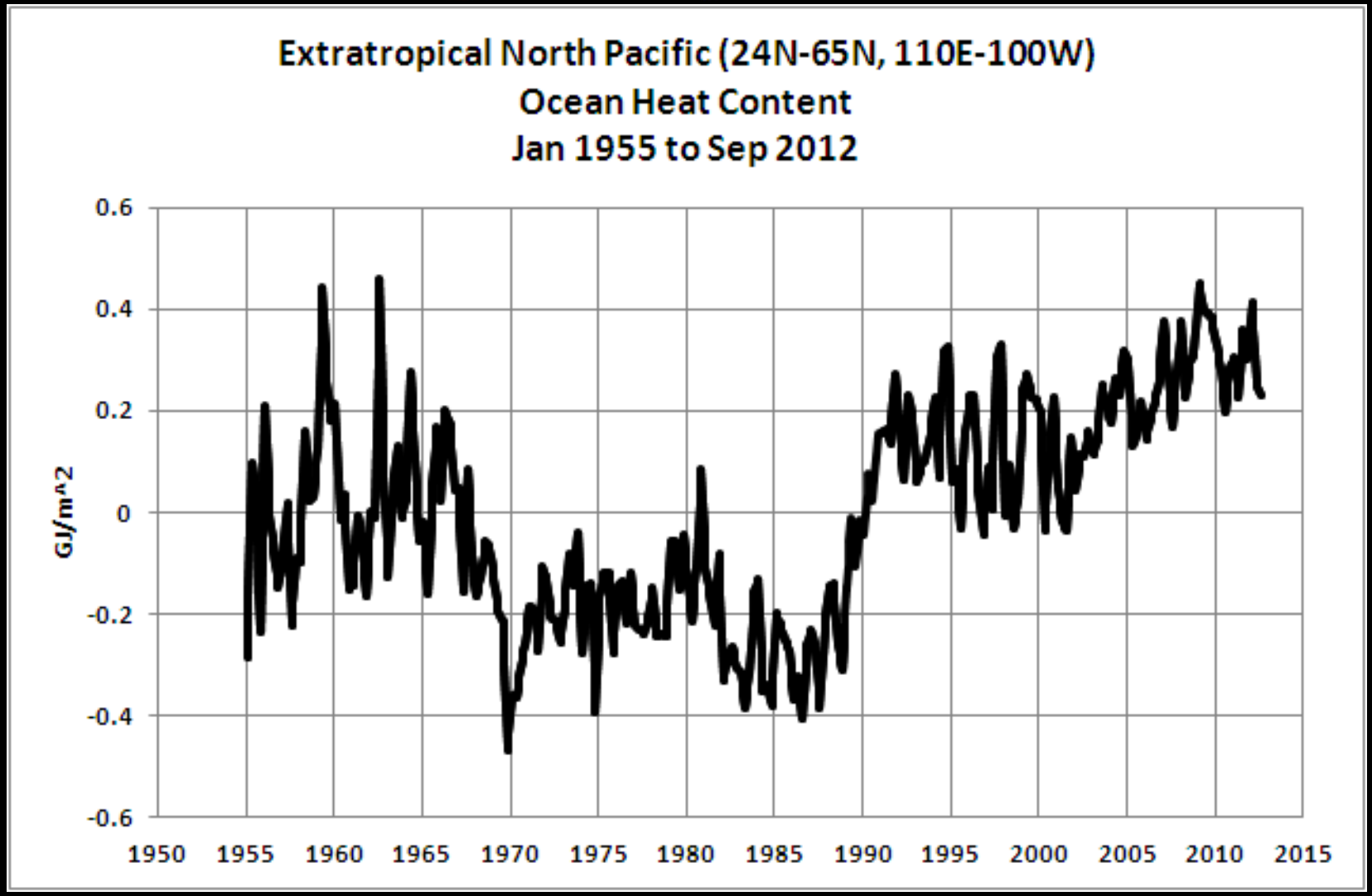
If the Other Datasets Haven't Already Convinced You That Manmade Greenhouse Gases

ARE NOT

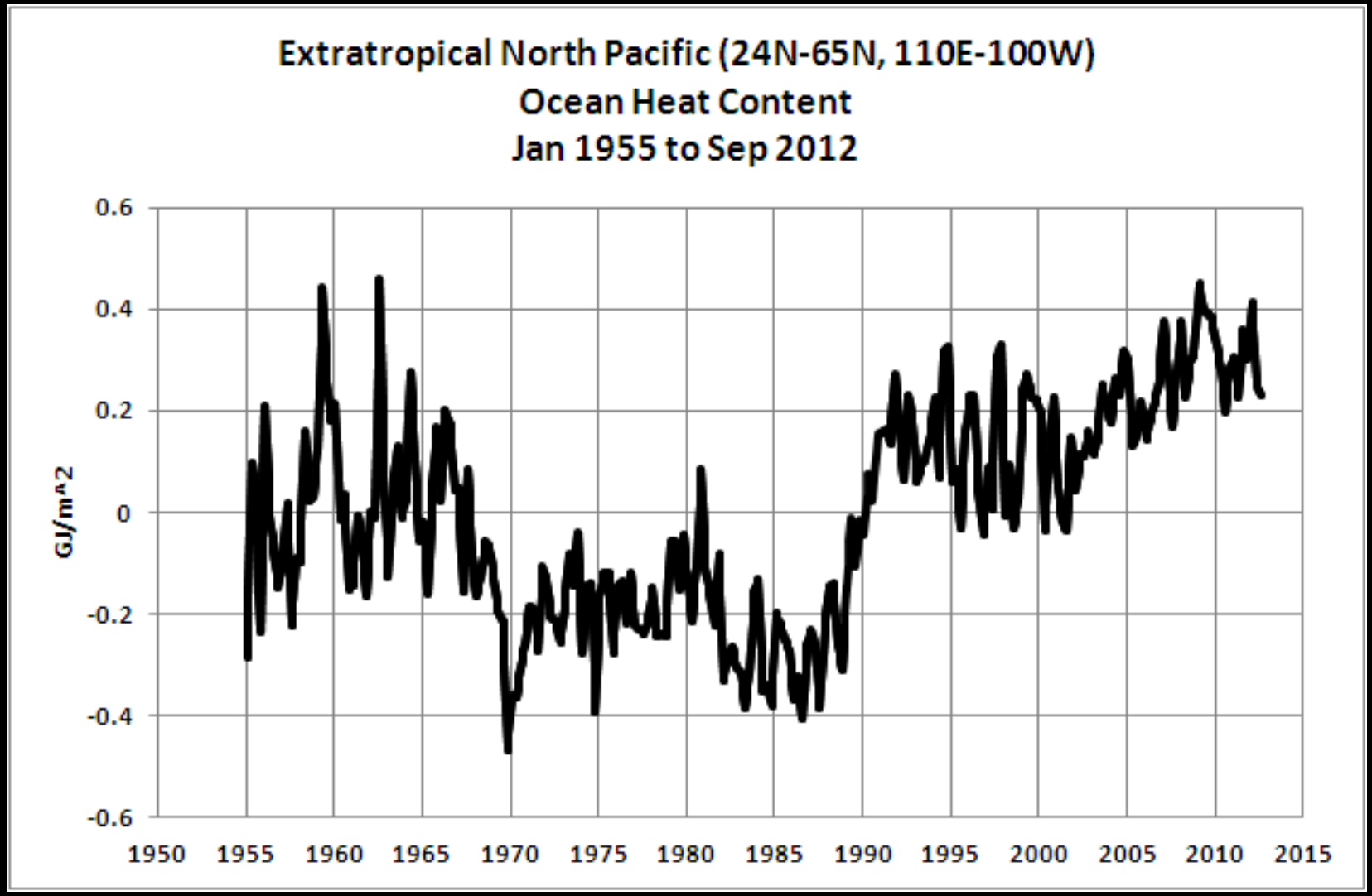
Responsible for the Warming of the Global Oceans,

This Subset Should!

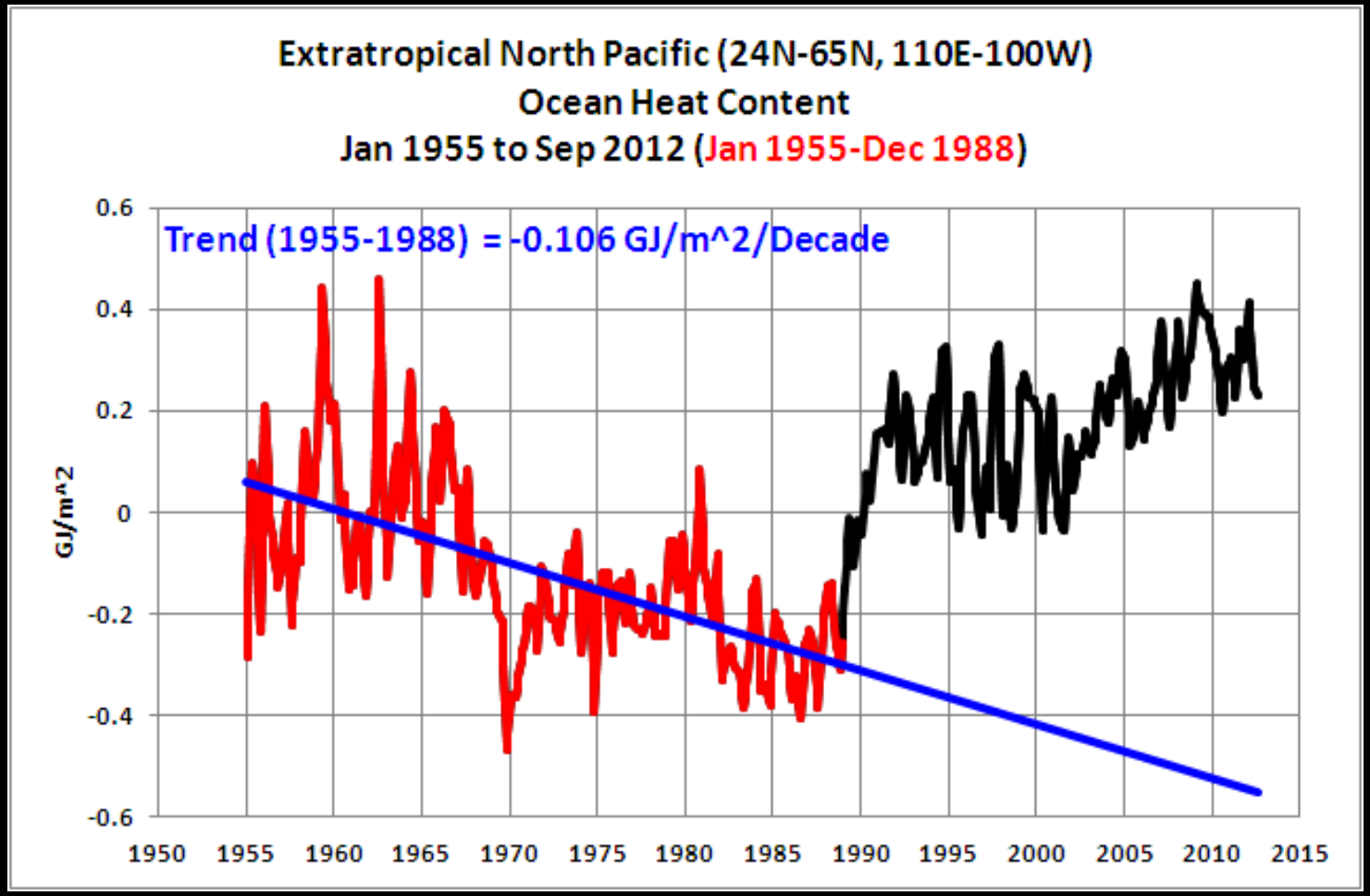
Can You Find the Manmade Global Warming Component Here?



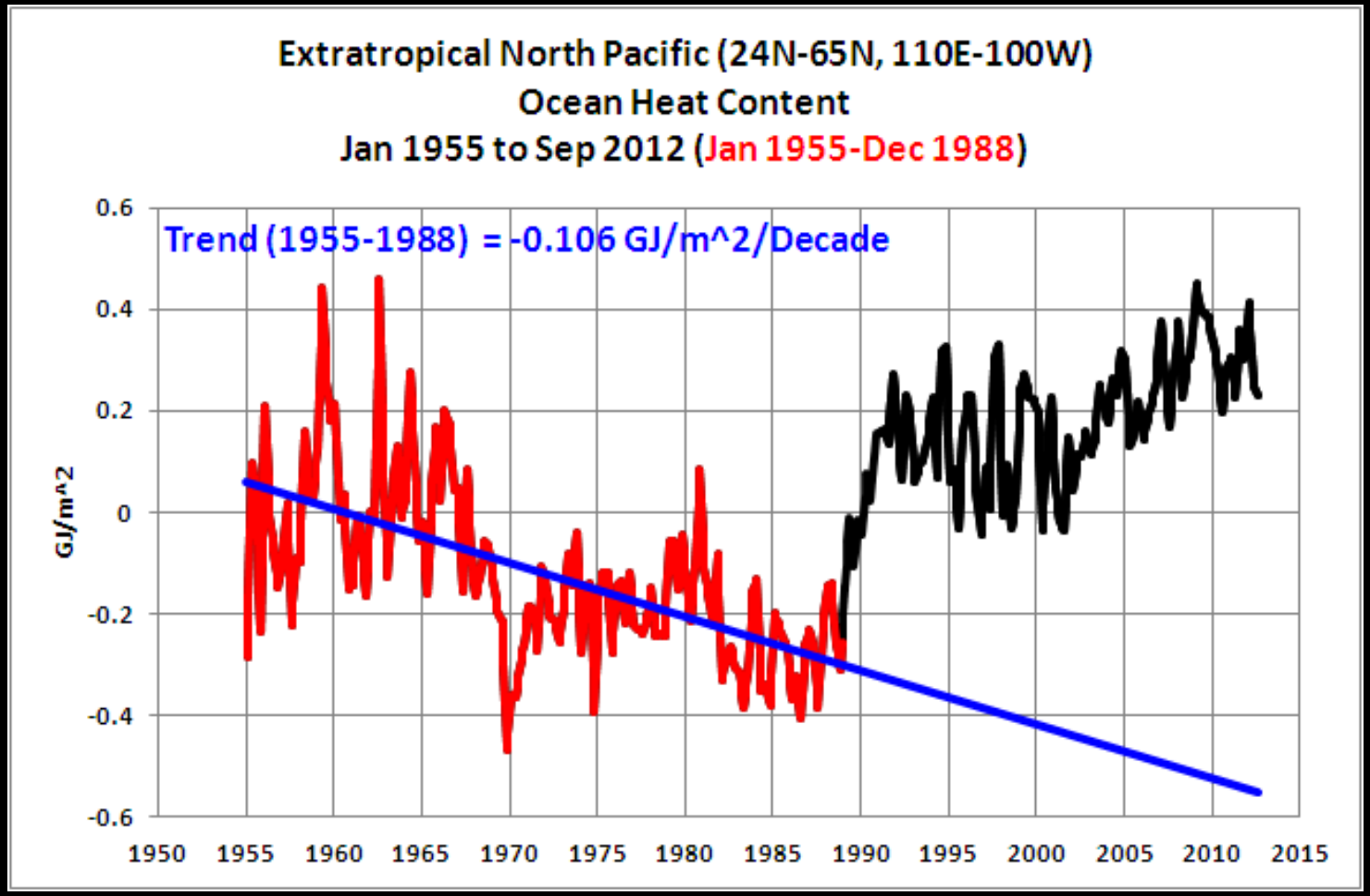
That's Really Difficult, For Two Reasons.



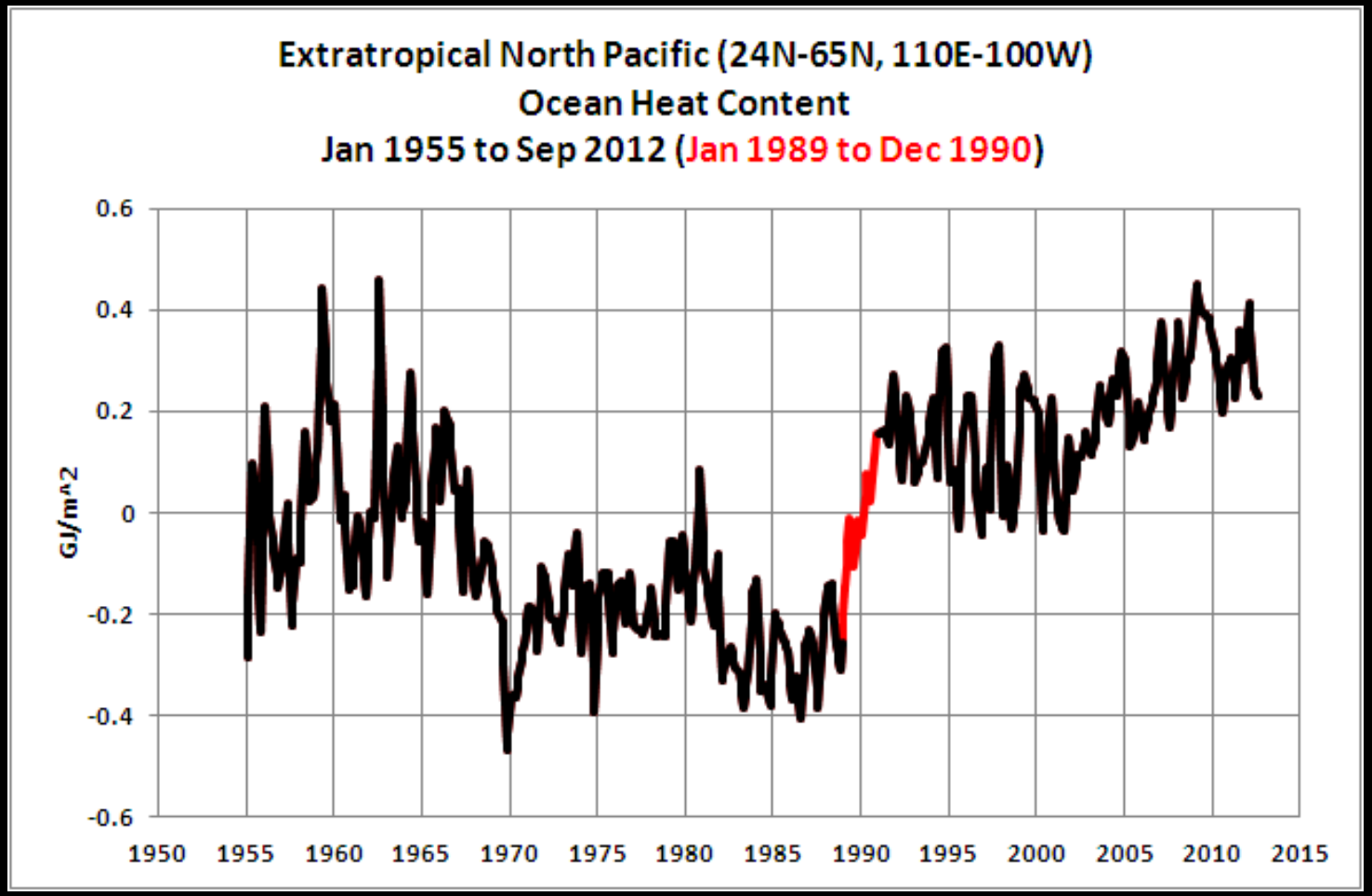
First, Ocean Heat Content (0-700m) for the North Pacific (North of the Tropics) Cooled from 1955 to 1988.



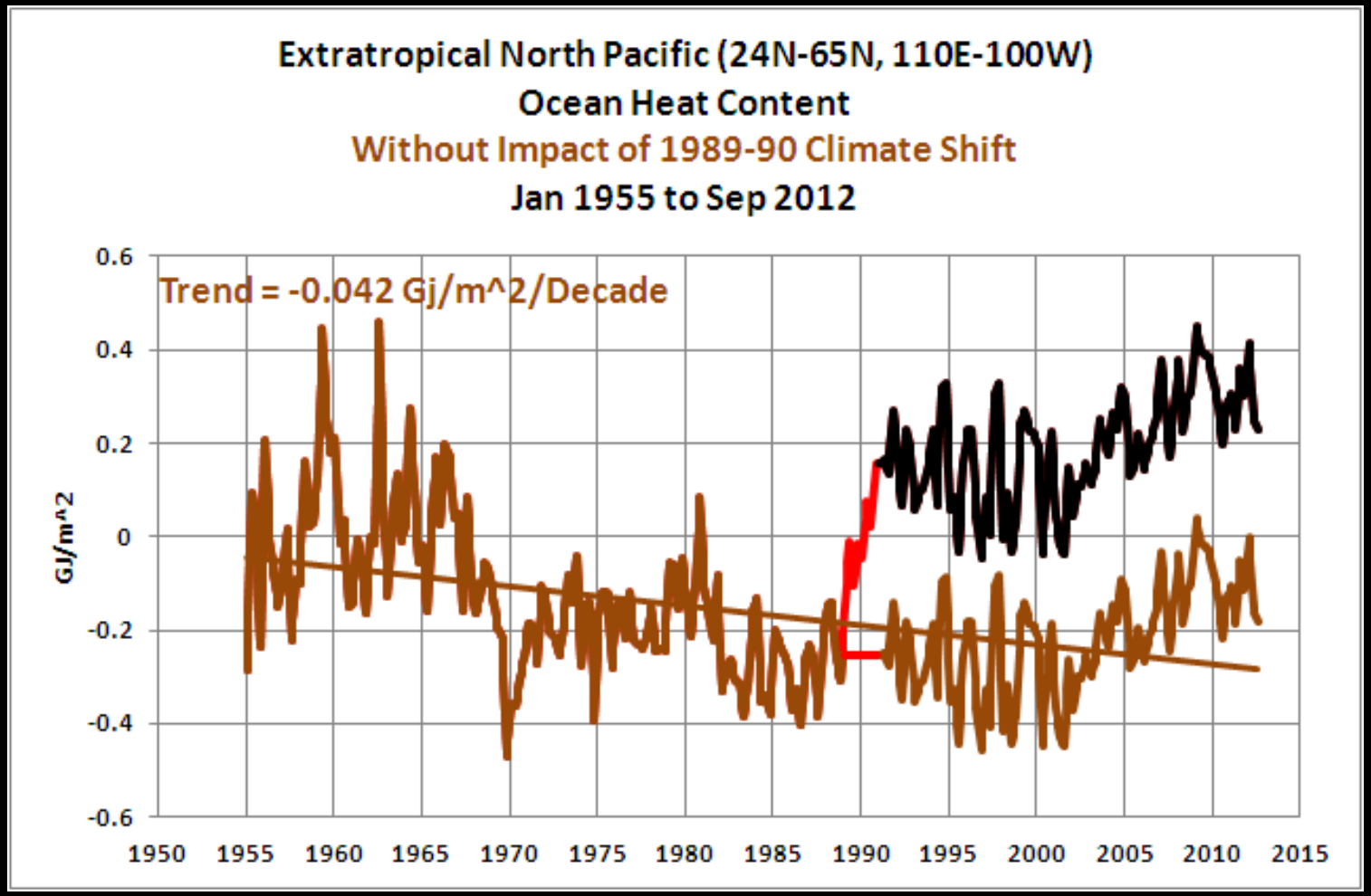
Again, It's Difficult to Say Greenhouse Gases Were Responsible for the Warming, While the North Pacific Was Cooling!



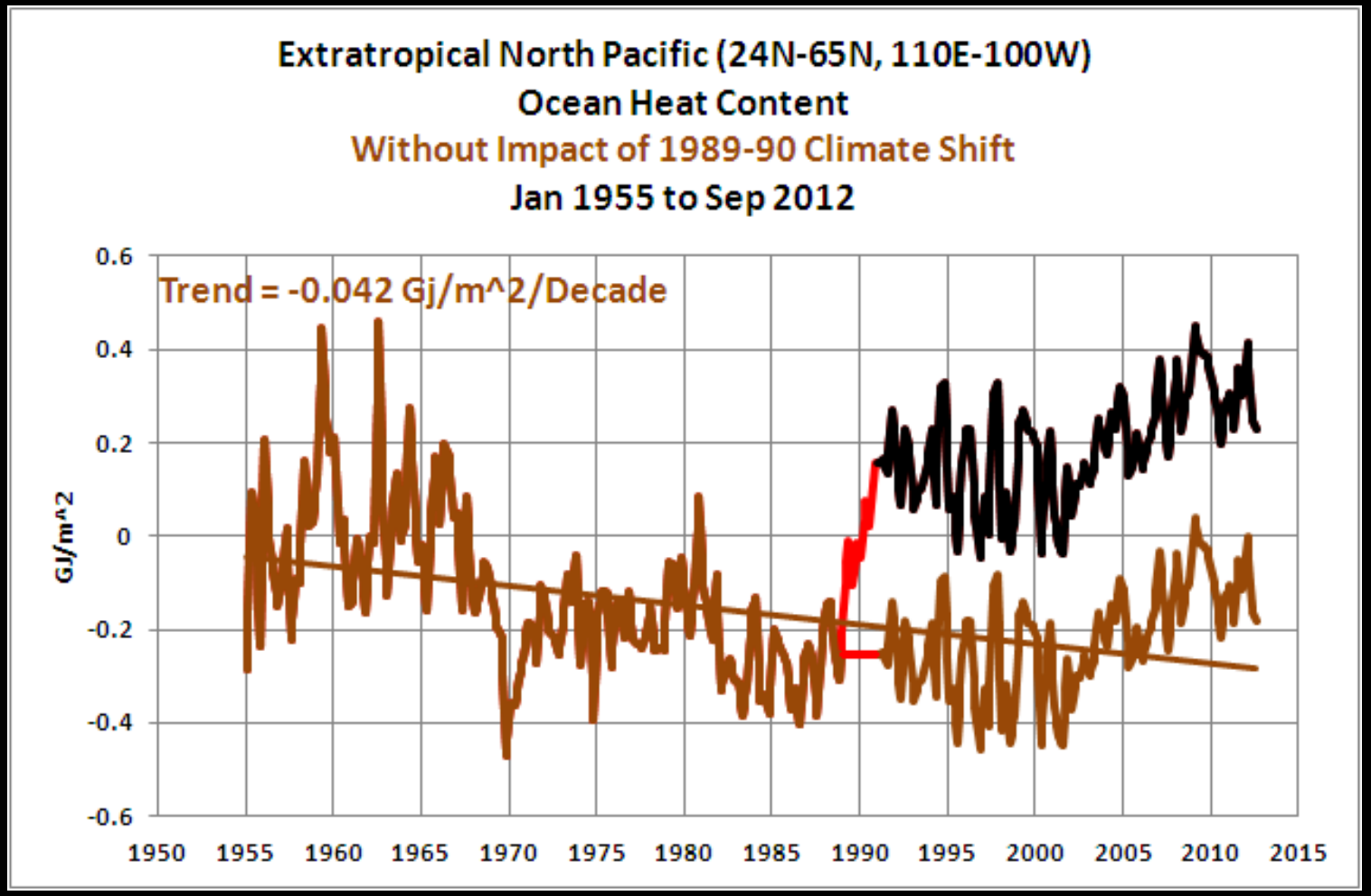
Second, the Long-Term Warming in the North Pacific is Dependent on an Obvious 2-Year Climate Shift.



Without that 2-Year Shift, the Ocean Heat Content for the North Pacific (North of the Tropics) Would Cool Since 1955.

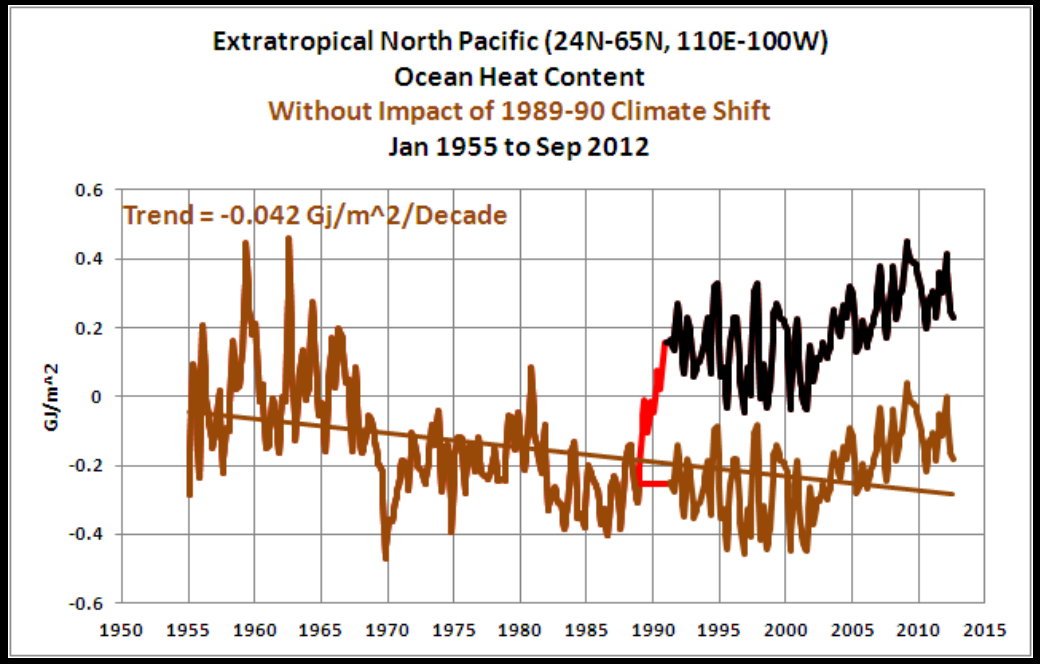


Does This Agree with Your Understanding of Manmade Global Warming?

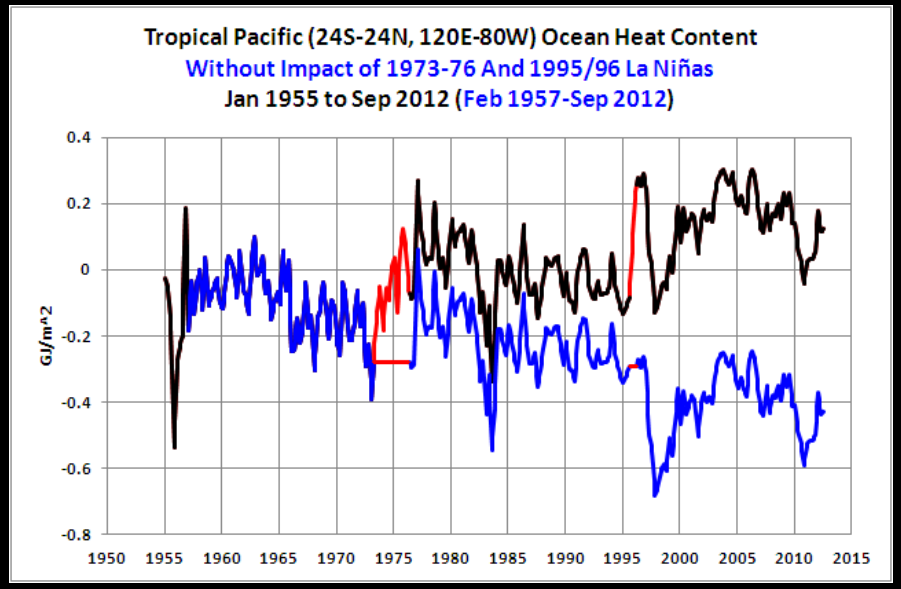


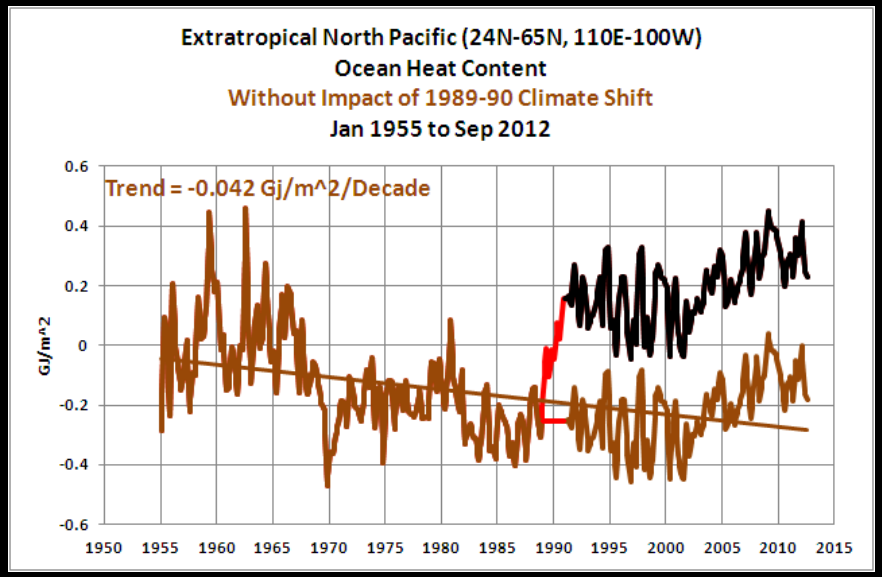
Looking for One More Thing That's Really Challenging? Try to Find Climate Model-Based Scientific Studies That Explain Specifically:

- Why the Warming of Ocean Heat Content for the Extratropical North Pacific (0-700m) Is Dependent on a 2-Year Climate Shift

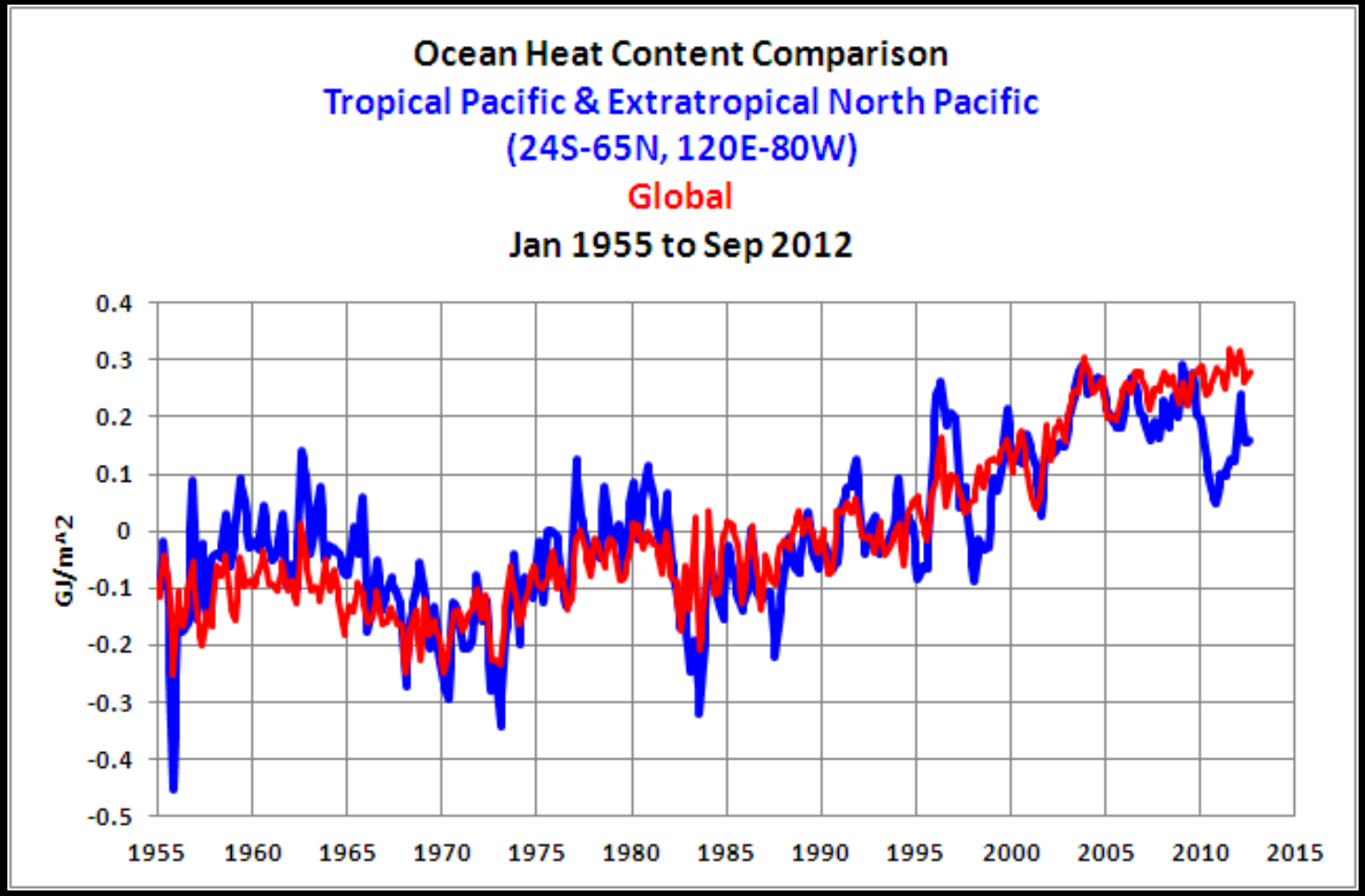


Individually, Those Two Ocean Heat Content Subsets from the Pacific Ocean Show No Evidence of Manmade Global Warming, But…

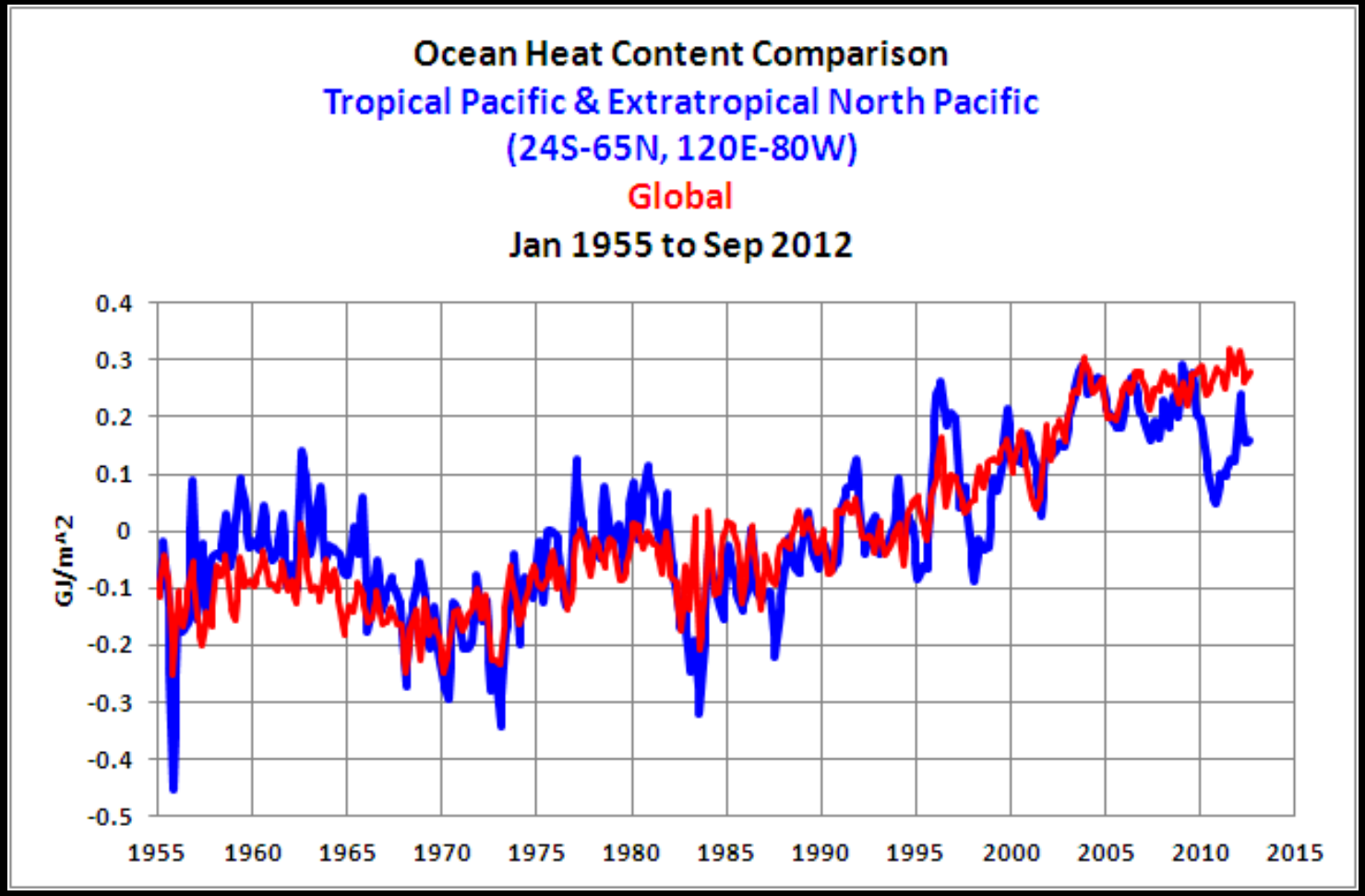




…When Combined, They Give the MISLEADING APPEARANCE of Manmade Global Warming.



That is, the Heat Content Data for the Global Oceans Mimic the Long-Term Variations in the Naturally Warming Pacific Data We've Examined.



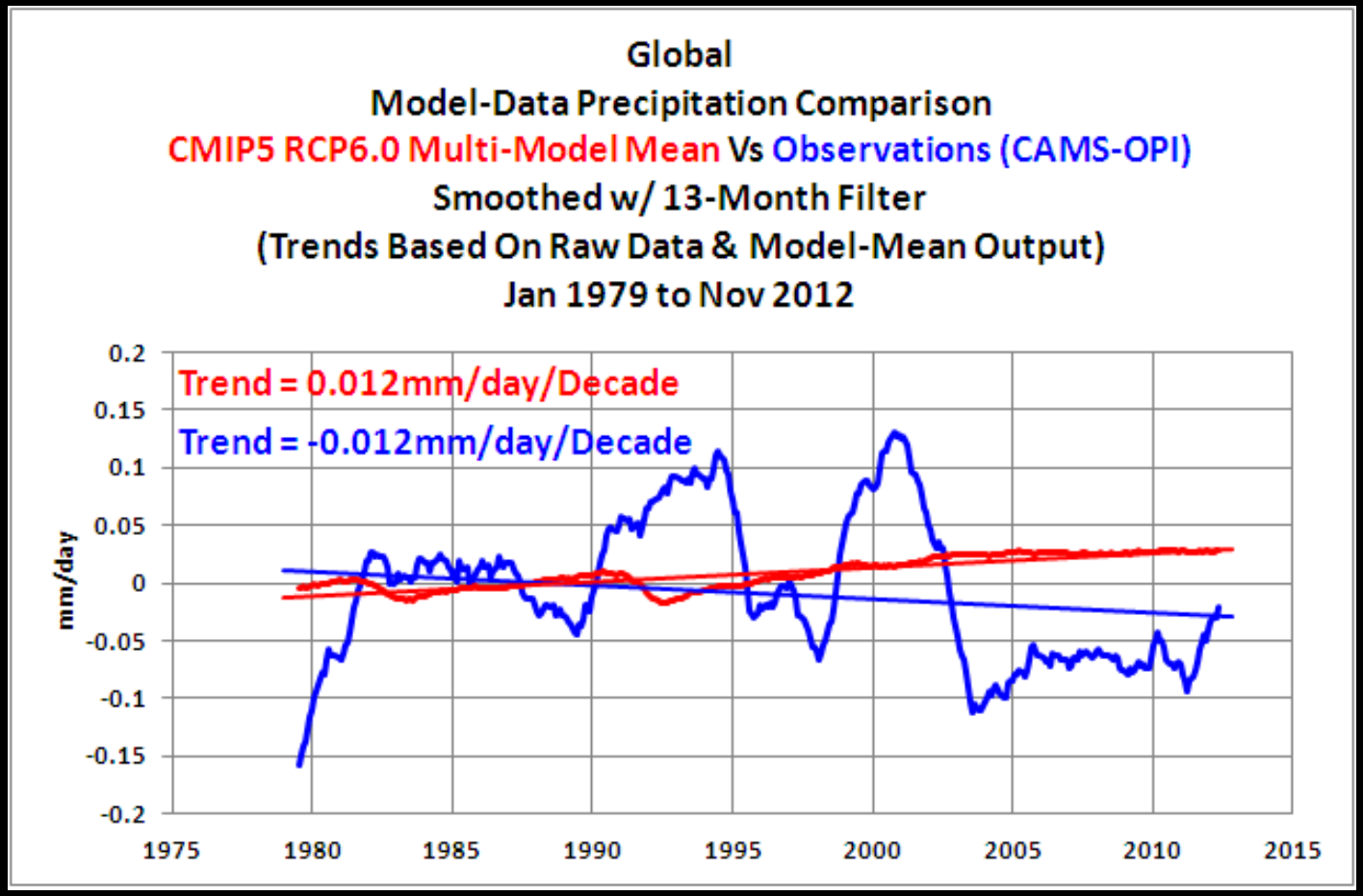
Some Closing Notes About Ocean Heat Content Data

- You'll Often See Statements to the Effect of: 90% of the Manmade Global Warming Goes into Warming the Oceans.
  - Claims Like That are Based on Climate Model Studies.
    - But Climate Models Do Not Properly Simulate El Niño and La Niña and Other Ocean Processes
  - Also the Ocean Heat Content Data Shows No Evidence of Manmade Global Warming.
  - And Sea Surface Temperature Data Also Indicates They Warmed Naturally.

So What Impact Does the Additional Infrared Radiation from Manmade Greenhouse Gases Have on the Oceans?

- Unlike Downward Shortwave Radiation from the Sun, Infrared Radiation from Manmade Greenhouse Gases Can Only Penetrate the Top Few Millimeters of the Ocean Surface.
- Evaporation Takes Place at the Ocean Surface.
- Therefore, It's Likely the Additional Infrared Radiation from Manmade Greenhouse Gases Only Adds to the Evaporation Already Taking Place.

Curiously, However, Global Precipitation During the Satellite Era Has Decreased—While the IPCC's Climate Models Say It Should Be Increasing!!



A Brief Discussion of El Niño and La Niña Events

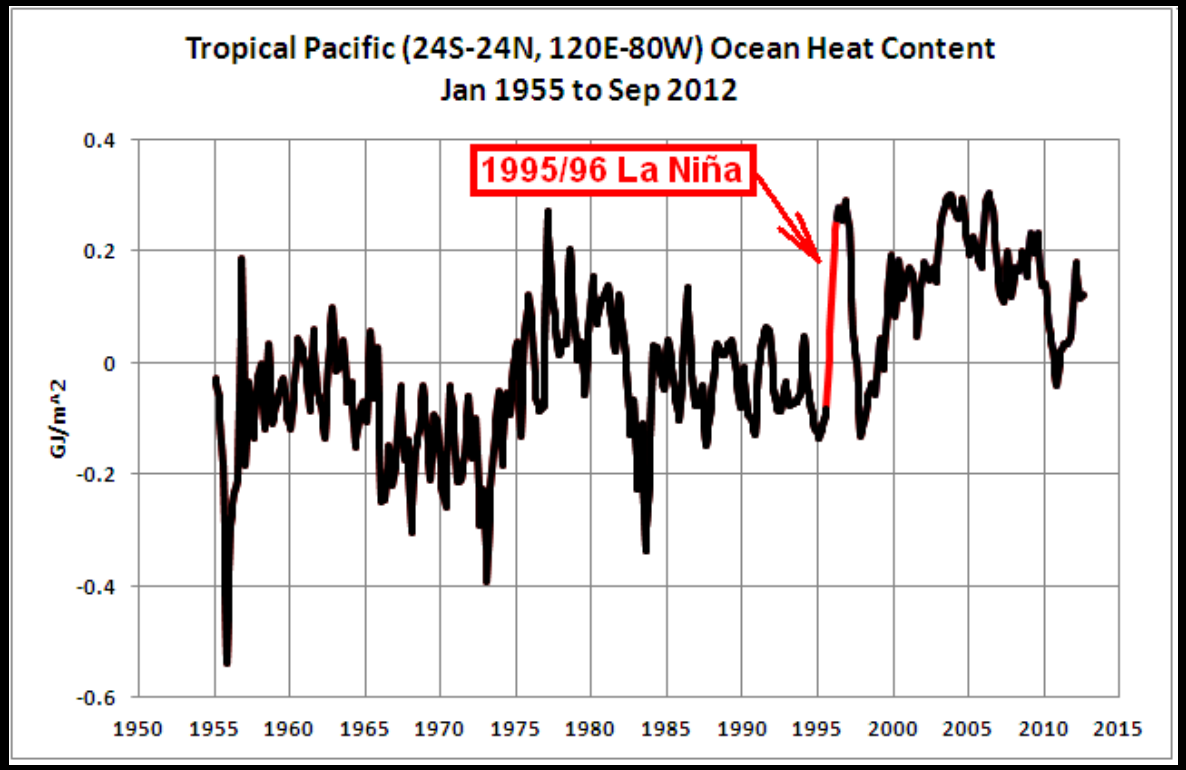
- El Niño and La Niña Are Often Described As:
  - An El Niño is an Unusual Warming of the Central and Eastern Tropical Pacific, Occurring at Intervals of 2 to 7 Years
  - Conversely, A La Niña is an Unusual Cooling of the Central and Eastern Tropical Pacific

A Brief Discussion of El Niño and La Niña Events

- But As We've Seen, El Niños and La Niñas Are Much More Than Those Simple Descriptions
- They Are Processes That Can and Do Produce and Distribute Huge Amounts of Naturally Created Warm Water
- Or Expressed in Technical Terms, They Function as a Naturally Occurring Recharge-Discharge Oscillator

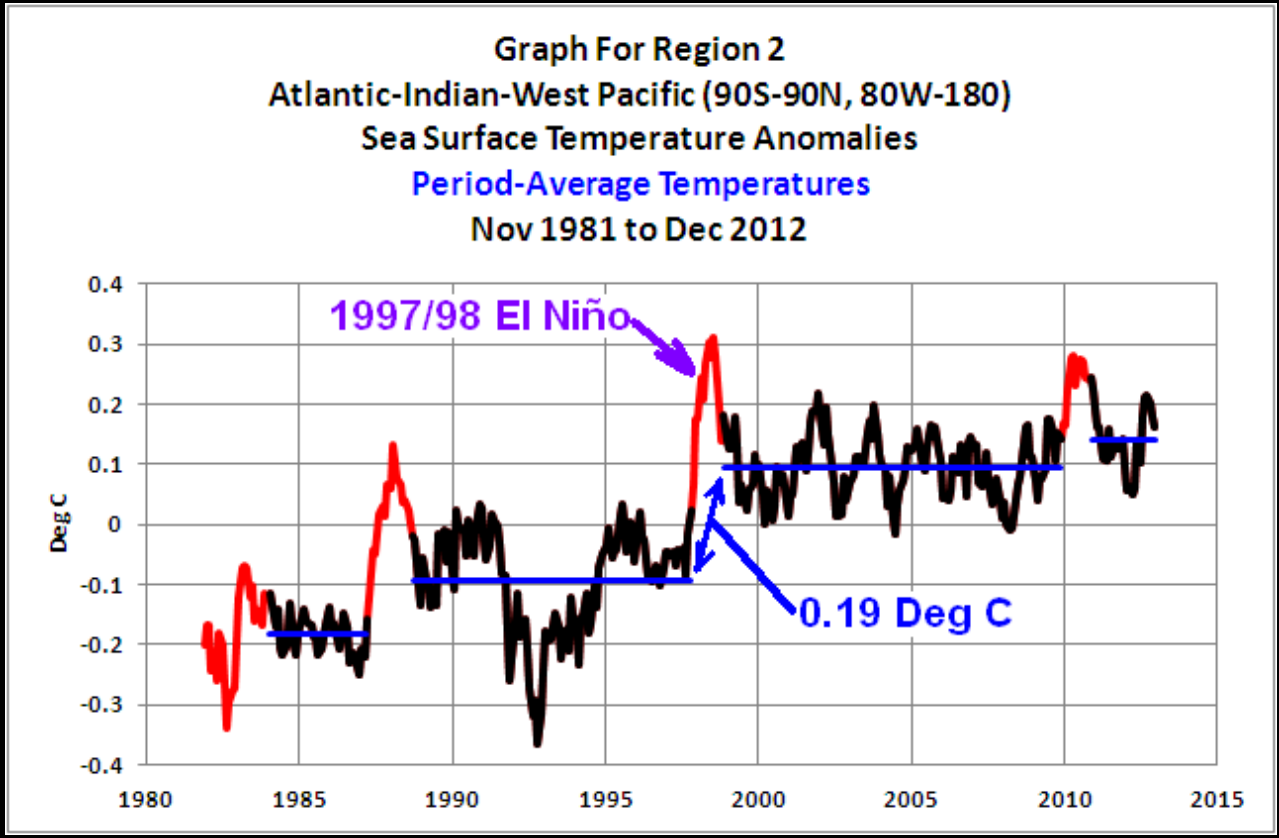
A Brief Discussion of El Niño and La Niña Events

- With La Niñas Recharging (and Sometimes "Overcharging") the Warm Water Available for El Niños



A Brief Discussion of El Niño and La Niña Events

- And With El Niños Discharging the Warm Water and Redistributing It



The IPCC Fails to Account for the Warm Water Released By the El Niños

- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- That Leftover Warm Water is Blatantly Obvious in this Animation of Sea Level Anomalies from the JPL, Which We Presented Earlier.
  - It Captures the Leftover Warm Water from the 1997/98 El Niño Being Returned to the Western Tropical Pacific. That Phenomenon Carrying Leftover Warm Water from East to West at about 10N is Called a Slow-Moving Rossby Wave.

The IPCC Fails to Account for the Warm Water Released By the El Niños

- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- That Leftover Warm Water is Blatantly Obvious in this Animation of Sea Level Anomalies from the JPL, Which We Presented Earlier.
  - Watch What Happens when the Rossby Wave Reaches Indonesia. It's Like a "Secondary El Niño" is Taking Place in the Western Tropical Pacific, While the La Niña is Taking Place in the Central and Eastern Equatorial Pacific.

The IPCC Fails to Account for the Warm Water Released By the El Niños

- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- That Leftover Warm Water is Blatantly Obvious in this Animation of Sea Level Anomalies from the JPL, Which We Presented Earlier.
  - That "Secondary El Niño" Counteracts the Effects of the La Niña on Surface Temperatures throughout the Rest of the World

The IPCC Fails to Account for the Warm Water Released By the El Niños

- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- And the Aftereffects of that Warm Water Can Be Seen in this Animation of Sea Surface Temperature Anomalies During and After the 1997/98 El Niño.
  - The Animation Starts by Highlighting an Area Where the Leftover Warm Waters Have A Very Strong Impact—the East Indian and West Pacific Oceans (60S-65N, 80E-180)

The IPCC Fails to Account for the Warm Water Released By the El Niños

- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- And the Aftereffects of that Warm Water Can Be Seen in this Animation of Sea Surface Temperature Anomalies During and After the 1997/98 El Niño.
  - The Graph to the Right Infills to Show the Natural Warming of the Sea Surface Temperature Anomalies of the East Indian and West Pacific Oceans (the Red Curve)

The IPCC Fails to Account for the Warm Water Released By the El Niños

- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- And the Aftereffects of that Warm Water Can Be Seen in this Animation of Sea Surface Temperature Anomalies During and After the 1997/98 El Niño.
  - The Purple Curve Shows Scaled NINO3.4 Region Sea Surface Temperature Anomalies, Which Are Used to Show the Timing and Duration of the El Niño and La Niña.

The IPCC Fails to Account for the Warm Water Released By the El Niños

- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- And the Aftereffects of that Warm Water Can Be Seen in this Animation of Sea Surface Temperature Anomalies During and After the 1997/98 El Niño.
  - The Red Curve Does Not Cool Fully During the La Niña Because of the Warm Water That's Left Over from the El Niño. The Effects are Also Very Obvious in the Map Animation!

The IPCC Fails to Account for the Warm Water Released By the El Niños

- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- And the Aftereffects of that Warm Water Can Be Seen in this Animation of Sea Surface Temperature Anomalies During and After the 1997/98 El Niño.
  - Looking at the Maps: Traveling Eastward from the Eastern Tropical Pacific, the Sea Surface Temperature Anomalies of the Atlantic, Indian and West Pacific Oceans Warm in Delayed Responses to the El Niño.

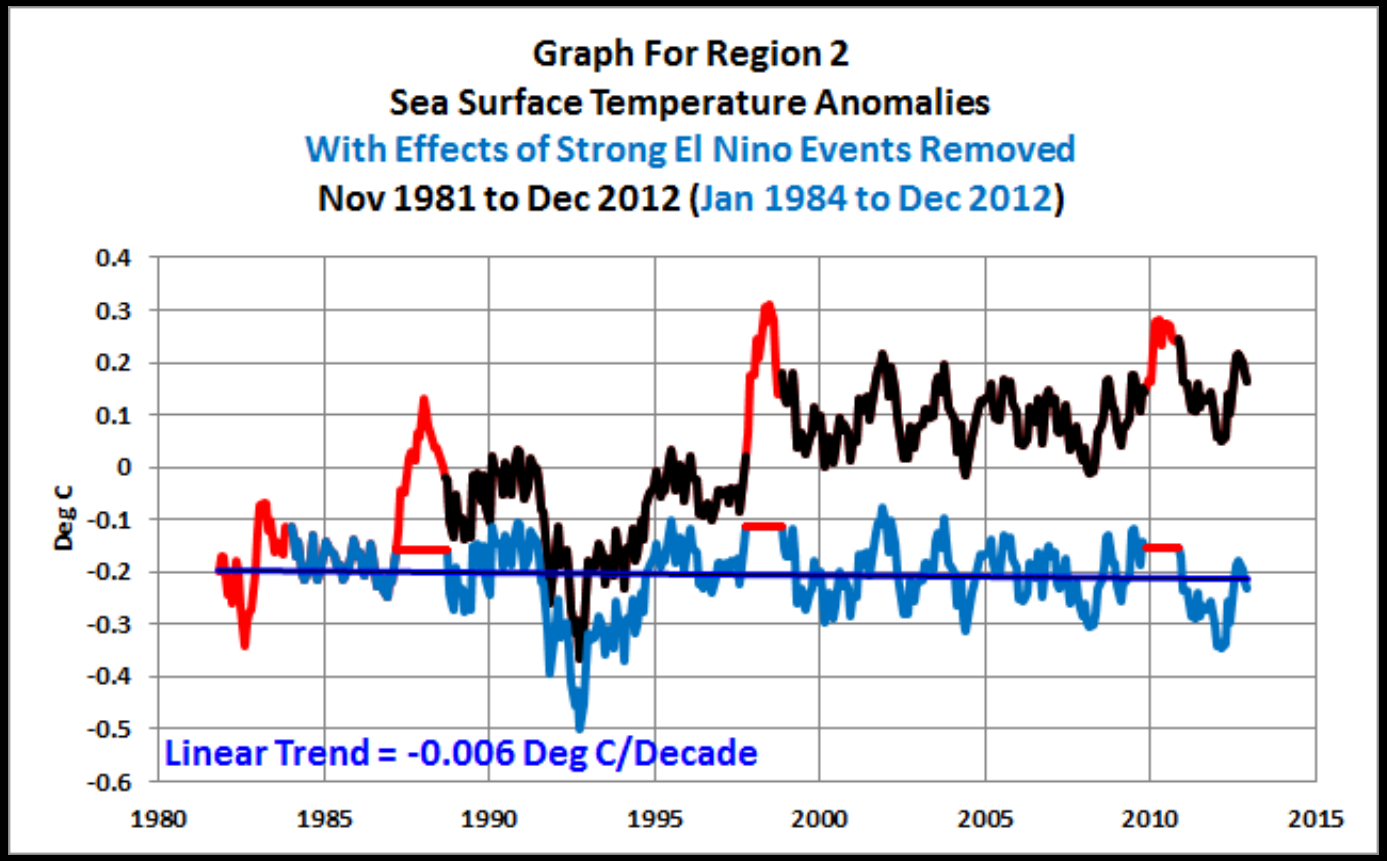
The IPCC Fails to Account for the Warm Water Released By the El Niños

- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- And the Aftereffects of that Warm Water Can Be Seen in this Animation of Sea Surface Temperature Anomalies During and After the 1997/98 El Niño.
  - Those Initial Warmings Occur in Response to Changes in Atmospheric Circulation Caused by the El Niño. They Reach the West Pacific about the Time the Leftover Warm Surface Waters are Being Swept Back to the Western Pacific.

The IPCC Fails to Account for the Warm Water Released By the El Niños

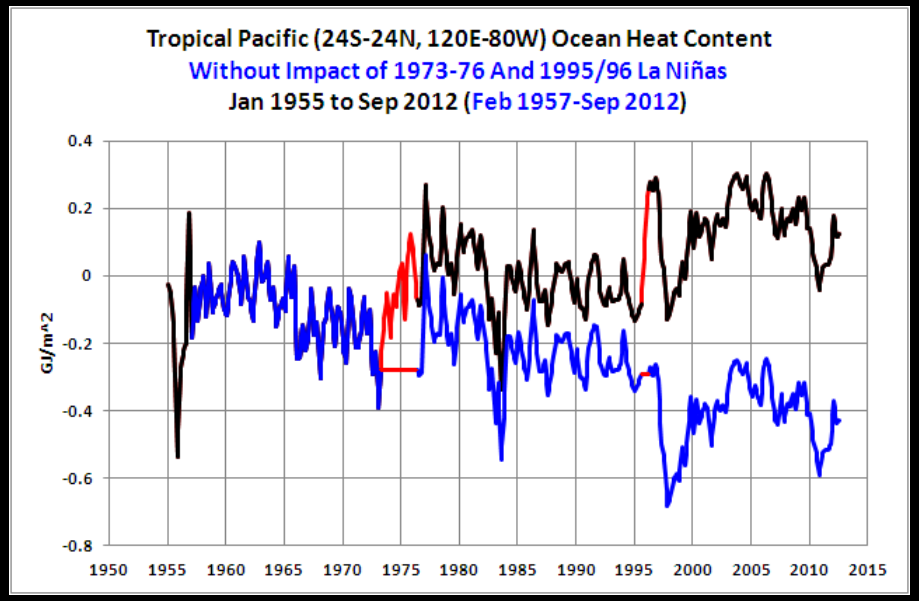
- More Specifically, The IPCC Fails to Account for the Warm Water That's Left Over at the End of the El Niño.
- And the Aftereffects of that Warm Water Can Be Seen in this Animation of Sea Surface Temperature Anomalies During and After the 1997/98 El Niño.
  - And the Rossby Wave Carrying More Warm (Subsurface) Water Reaches the Western Tropical Pacific. The Leftover Warm Water Spreads Poleward in the Pacific and Also into the Eastern Indian Ocean.

Those Warm Waters Left Over from the El Niños Are What Cause the Upward Shifts in the Sea Surface Temperatures of the Atlantic, Indian and West Pacific Oceans



The IPCC Also Fails to Account for the Warm Water Created During the La Niñas

- **Again, Try to Find Climate Model-Based Scientific Studies That Explain Specifically Why the Warming of the Ocean Heat Content for the Tropical Pacific Depends on the 1973-76 and 1995/96 La Niña Events**



The IPCC's Climate Models Simulate El Niño and La Niña Processes Very Poorly!

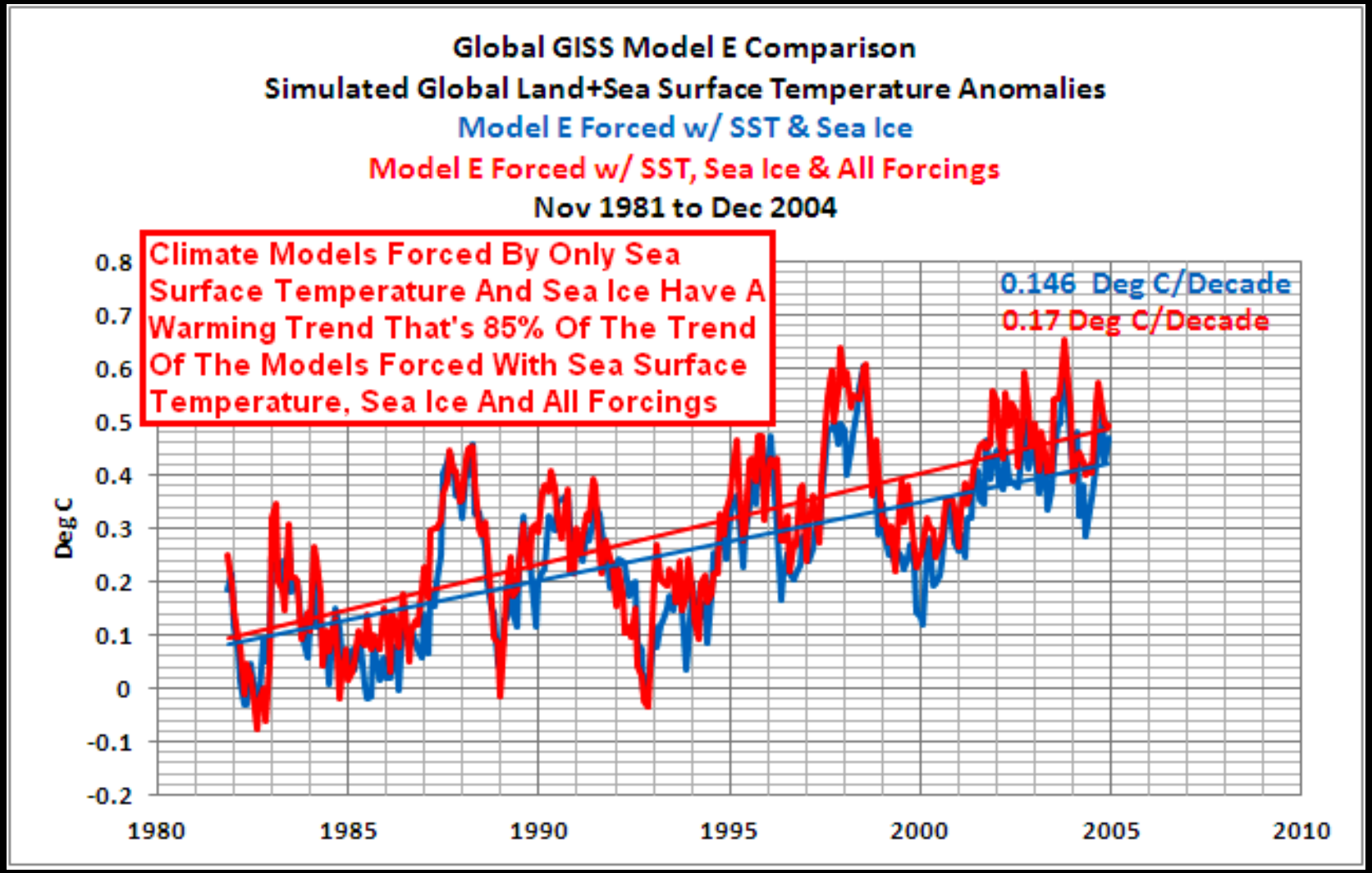
- Refer to Guilyardi et al (2009) "Understanding El Niño in Ocean-Atmosphere General Circulation Models: progress and challenges". (Click Here.)
  - Some Climate Models Perform Better Than Others, But Being Better Than Horrendous Does Not Make Them Good.
  - Overall, the IPCC's Climate Models Simulate El Niño and La Niña So Poorly the Authors State:
    - *Because ENSO is the dominant mode of climate variability at interannual time scales, the lack of consistency in the model predictions of the response of ENSO to global warming currently limits our confidence in using these predictions to address adaptive societal concerns, such as regional impacts or extremes (Joseph and Nigam 2006; Power et al. 2006).*

A Quick Look at the Big Picture

- We've Seen and Discussed How Manmade Greenhouse Gases Have Had No Apparent Impact on Sea Surface Temperatures and Ocean Heat Content

- Some of You May Even Think the Sea Surface Temperature and Ocean Heat Content Data Contradict the Hypothesis of Manmade Global Warming. They Definitely Do Not Support it.

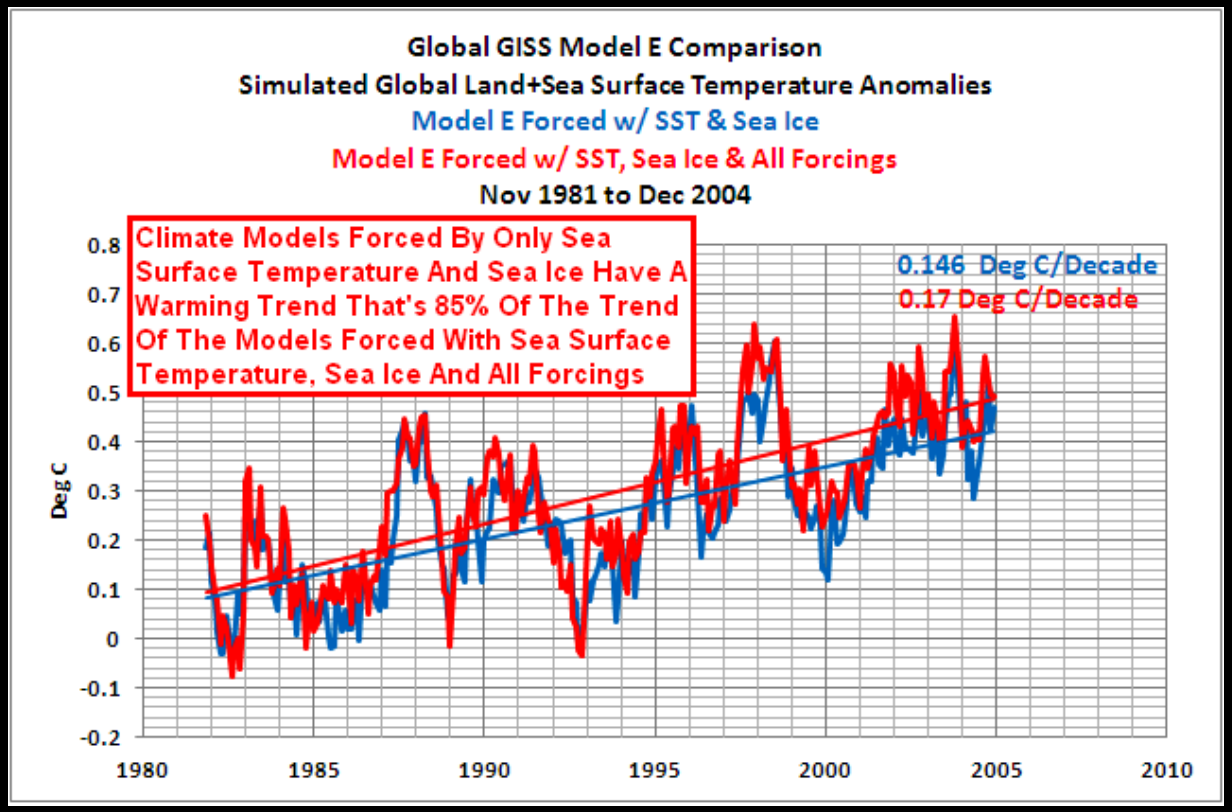
Land Surface Air Temperature Anomalies Mimic and Exaggerate the Natural Warming of the Global Sea Surface Temperature Anomalies.



Land Surface Air Temperature Anomalies Mimic and Exaggerate the Natural Warming of the Global Sea Surface Temperature Anomalies.

- Refer to Compo and Sardeshmukh (2009): Oceanic influences on recent continental warming.
- The Abstract Begins:
  - *Evidence is presented that the recent worldwide land warming has occurred largely in response to a worldwide warming of the oceans rather than as a direct response to increasing greenhouse gases (GHGs) over land.*

That is, Carbon Dioxide and Other Manmade Greenhouse Gases Likely Provide A Small Amount of Additional Warming of Land Surface Air Temperatures, Above the Significant Portion Caused by the Natural Warming of the Global Oceans.

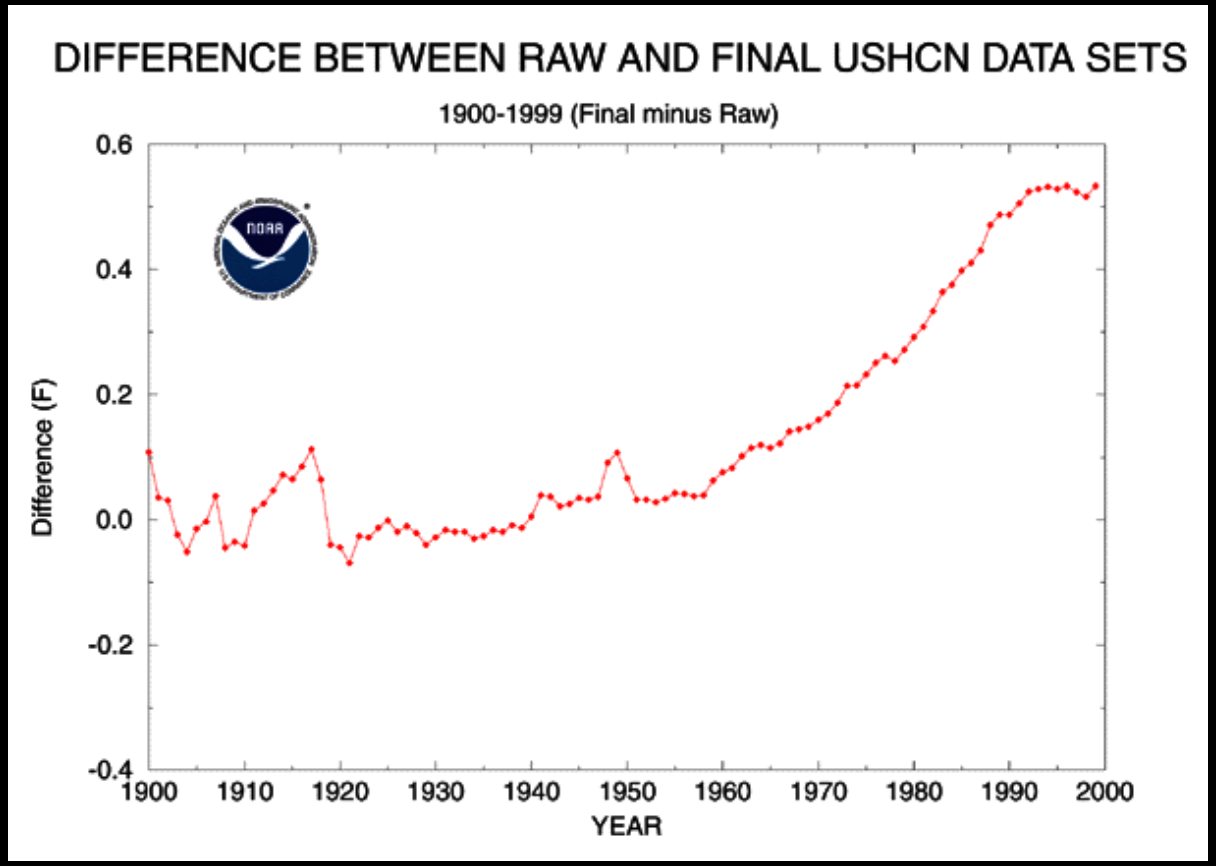


BUT

Manmade Greenhouse Gases Share that Warming of Land Surface Air Temperatures (The Tiny Amount Remaining After the Natural Warming Caused by the Oceans) with Other Anthropogenic Factors, Such as:

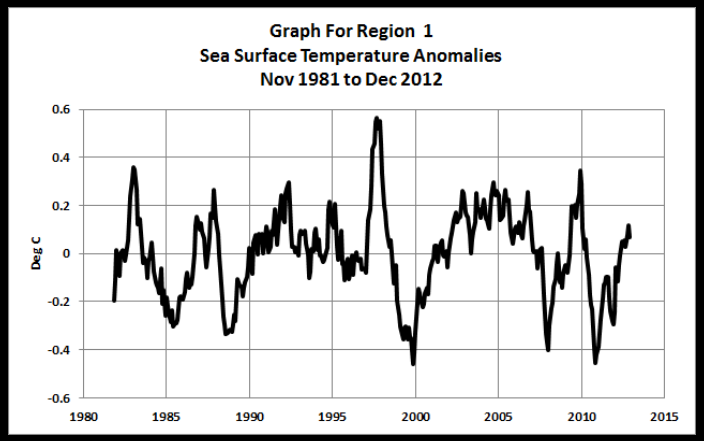
- Land Use Changes
- Black Carbon on Snow
- Heat Island Effect
- Poorly Sited Surface Stations
- Excessive “Adjustments” to Temperature Records, Etc.

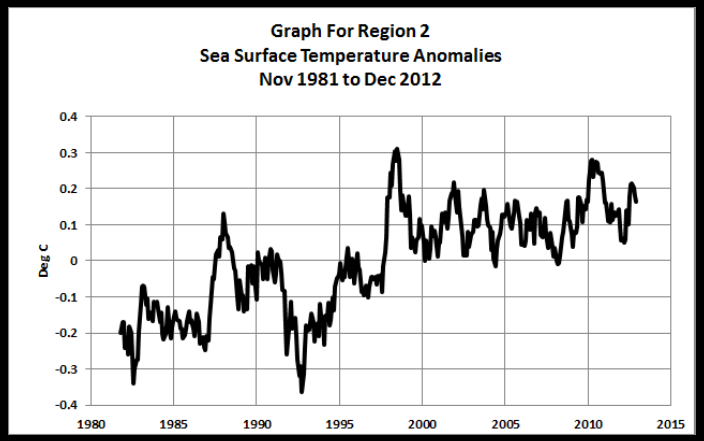
Are You Aware That NOAA's Adjustments to the United States Land Surface Air Temperature Records Provided an Additional 0.5 Deg F Warming Since the 1940s & 50s? (NOAA Source Here)

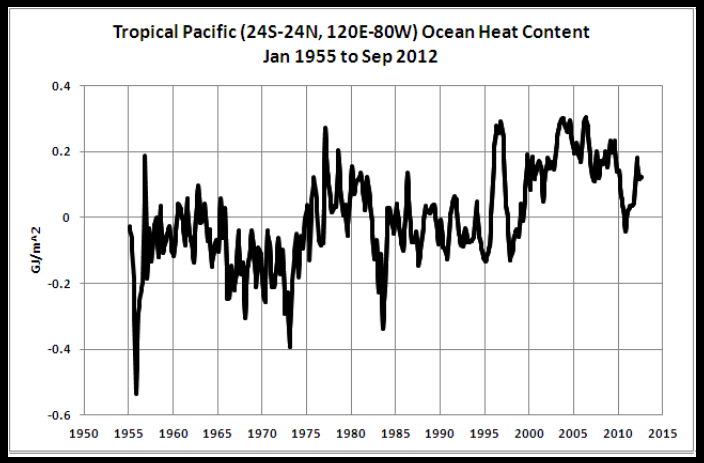


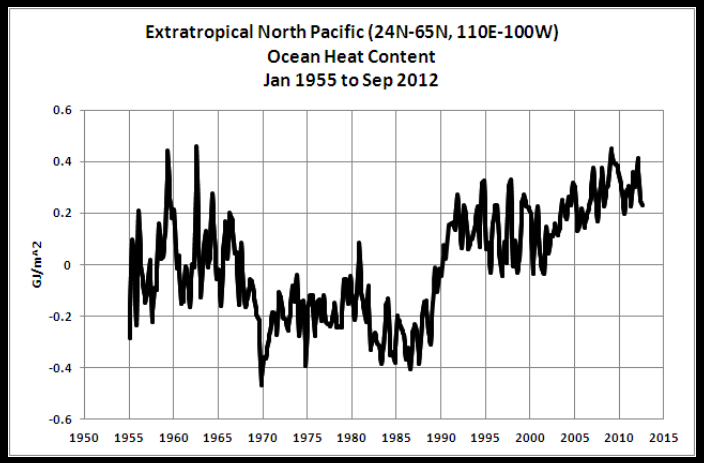
How to Confirm the Data Presented in the Graphs

If You're Skeptical of the Graphs of Sea Surface Temperature and Ocean Heat Content, Here's How to Verify the Results









If You're Skeptical of the Graphs of Sea Surface Temperature and Ocean Heat Content, Here's How to Verify the Results

- Both Datasets are Available through the Royal Netherlands Meteorological Institute Website Called the KNMI Climate Explorer. (Click Here)

- Specifically, See the Monthly Observations Webpage Here.

Retrieving the Sea Surface Temperature Data

- On the Monthly Observations Webpage, the Sea Surface Temperature (SST) Dataset Used in This Presentation is Identified as “1982-now: 1° Reynolds OI v2 SST” (Click Here for the Reynolds SST Webpage)

Retrieving the Sea Surface Temperature Data

- The Latitudes Used for the East Pacific Sea Surface Temperature Anomalies are 90S [Entered as -90] & 90N [90]. The Longitudes are 180 [-180] & 80W [-80].
- For the Sea Surface Temperature Anomalies of the Atlantic-Indian-West Pacific Oceans, the Latitudes Used are 90S [-90] & 90N [90] and the Longitudes are 80W [-80] & 180 [180].
- After Entering the Coordinates and Clicking on “Make time series”, a New Webpage Will Open Called “Time Series”.
- Click on the “raw data” Link above the Anomalies (the 3rd) Graph There. Then Copy and Paste the Data to Your Spreadsheet.

Retrieving the Ocean Heat Content Data

- On the Monthly Observations Webpage, the Ocean Heat Content Dataset is Identified as “1955-now: NODC 0-700m” (Click Here for the NODC 0-700m ocean heat content Webpage)

Retrieving the Ocean Heat Content Data

- For the Ocean Heat Content of the Tropical Pacific, the Latitudes Used are 24S [Entered as -24] & 24N [24] and the Longitudes are 120E [120] & 80W [280].
- The Latitudes Used for the Ocean Heat Content of the Extratropical North Pacific are 24N [24] & 65N [65] and the Longitudes are 110E [110] & 100W [260].
- After Entering the Coordinates and Clicking on “Make time series”, a New Webpage Will Open Called “Time Series”.
- Click on the “raw data” Link above the Anomalies (the 3rd) Graph There. Then Copy and Paste the Data to Your Spreadsheet.

Additional Information

- An Introduction to the KNMI Climate Explorer Can Be Found Here.
- And if You're Not Sure How to Convert the txt Data You've Downloaded into Columns in EXCEL, See the Post Here.

IN SUMMARY

- The Sea Surface Temperature Data for the Past 31 Years and the Ocean Heat Content Data for the Past 57 Years DO NOT Support the Hypothesis of Manmade Greenhouse Gas-Driven Global Warming

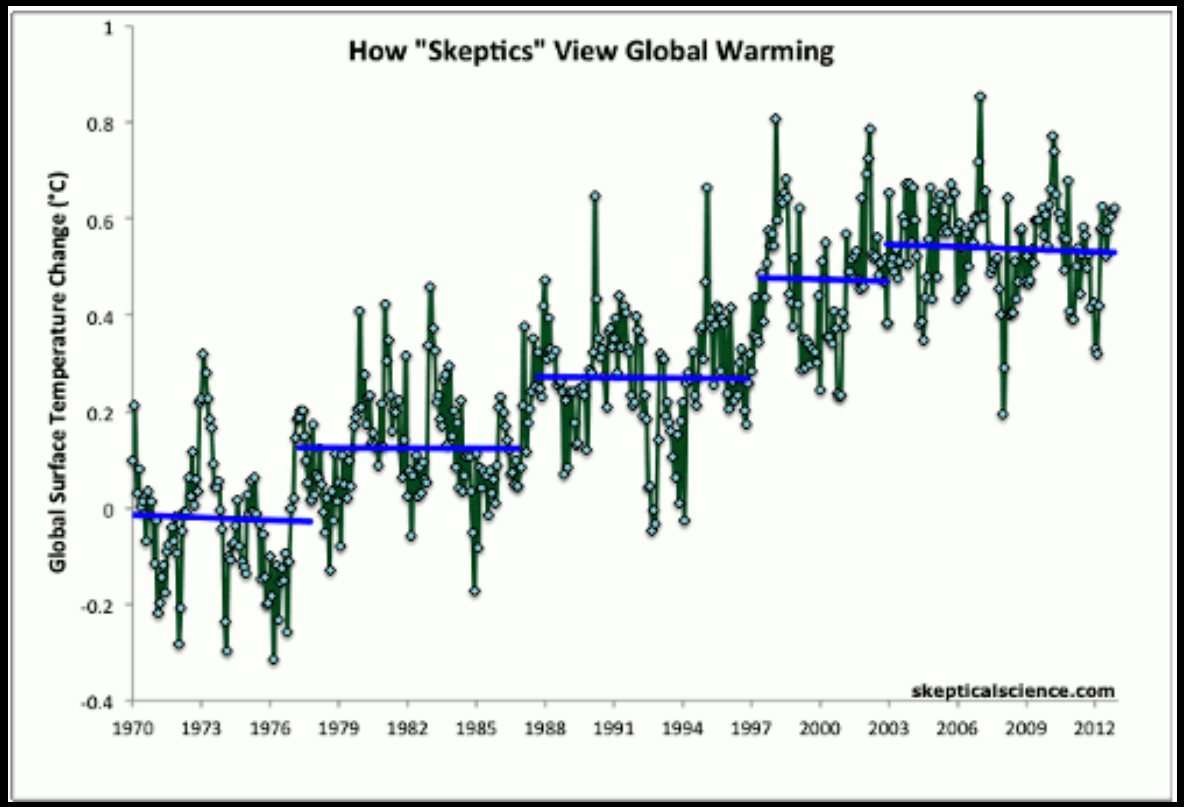
- I've Been Presenting This in Some Form for 4-Years. People Have Responded to It Quite Differently.

One Response:

- Some Persons Choose to Continue to Faithfully Believe in the Hypothesis of Manmade Global Warming Even Though the Sea Surface Temperature and Ocean Heat Content Data Do Not Support It.
  - Persons Who Choose the Hypothesis Instead of the Data Then Try to Defend the Hypothesis With:
    - Lots of Excuses
    - Lots of Myths and Failed Arguments
    - Lots of Misinformation. (Their Two Favorite Fabrications Are Discussed Here. That Post Also Provides a Basic Overall Discussion of El Niño and La Niña Processes.)

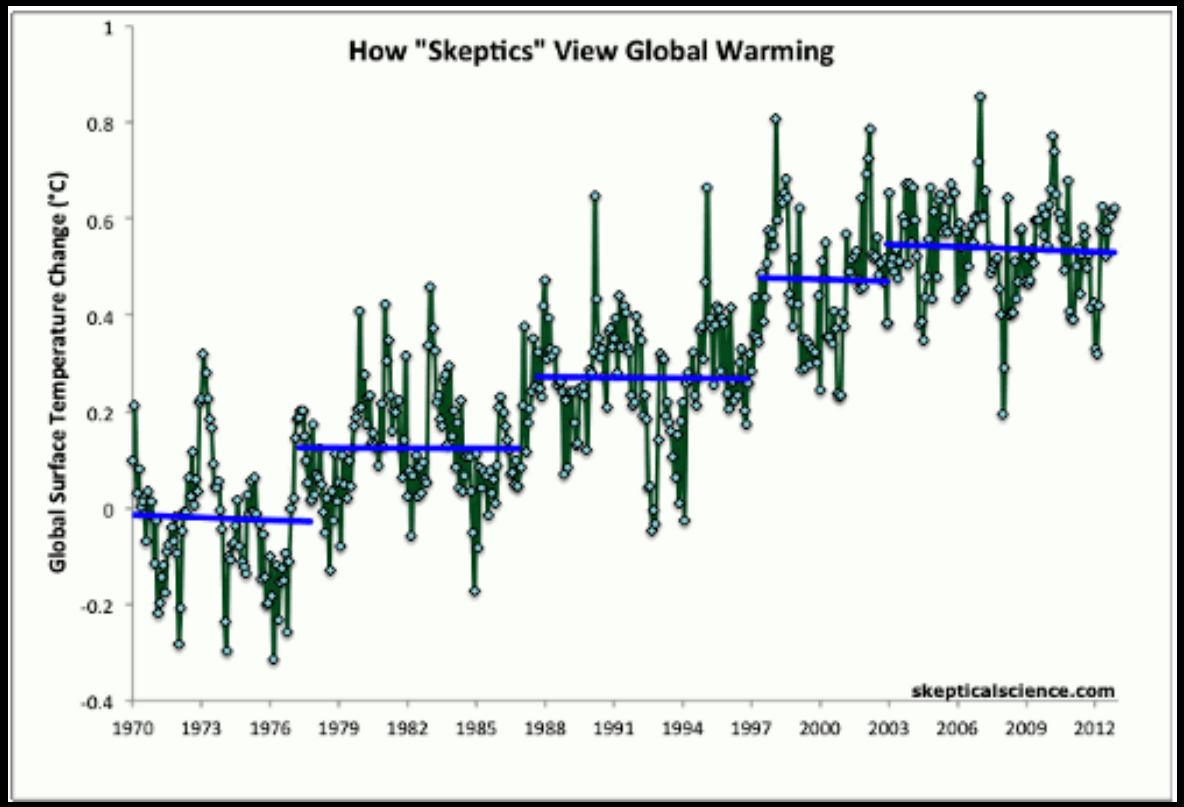
SAMPLE EXCUSE

- Those Who Believe in Manmade Global Warming Often Present “The Escalator” in Its Defense.



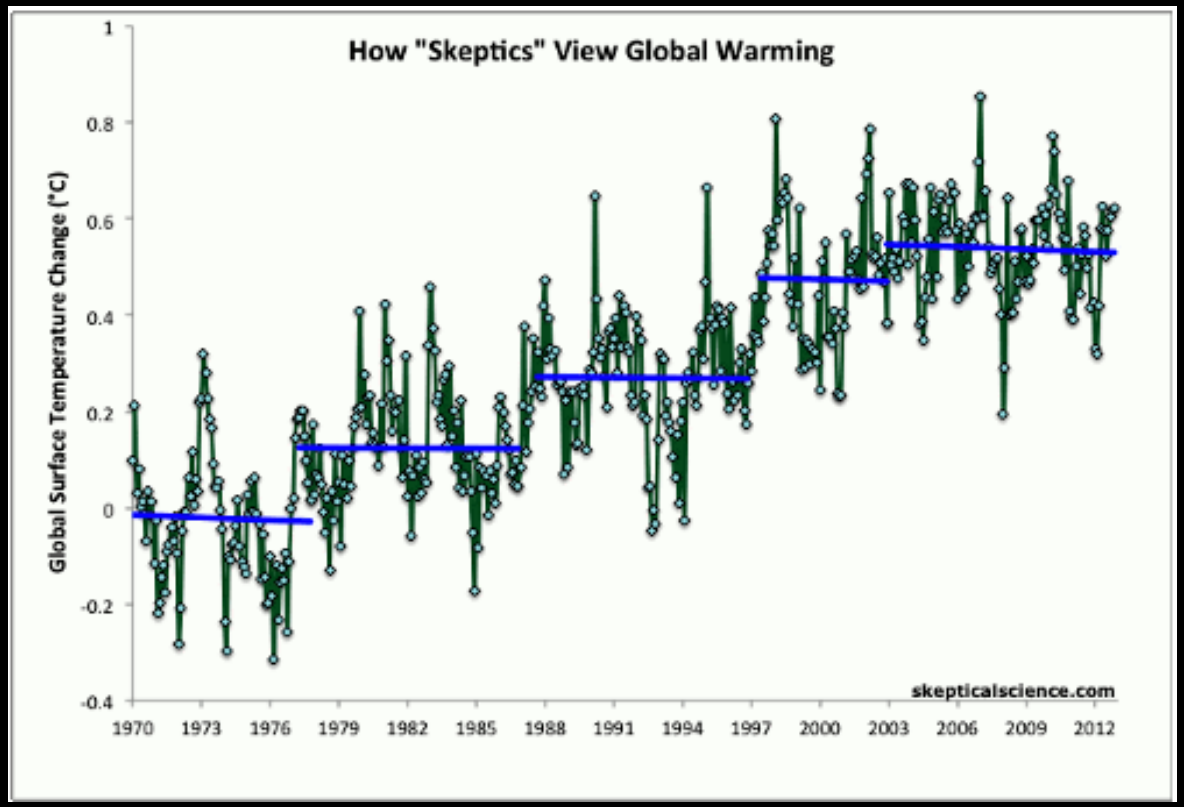
SAMPLE EXCUSE

- This is the “Short-Term Noise Versus Long-Term Signal” Excuse.

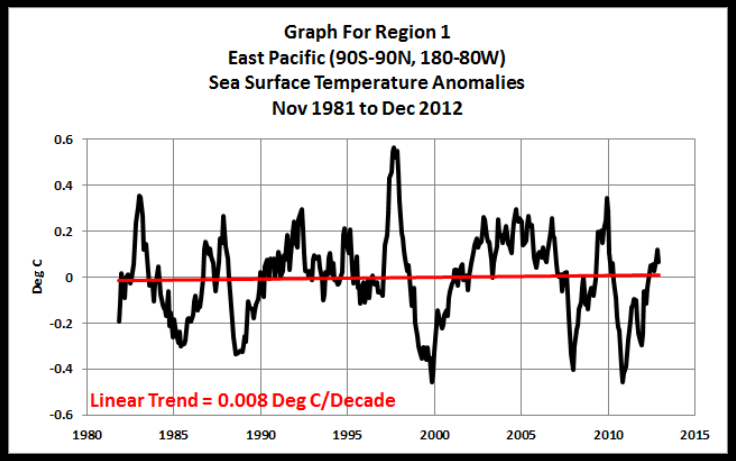


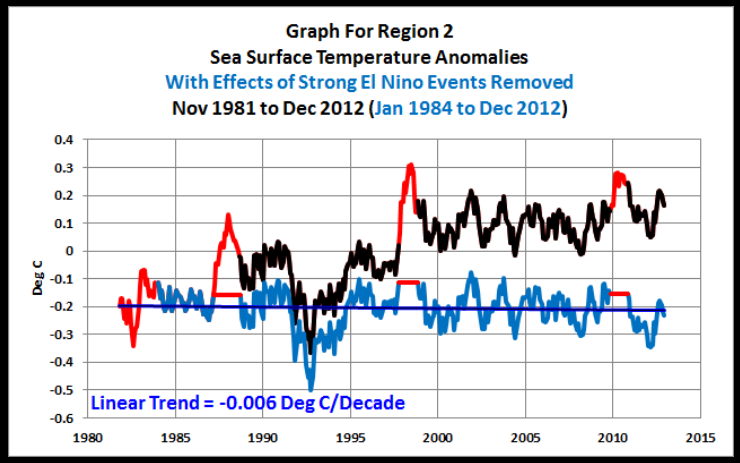
SAMPLE EXCUSE

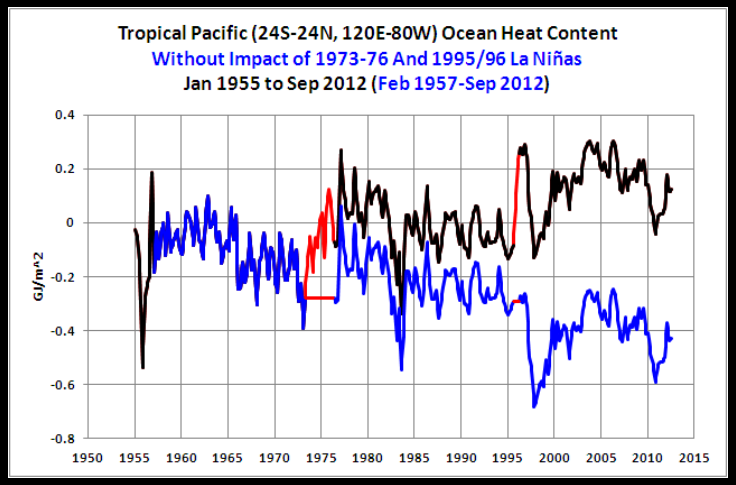
- By Definition, “The Escalator” is an Exercise in Cherry-Picked Start and End Dates

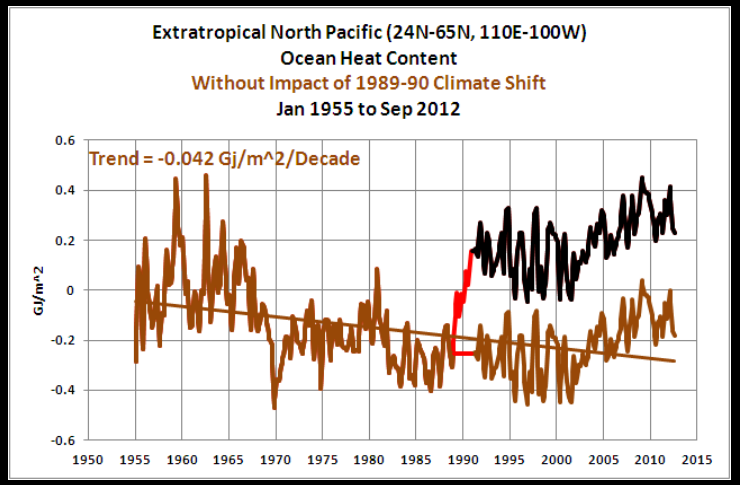


These Graphs ARE NOT Exercises in Cherry-Picked Start and End Dates

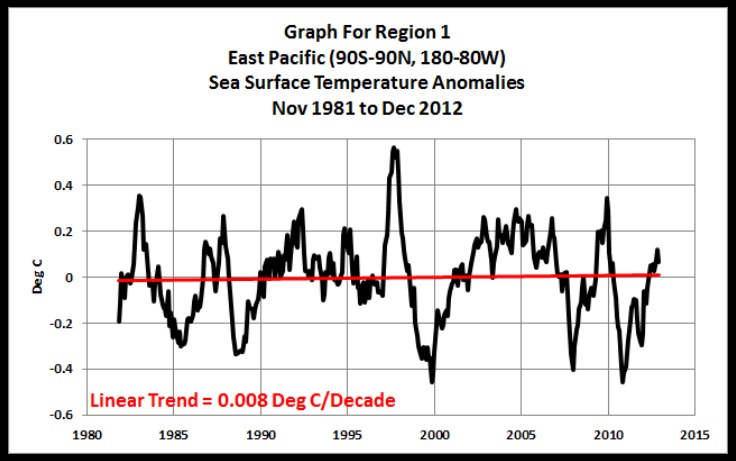


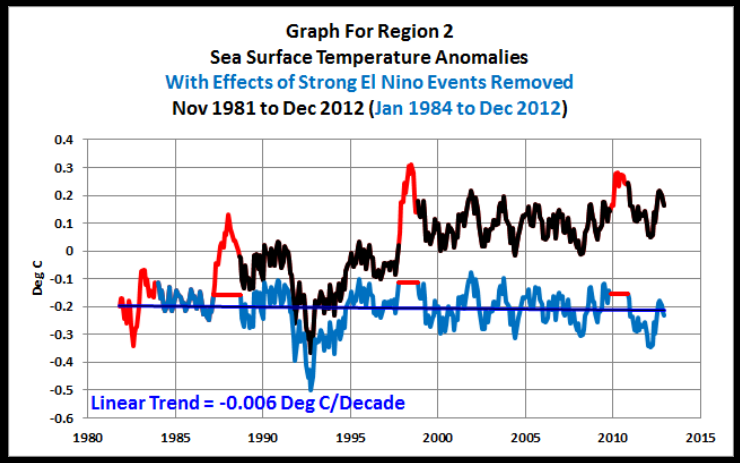


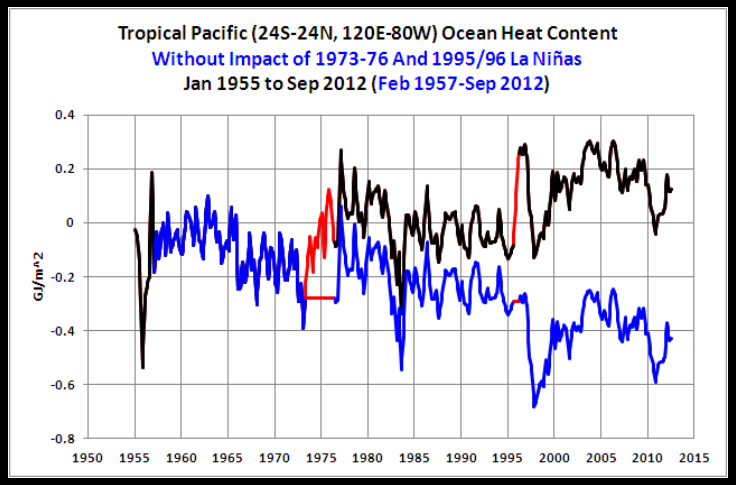


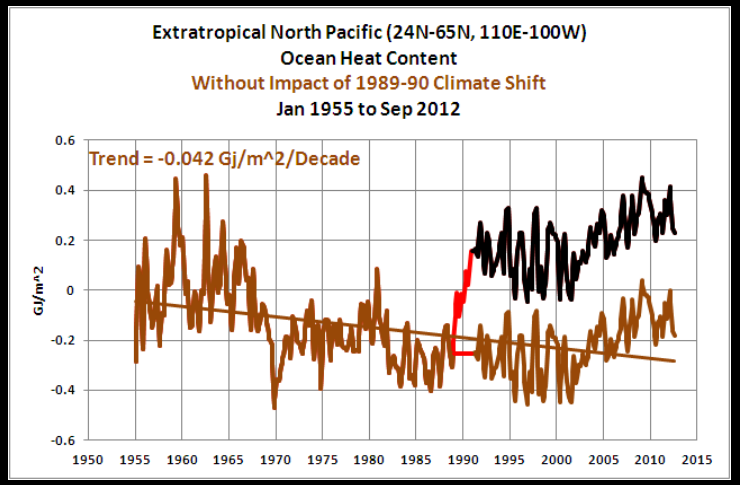


These Graphs Show There's No Warming Without the Upward Shifts Caused By Natural Processes









Another Response:

- Some People Choose to Believe the Data and Conclude the Manmade Global Warming Hypothesis is Flawed

  - If That's What You Believe, Please Share this Presentation Through Every Electronic Means at Your Disposal
    - In Addition to Your Friends and Associates, Consider Sending Lawmakers and Reporters Links to the Introduction. Hopefully, It Will Spark Their Interests.

And Another Response:

- Some Persons Question the Hypothesis and the Data, and Elect to Study the Matter Further
  - Please Refer to the 2-Part Video Series The Natural Warming of the Global Oceans
    - YouTube Links are Here and Here
  - These Topics Have Been Discussed at Numerous Posts at My Blog Climate Observations.
  - Many of those Posts Have Also Been Cross Posted at the World's Most-Visited Website on Global Warming and Climate Change Watts Up With That?
  - If You Don't Have the Time to Search through Those Posts, Please Also Consider my eBook ***Who Turned on the Heat? – The Unsuspected Global Warming Culprit, El Niño-Southern Oscillation***

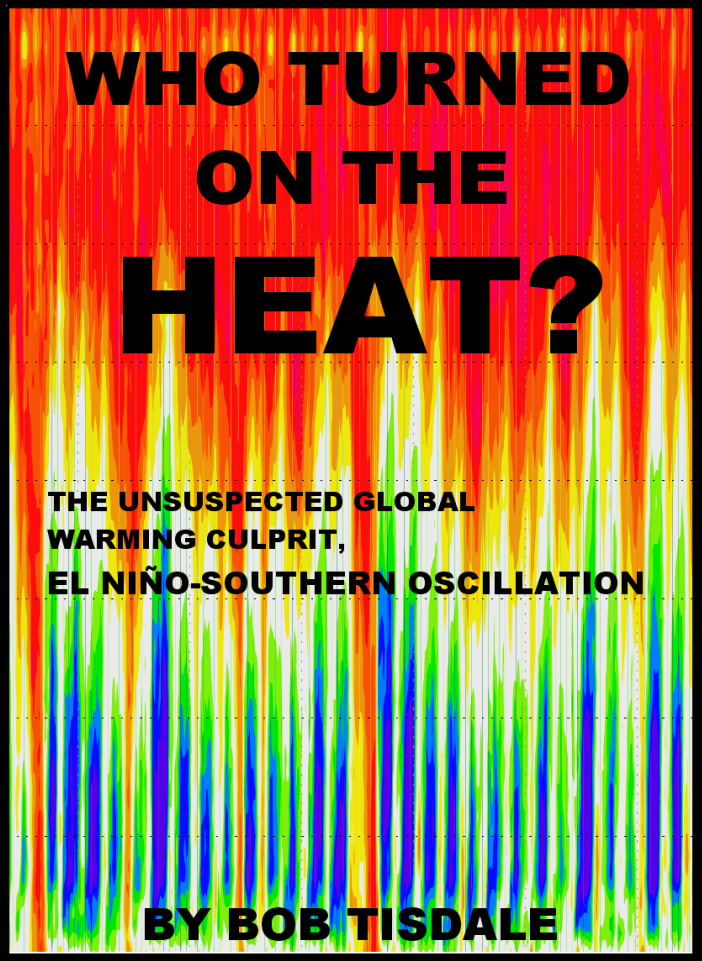
The eBook
Who Turned on the Heat?

- It Was Introduced in the Blog Post "**Everything You Ever Wanted to Know About El Niño and La Niña**". (Click Here.)
- It Provides a Detailed Explanation of El Niño and La Niña Processes and How and Why They Cause the Warming Exhibited the Sea Surface Temperature and Ocean Heat Content Data
- It Also Includes Discussions About Their Impacts on Land+Sea Surface Temperature and Lower Troposphere Temperature Data

The eBook
Who Turned on the Heat?

- A Free Preview can be Found Here. It Includes the Table of Contents; the Introduction; the Beginning of Section 1, with the Cartoon-Like Illustrations; the Discussion About the Cover; and the Closing.
- If You're Interested in More Information About the Natural Warming of the Global Oceans, but Don't Have the Time to Sift through Blog Posts, **Please Buy a Copy of the eBook**. Credit/Debit Card through PayPal. **You Do NOT Need to Open a PayPal Account.** Simply Scroll Down to the "Don't Have a PayPal Account" Purchase Option. The Book is Only **US$8.00.**

Who Turned on the Heat?
is Only Available in .pdf Format



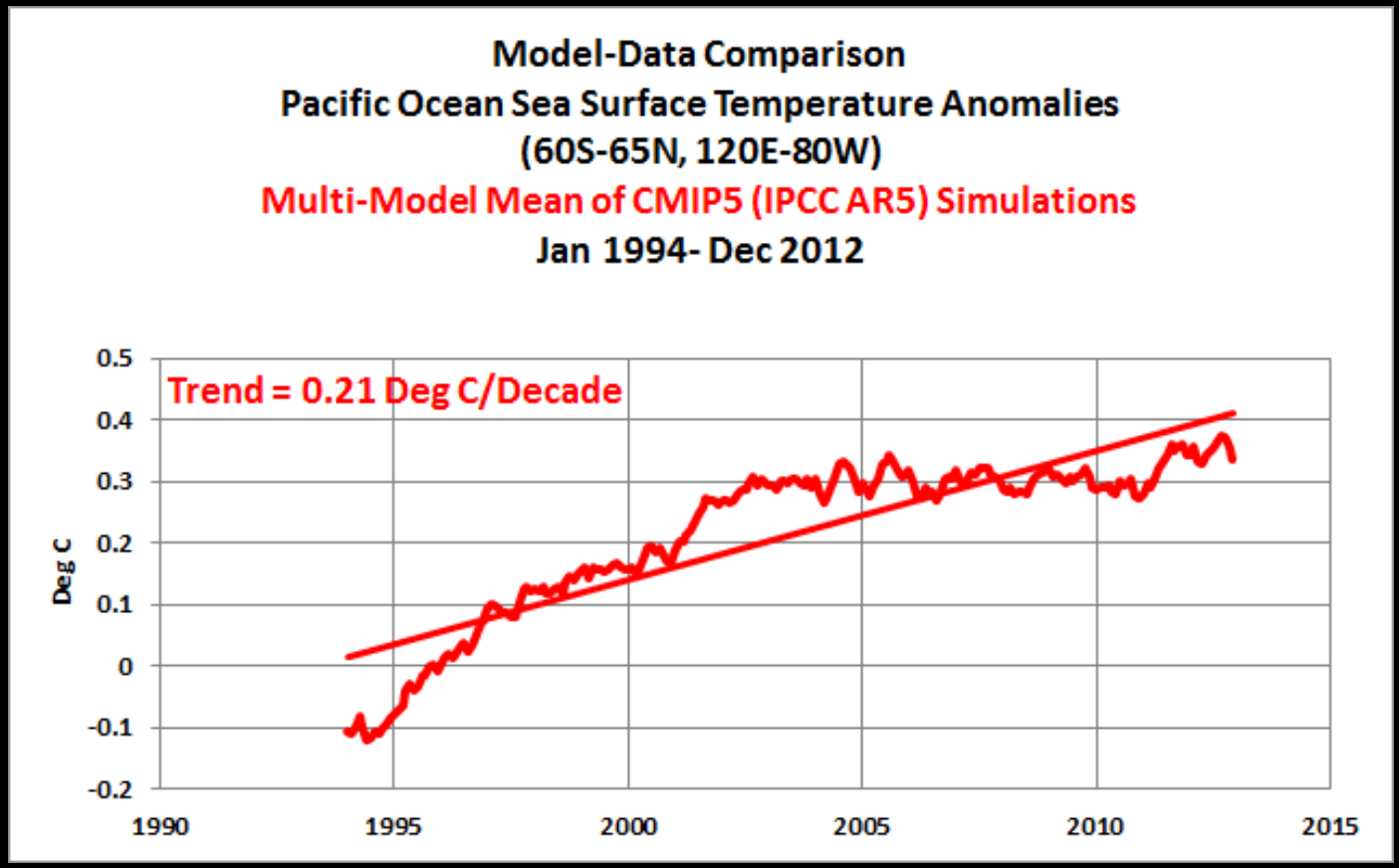
- It is Intended for Persons With and Without Technical Backgrounds
- Take a Look at the Free Preview Here

Something Else to Consider!

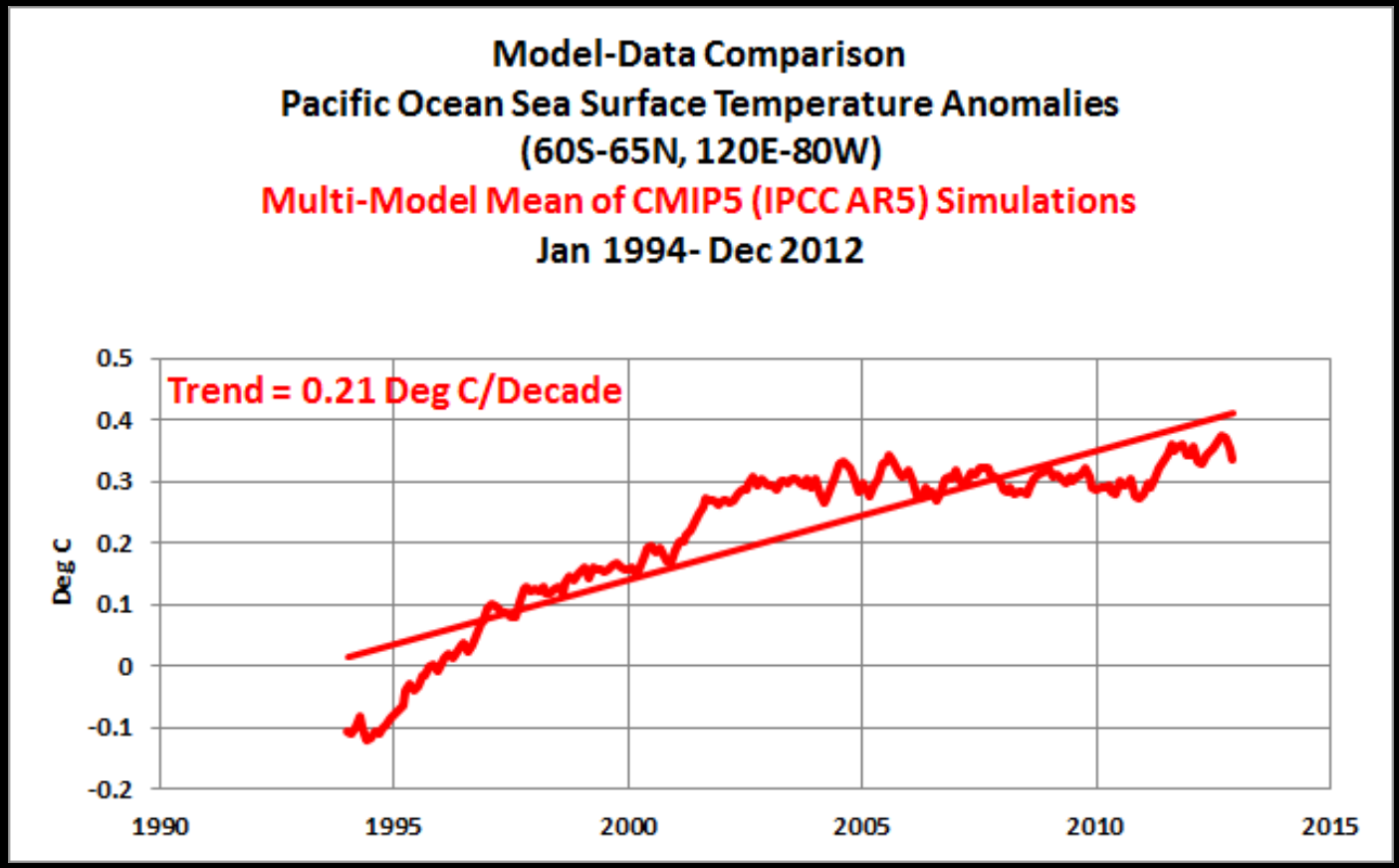
Contrary to What You've Been Told, the IPCC's Climate Models Show No Skill at Being Able to Simulate:

- 20th Century Global Land+Sea Surface Temperatures (For Discussions, See **Here**, **Here**)
- Global or Regional Satellite-Era Sea Surface Temperatures (See Here and **Here**)
- Global or Regional Satellite-Era Precipitation (See Here and Here)

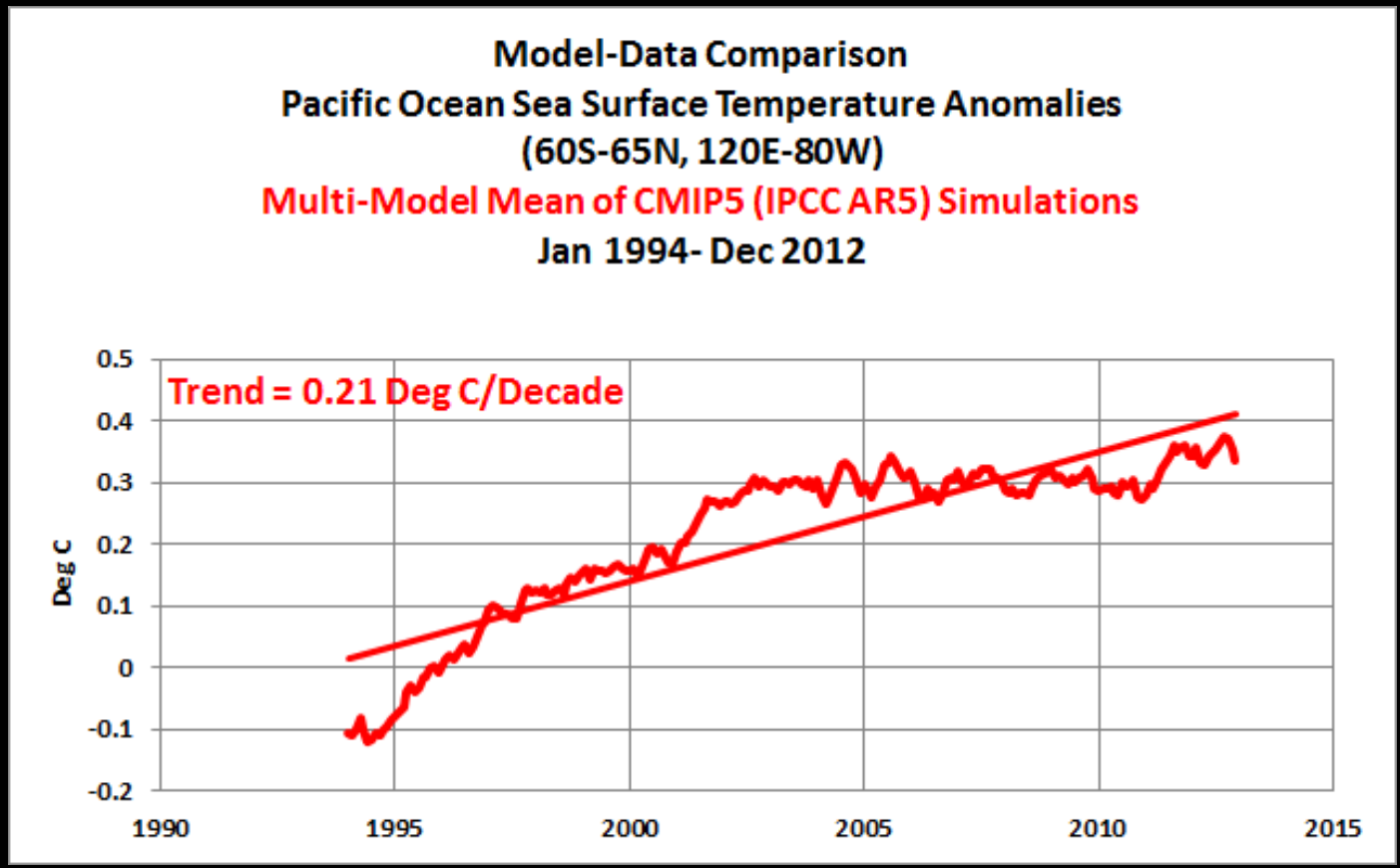
Example: The Climate Models Used in the IPCC's Upcoming 5th Assessment Report are Stored in an Archive Called CMIP5



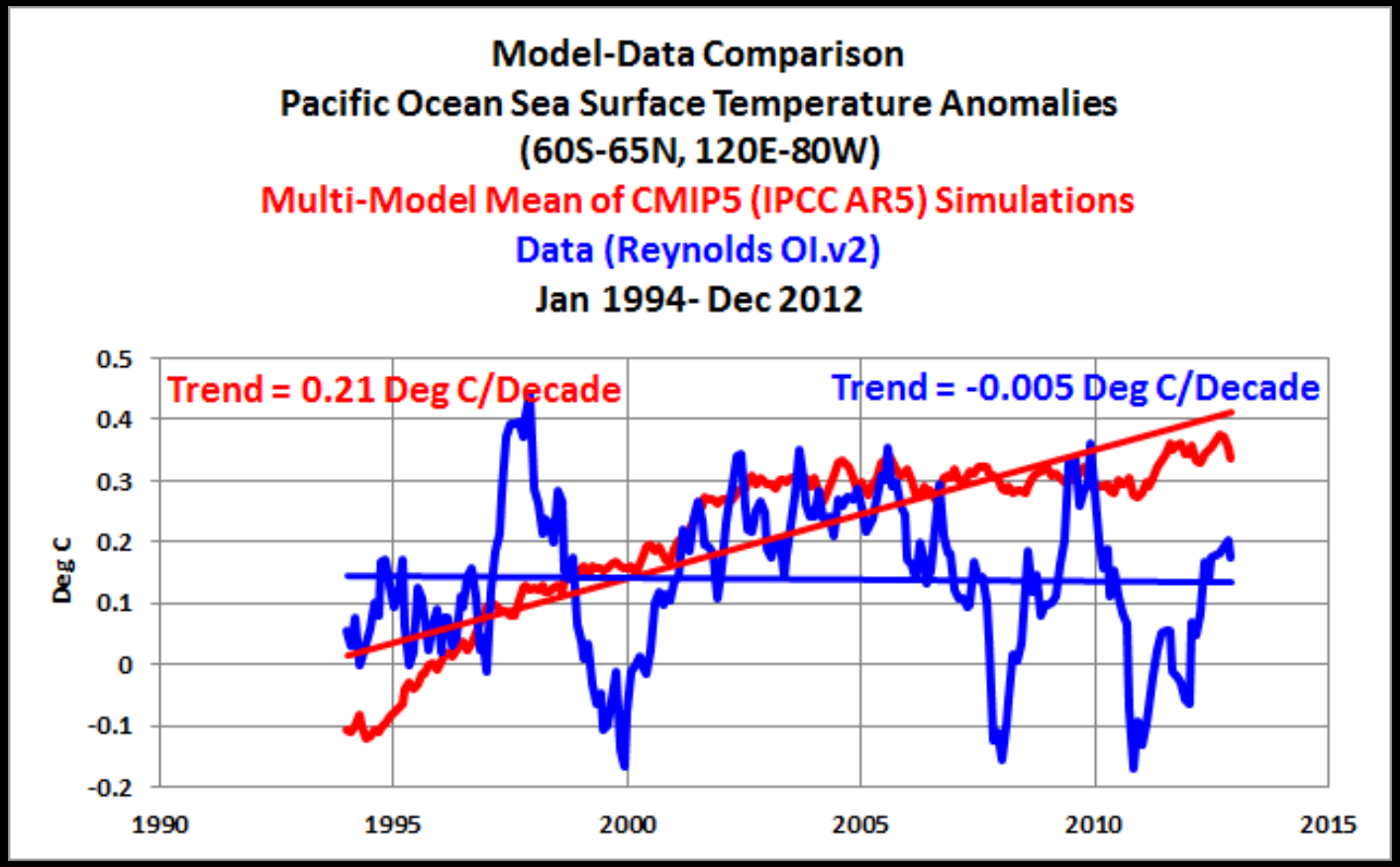
The Outputs of the IPCC's (CMIP5) Climate Models Are Also Available to the Public through the KNMI Climate Explorer.



In Effect, the Average of All of the Simulations Say, IF the Sea Surface Temperatures of the Pacific Ocean Were Warmed by Manmade Greenhouse Gases, They Should Have Warmed 0.4 Deg C Over the Last 19 Years

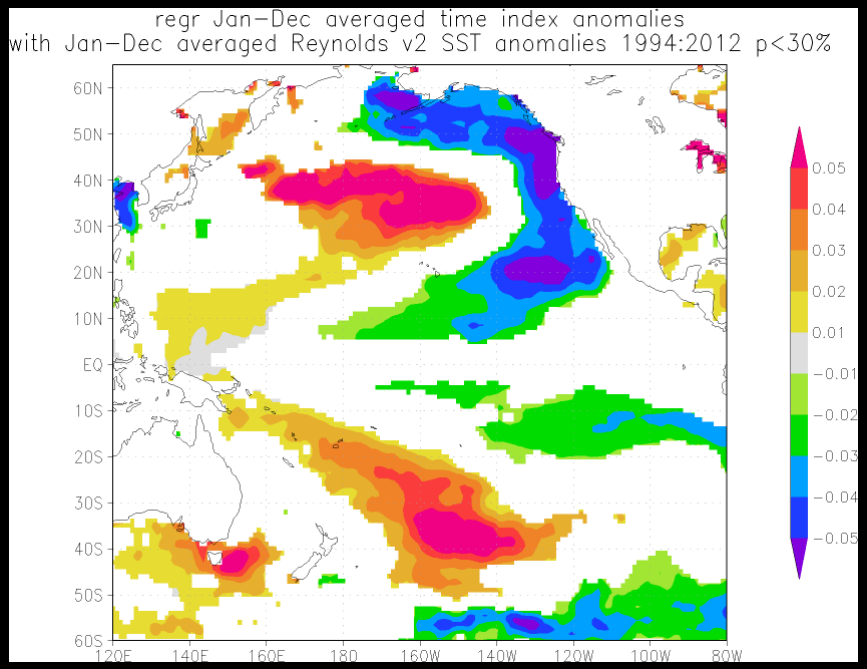


But the Sea Surface Temperature Anomalies of the Pacific Ocean HAVE NOT WARMED IN 19 YEARS!!

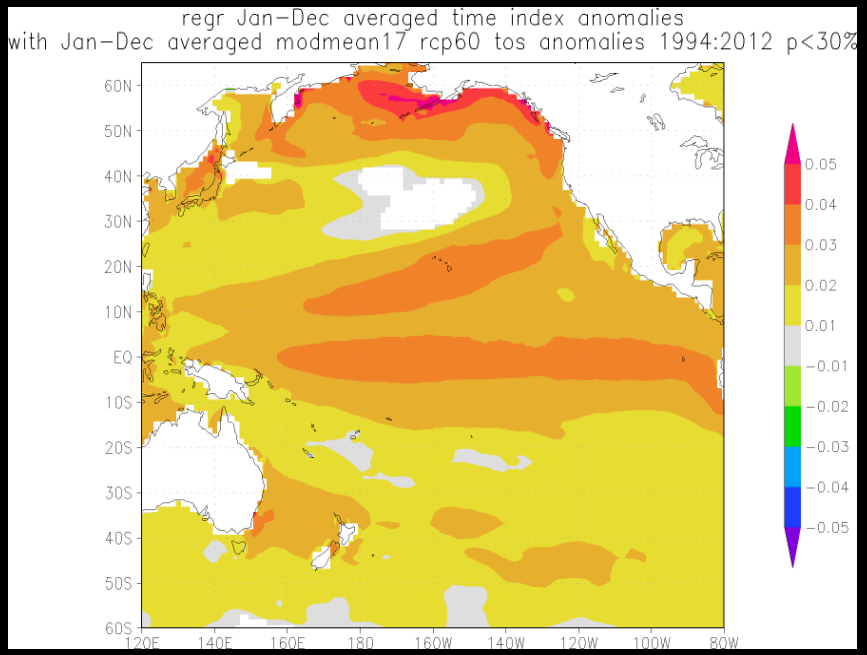


And Here Are the Maps of the Linear Trends in the Sea Surface Temperatures for the Pacific Ocean from 1994-2012

OBSERVED



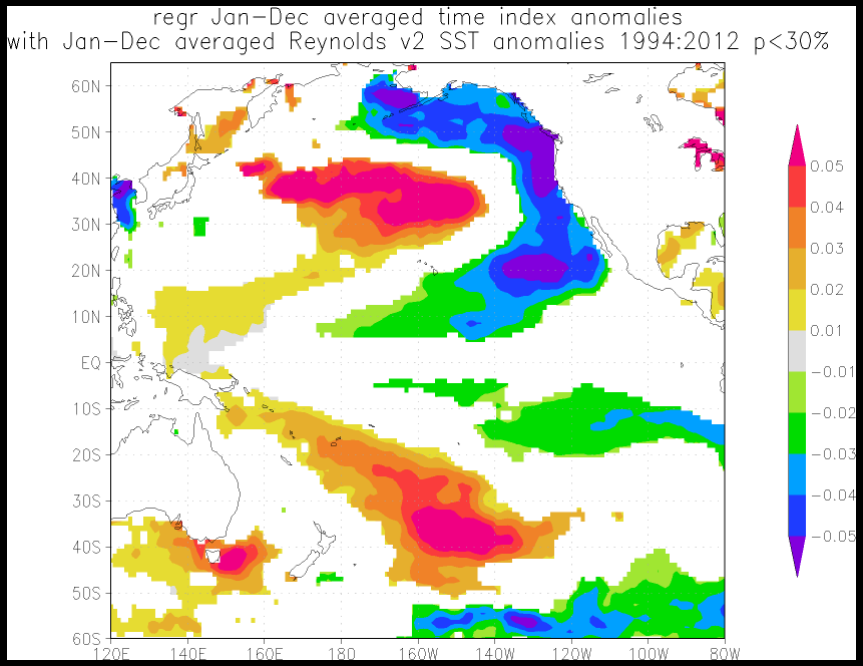
MODELED



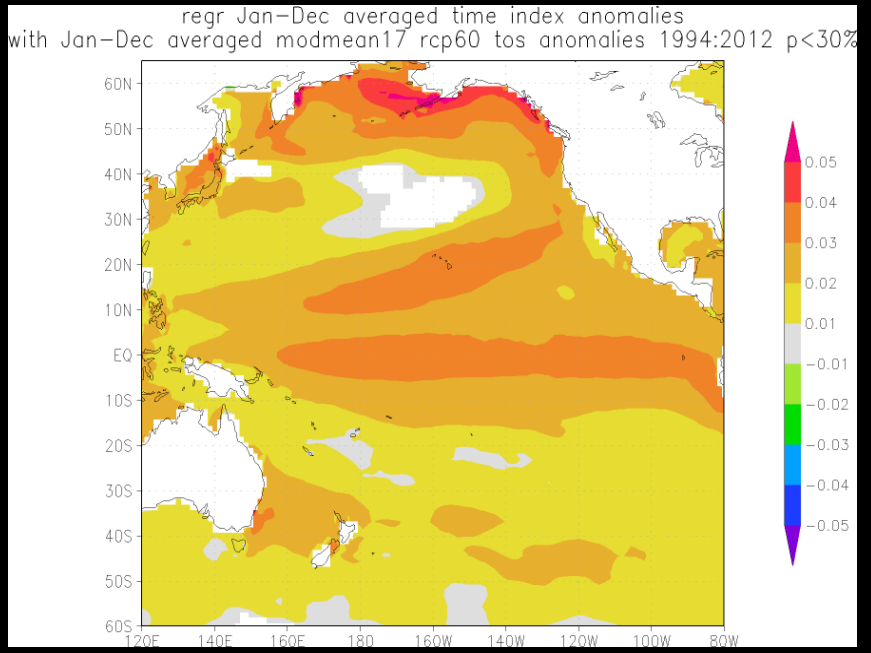
And Here Are the Maps of the Linear Trends in the Sea Surface Temperatures for the Pacific Ocean from 1994-2012

THERE ARE NO SIMILARITIES!!!!!

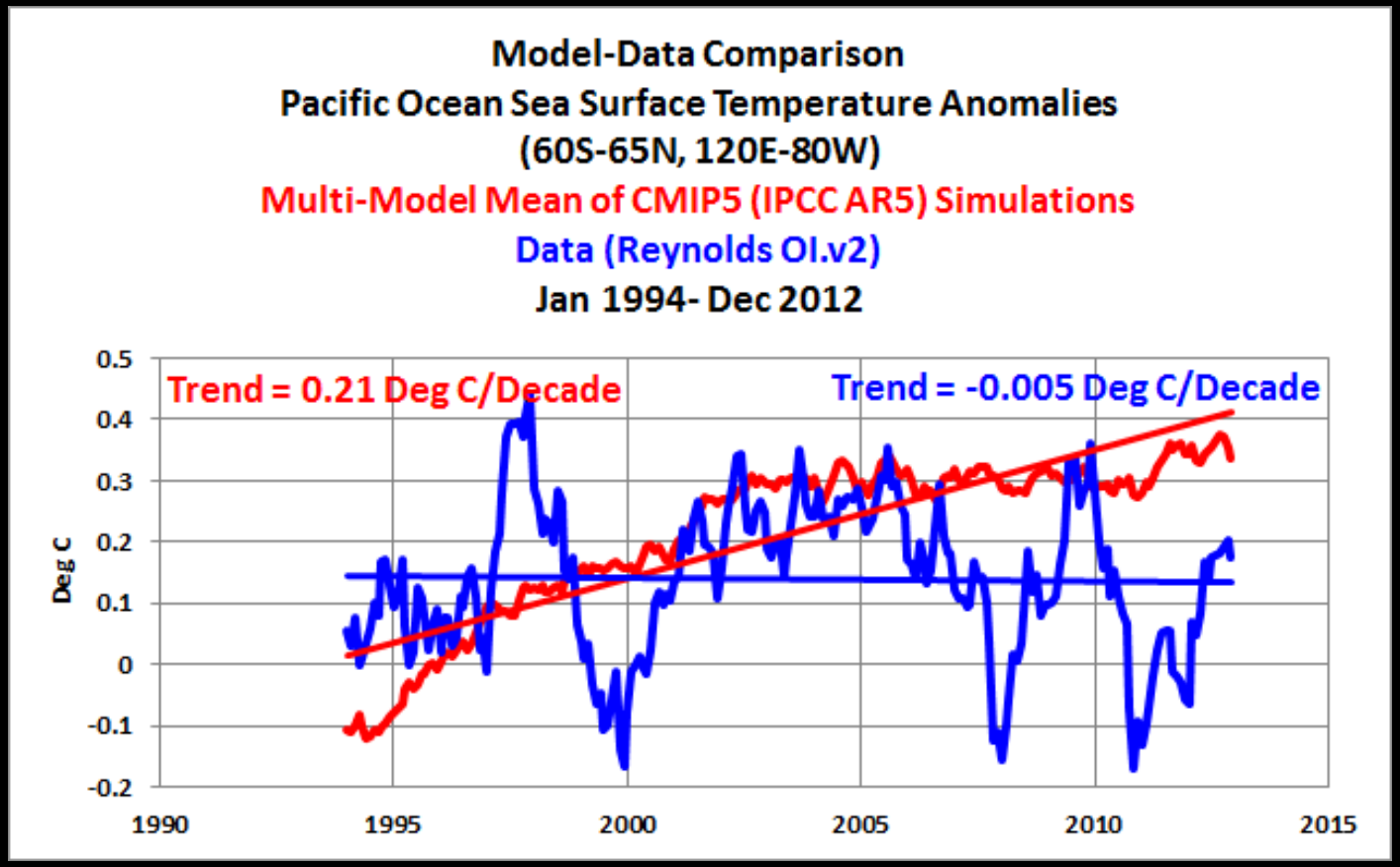
OBSERVED



MODELED



The Pacific Ocean is the Largest Body of Water on This Planet. It's Really Difficult to Overlook It. But Somehow the IPCC's Climate Modelers Have Managed to Do Exactly That!!



For a Further Discussion, Refer to the Blog Post Model-Data Comparison: Pacific Ocean Satellite-Era Sea Surface Temperature Anomalies

The IPCC's Climate Models Show No Skill at Being Able to Simulate the Past.

That Fact Generates an Obvious Question:

Why Should We Have Any Confidence in Their Projections of Future Climate?

Thanks for
Your Interest in the Very
Obvious Natural Warming
of the Global Oceans!!!

More Information in Much More Detail Can Be Found at My Website

Climate Observations

QUESTIONS?

- If You Have Any Questions or Would Like Further Information, Feel Free to Comment on Any Thread at My Blog Climate Observations