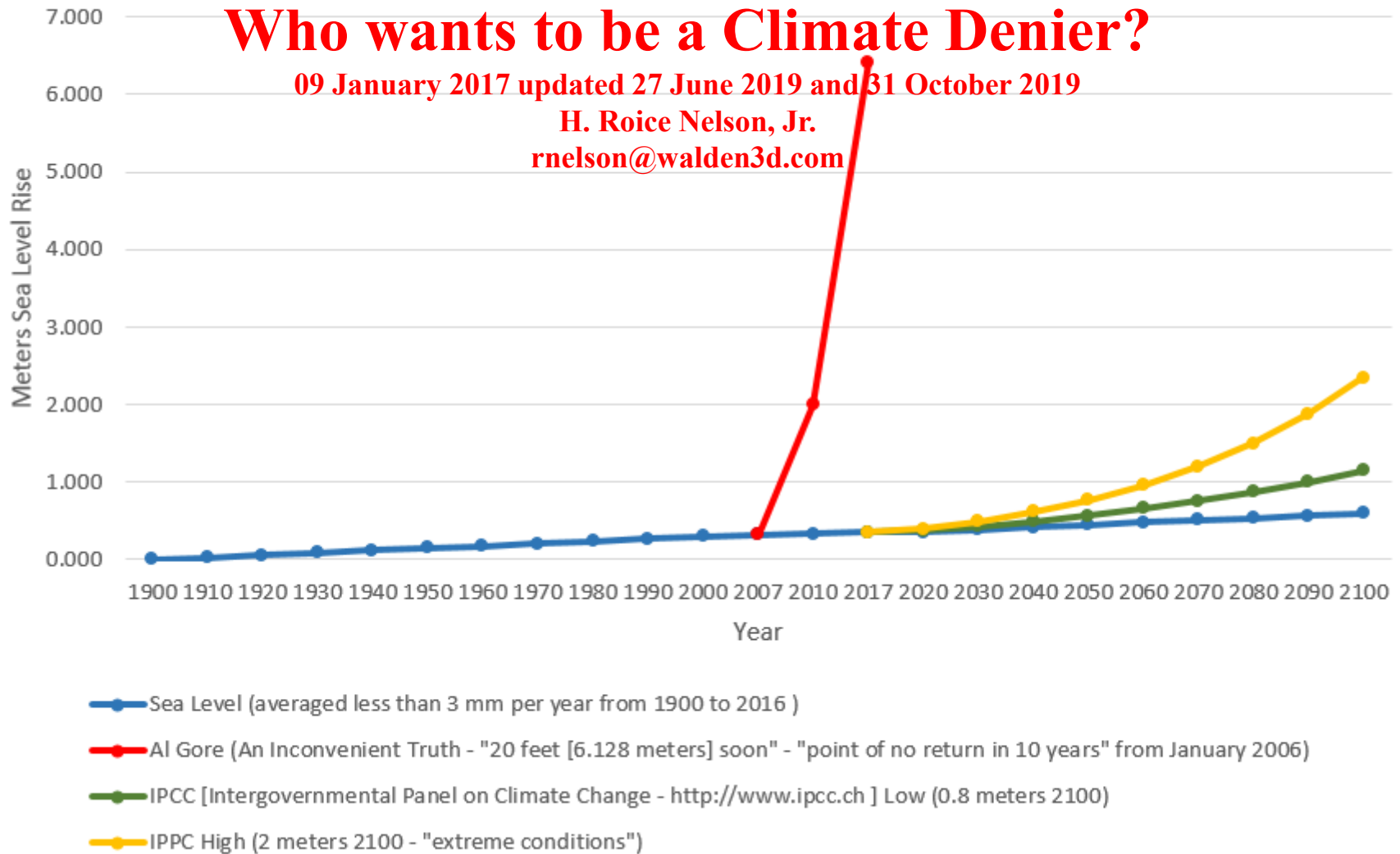


"An Inconvenient Truth"

Who wants to be a Climate Denier?

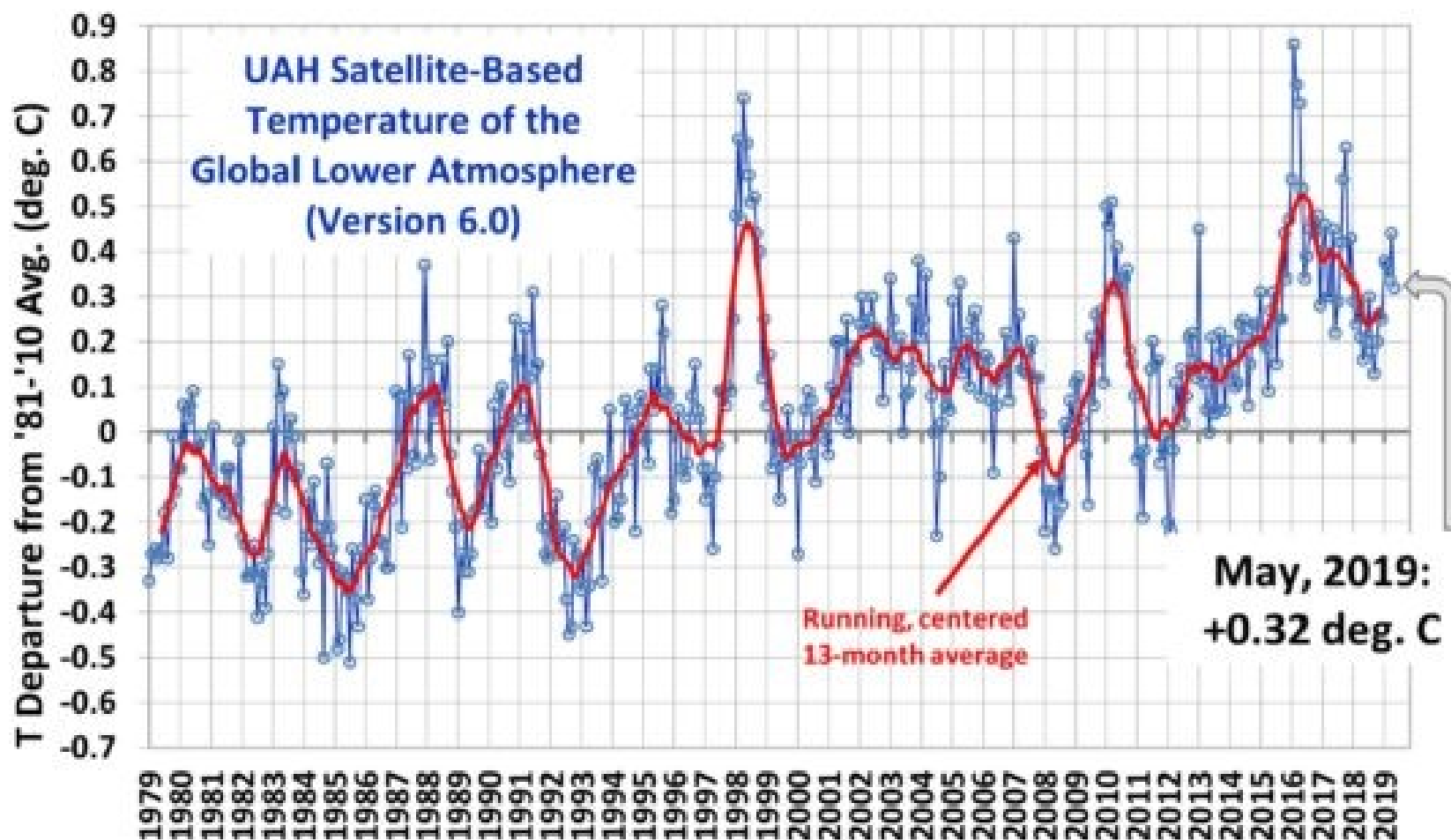
09 January 2017 updated 27 June 2019 and 31 October 2019

H. Roice Nelson, Jr.
rnelson@walden3d.com

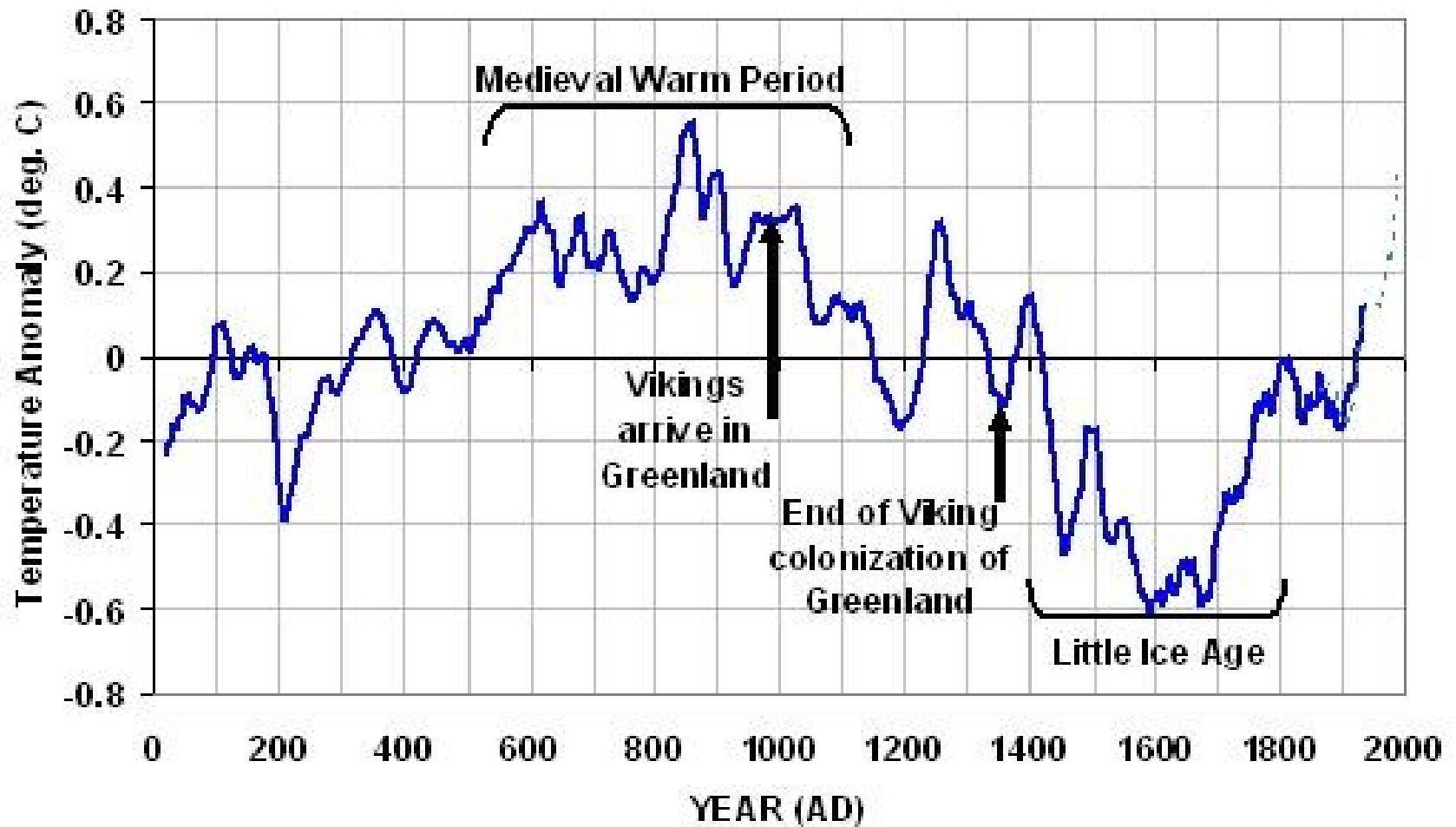


<https://youtu.be/8455KEDitpU>

UAH Global Temperature Update for May 2019

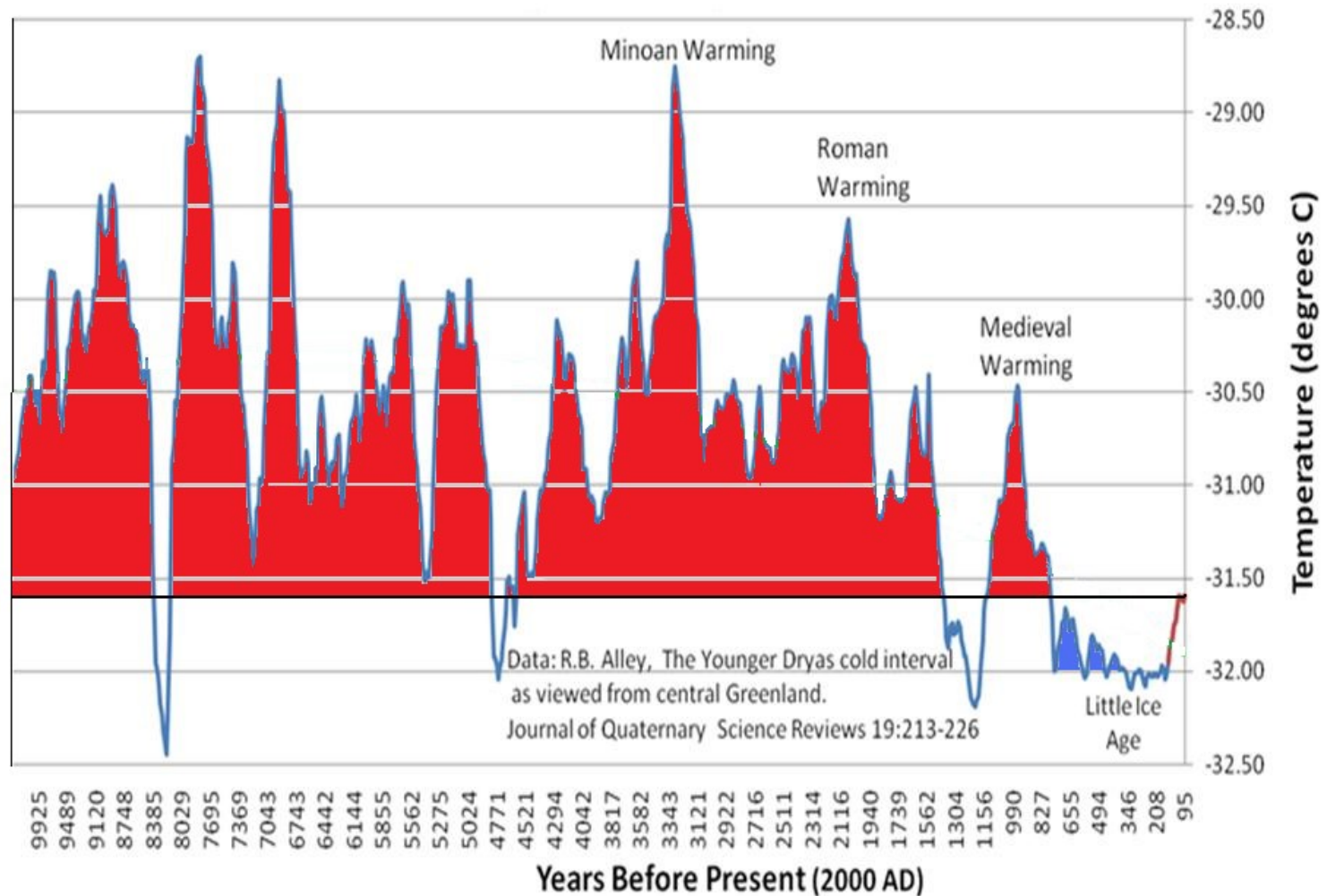


2,000 Years of Global Temperatures



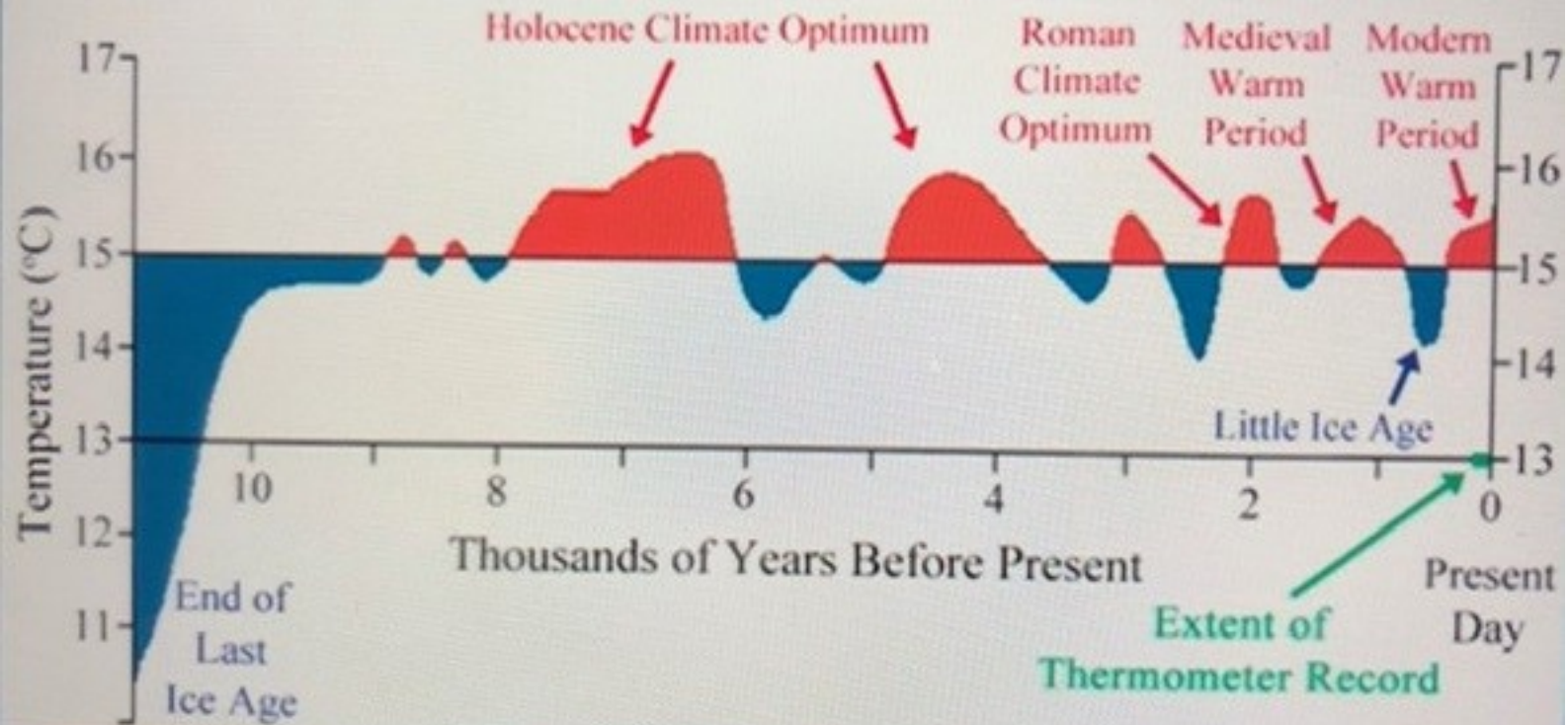
10,000 Years of Global Temperatures

Greenland GISP2 Ice Core - Temperature Last 10,000 Years



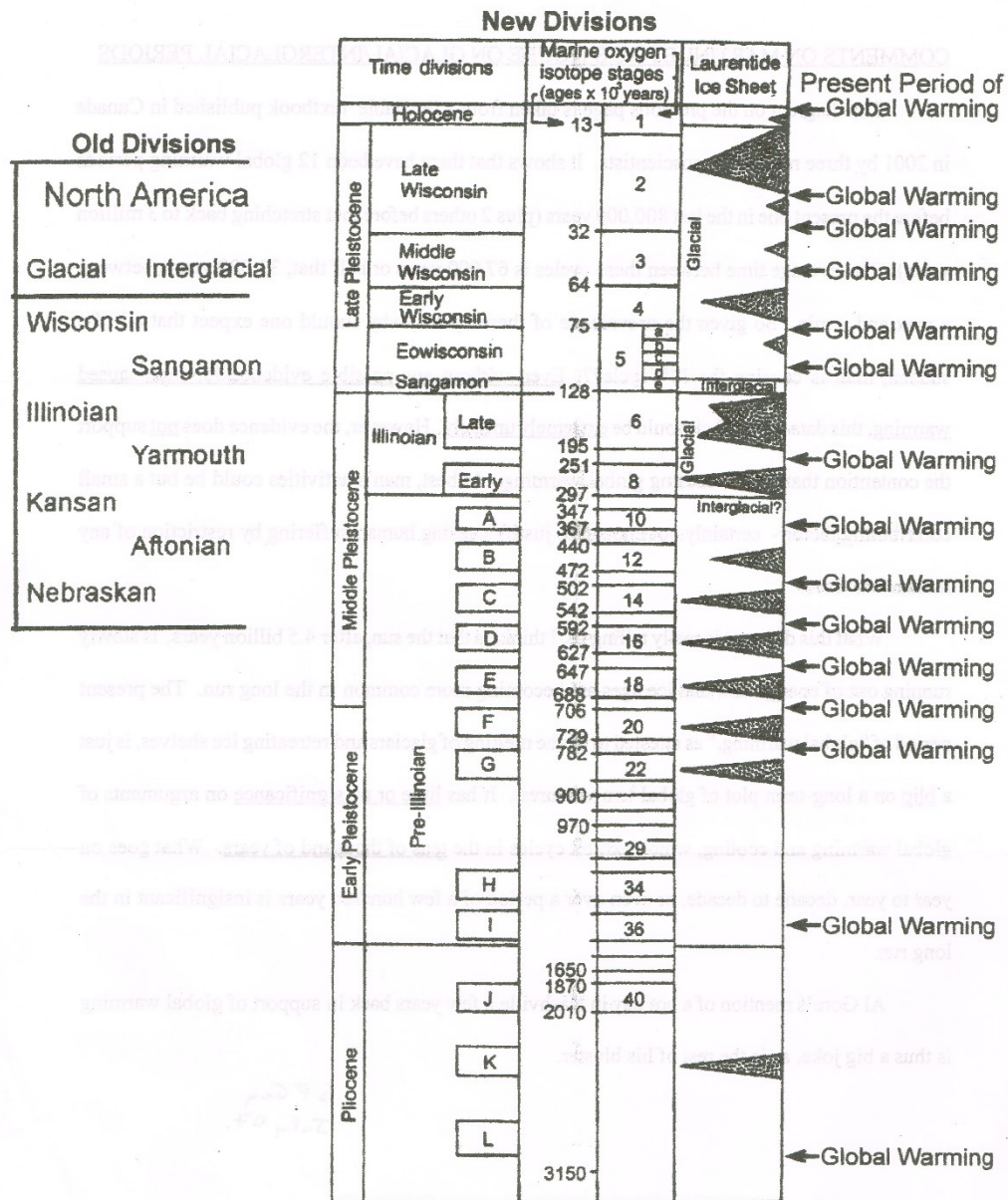
The 1500-Year Temperature Cycle

Ice Core Data from Crete Site in Central Greenland



Dansgaard (1984), Avery (2009)

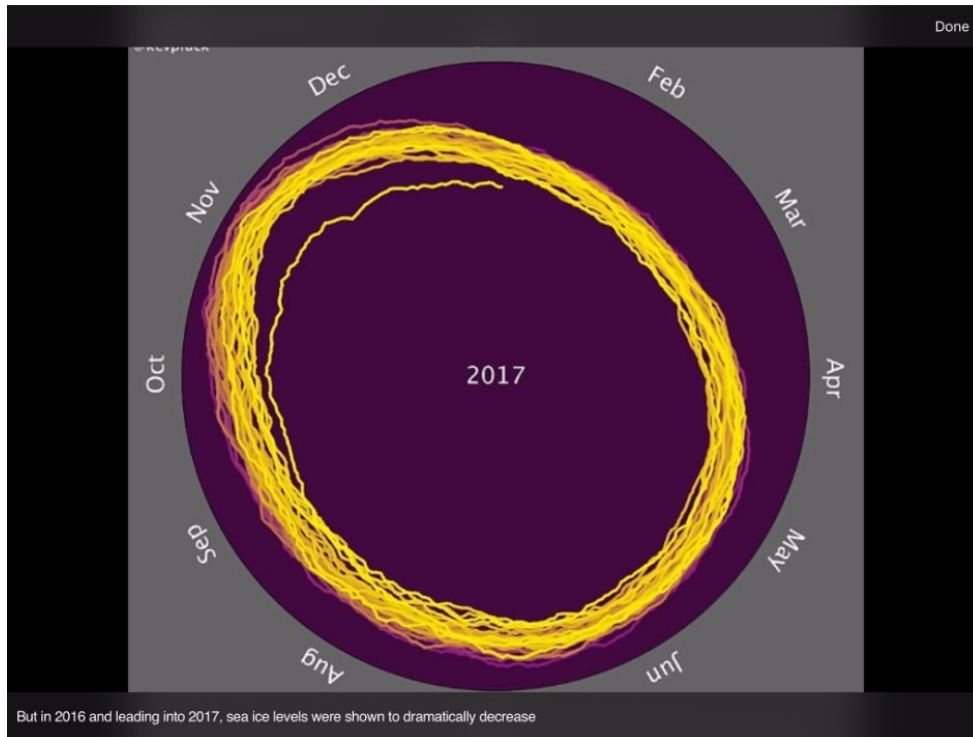
Ice Ages & Interglacial Periods ("Global Warming") in North America



3.15 Million Years of Global Temperatures

Glacials-Interglacials from Martini, I.P., M.E. Brookfield & S. Sadura, 2001, *Principles of Glacial Geomorphology*, Prentice Hall, 381 p. "Global Warming" added to this diagram by S.P. Gay, 2002.

Glaciers Melting – Florida Inundated

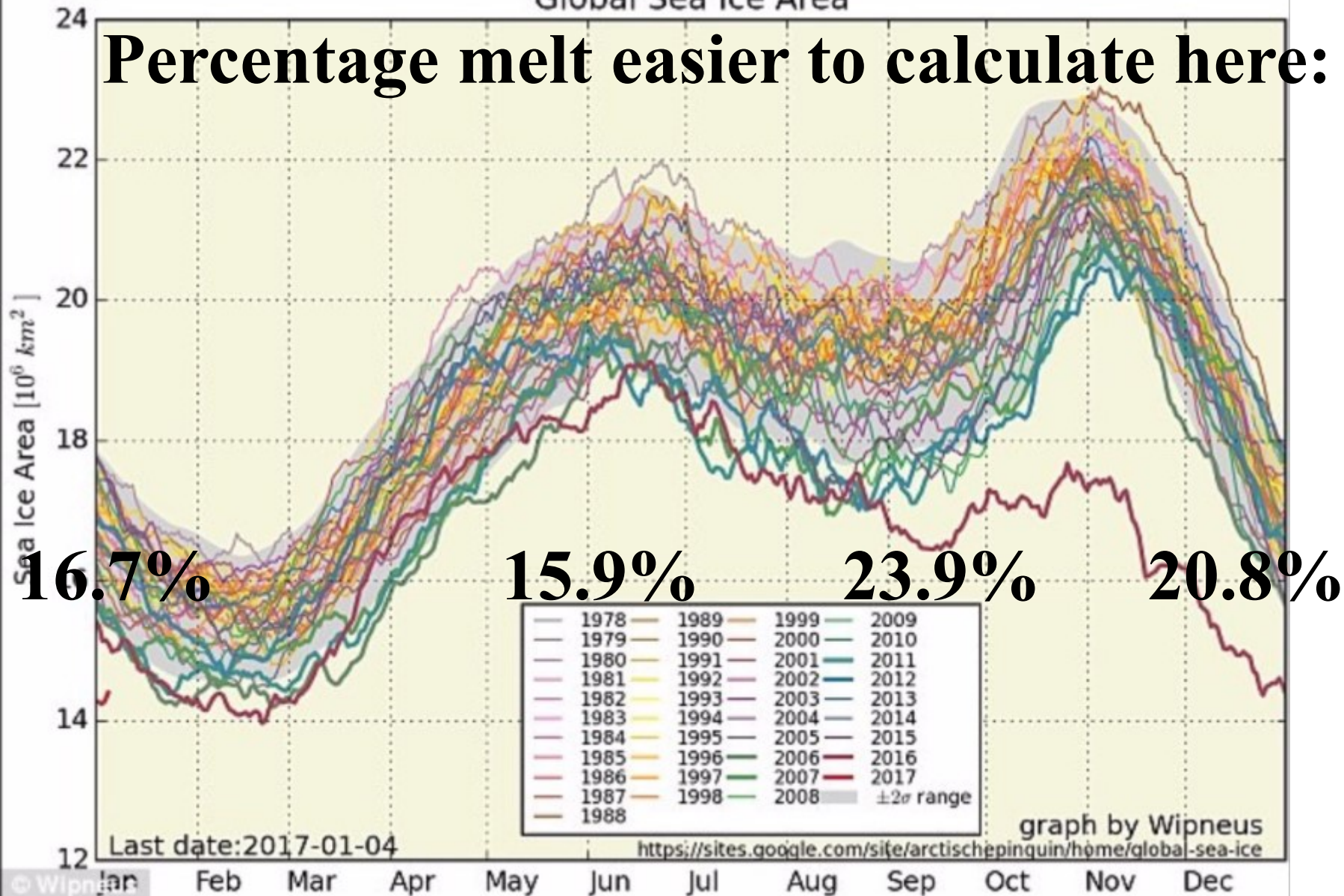


This chart implies 1/5th (20%) of the ice on the poles has melted.

(South Florida 6 meters of sea level rise before [left frame] and after [right frame]. Note that second image is an artist's rendering based on flood analysis showing what a 6 meter sea level rise would look like for South Florida, should it occur. Image source: [Tropical Audobon Society](#).)

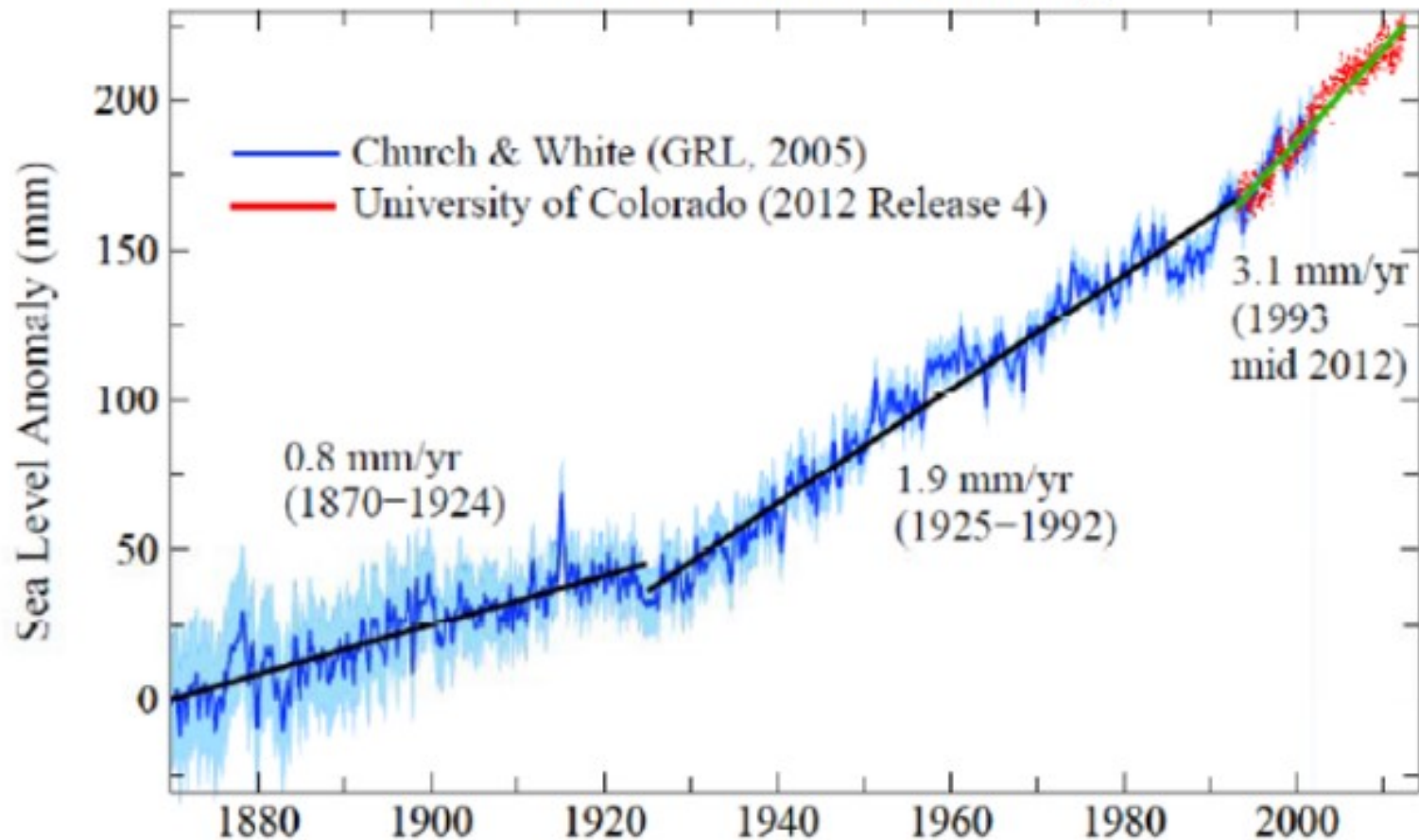
from NSIDC sea ice concentration data
Global Sea Ice Area

Percentage melt easier to calculate here:



Key Indicator

Global Mean Sea Level Change



(Global sea level rise since 1870. Image source: [Dr. James Hansen.](#))

Why isn't 16.7%-23.9%% ice melt reflected in sea level change?

Original Data Haslam Curve is Based On

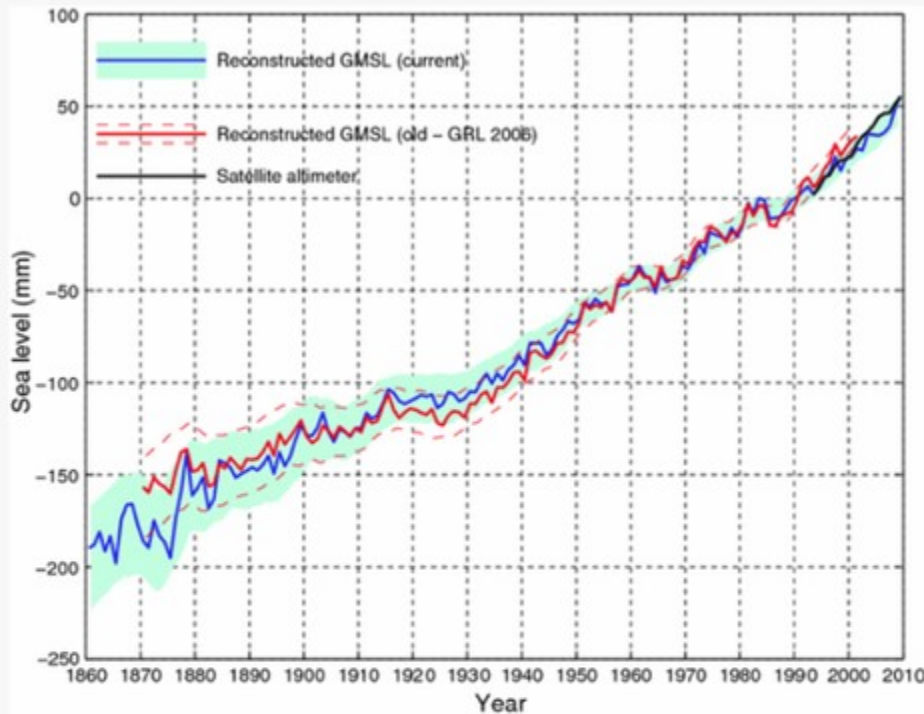
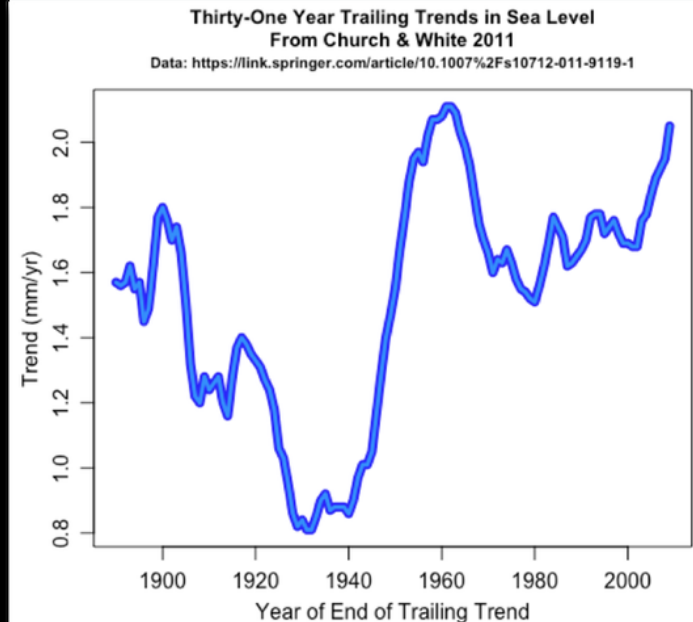


Fig. 5

Global average sea level from 1860 to 2009 as estimated from the coastal and island sea level data (blue). The one standard deviation uncertainty estimates plotted about the low passed sea level are indicated by the shading. The Church and White (2006) estimates for 1870–2001 are shown by the red solid line and dashed magenta lines for the 1 standard deviation errors. The series are set to have the same average value over 1960–1990 and the new reconstruction is set to zero in 1990. The satellite altimeter data since 1993 is also shown in black

For discussion see:

<https://wattsupwiththat.wordpress.com/2018/05/22/changes-in-the-rate-of-sea-level-rise/> where the acceleration of sea level rise (bottom chart) is not constant growth.

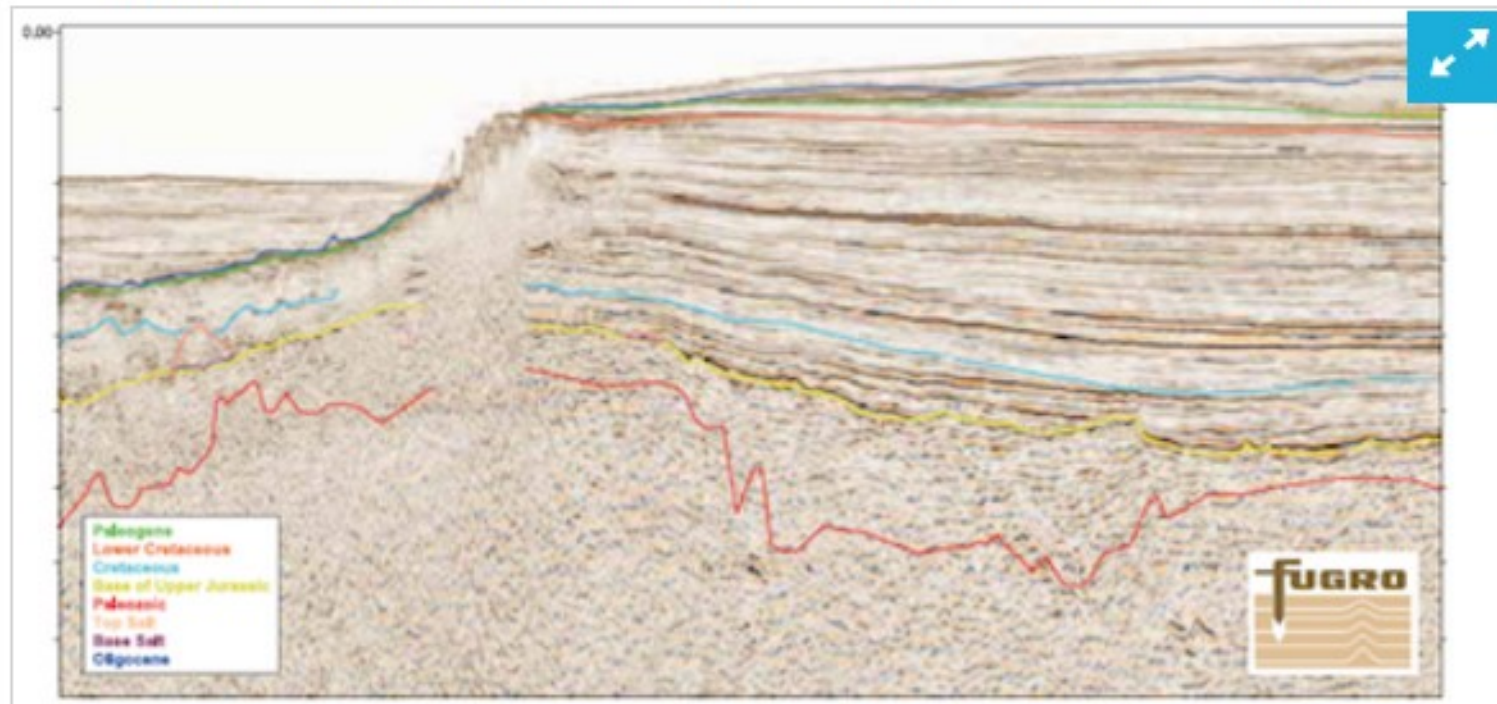


Florida is a Limestone Reef

Reefs only grow when covered with water.

Florida exists because sea level is lower than it has been during most of Florida's geologic past

www.geoexpro.com/articles/2012/09/florida-the-next-us-frontier



A west-east seismic line on the north side of the 3D survey shows the thinning of the Mesozoic (green to yellow) strata across the shelf and slope. A series of pre-Louann salt basins below the yellow horizon have been interpreted on the line. Source: Fugro

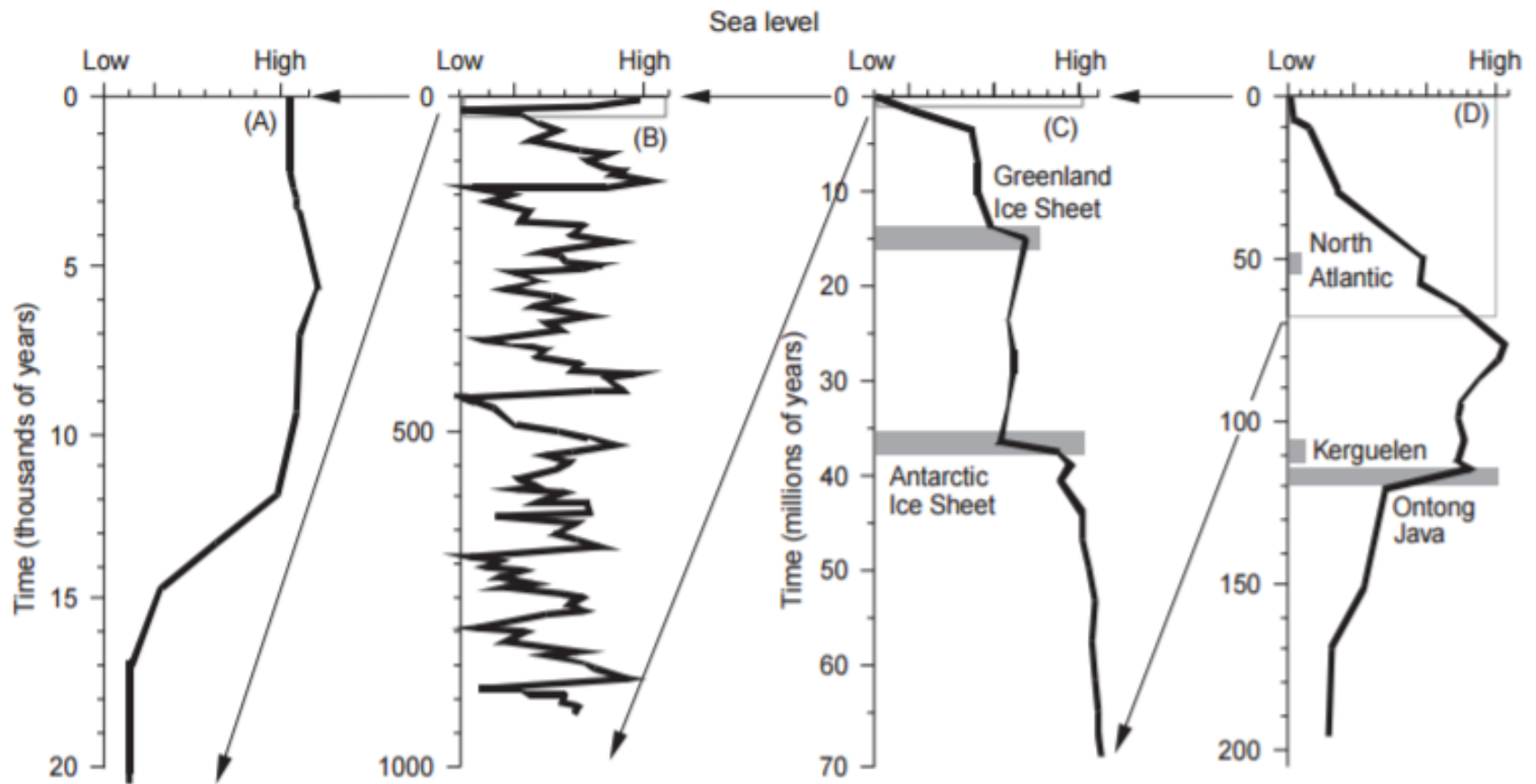


Figure 1 (A) Estimates of sea level change over the last 20 000 years. Amplitude is about 120 m. (B) Northern Hemisphere glaciers over the last million years or so generated major sea level fluctuations, with amplitudes as high as 125 m. (C) The long-term oxygen isotope record reveals rapid growth of the Antarctic and Greenland ice sheets (indicated by gray bars) as Earth's climate cooled. (D) Long-term sea level change as indicated from variations in deep-ocean volume. Dominant effects include spreading rates and lengths of mid-ocean ridges, emplacement of large igneous provinces (the largest, marine LIPs are indicated by gray bars), breakup of supercontinents, and subduction of the Indian continent. The Berggren *et al.* (1995) chronostratigraphic timescale was used in (C) and (D).

Plotted Same Way as Key Indicator

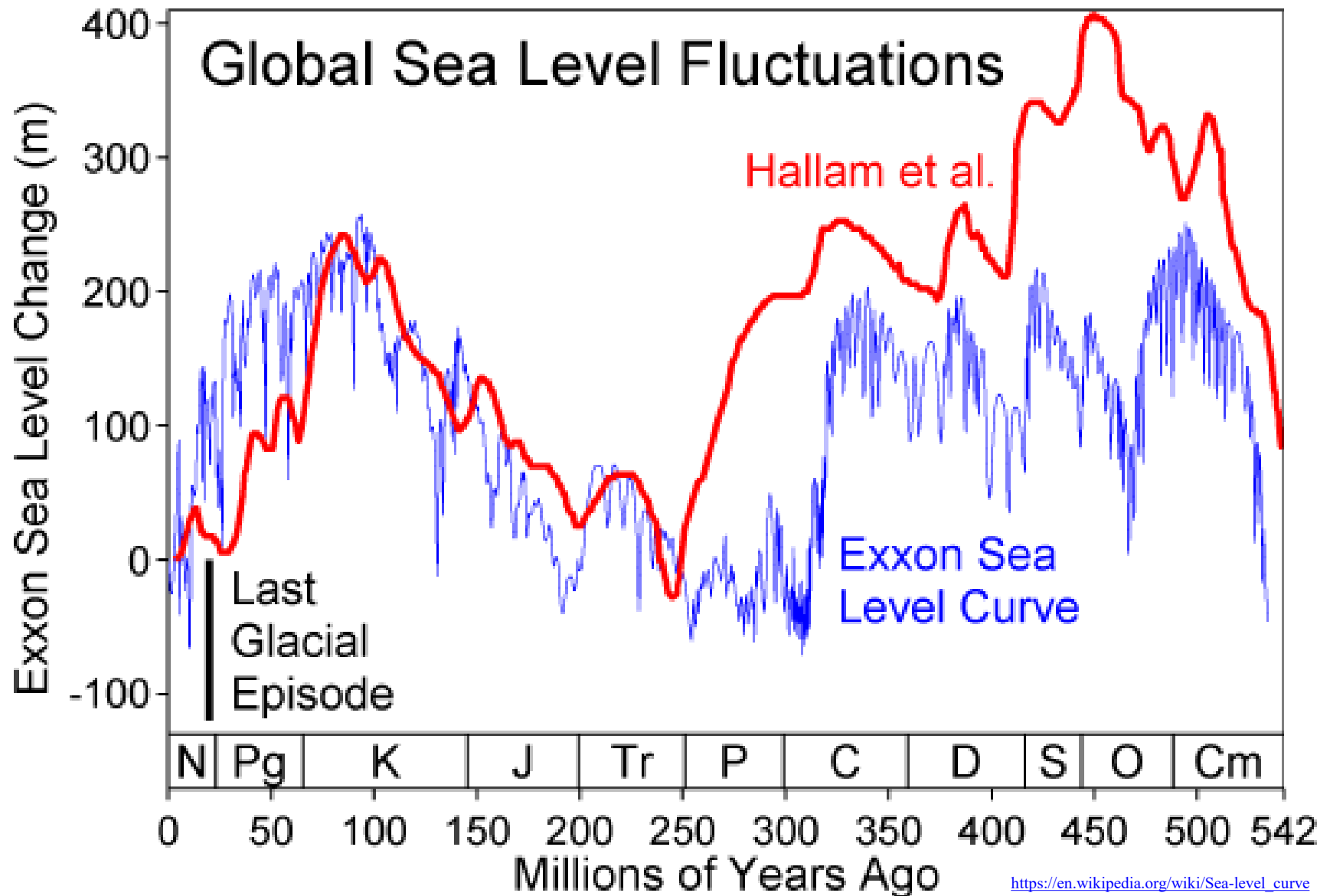
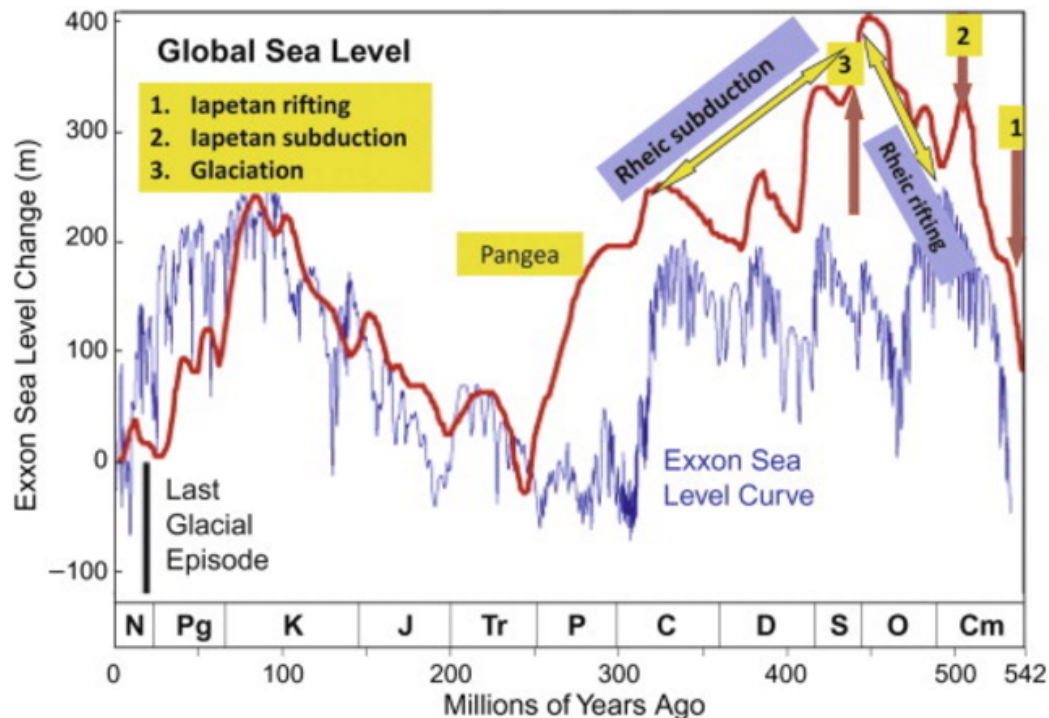
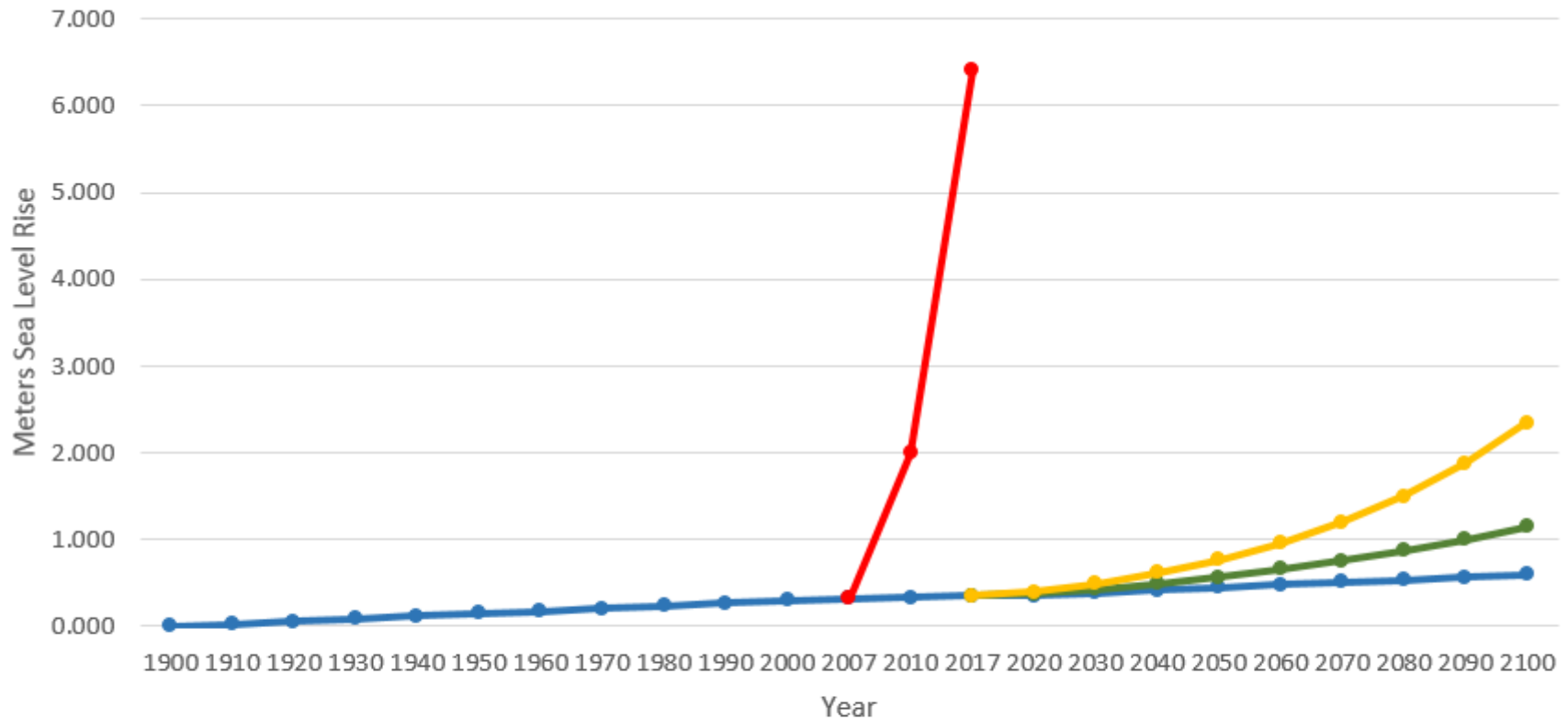


Plate Tectonics & Glaciation Driving Forces

Global sea level curve for the Phanerozoic (after Hallam, 1992). Sea level rise occurs throughout the Cambrian, consistent with the opening of the Iapetus Ocean. Global sea level drop at the end of the Cambrian is attributed to the onset of subduction within the Iapetus Ocean. The long-term drop in sea level beginning at ca. 440 Ma is broadly coincident with the onset of subduction within the Rheic Ocean, which eventually closed with the amalgamation of Pangea. The rise in sea level in the Mesozoic coincides with the opening of the Atlantic Ocean.



“An Inconvenient Truth”



- Sea Level (averaged less than 3 mm per year from 1900 to 2016)
- Al Gore (An Inconvenient Truth - "20 feet [6.128 meters] soon" - "point of no return in 10 years" from January 2006)
- IPCC [Intergovernmental Panel on Climate Change - <http://www.ipcc.ch>] Low (0.8 meters 2100)
- IPPC High (2 meters 2100 - "extreme conditions")

Questions & Comments

- Is there global warming?
 - Yes.
- Is it caused by mankind, or by natural processes, or both?
 - Both.
- Is mankind, or are natural processes, the major driving force?
 - Natural processes. More carbon dioxide is put into the atmosphere from salt water killing vegetation from a single hurricane or from a single volcanic eruption than is put into the atmosphere by millions of cars.
- Can mankind change natural processes?
 - No.
- Should we take care of the environment?
 - Absolutely!
- An implication of the 4th slide is in 5 x 40 years 100% of global sea ice will melt. Key to remember area is not volume These displays show global sea ice area.
 - Also important to realize the ice at the north pole is floating. So even if all of this ice melts, it will not raise the sea level. An analogy is ice melting in a glass of water does not overflow the glass. The good news is melting the north pole ice cap will create a northwest passage.
- In 2009 we were told the most important thing we could do to stop global warming, from President Obama's Science Advisor, was paint the tops of school buses white. We spent \$3.840-\$6.000 billion dollars to do this (480,000 school buses in US, at \$8,000 to \$12,500 each) and so it seems reasonable Global Warming should no longer be a concern.
- Let's not spend any more money saving polar bears, at least until Canada revises polar bear hunting laws, which would save many more polar bears than spending billions of dollars fruitlessly attempting to change natural processes.