This talk is available at https://youtu.be/0e1OIOZE-9E

Plate tectonics controls global climate change by determining

the **frequency** of major explosive, subduction-related volcanic eruptions causing incremental global cooling

versus

the **extent** of subaerial, rift-related, effusive, flood basaltic lava flows causing sudden global warming, ocean acidification, mass extinctions, and often the ends of geologic eons, eras, periods, etc.

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Science Is Never Settled

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WhyClimateChanges.com

Key points

1. Climate change is controlled primarily by sub-aerial volcanism

2. Frequent major explosive eruptions cause incremental **GLOBAL** cooling

3. Flood basaltic eruptions, on the other hand, cause sudden **GLOBAL** warming

4. **Sudden major warming followed by slow cooling occurs as often as every 1000 years in erratic sequences that are clearly not cyclic.** Rate is surprising

5. Plate tectonics determines which type of volcanism is dominant at any time

6. These distinctive sequences of volcanism appear to provide another tool, much like magnetic anomalies, for interpreting the geologic record including cross-correlation and dating


Pinatubo 1991

Aerosol forming explosive eruptions

versus

Aerially extensive flood-basaltic eruptions


Bárðarbunga 2014

Occur above subduction zones

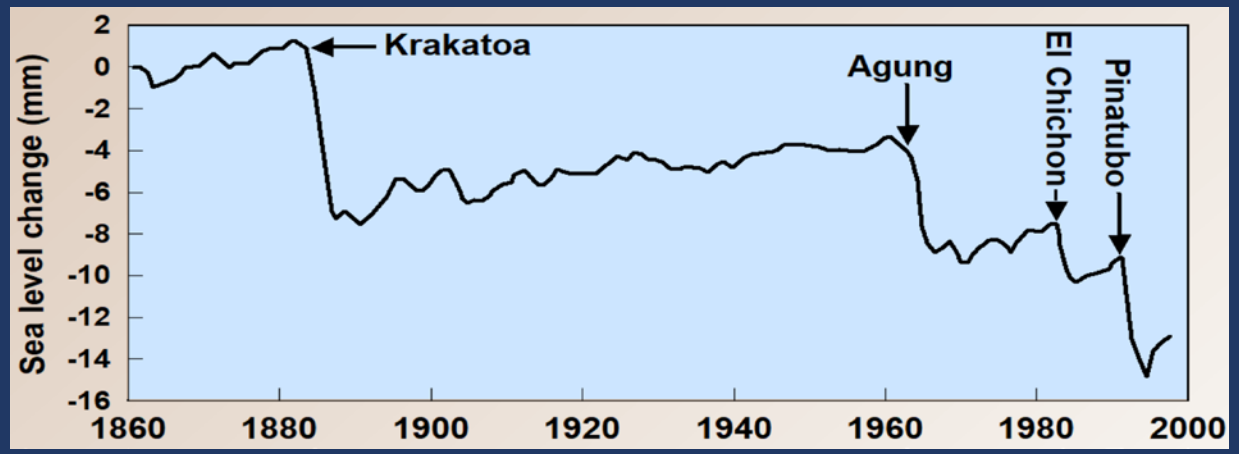
Occur in rift zones

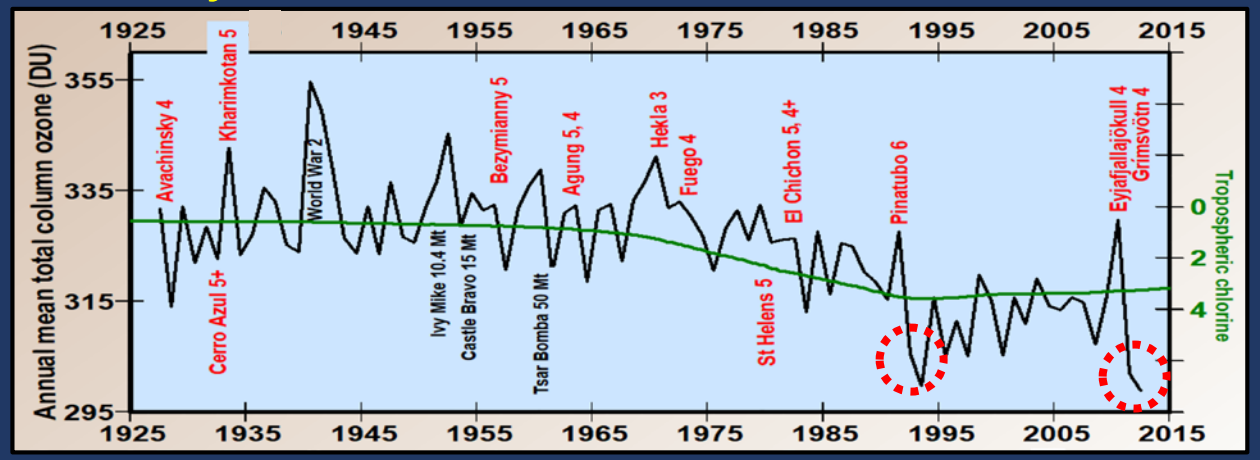
Form aerosols cooling Earth GLOBALLY ~0.5°C for ~3 years

Deplete ozone warming Earth GLOBALLY many degrees within years

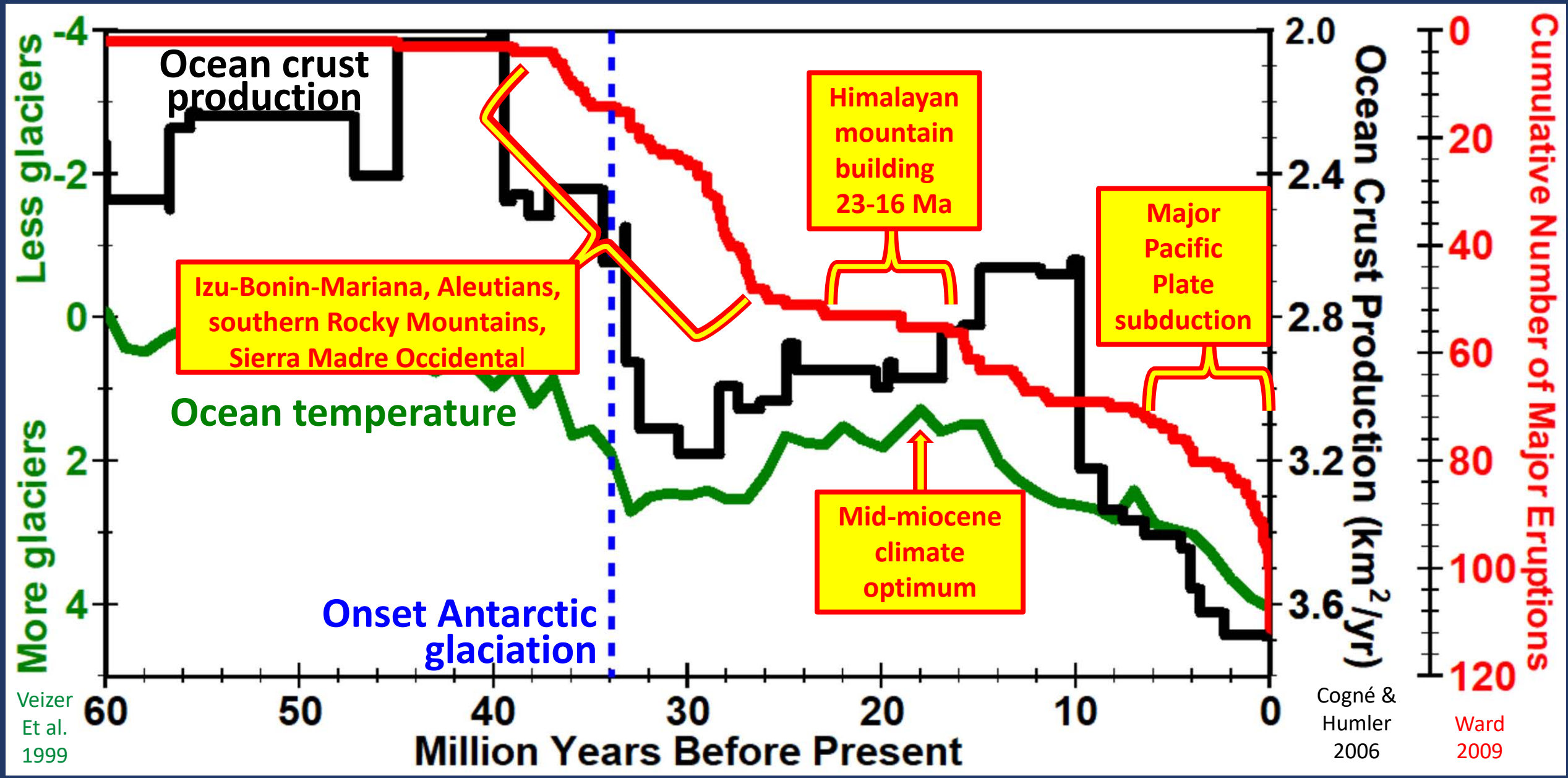
Climate effect is determined by number of eruptions per century

Climate effect is determined by duration and aerial extent

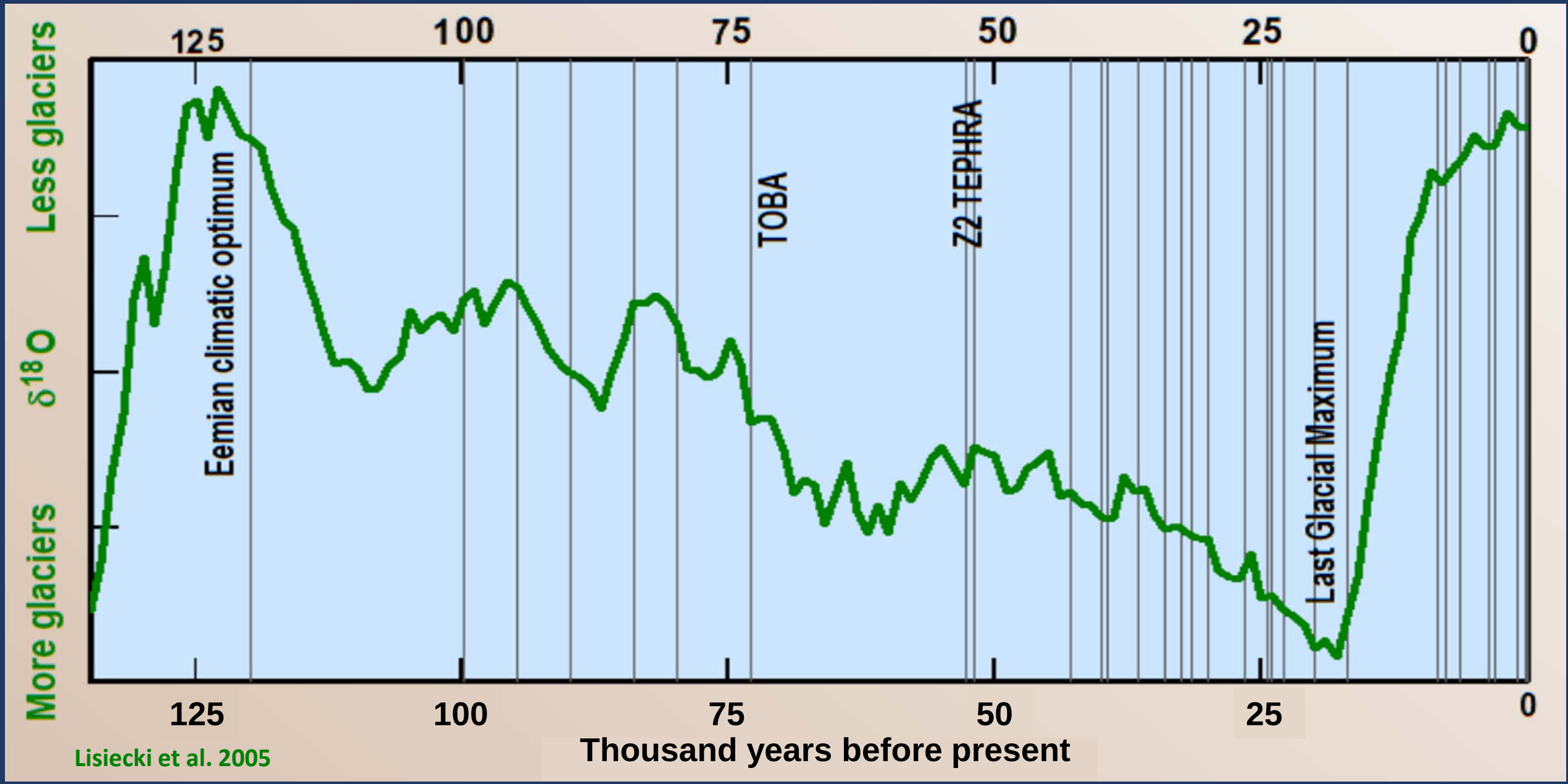




Major cooling when there is major subduction



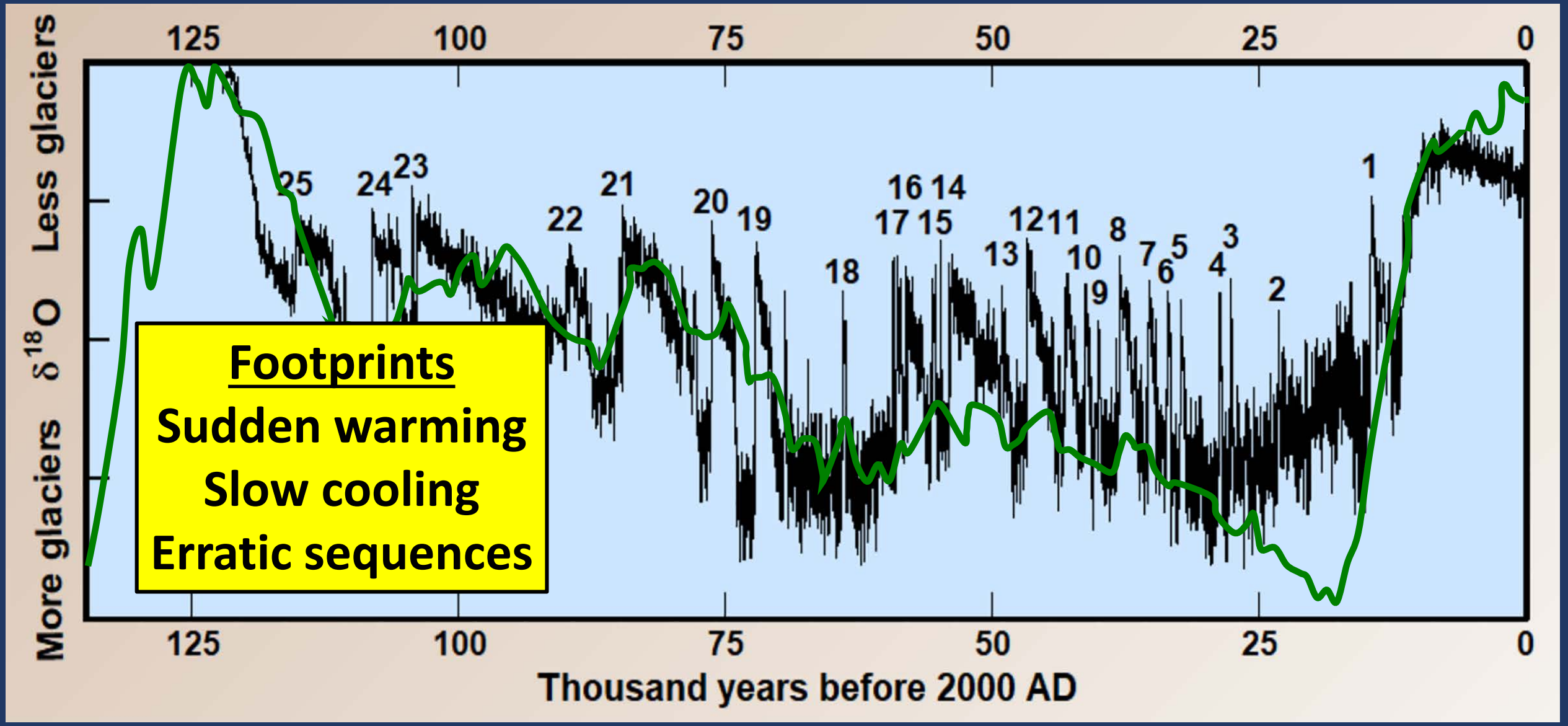
Stack of 57 globally distributed deep sea $\delta^{18}O$ records



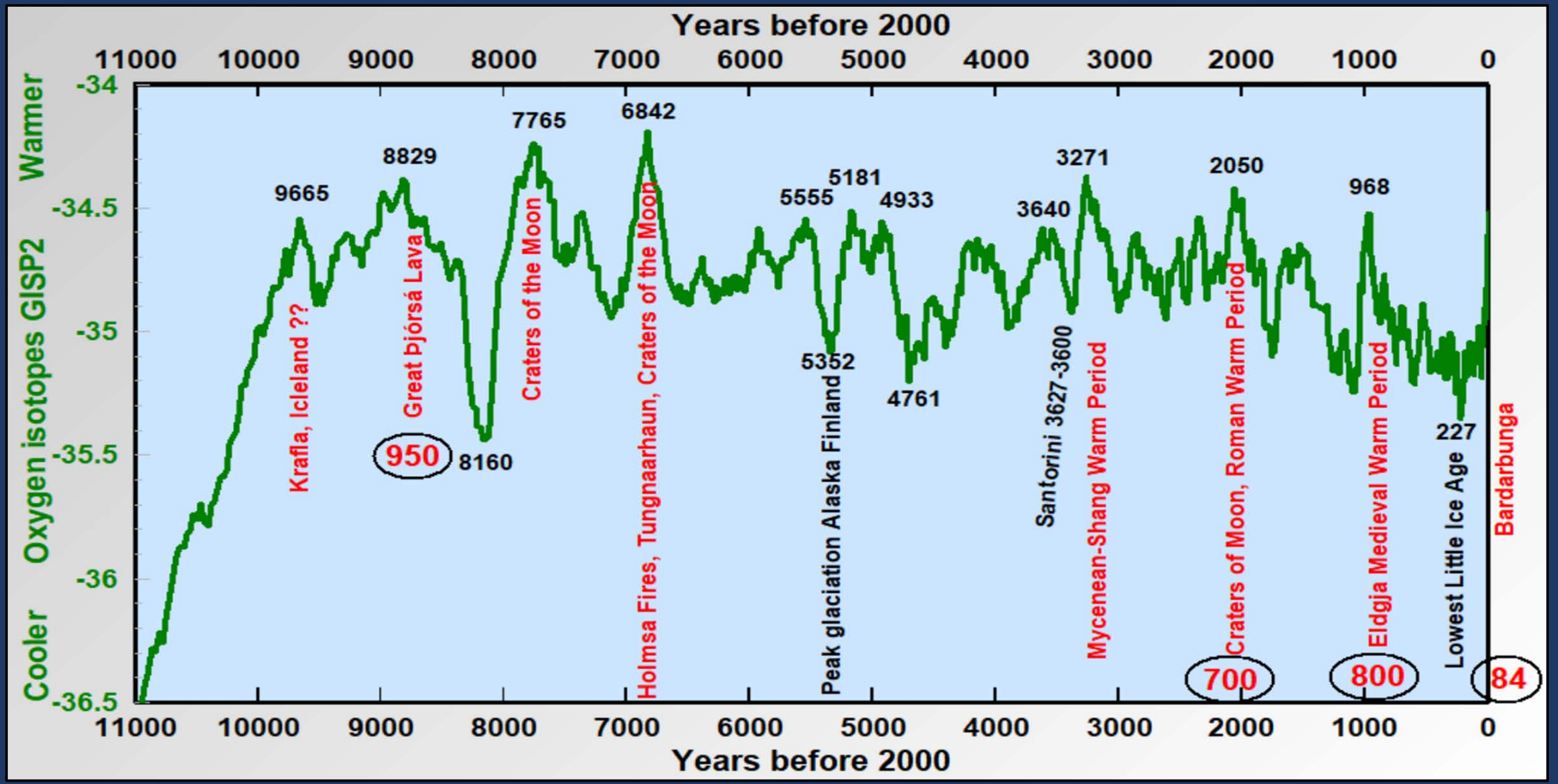
Lisiecki et al. 2005

Erratic sequences of rapid warming followed by slower cooling

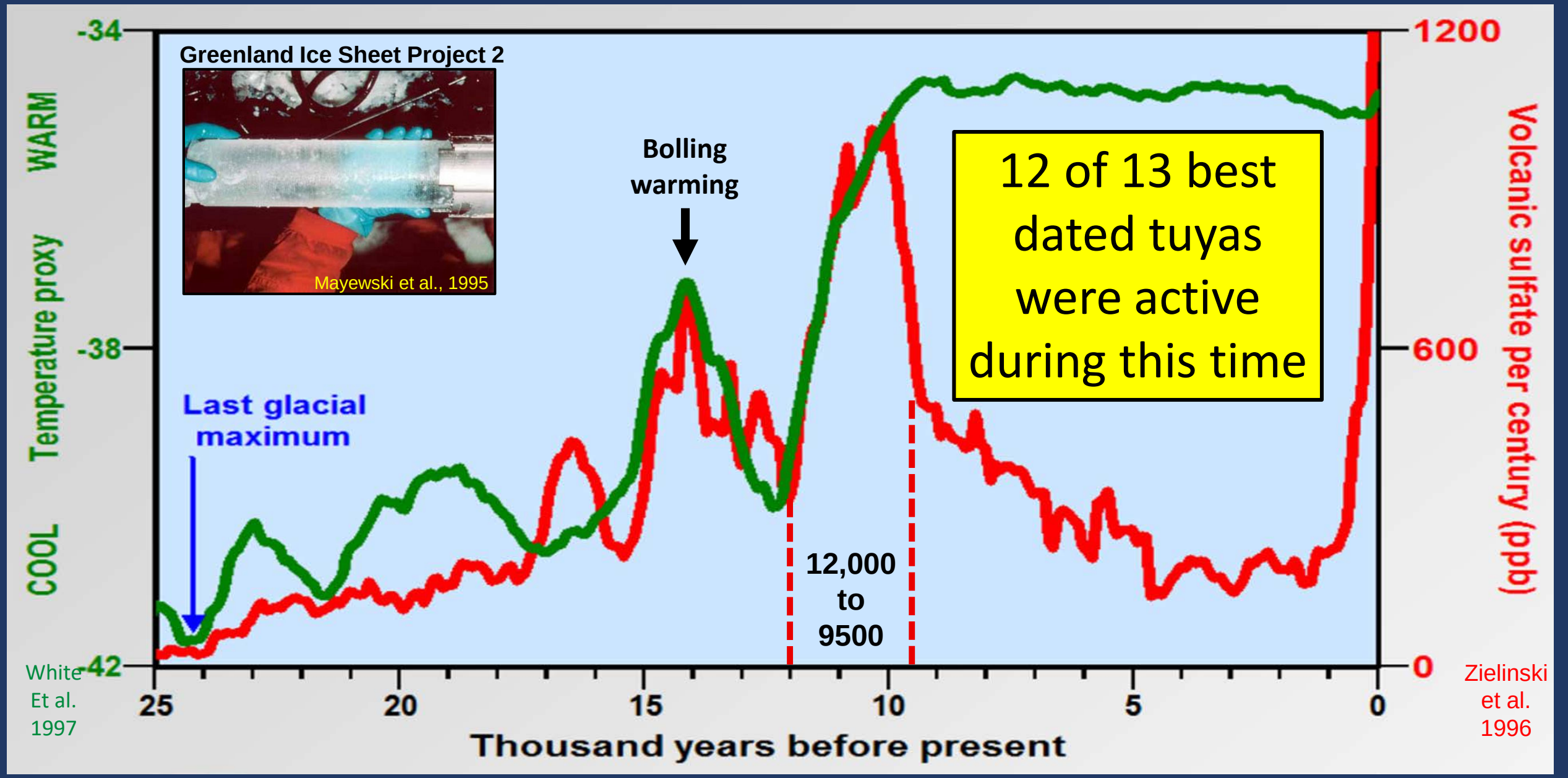
Dansgaard-Oeschger events observed in Greenland ice



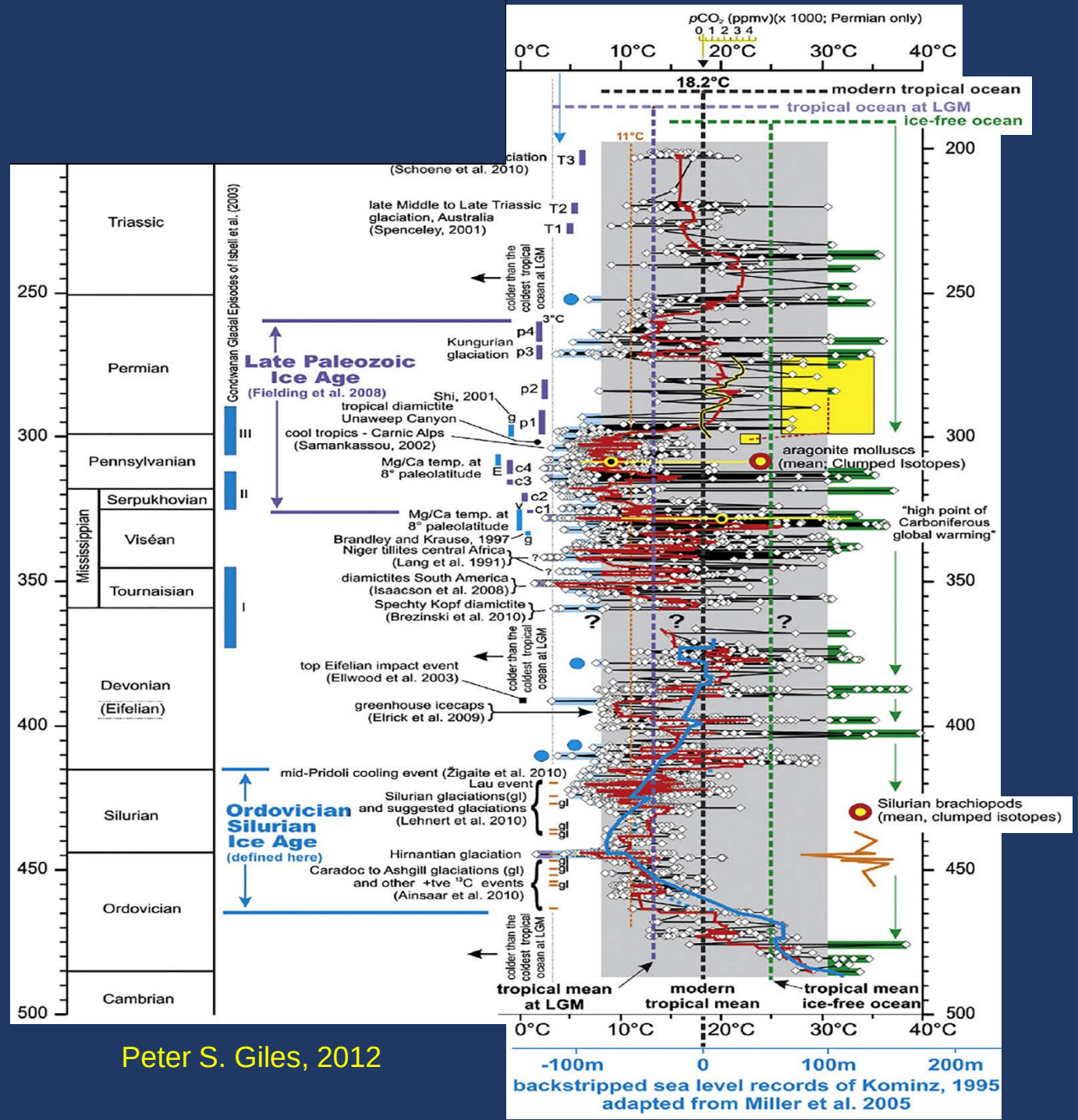
Holocene temperatures and volcanism



Basaltic volcanism ended the last ice age

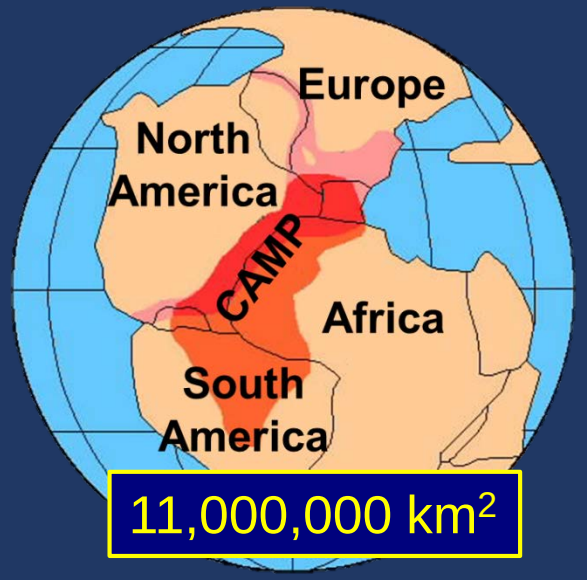


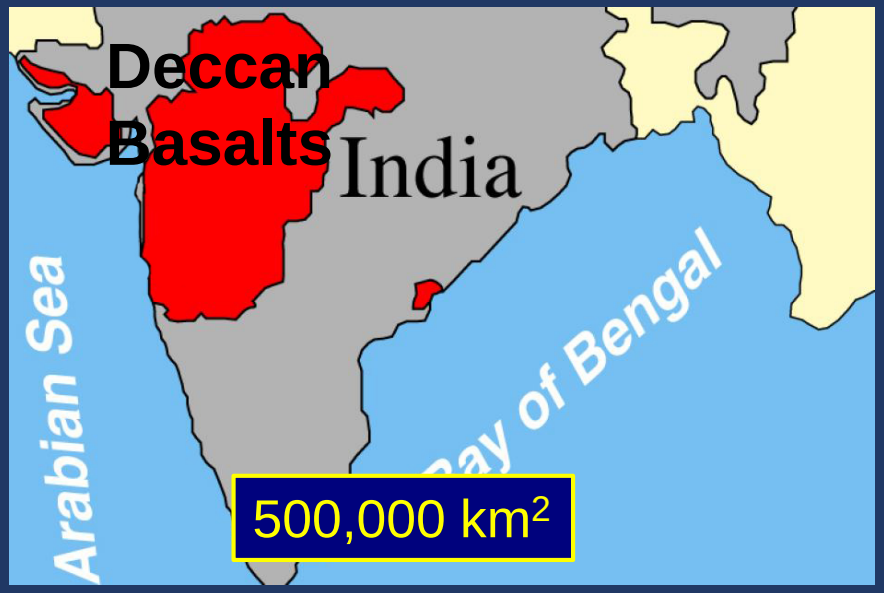
Paleozoic brachiopod habitat temperatures

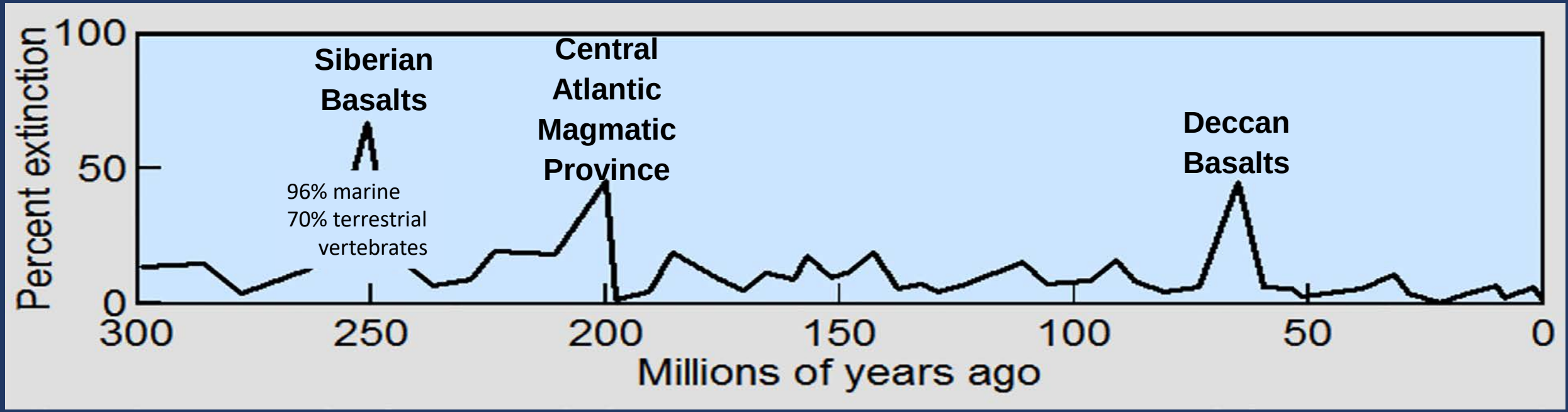


Peter S. Giles, 2012

Examples of flood basalts and large igneous provinces

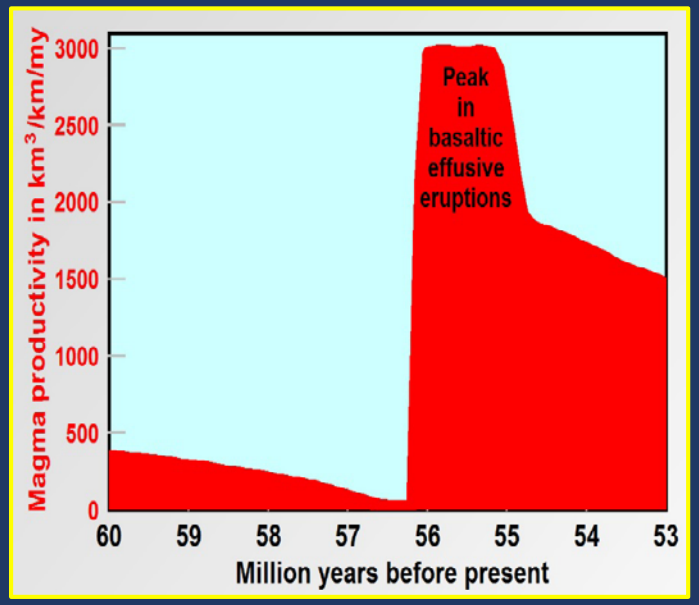




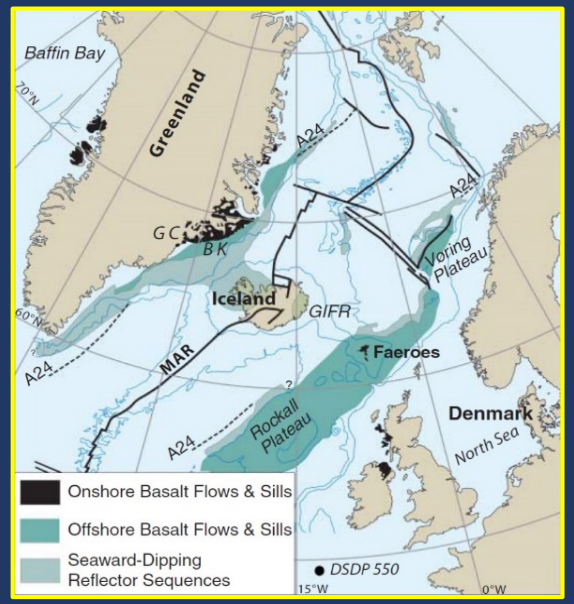


Paleocene-Eocene Thermal Maximum

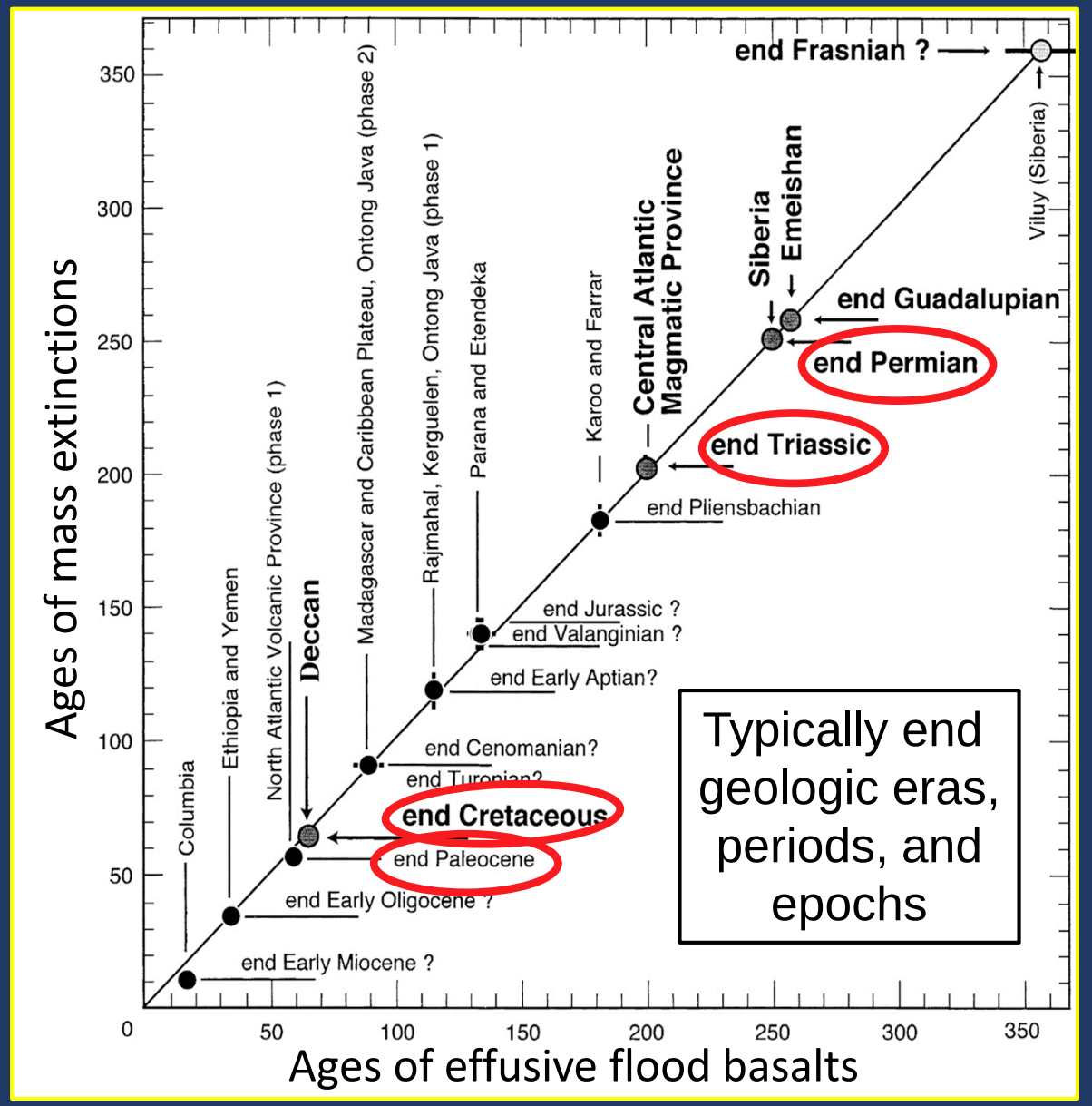
Extrusion of basaltic magma reached a peak 56 million years ago during the rifting of the Greenland-Norwegian Sea



Storey et al. 2007

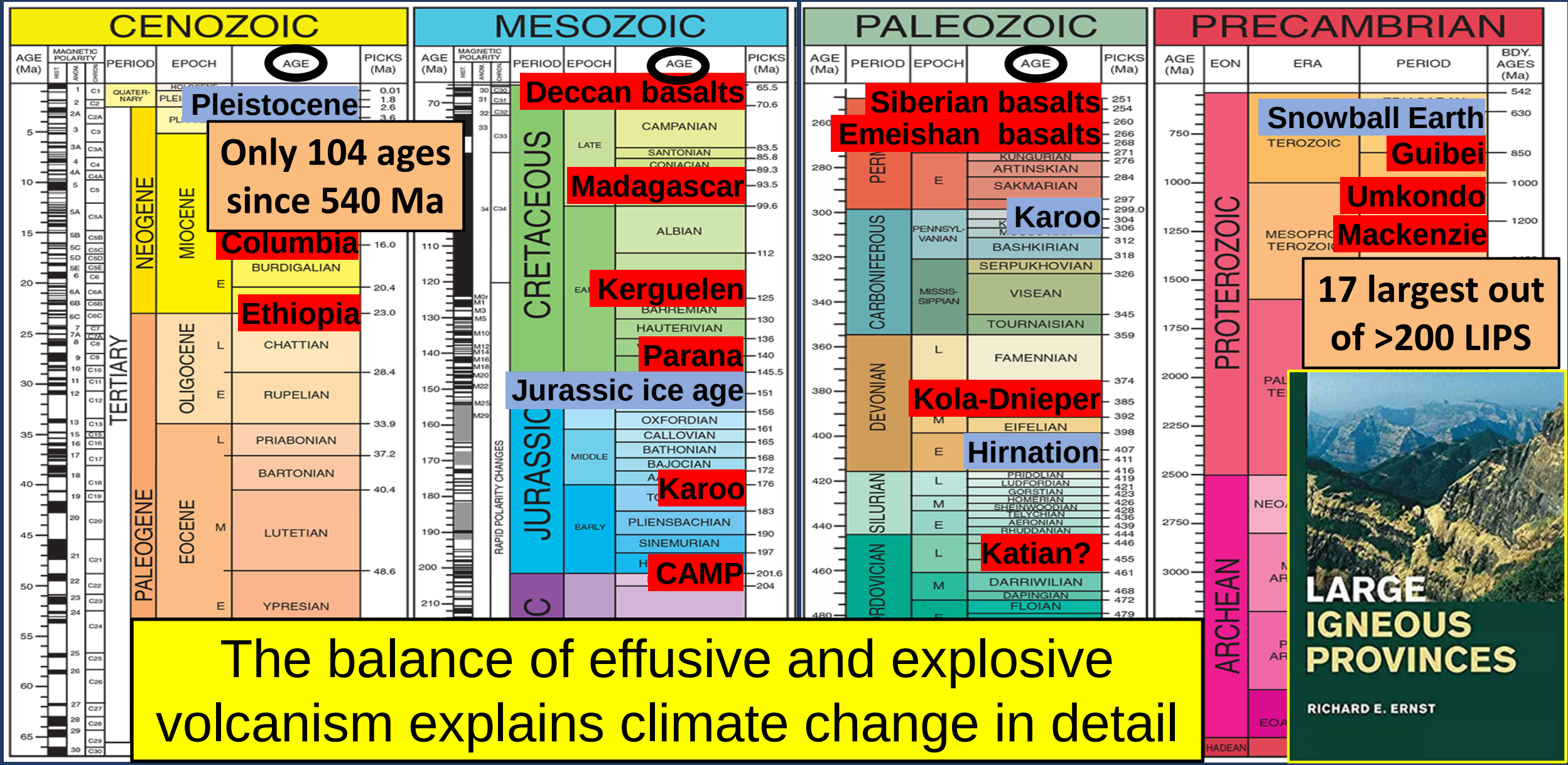


Association with end of time units



Courtillot and Renne 2003

Large Igneous Provinces punctuate the geologic time scale



Geological Society of America Time Scale

Ages of LIPs from Ernst 2014

Volcanoes Rule

WhyClimateChanges.com

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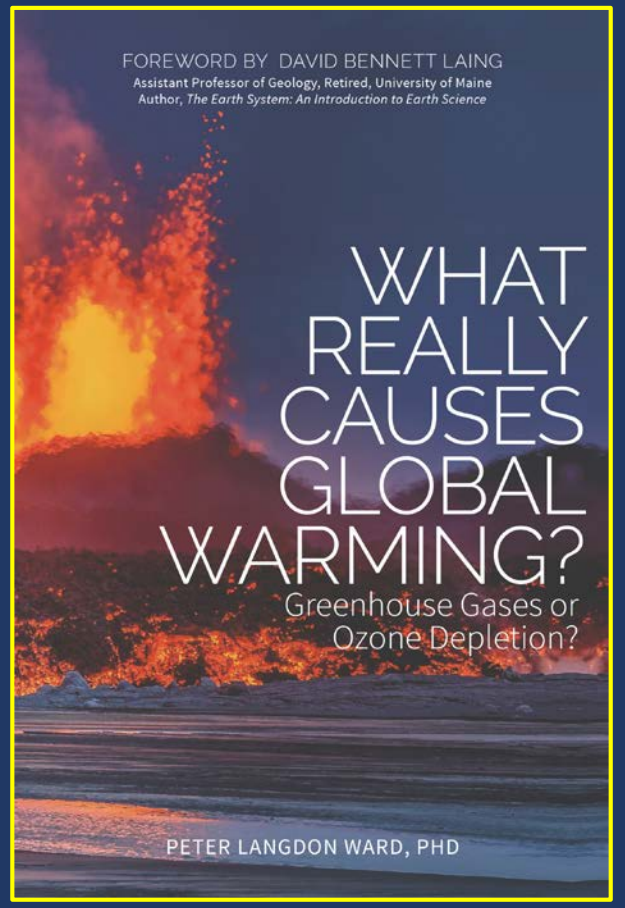
2. Frequent major explosive eruptions cause incremental **GLOBAL** cooling
3. Flood basaltic eruptions cause sudden **GLOBAL** warming
4. **Sudden major warming and slow cooling occurs as often as every 1000 years in erratic sequences that are clearly not cyclic**
5. Plate tectonics determines which type of volcanism is dominant at any time
6. These distinctive sequences of volcanism appear to provide another tool, much like magnetic anomalies, for interpreting the geologic record including cross-correlation and dating



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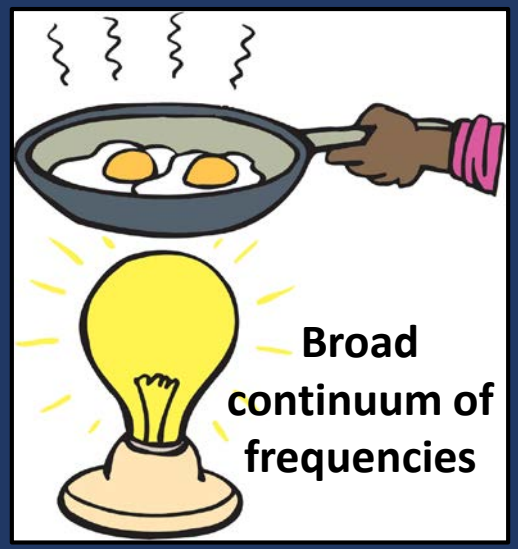
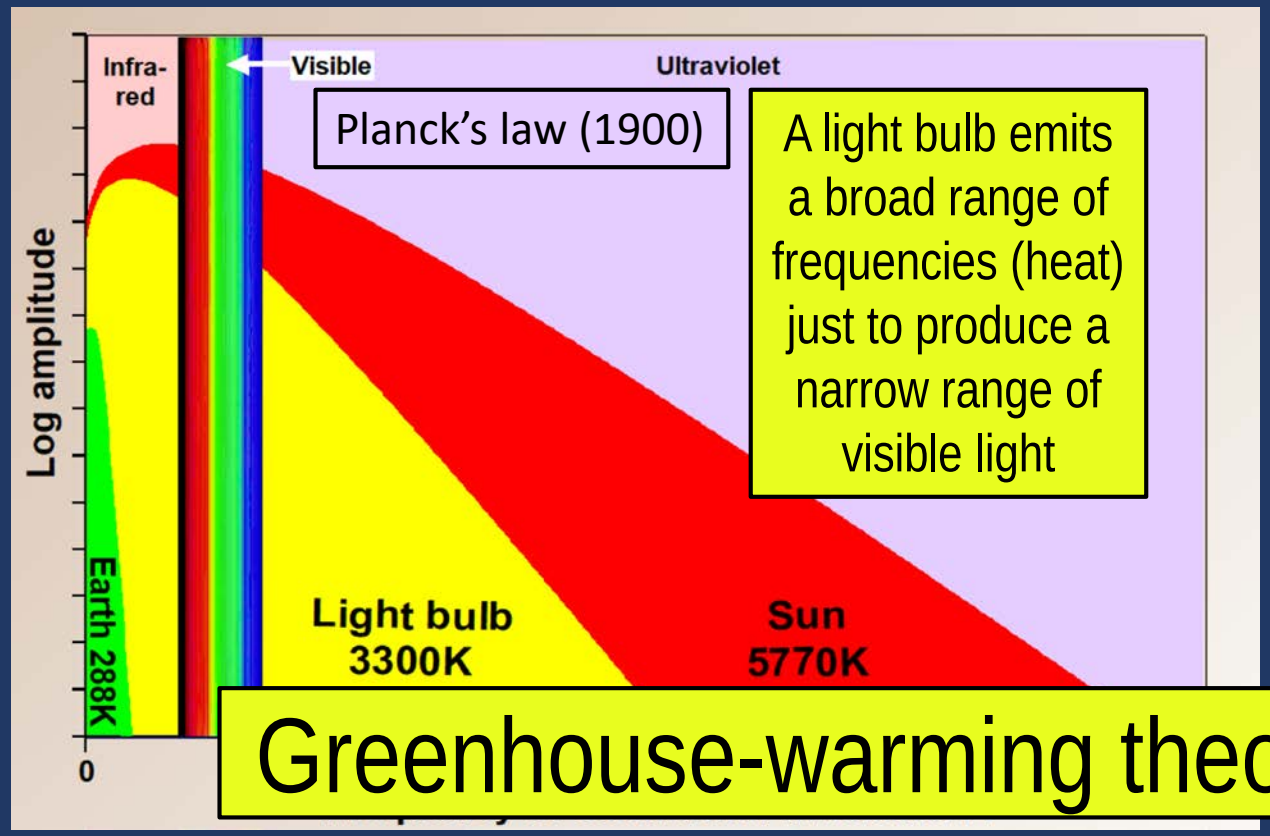
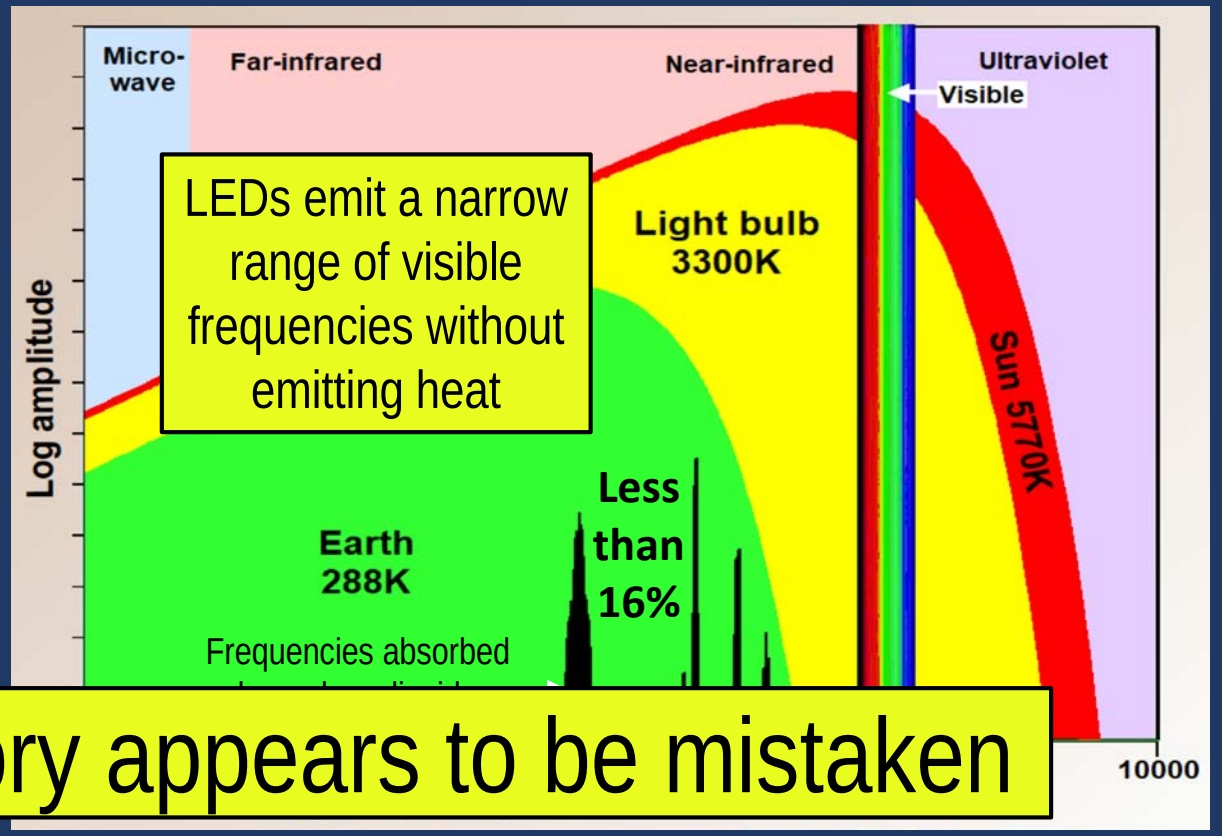


Greenhouse gases simply do not absorb a broad enough range of frequencies, known of as heat, to be a significant cause of global warming





Greenhouse-warming theory appears to be mistaken