



Earth Works: Arizona Geology

With Sarah Patterson and Nicholas Montiel

Who is this guy?



The Great
Outdoors

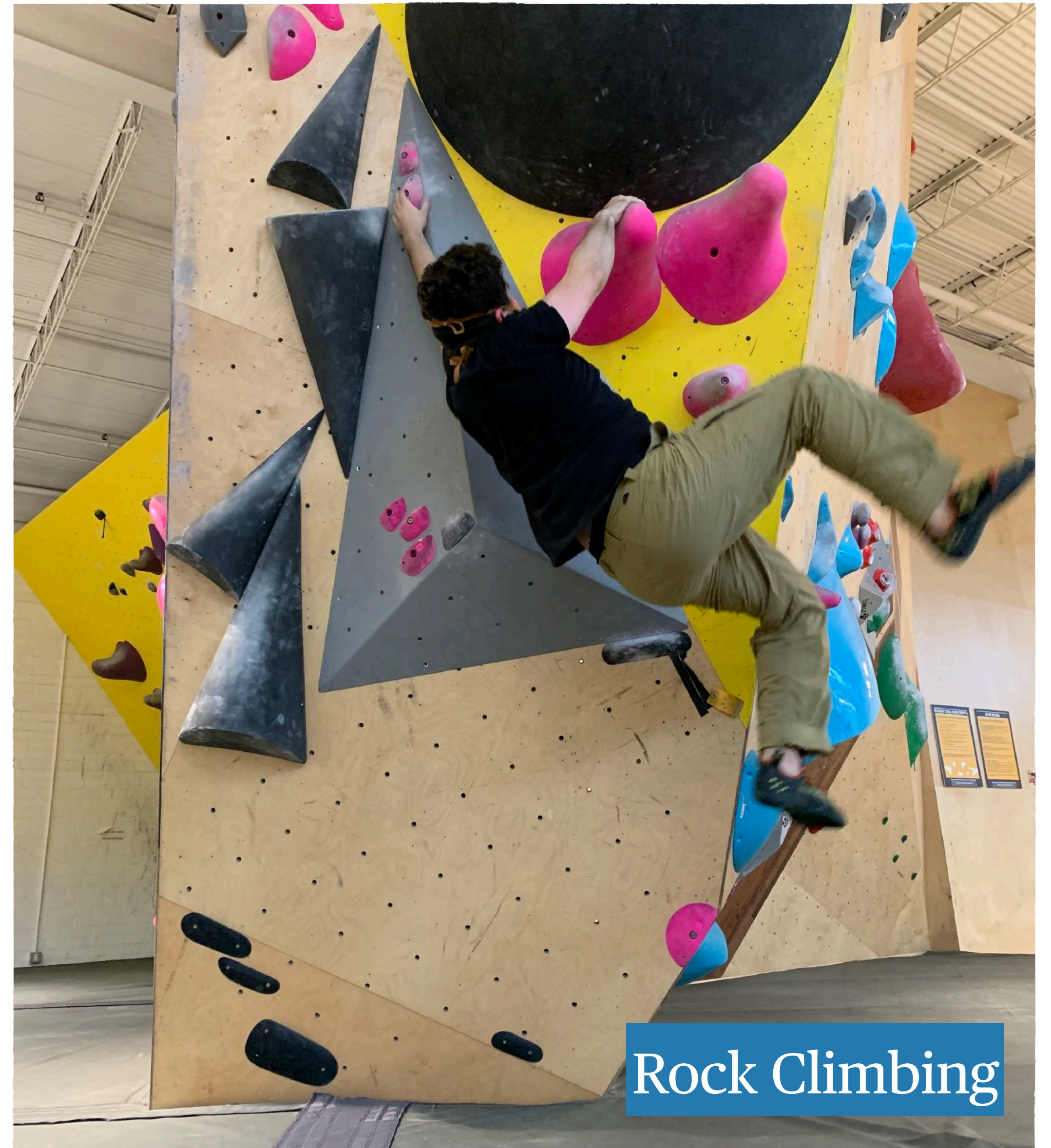
Nicholas Montiel

Phoenix born and raised
(for better or worse)

Shadow Mountain High
School,
University of Arizona,
University of Texas at
Austin



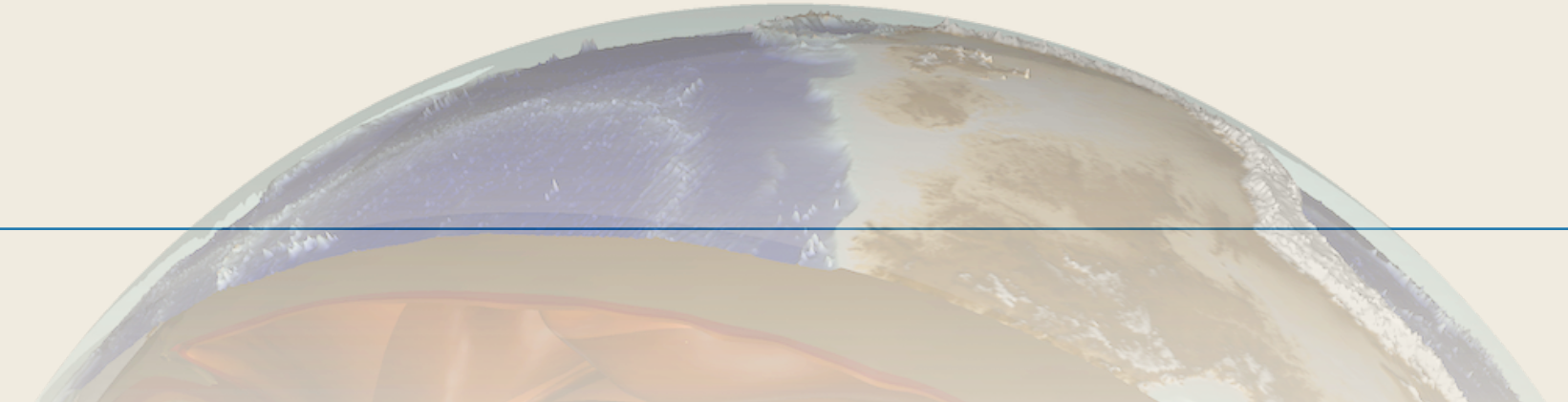
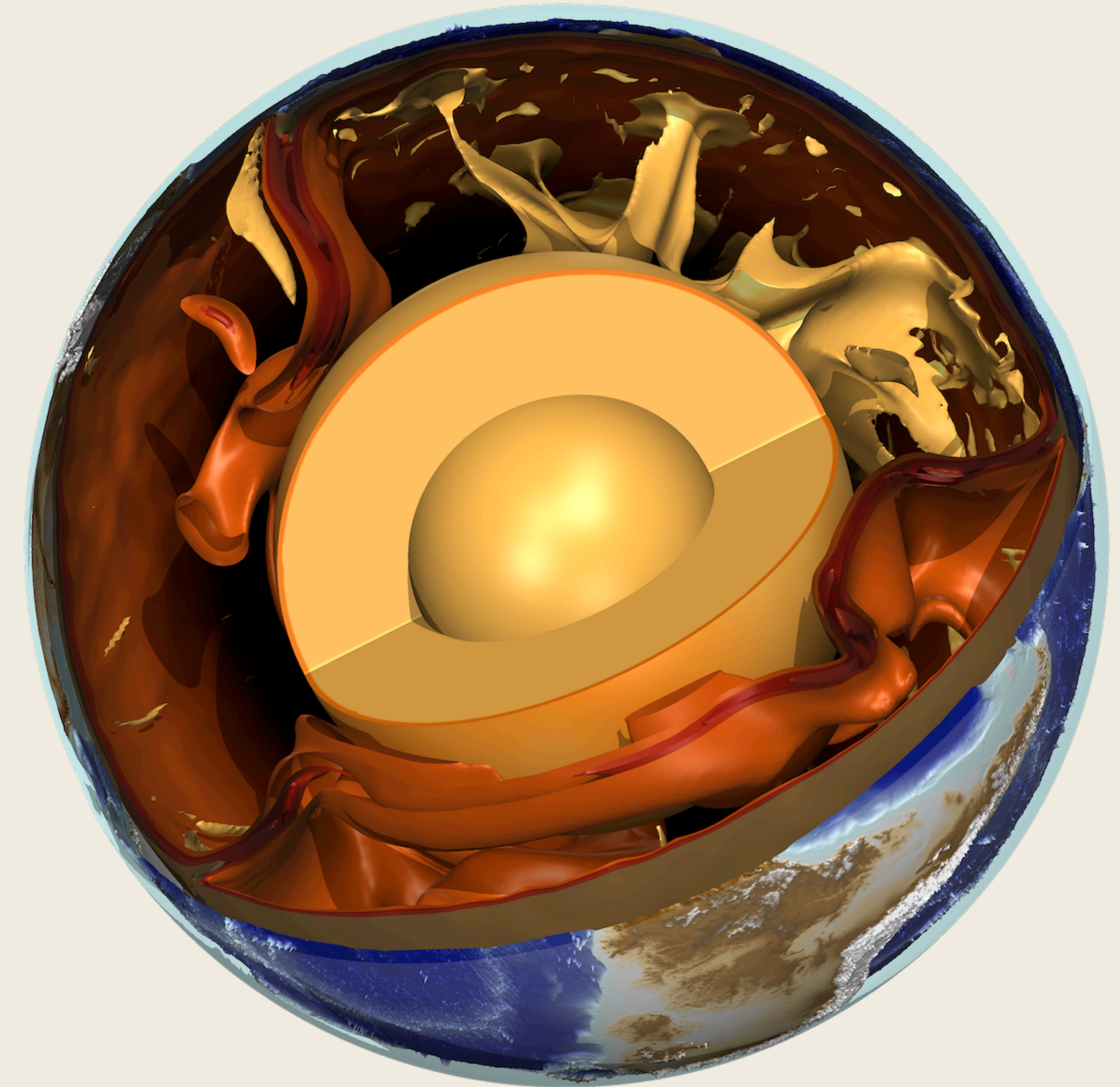
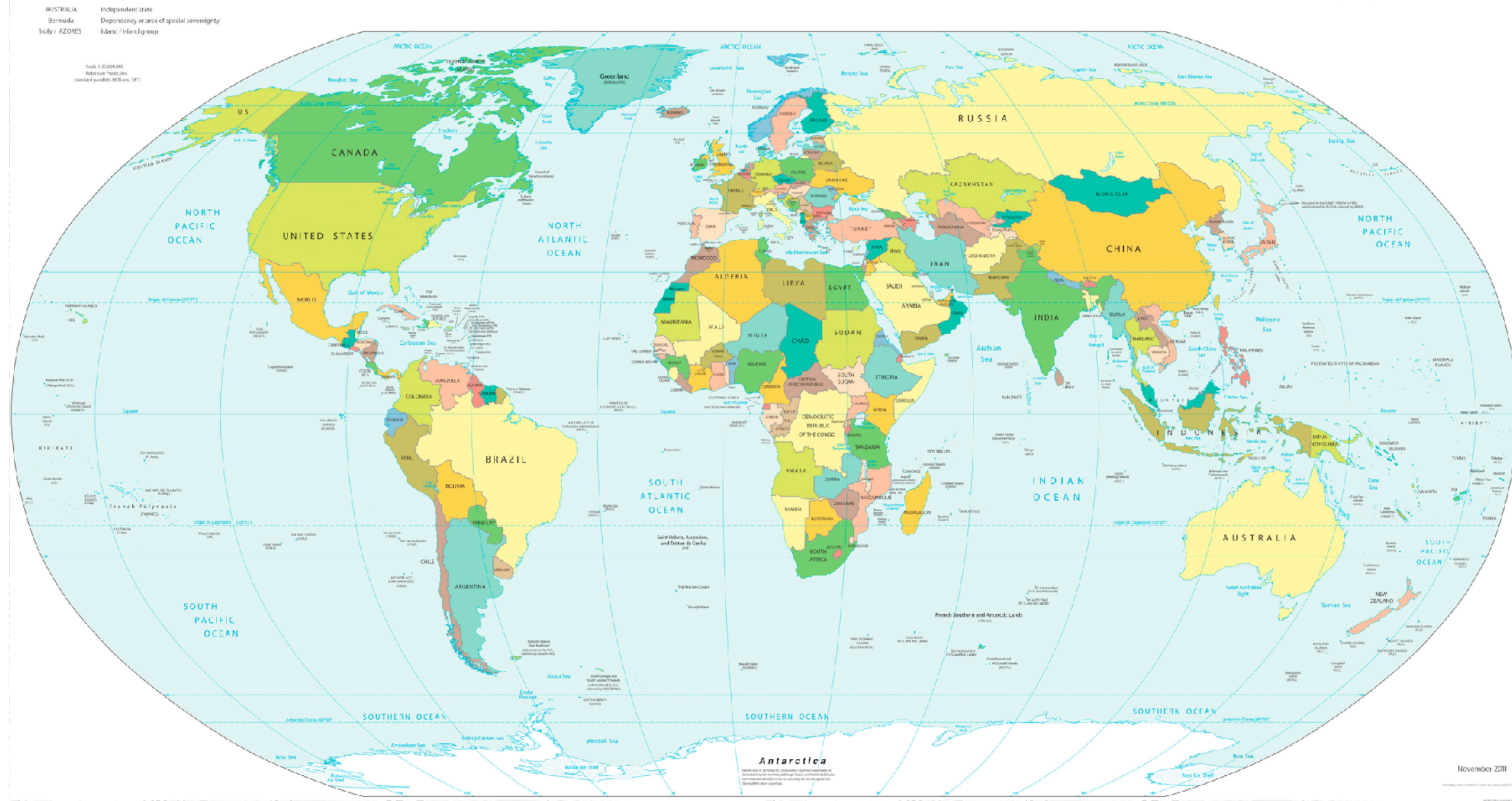
Chased by
Dinosaurs



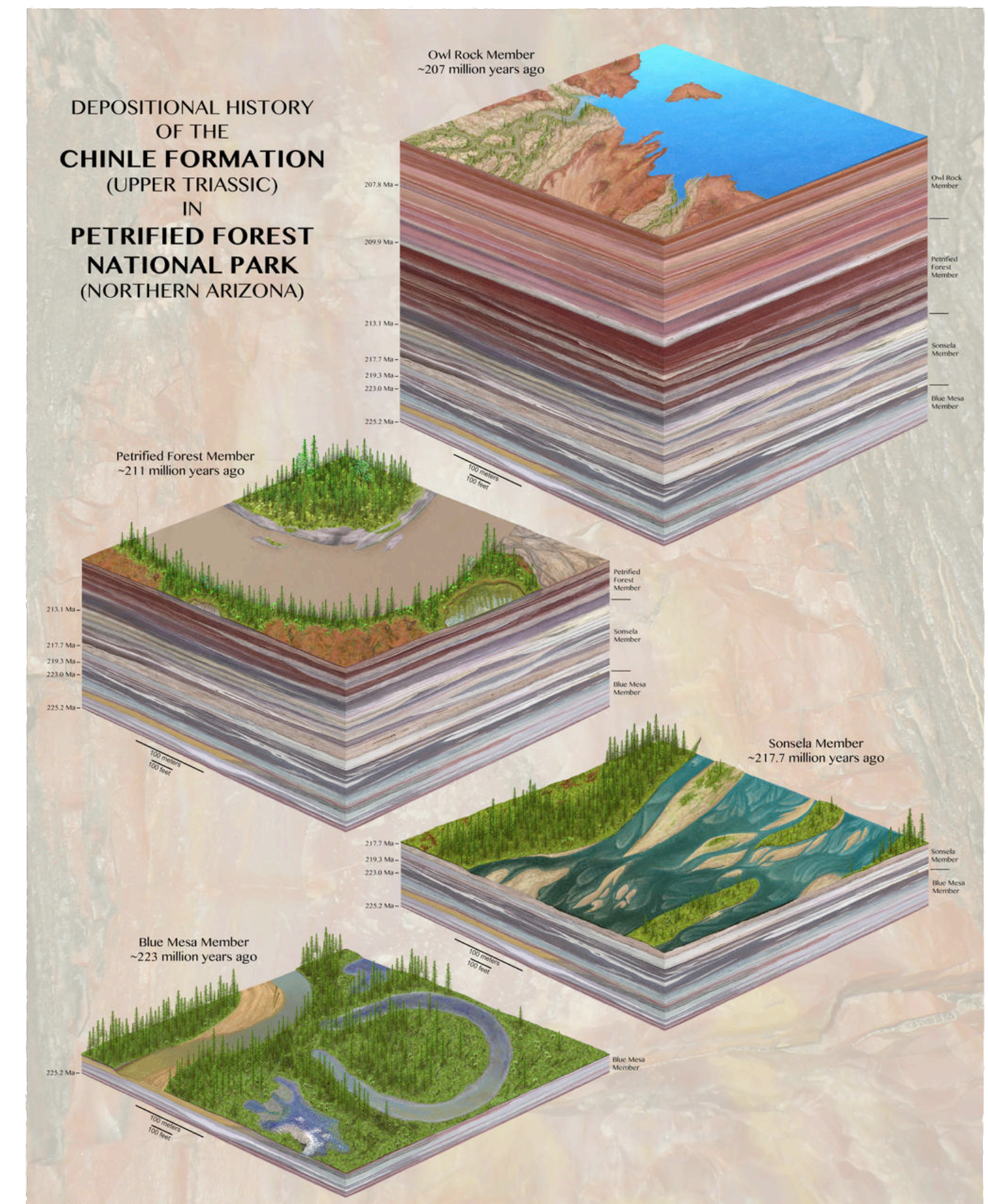
Rock Climbing

Geology 101

Political Map of the World, November 2011

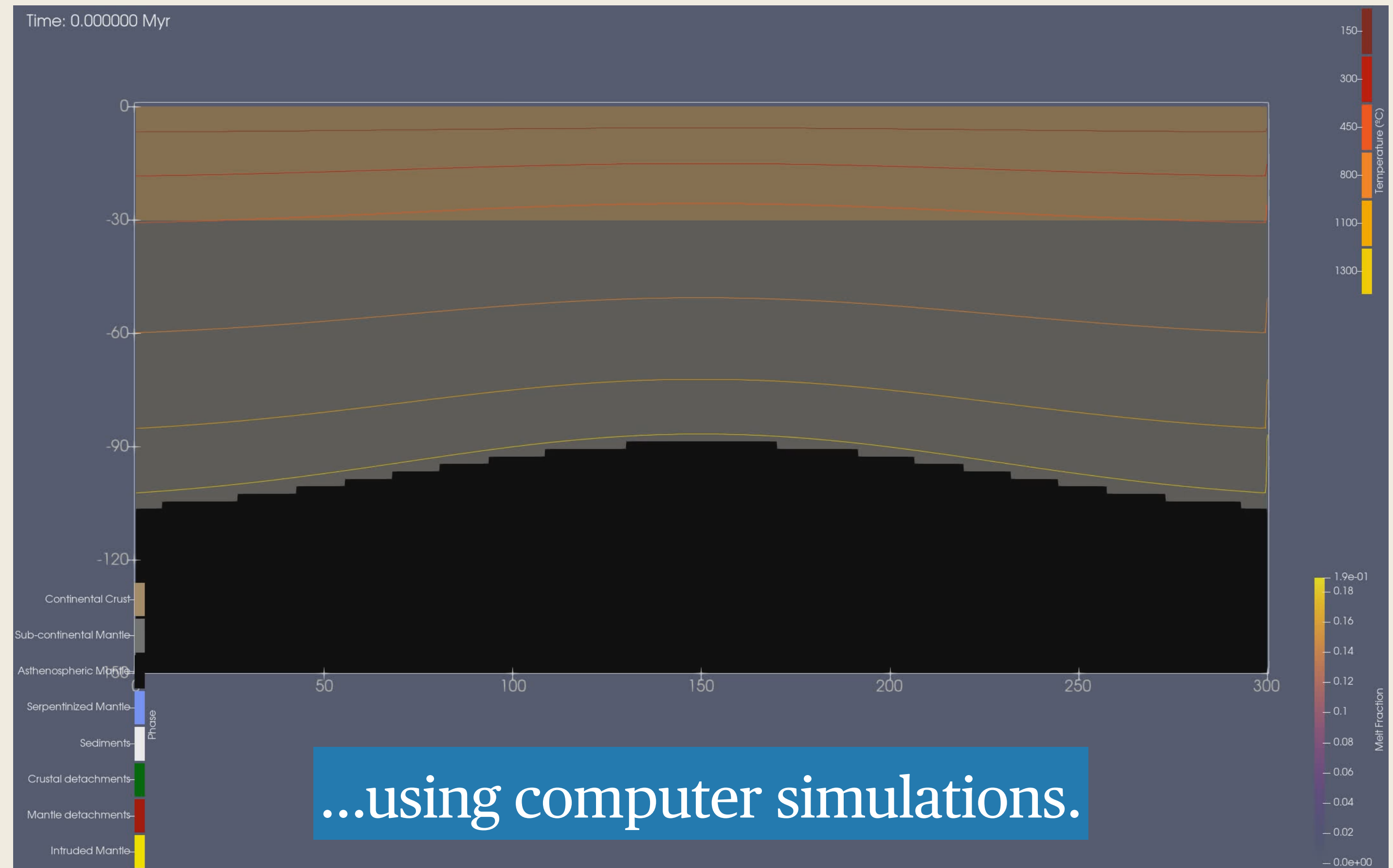
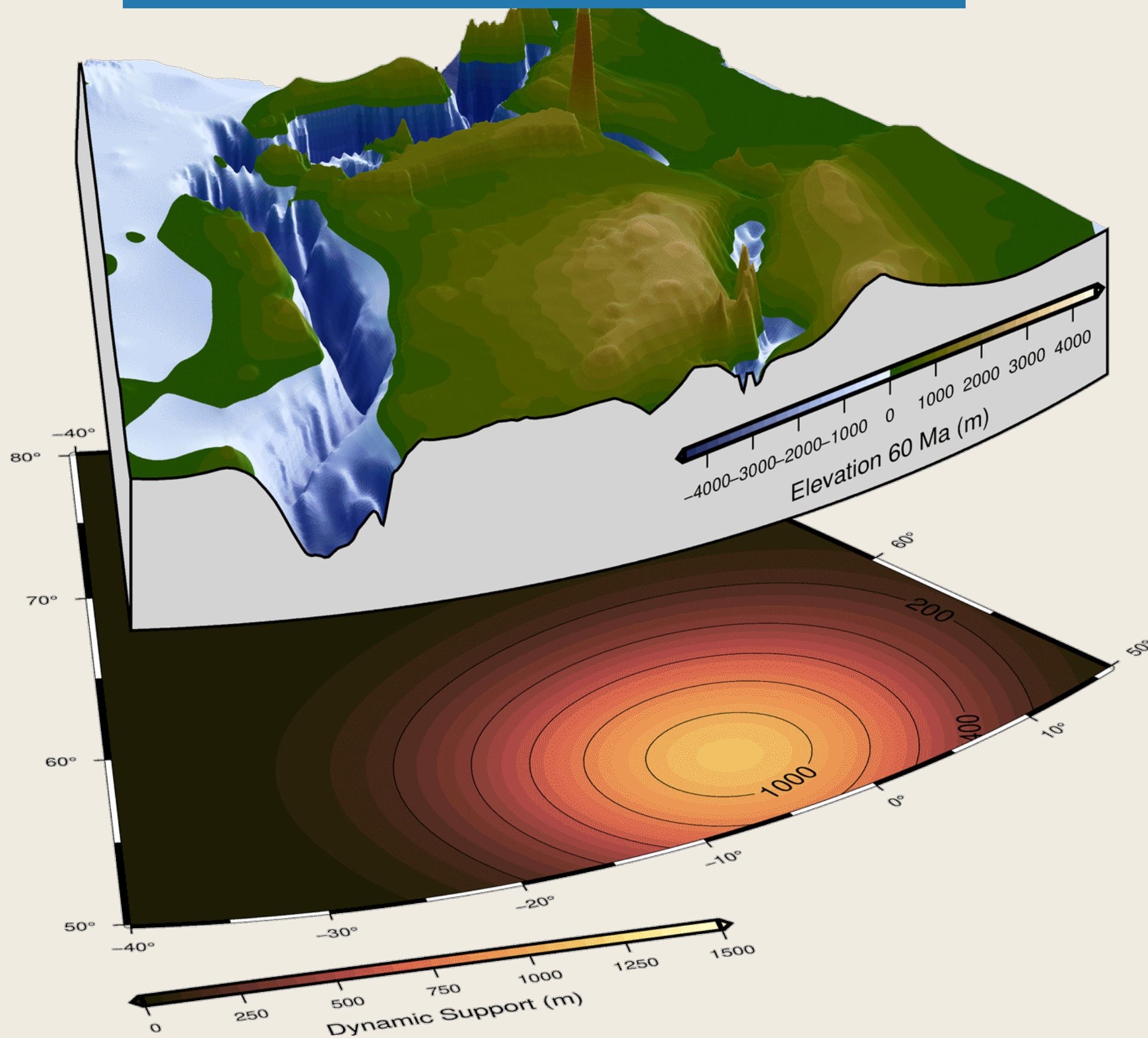


Geology 101



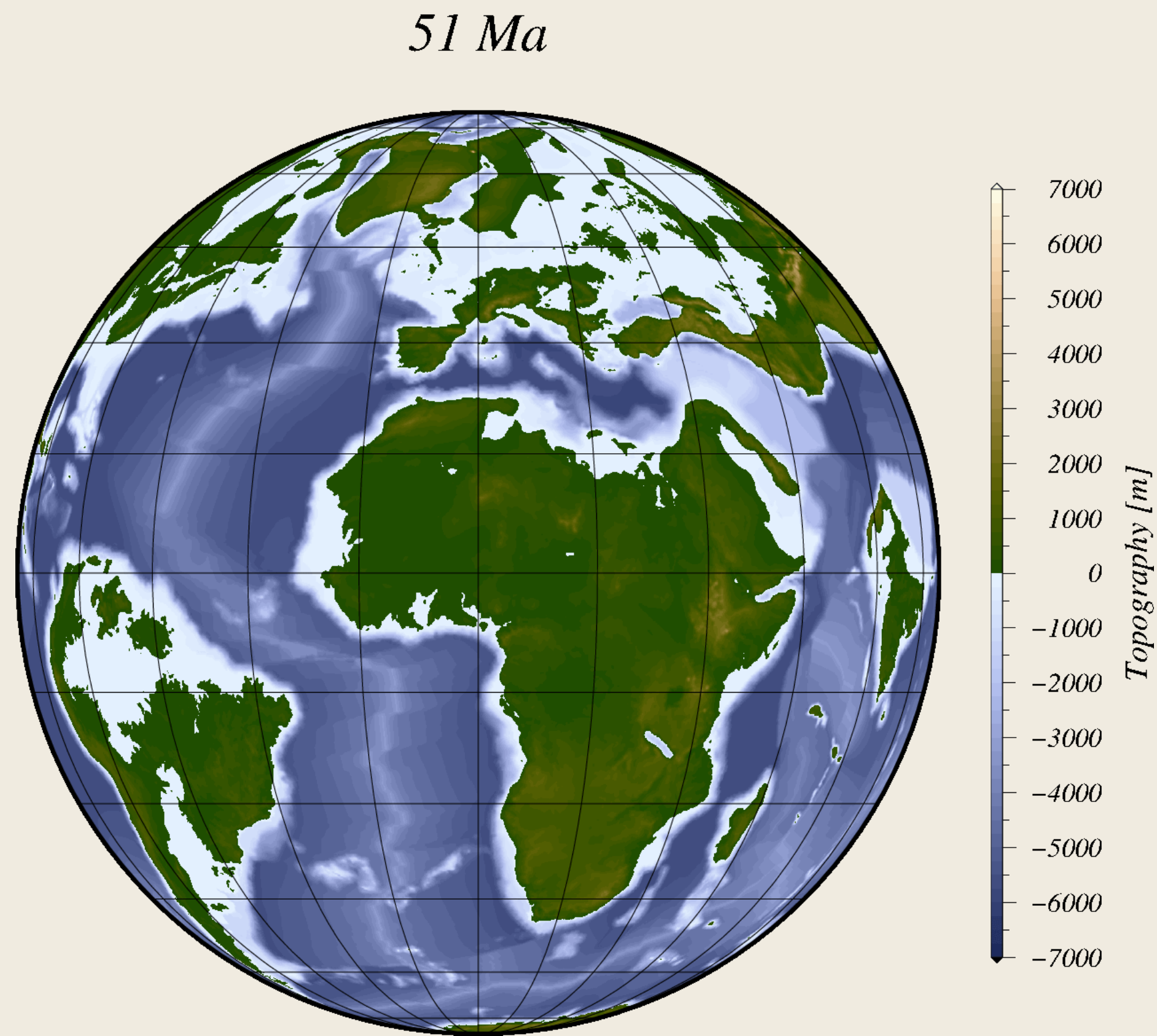
What I do:

I break continents in half...

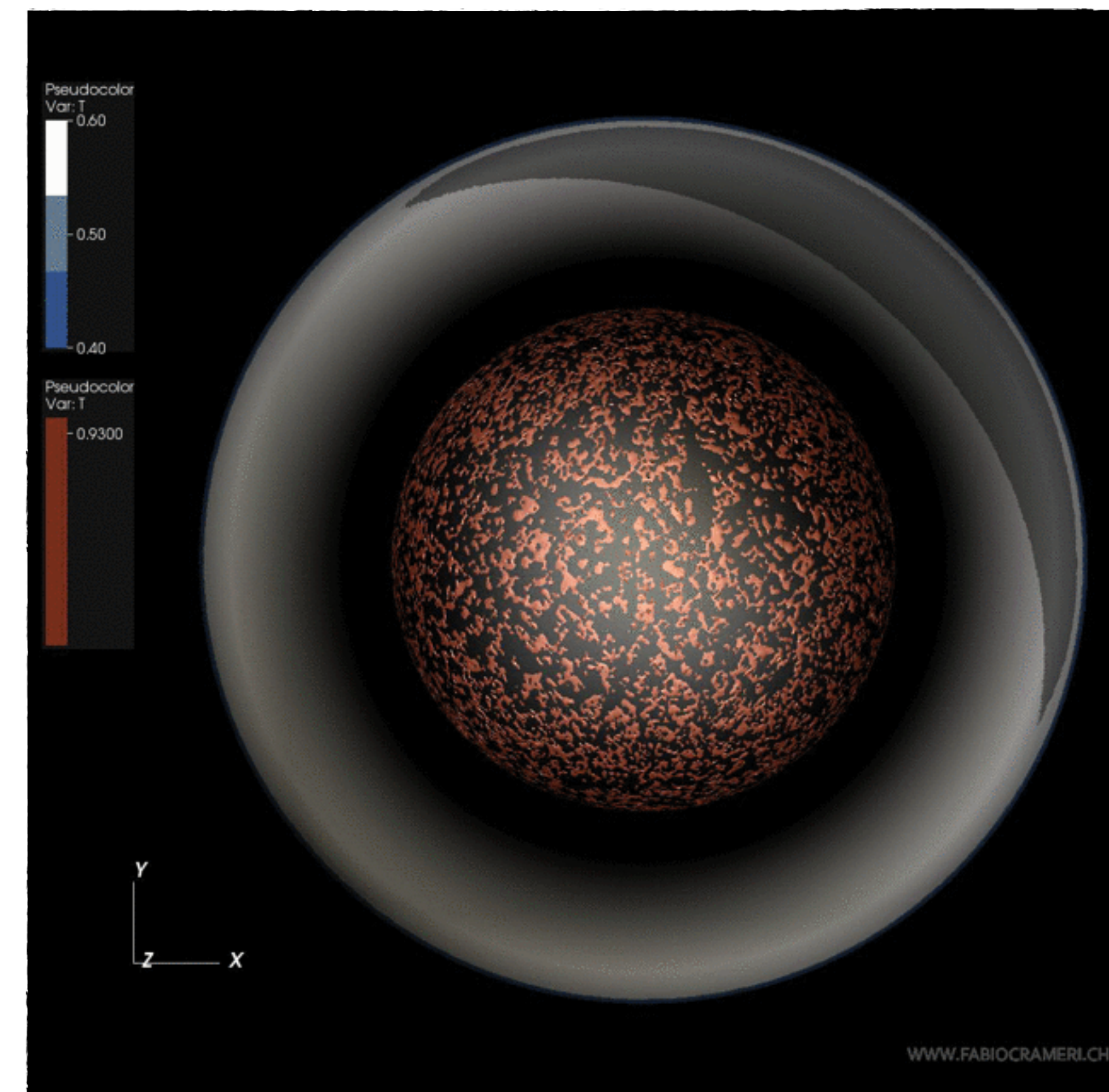


...using computer simulations.

From the Planet-Sized Picture...



This graphic by Eivind Straume based on Straume et al. (2020) is available via the open-access s-Ink repository.



This graphic by Fabio Cramerì adjusted from Cramerì & Tackley (2016) is available via the open-access s-Ink repository.

... to the public park.



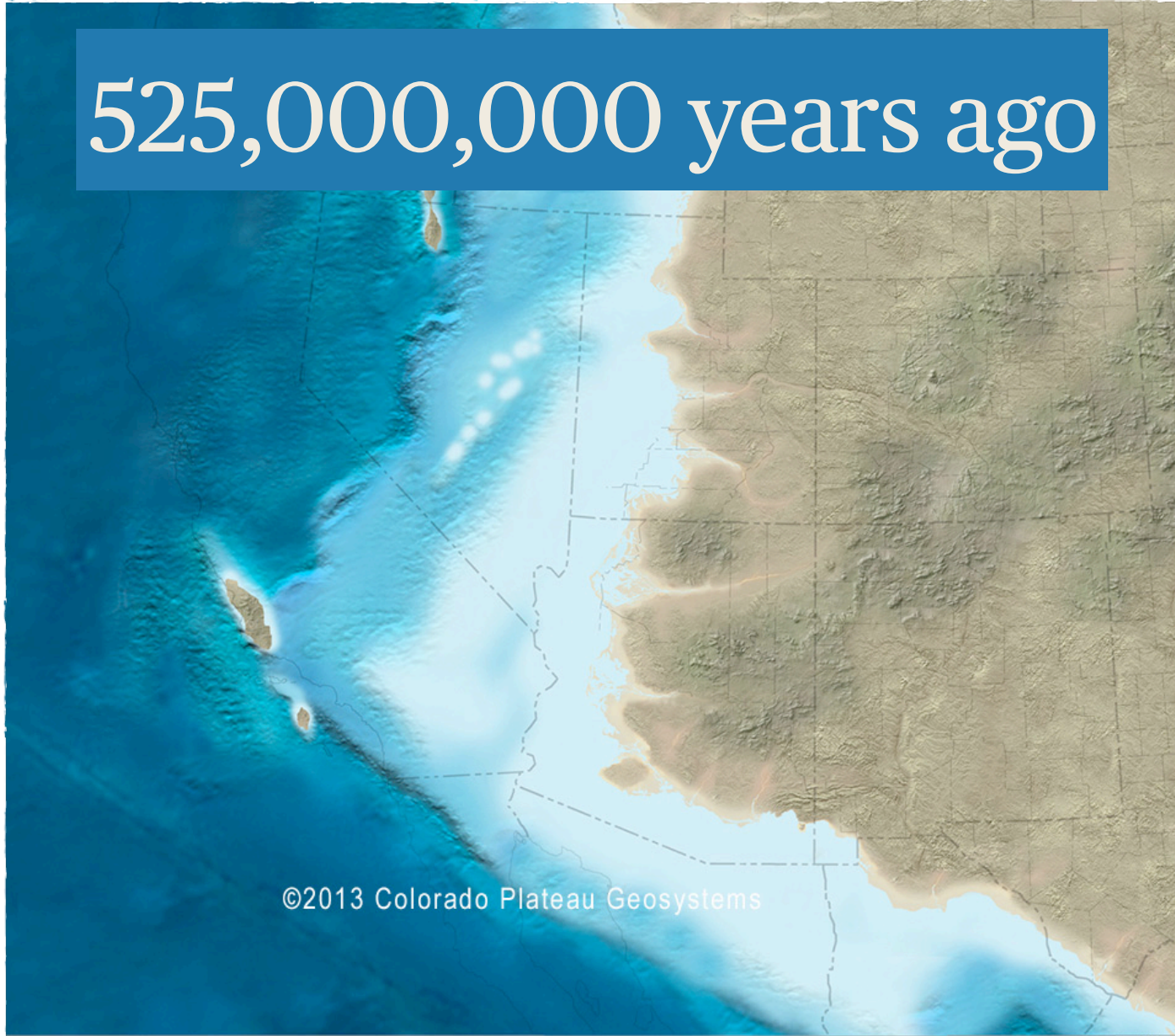
Arizona is a Geological Paradise



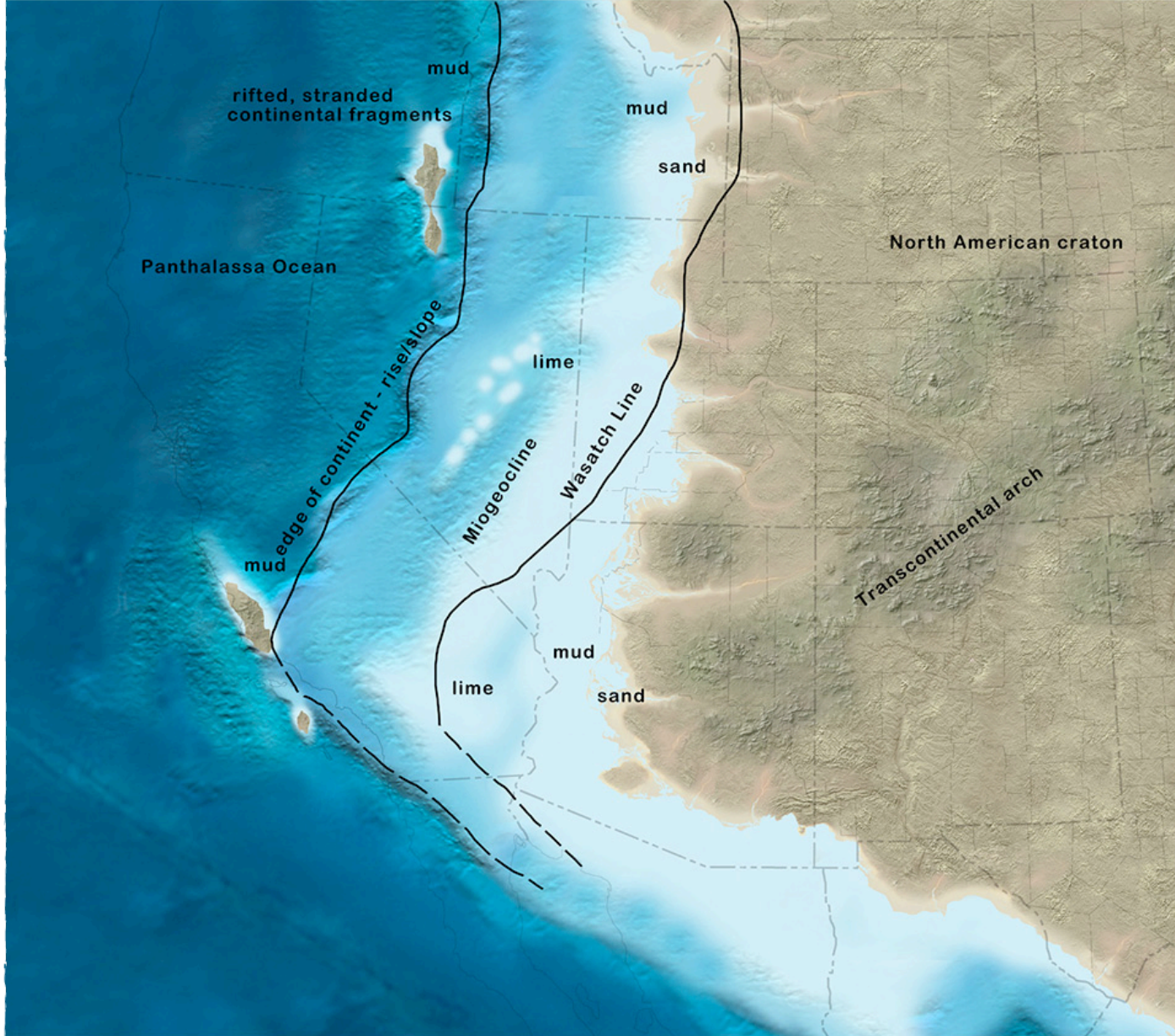
525,000,000 years ago

85,000,000 years ago

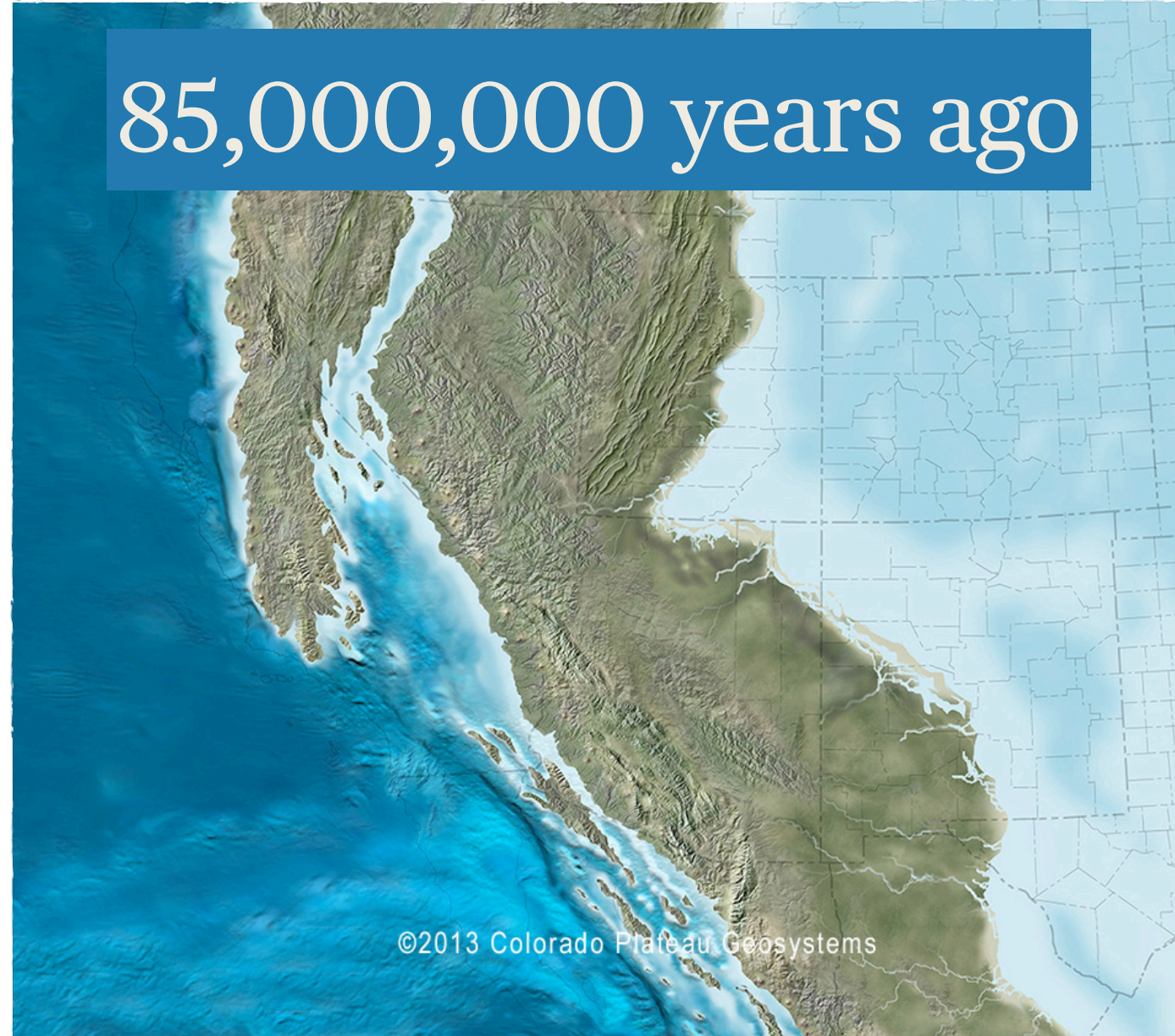
25,000 years ago



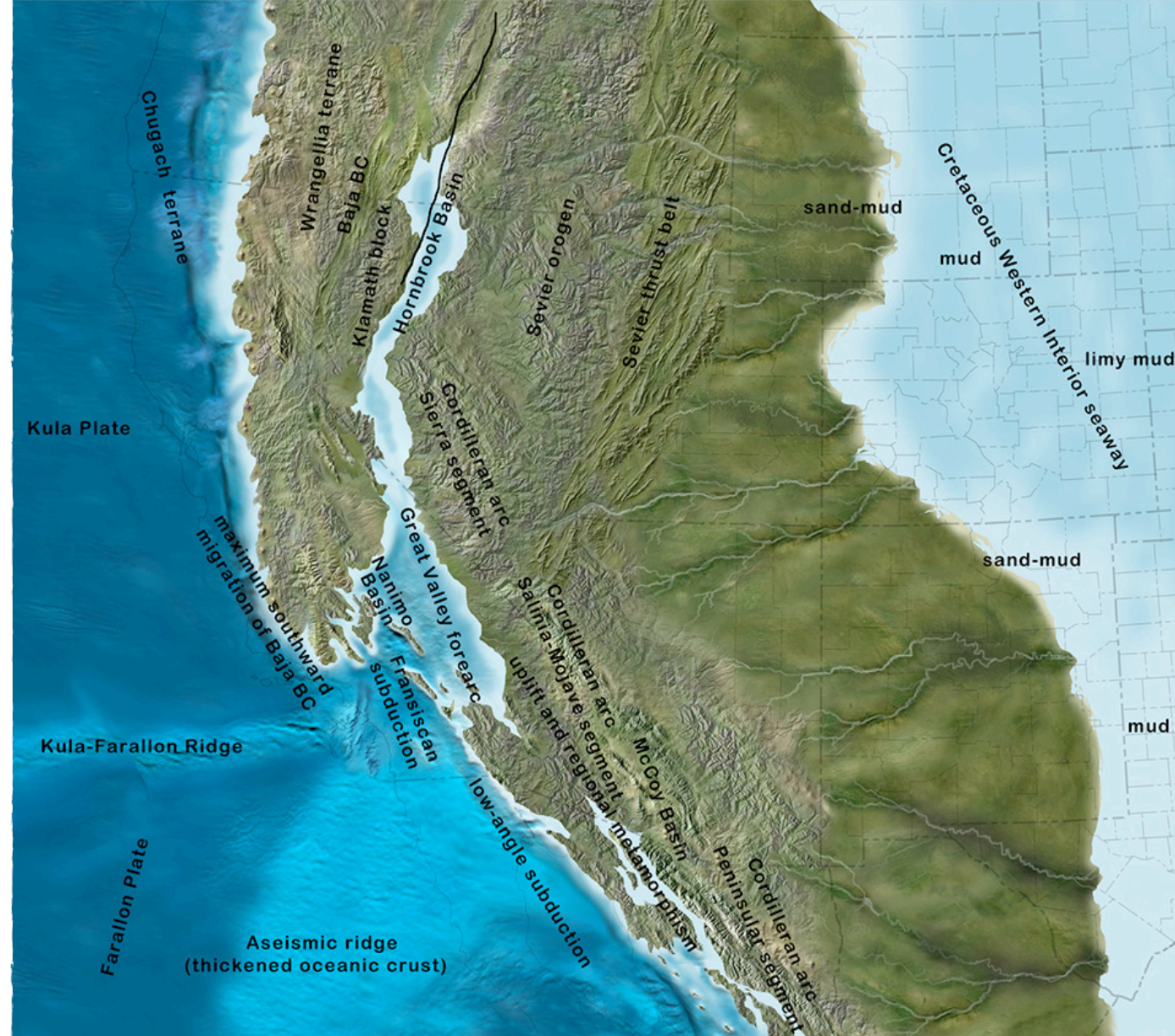
Early Cambrian 525 Ma (521-542)



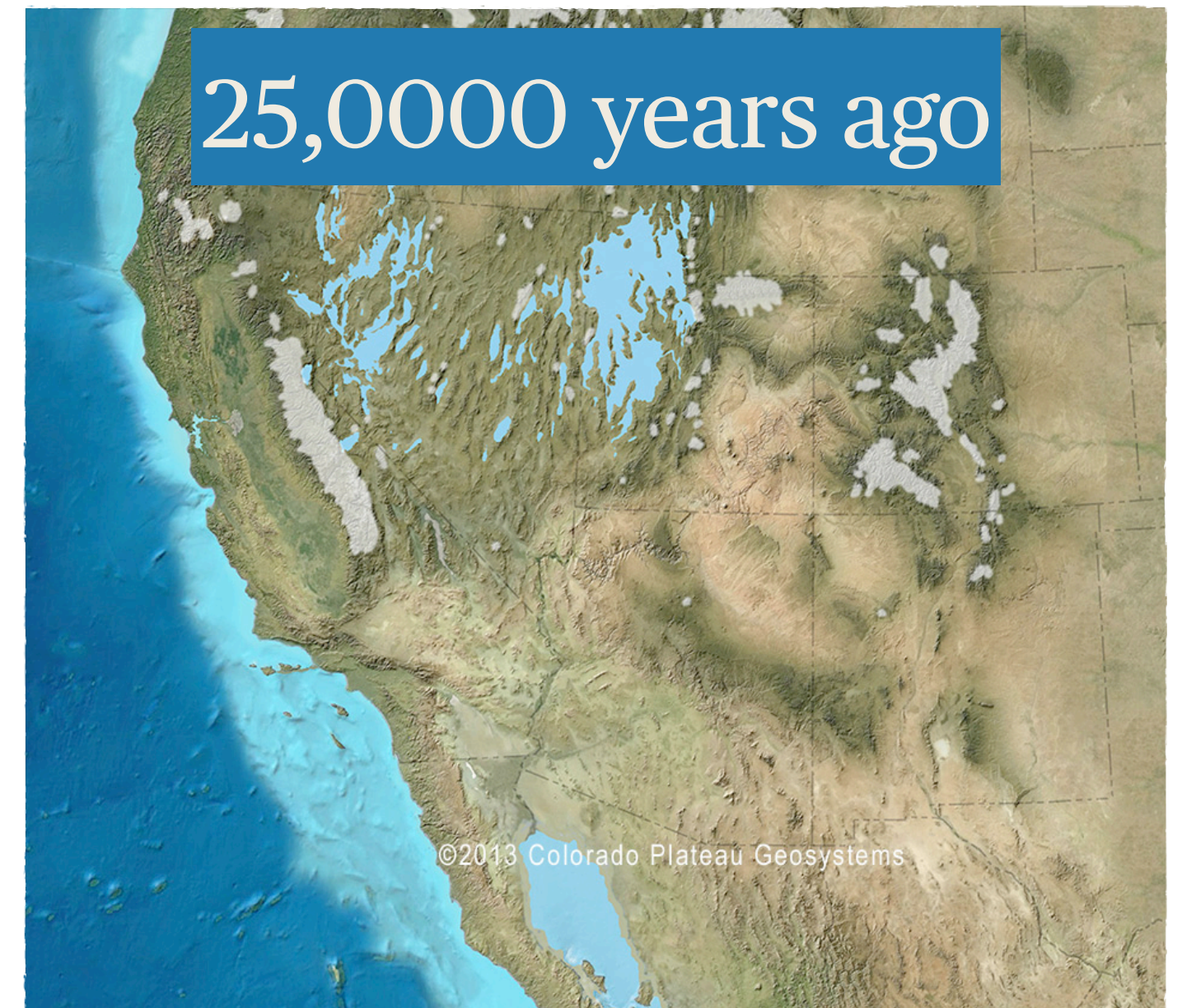
Early Cambrian 525 Ma (521-542)



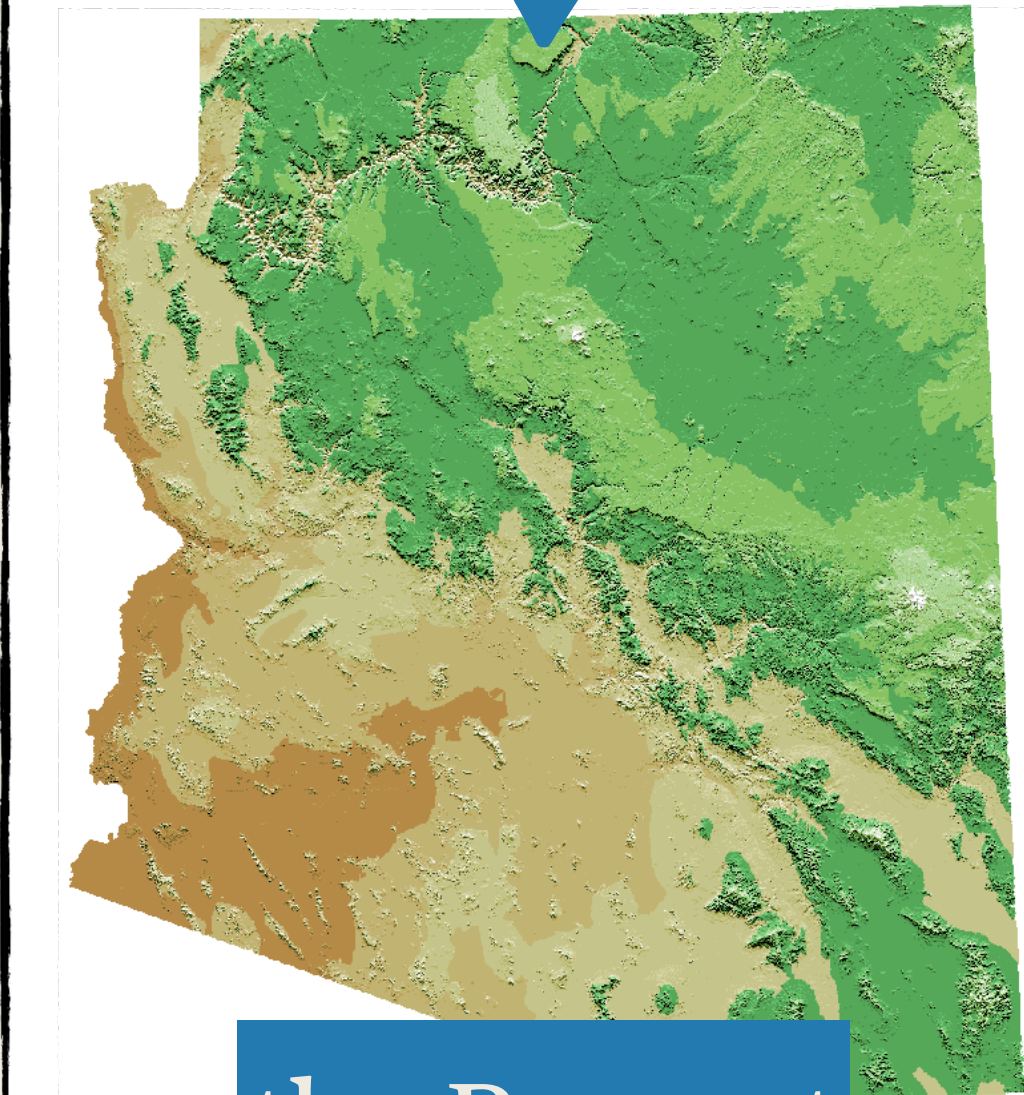
Late Cretaceous -- Middle-Late Santonian 85 Ma (84-86)



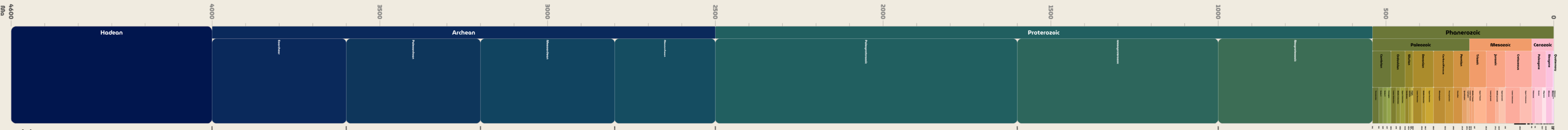
Late Cretaceous -- Early Campanian 80 Ma (79-81)



Pleistocene 25 Ka (150 Ka - 25 Ka)



the Present



s-luk.org

Earth forms from the solar nebula

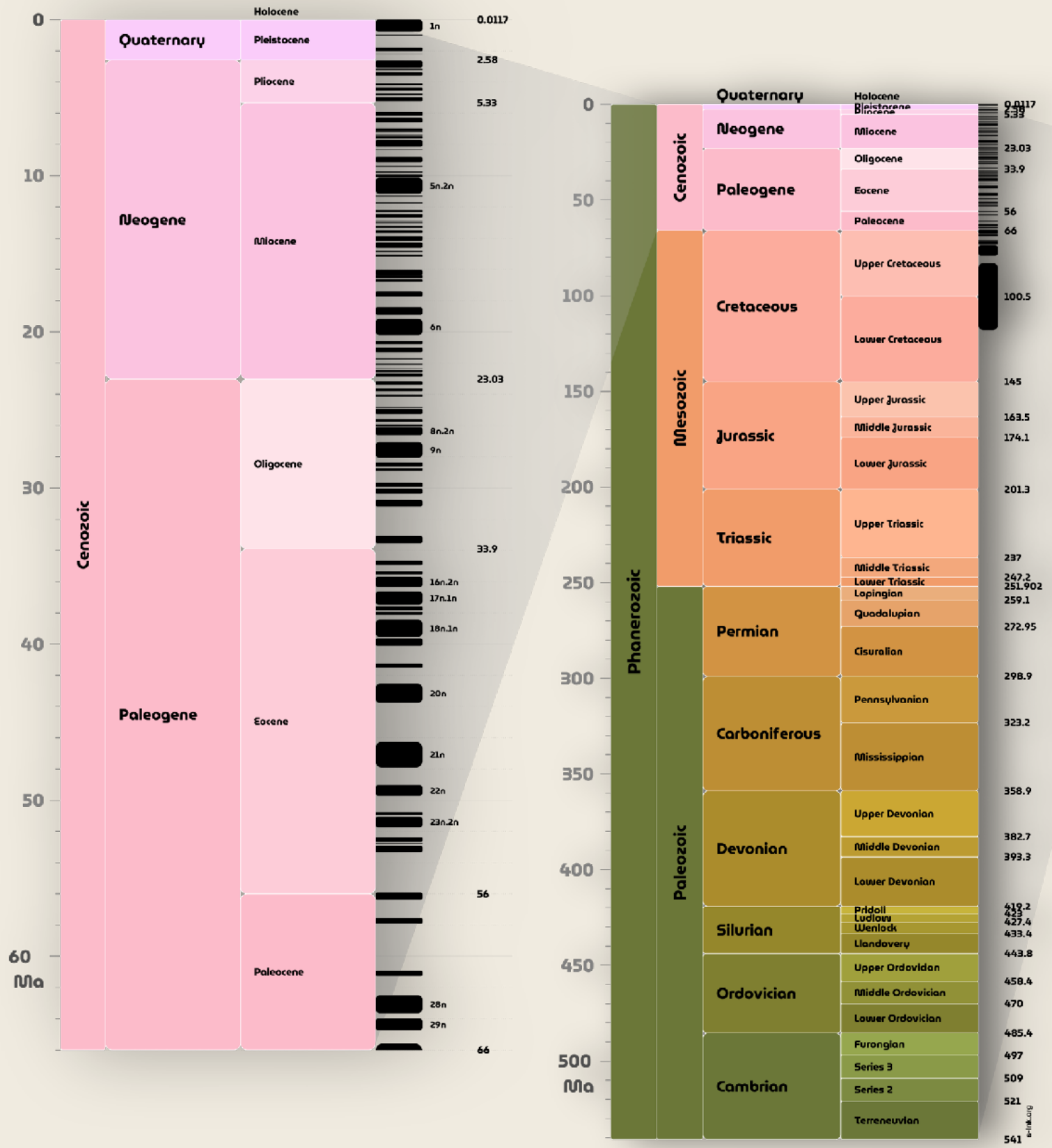
First life???

Oxygen in the atmosphere

Breathable atmosphere
First big plants, animals, and fungi

Life colonizes the land
Biggest mass extinction so far

Most recent mass extinction
First humans



Geologic Time Scale

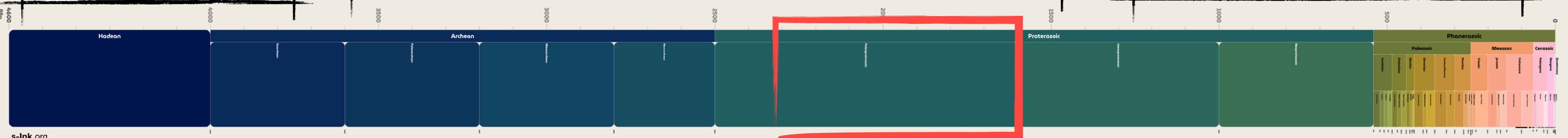
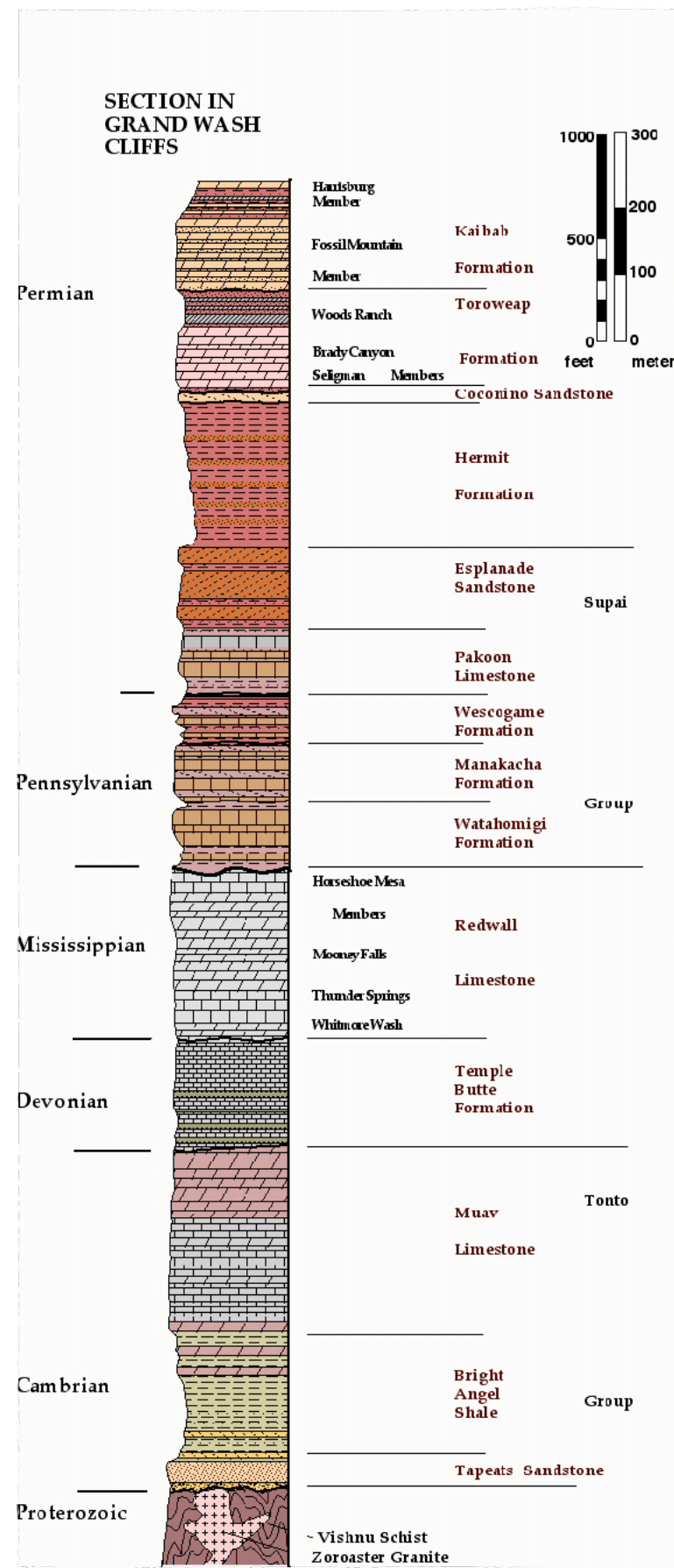
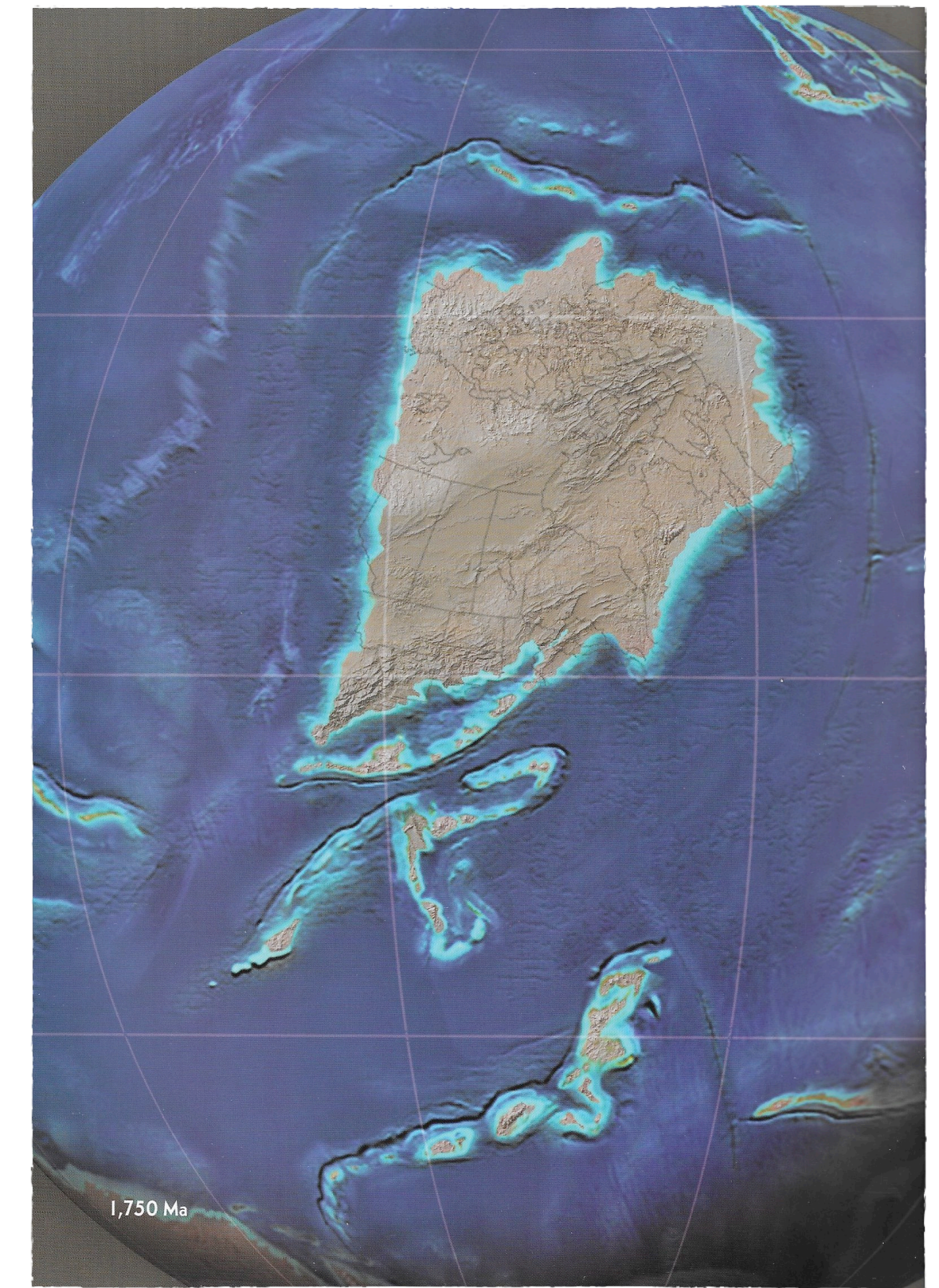
s-luk.org

This graphic by Fabio Crameri is available via the open-access s-luk repository.

Earth is Old

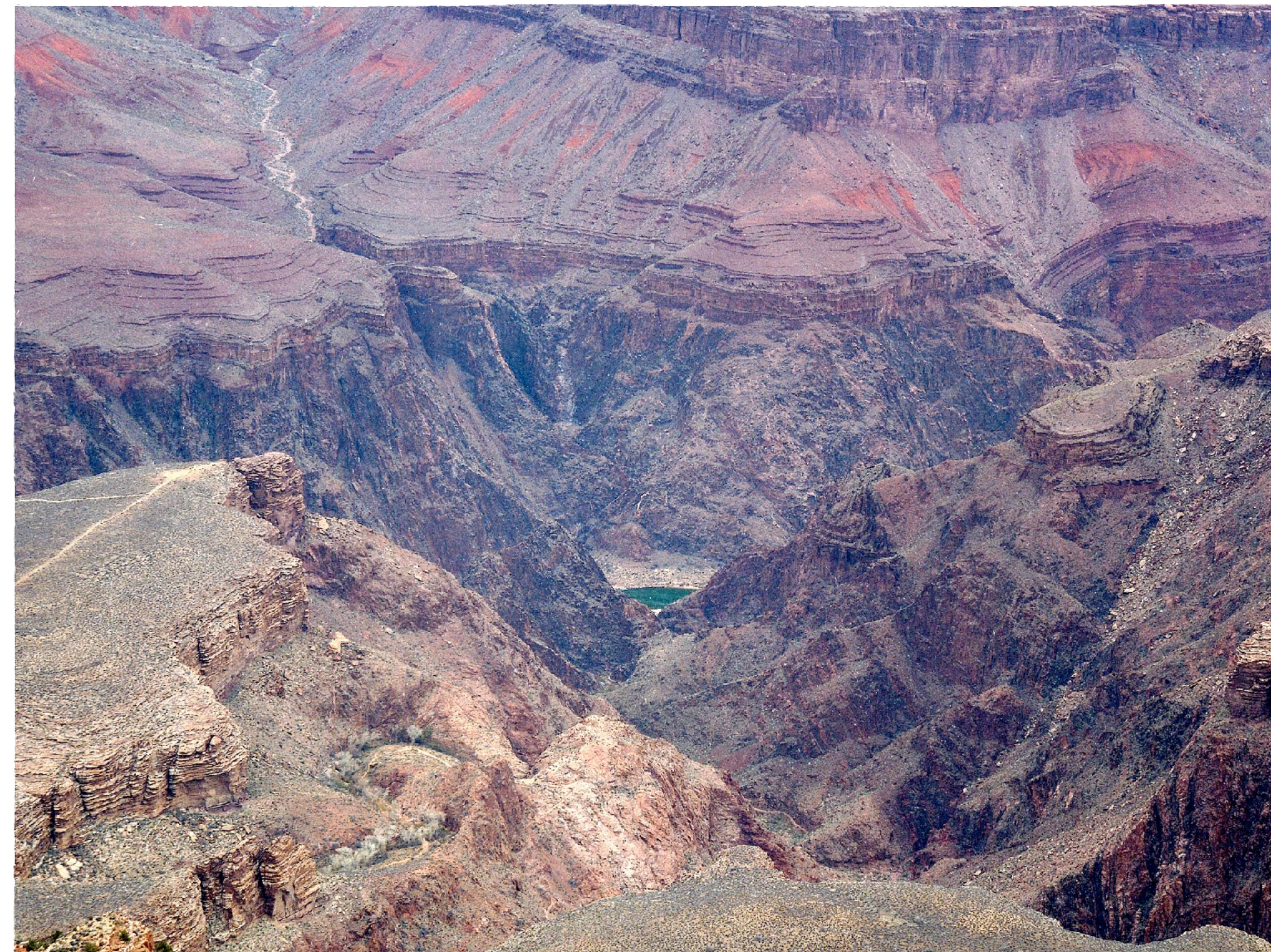
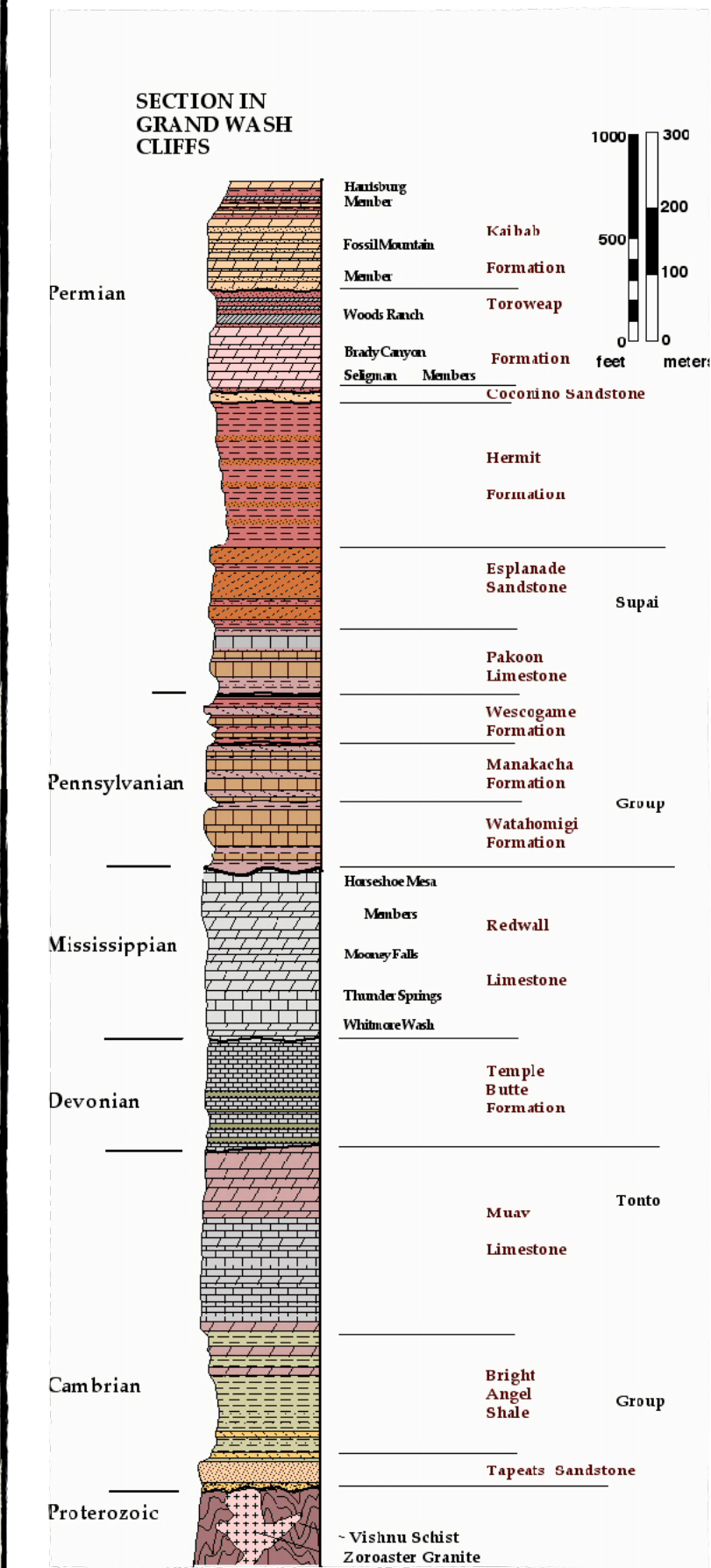
Really, really, really old.

Changing Environments



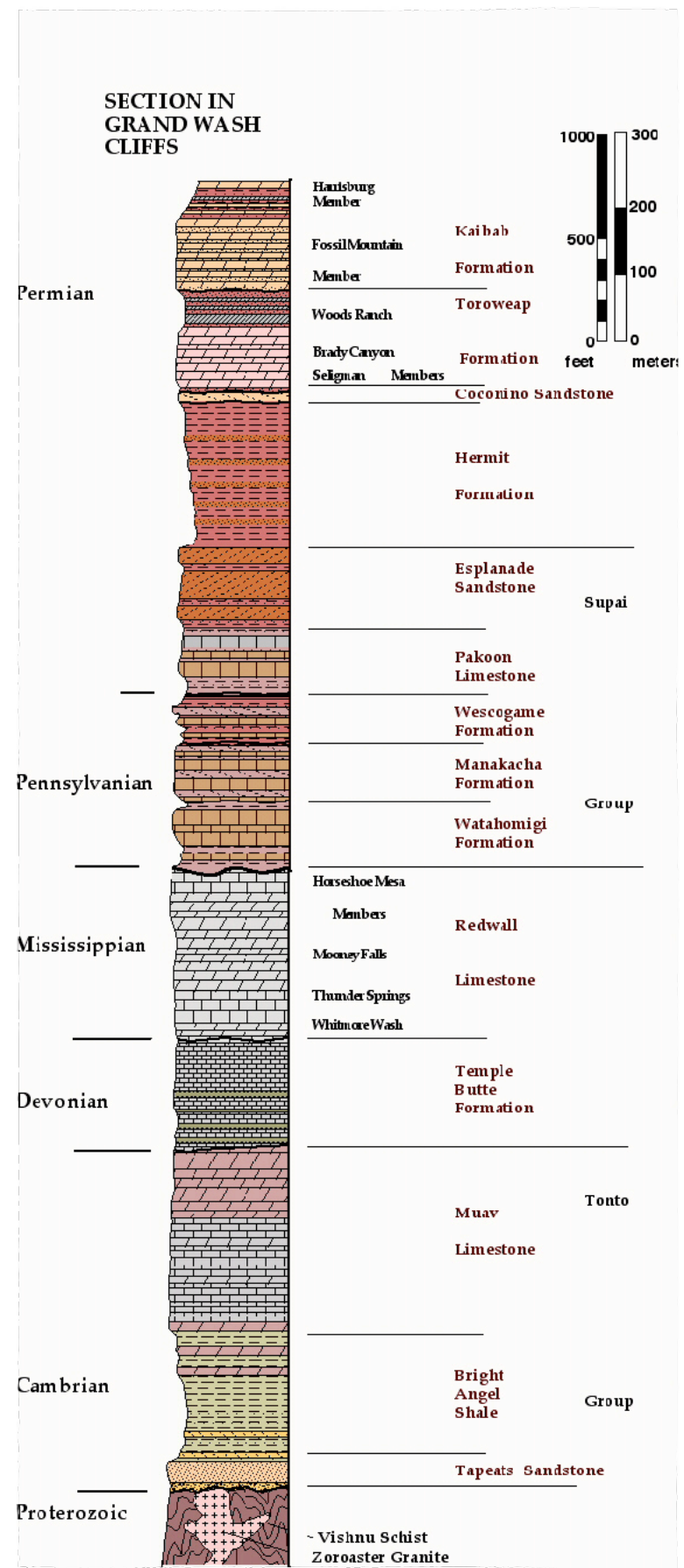
s-Ink.org

Changing Environments

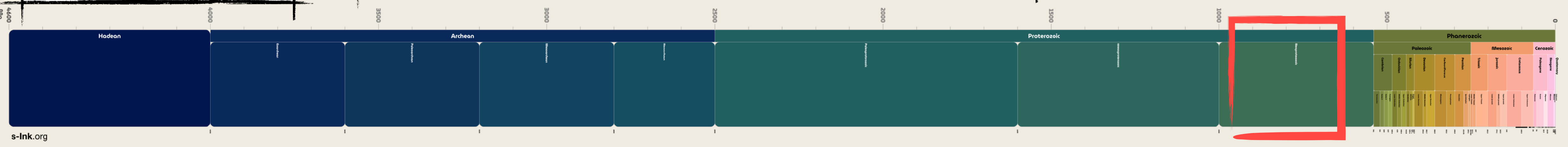


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Changing Environments

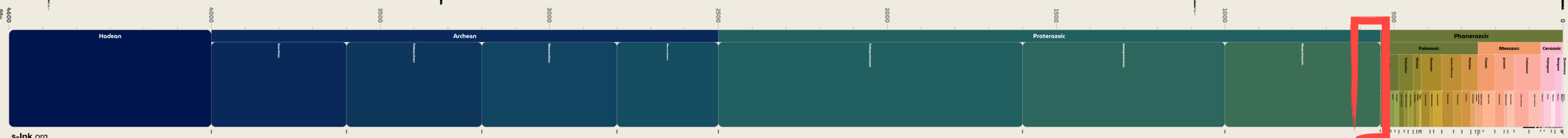
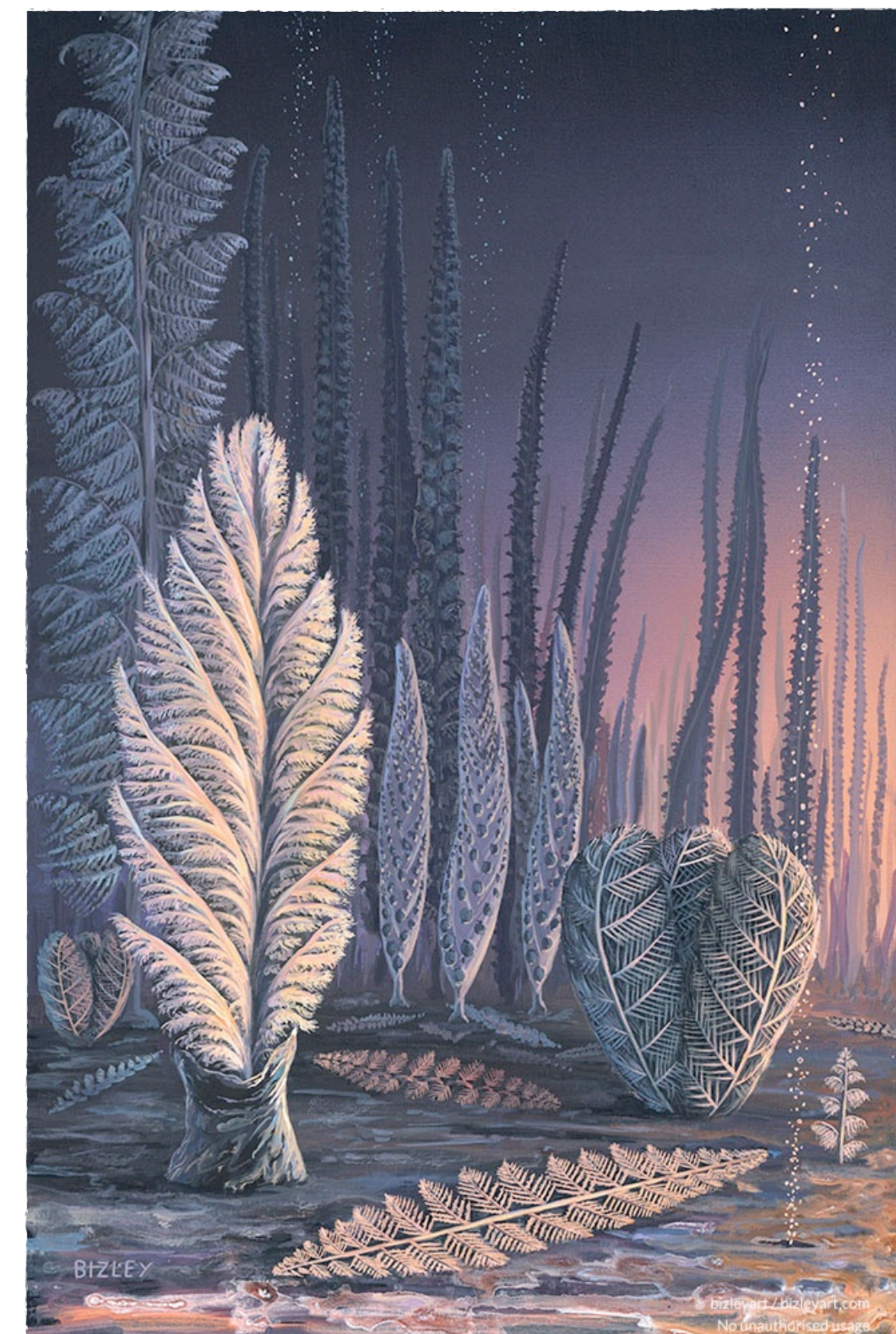
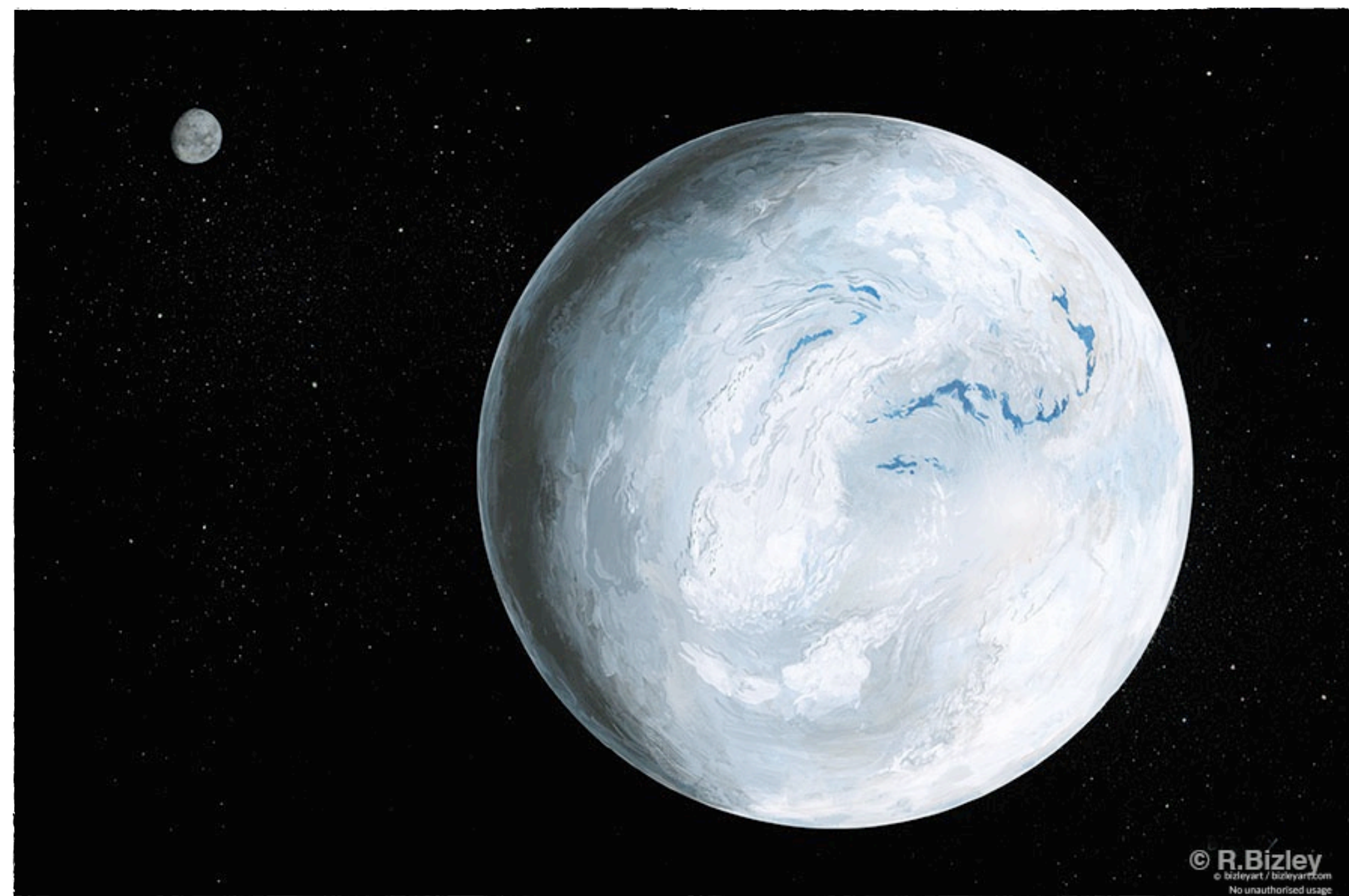


740 Ma



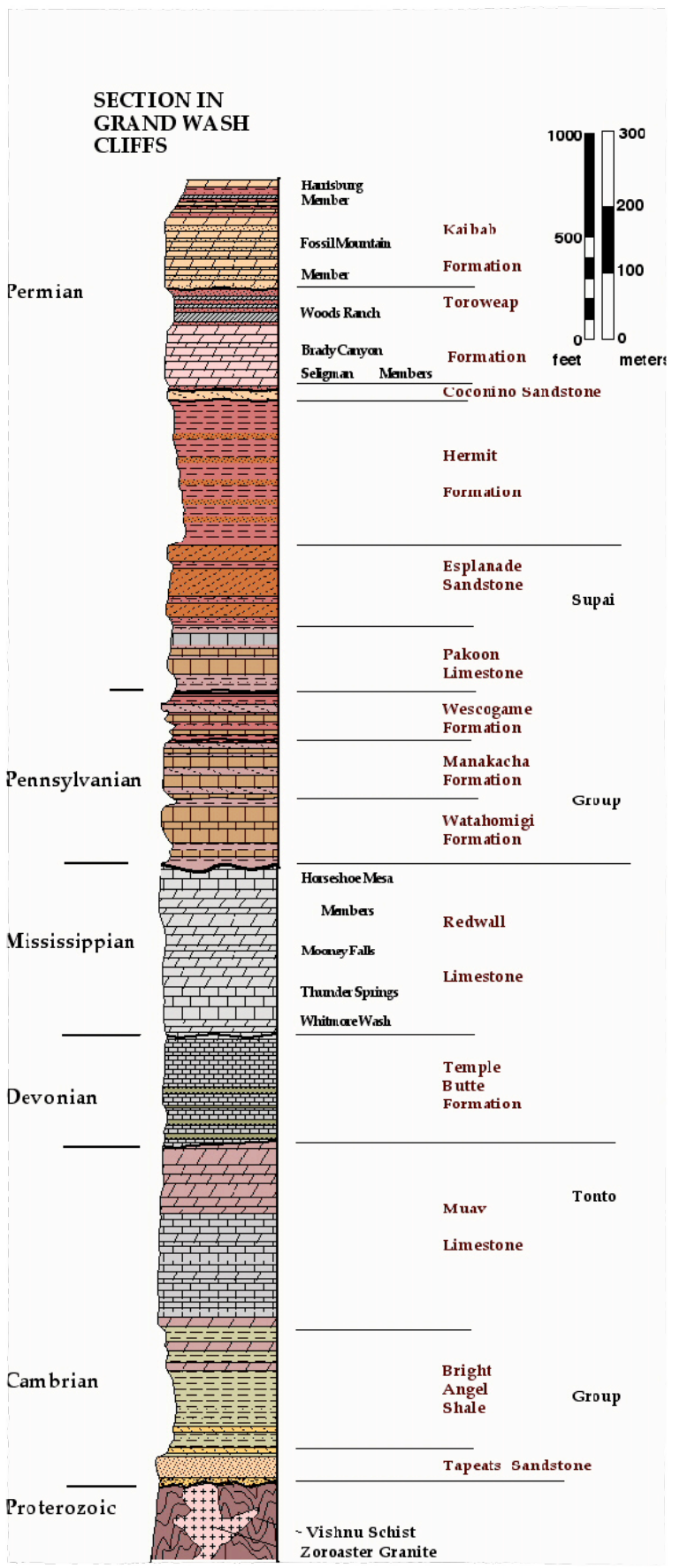
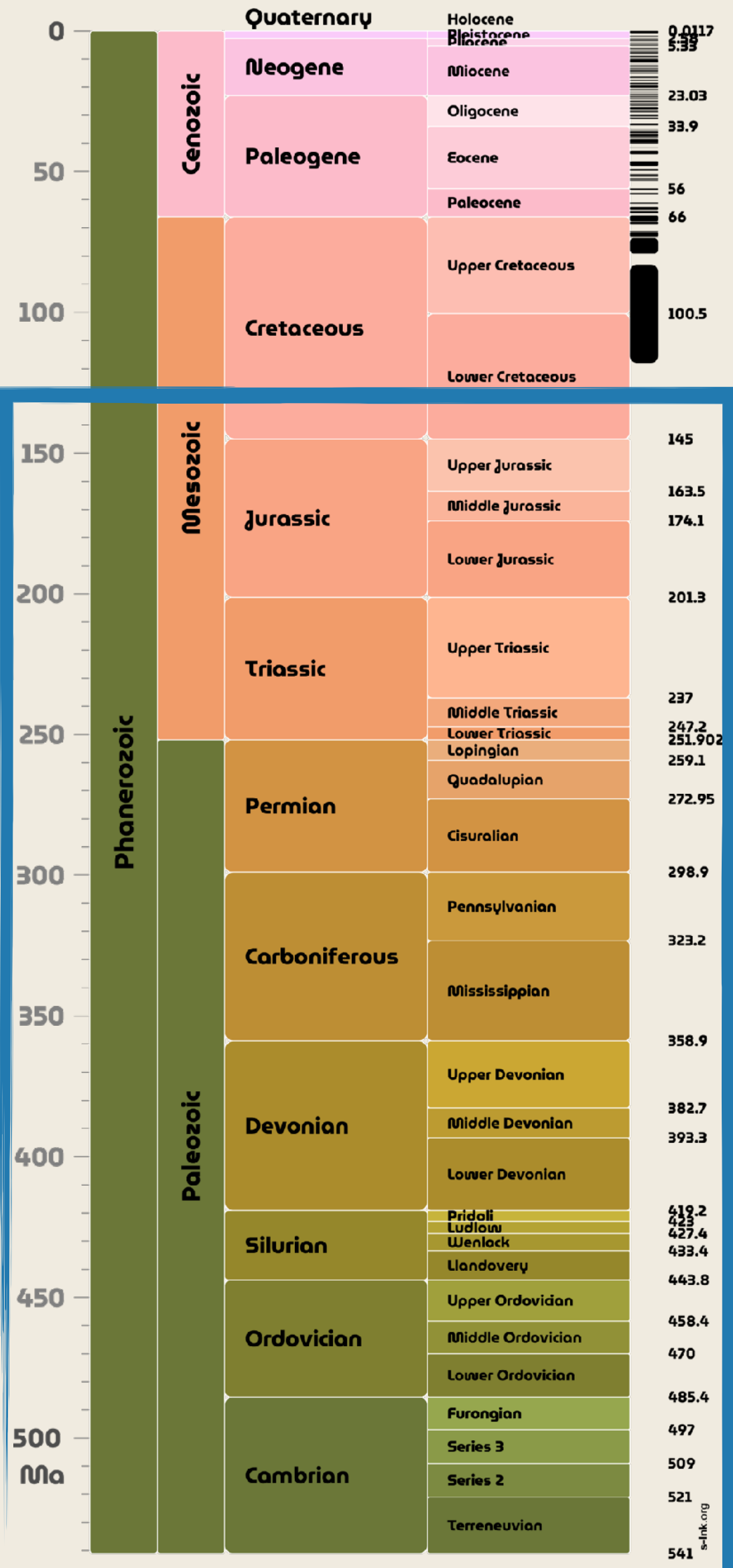
s-ink.org

Changing Environments

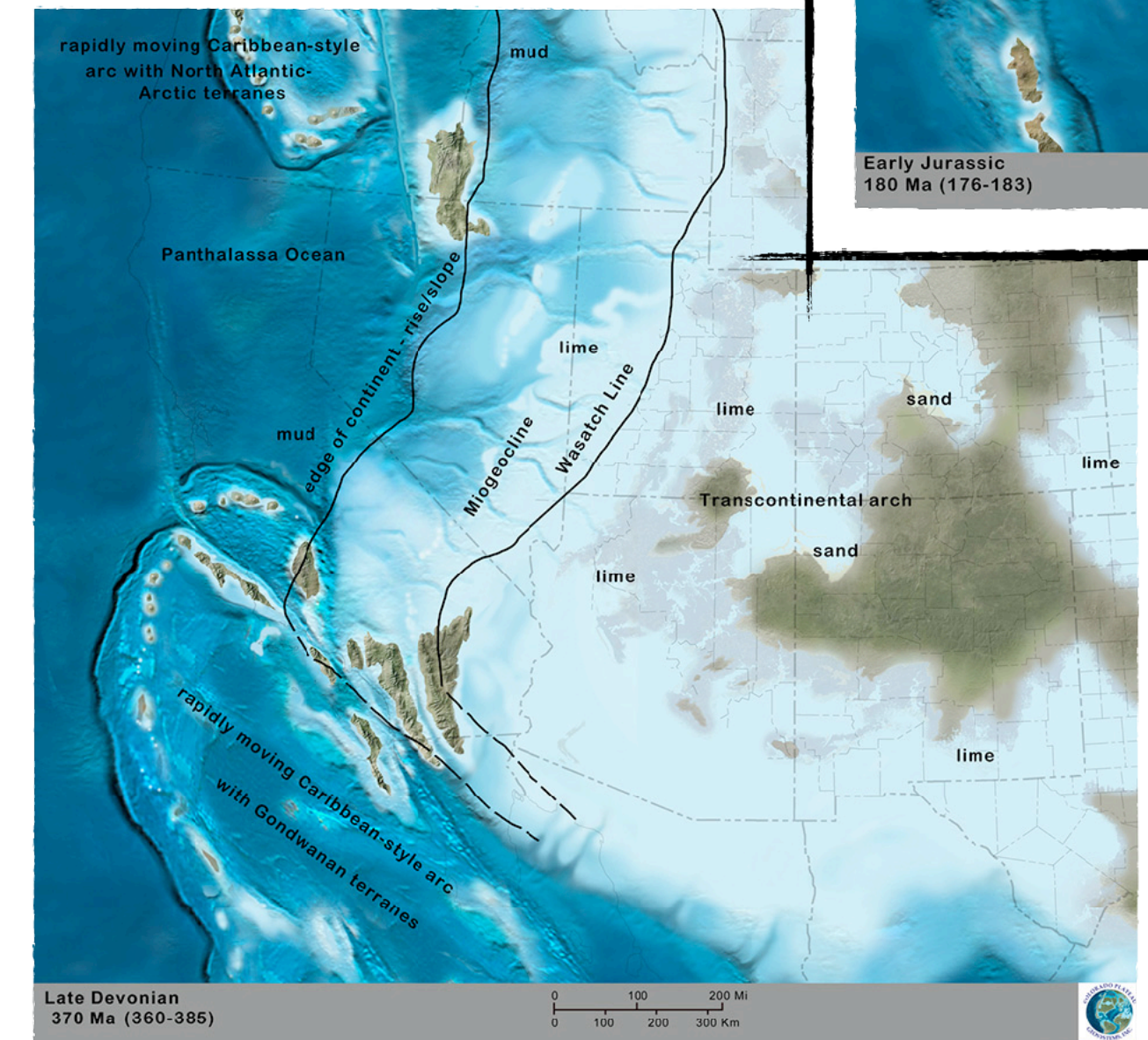
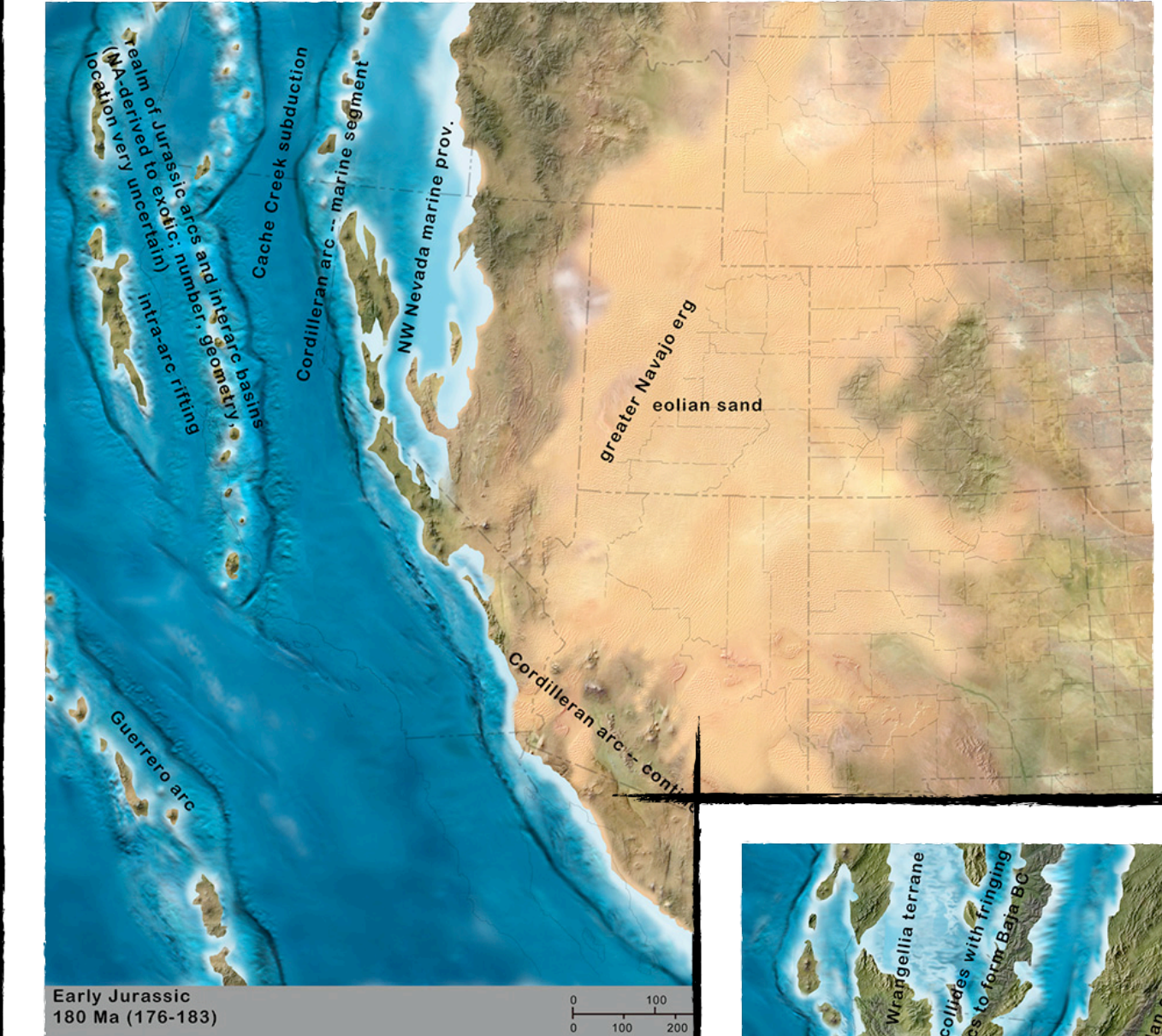
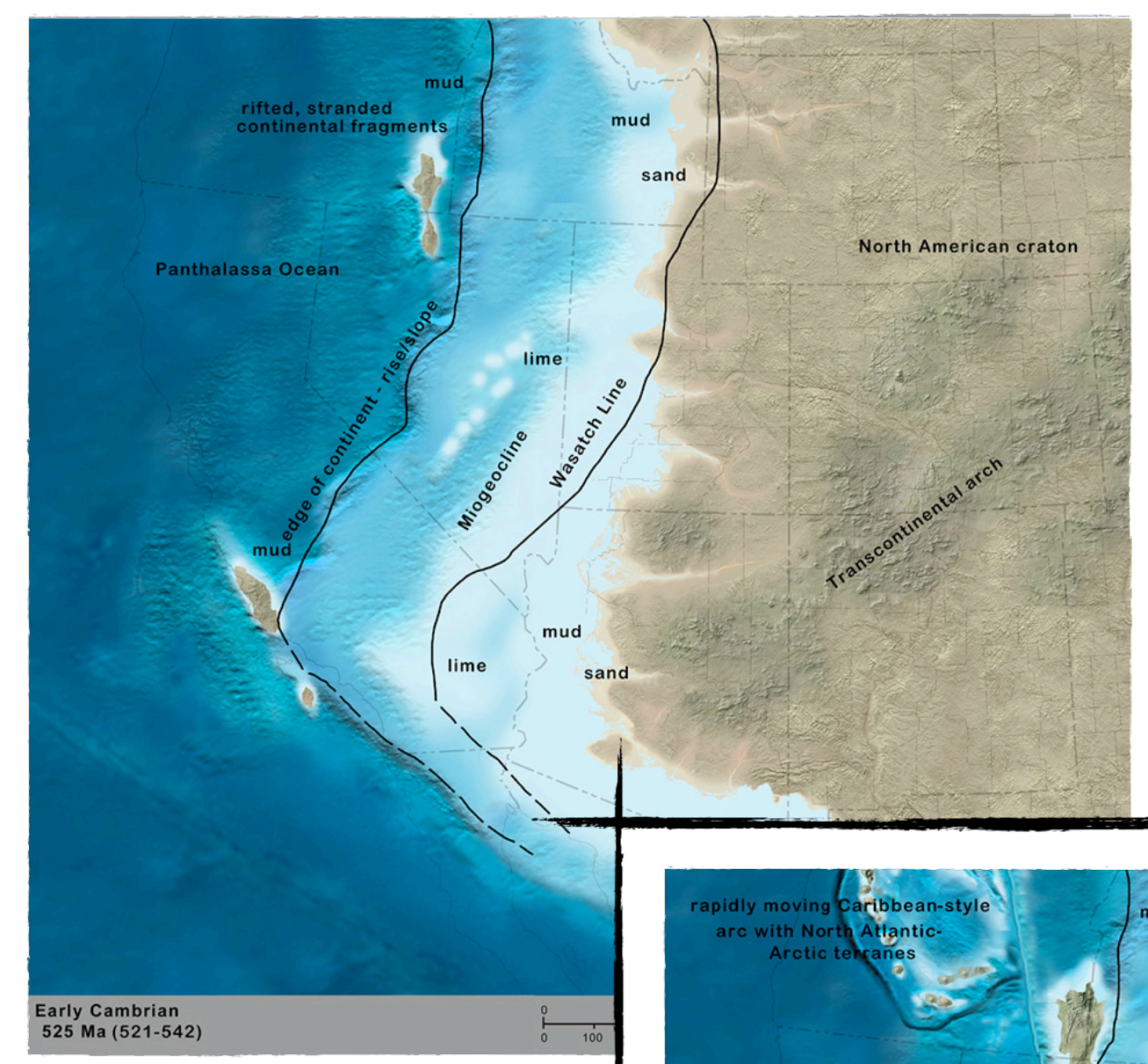
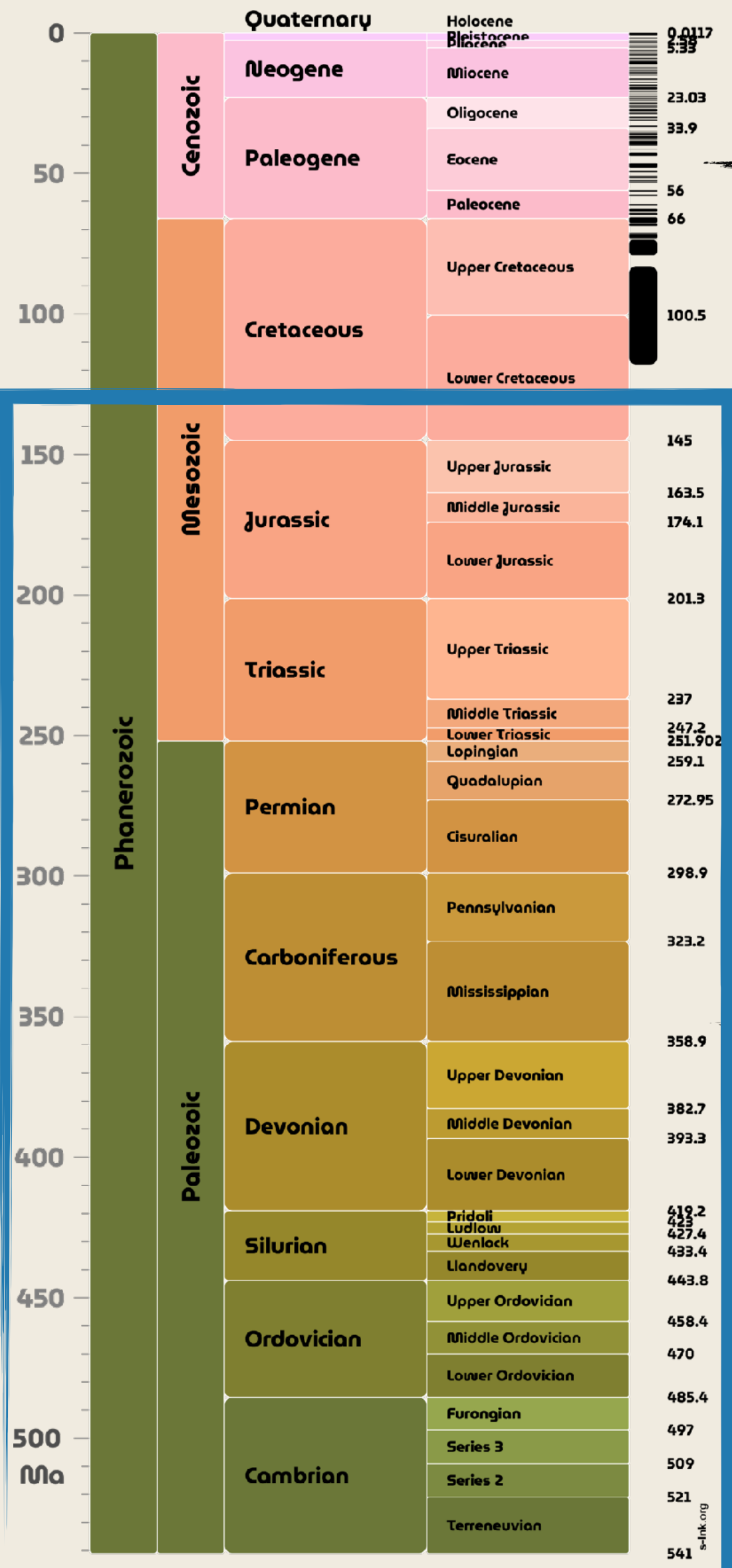


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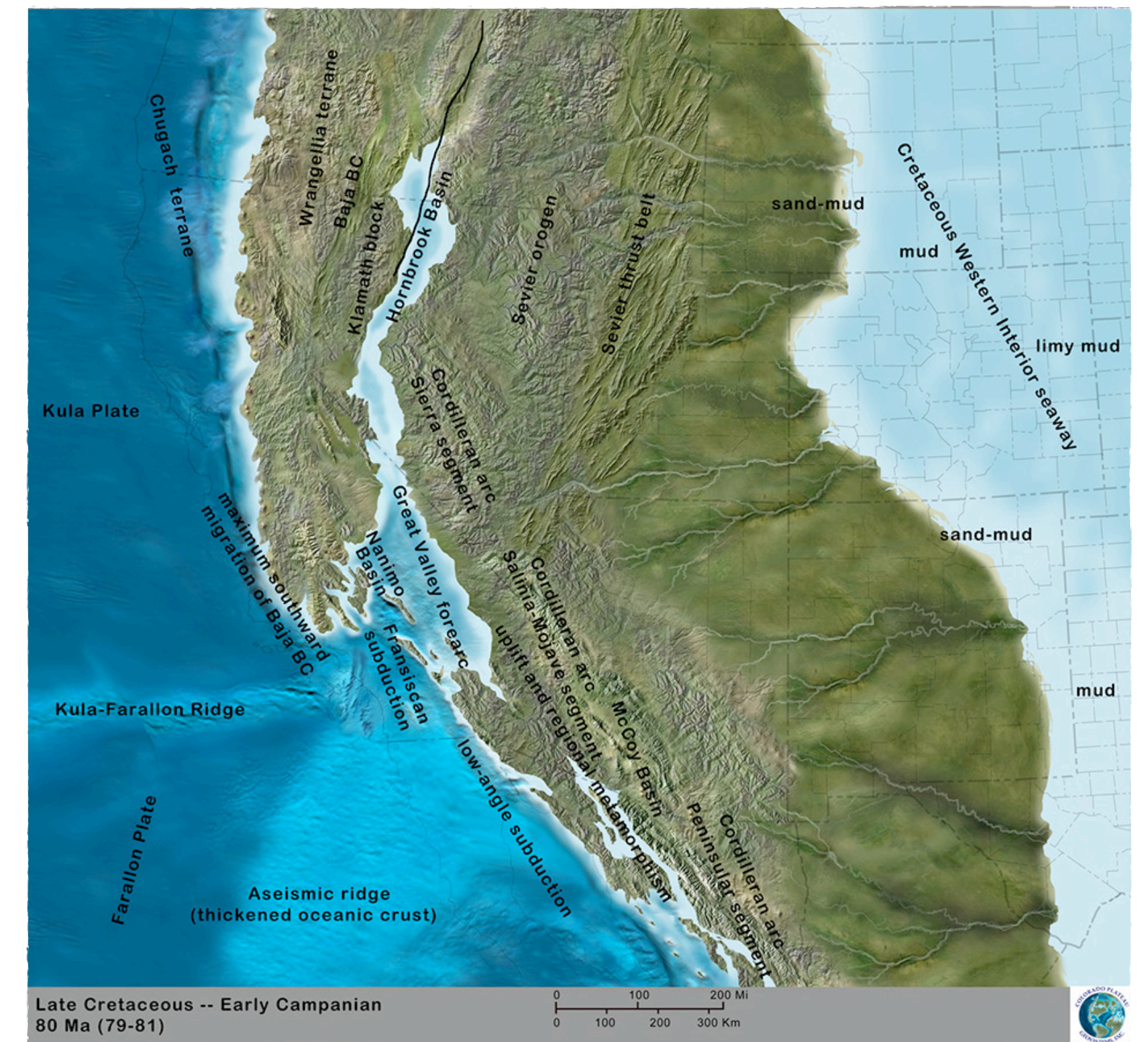
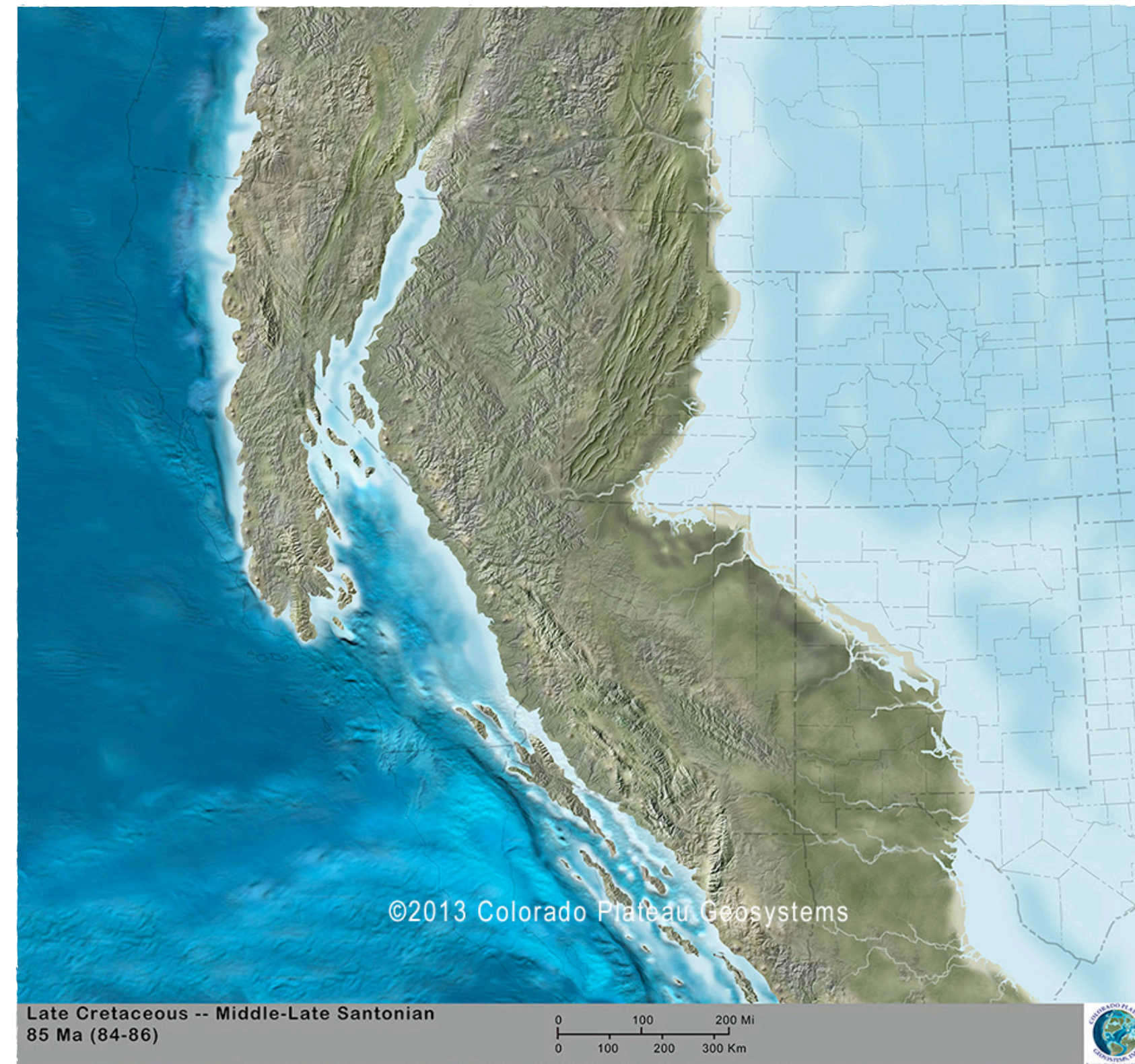
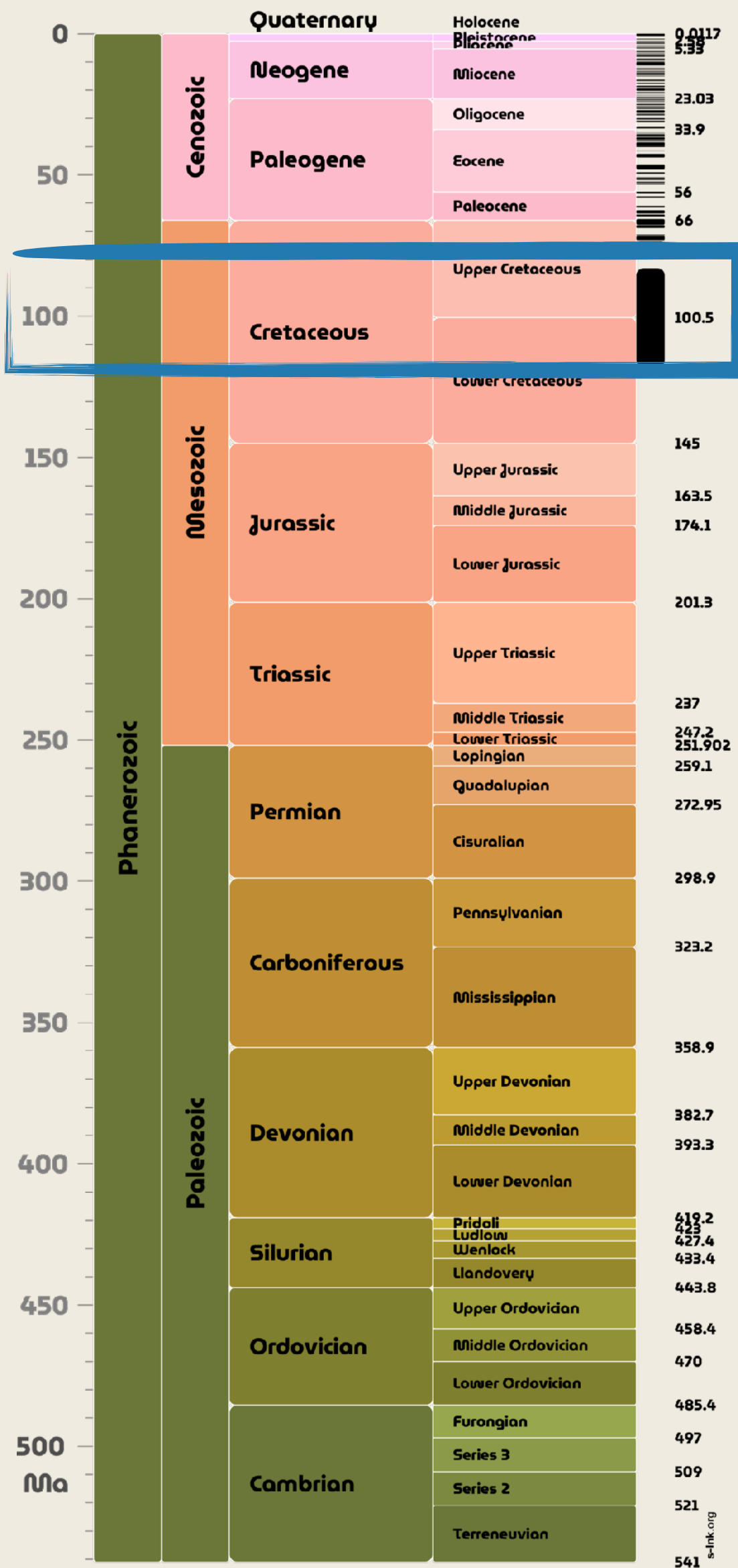
Changing Environments



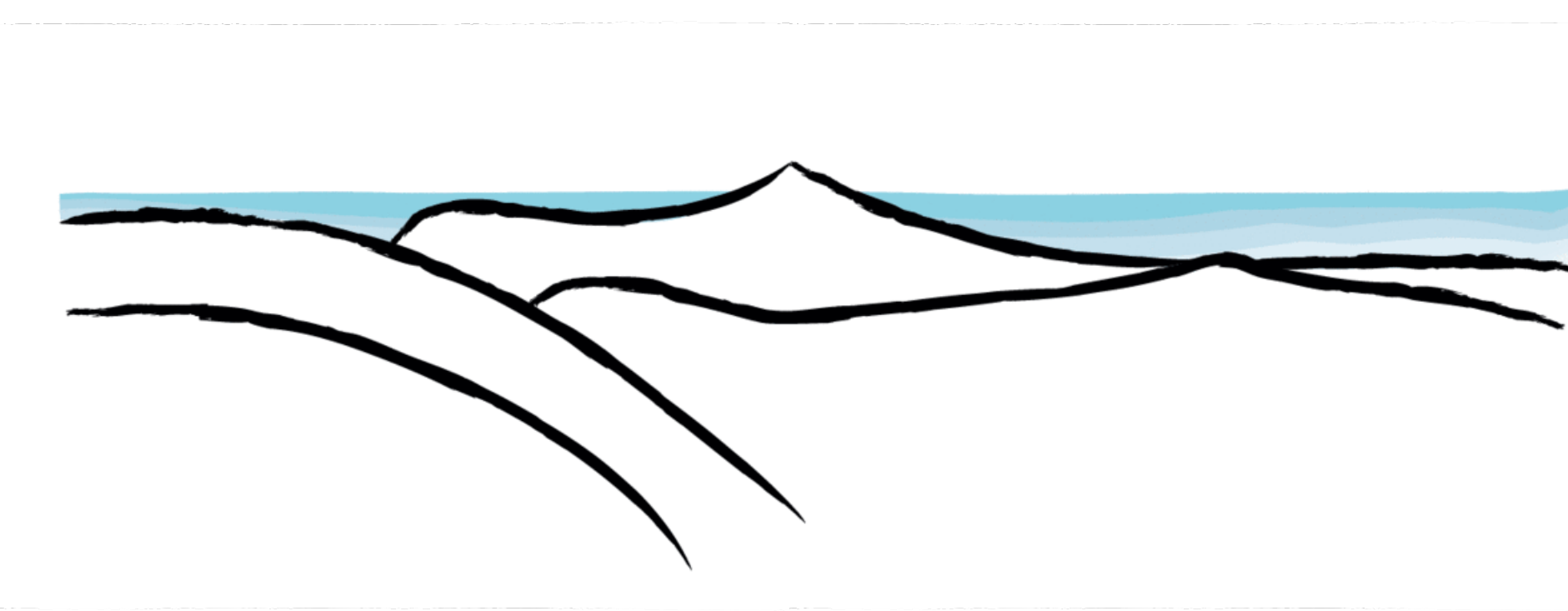
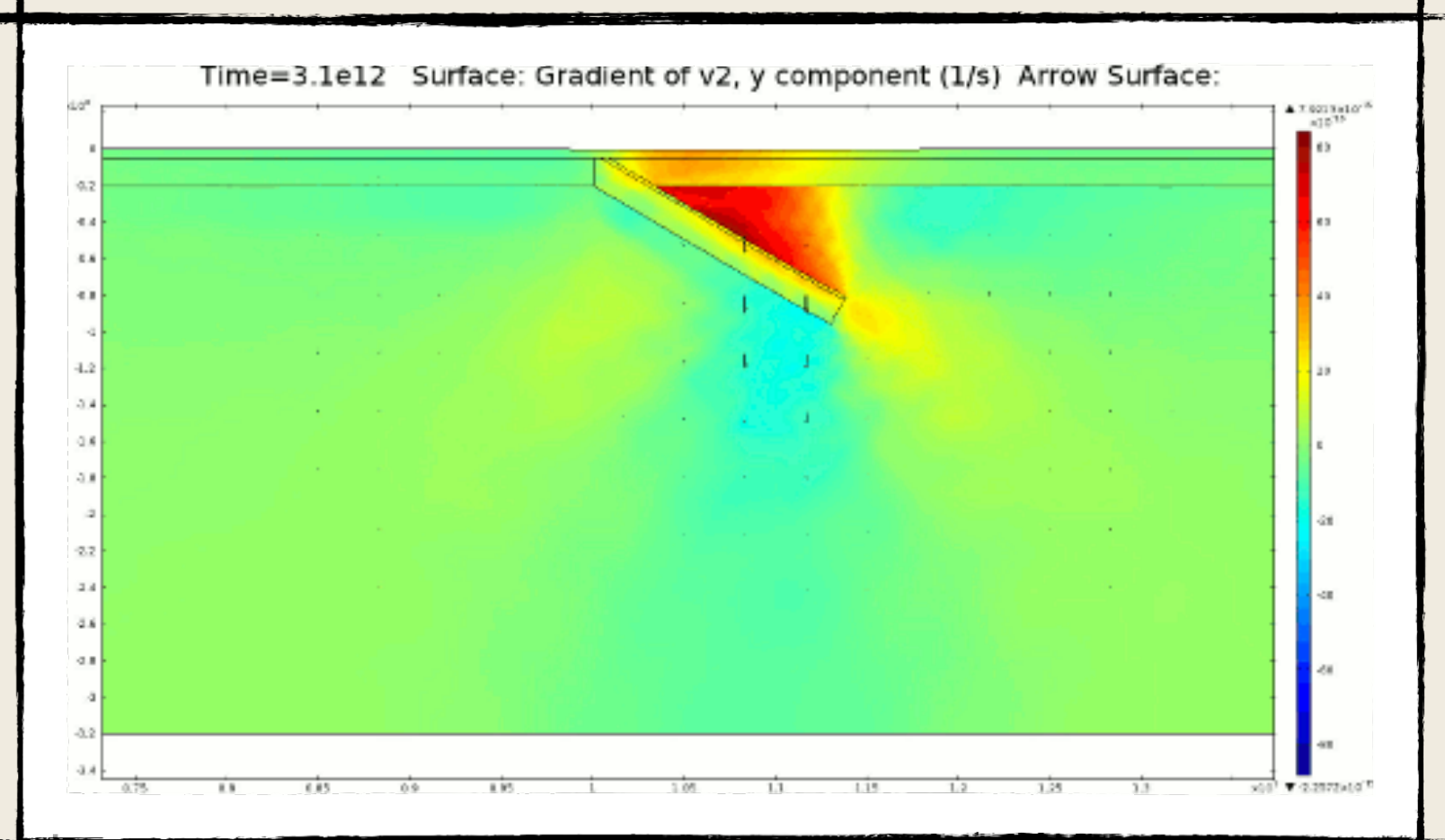
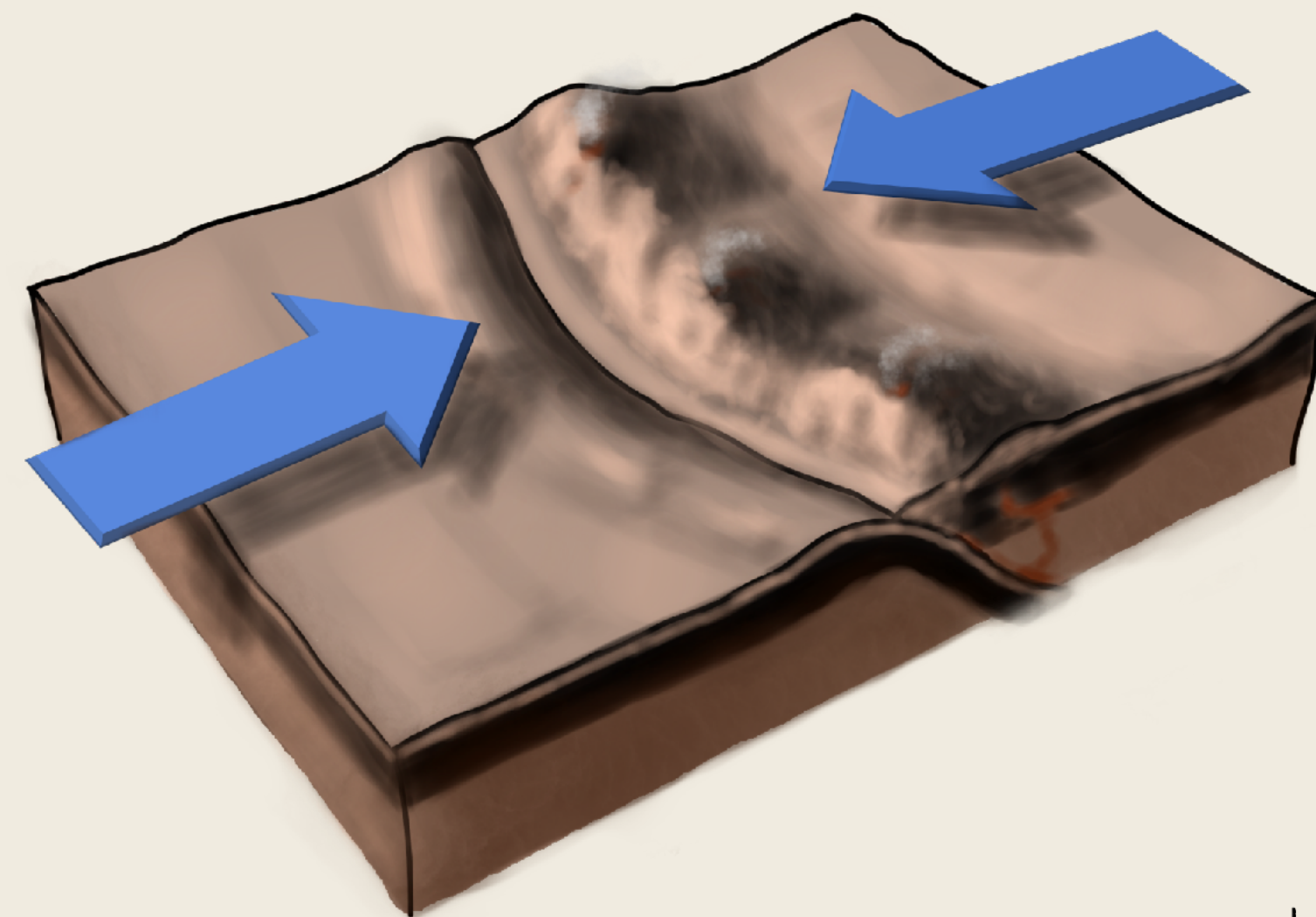
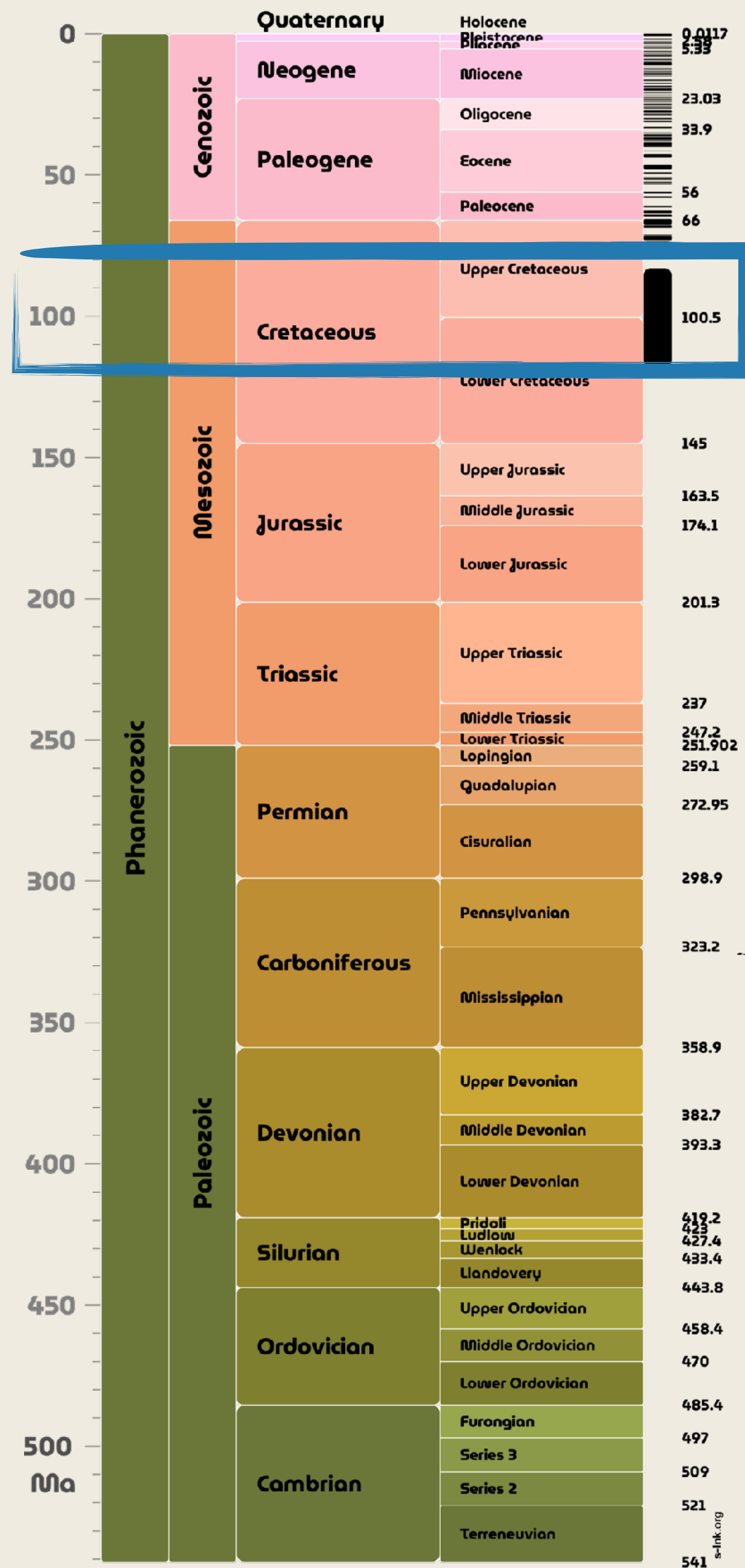
Changing Environments



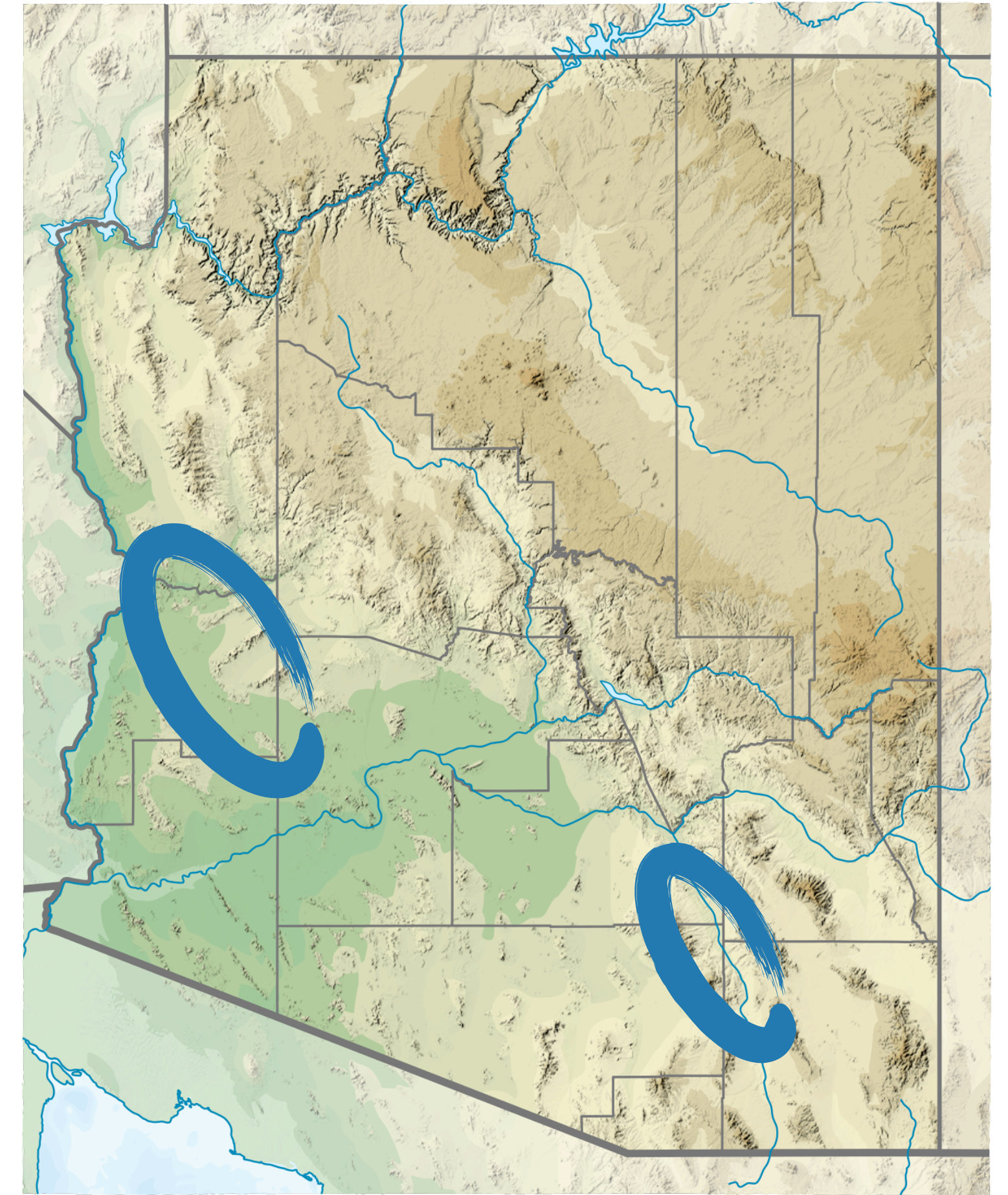
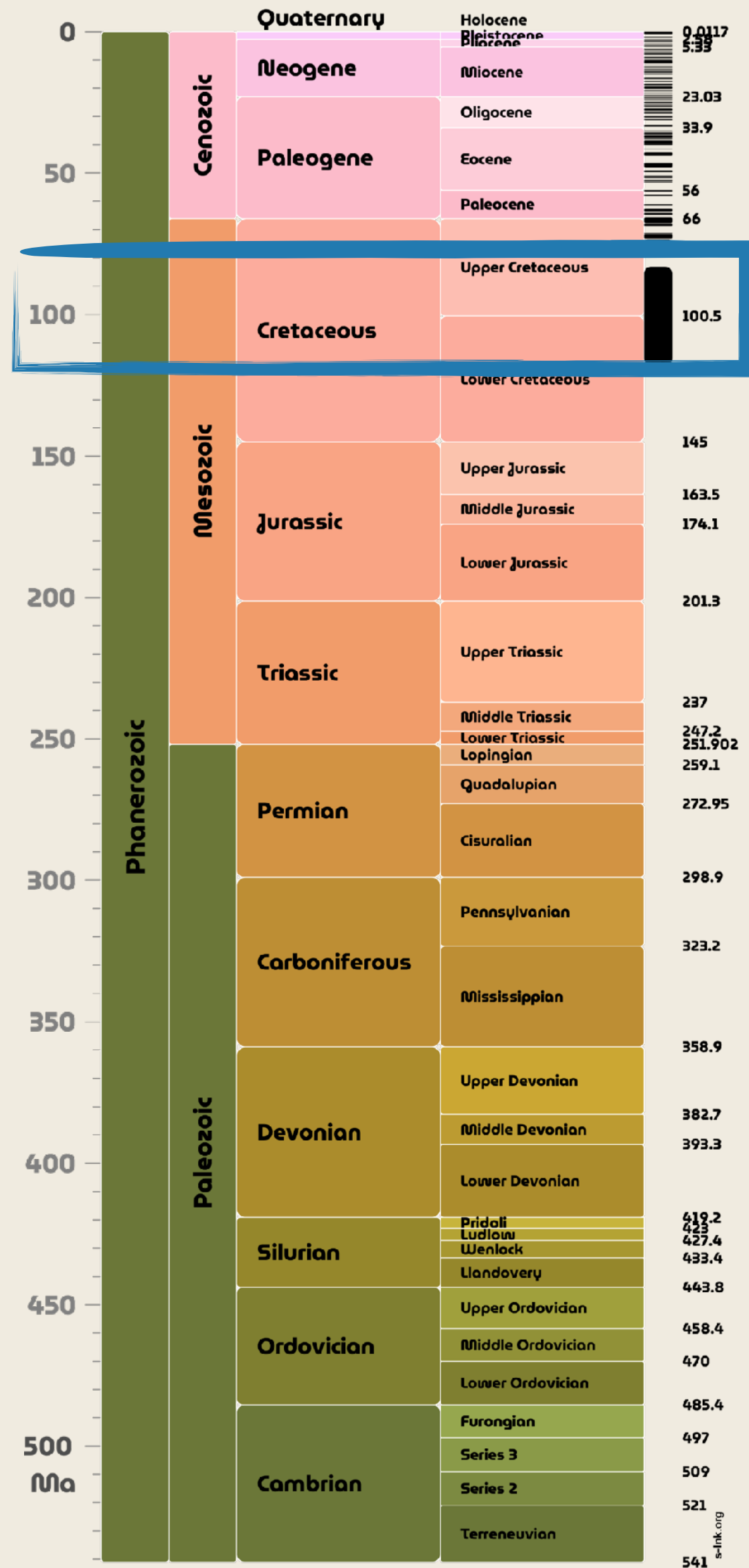
The North American Cordillera



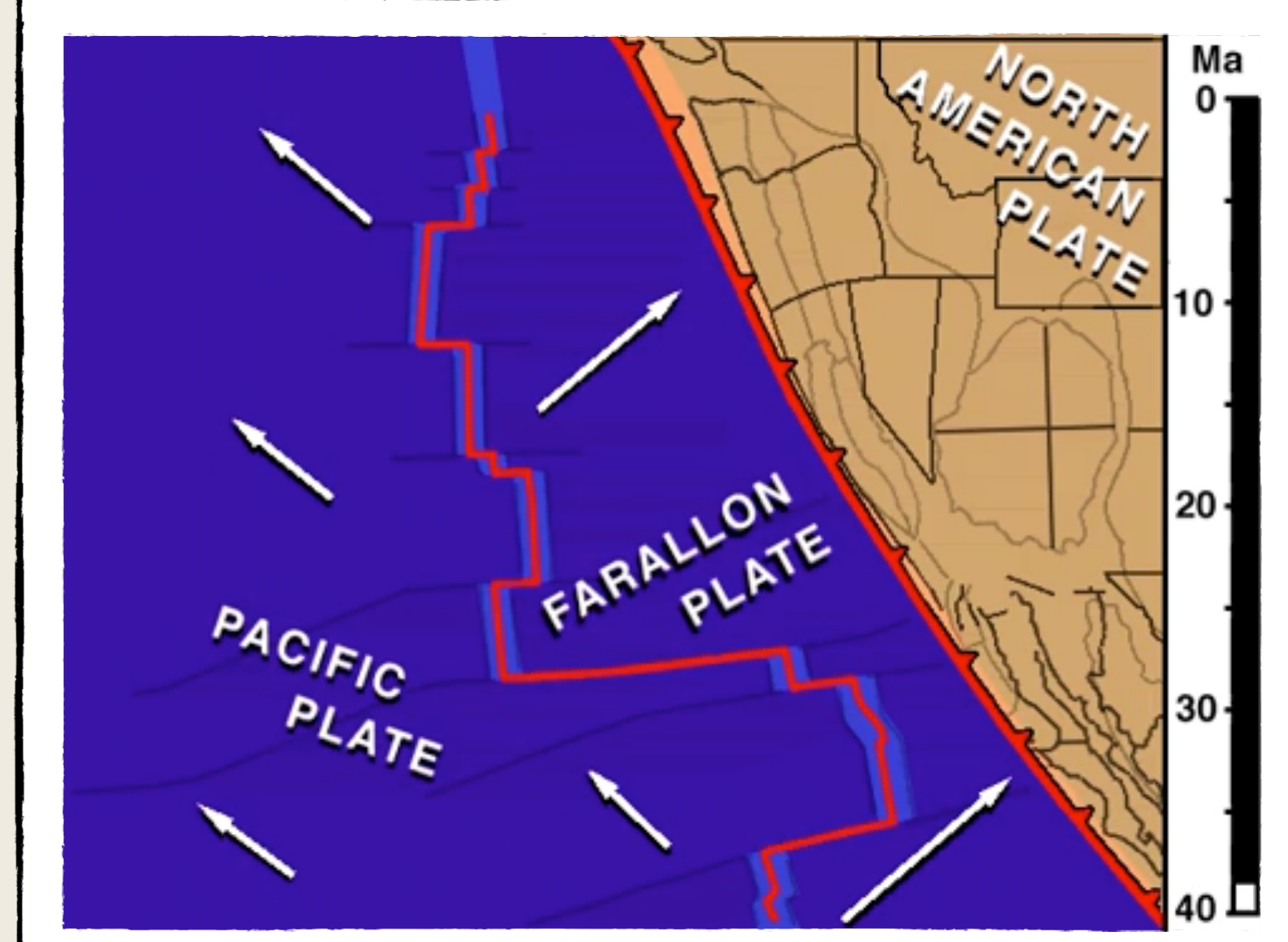
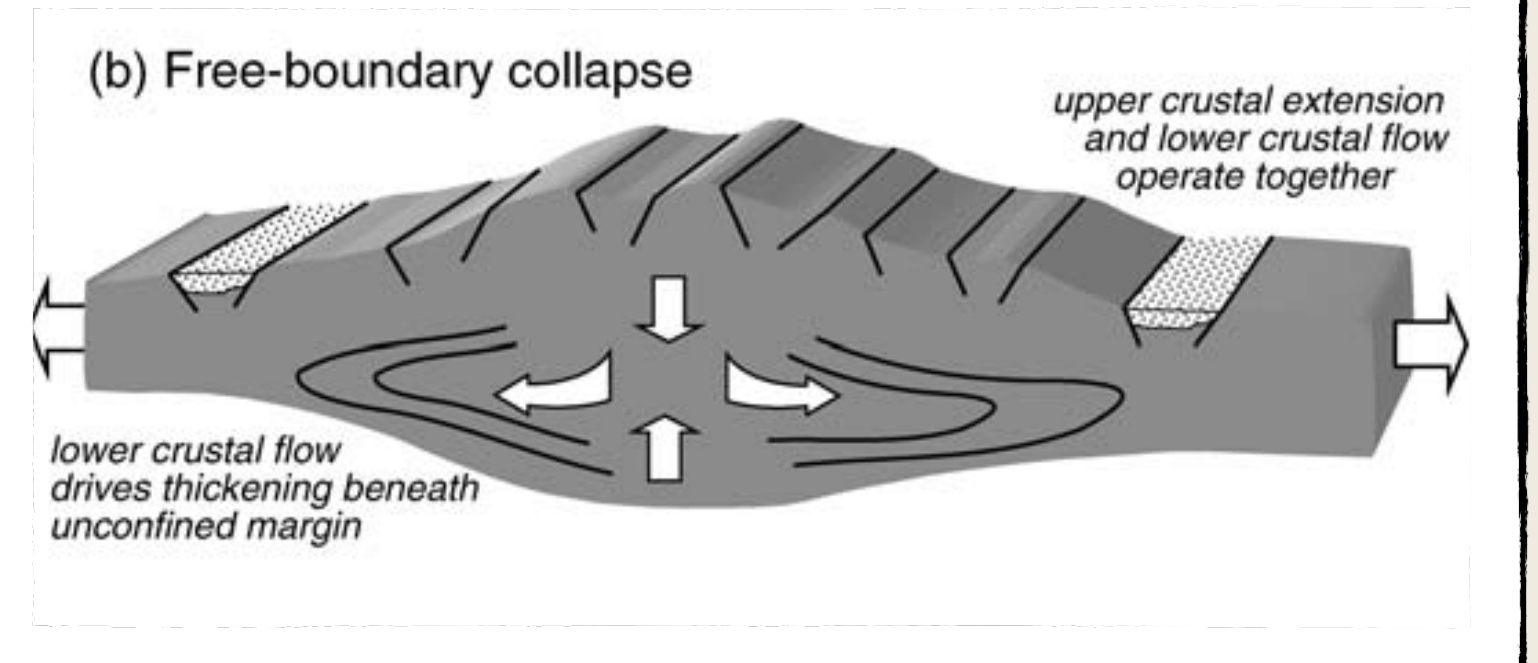
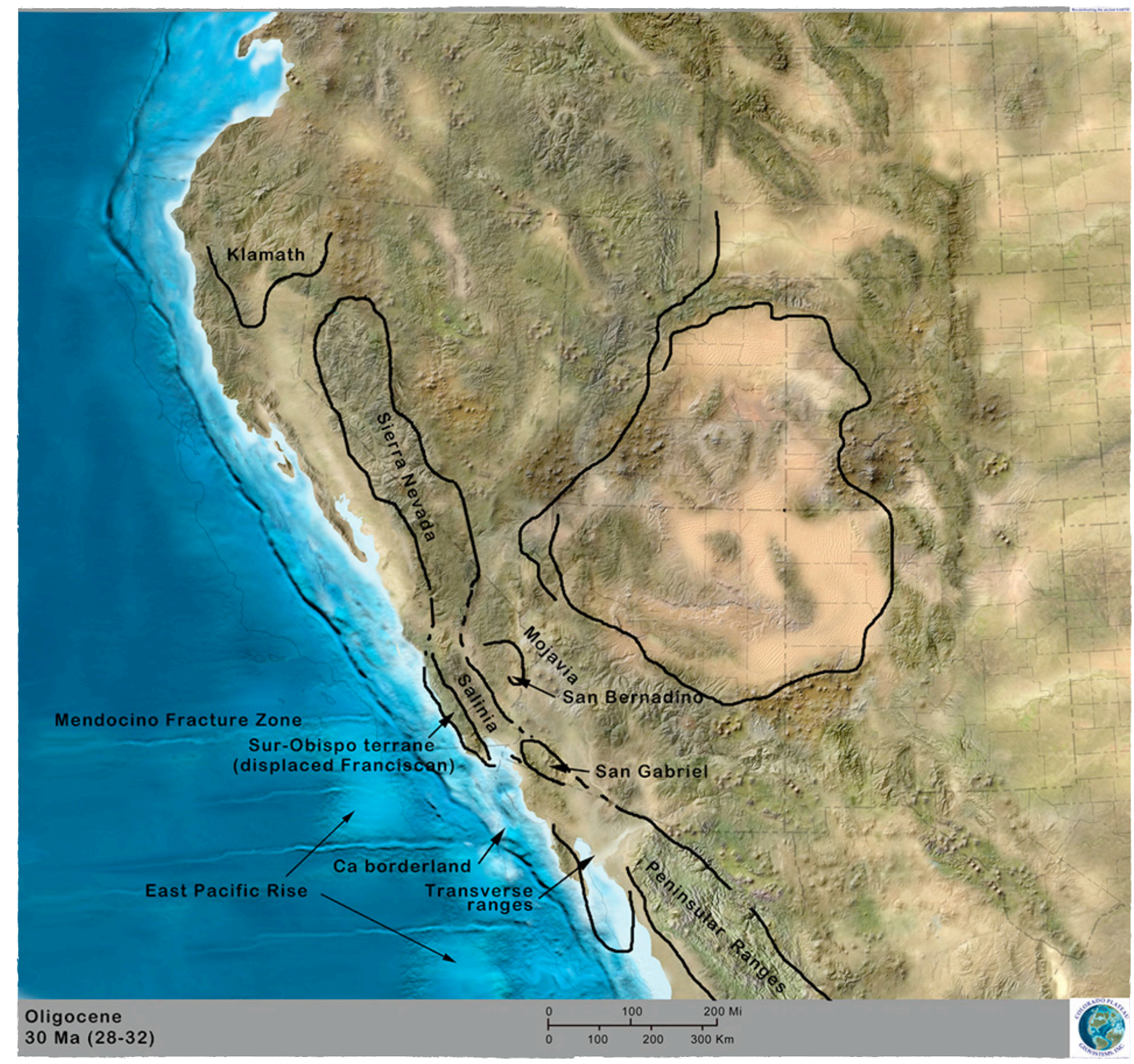
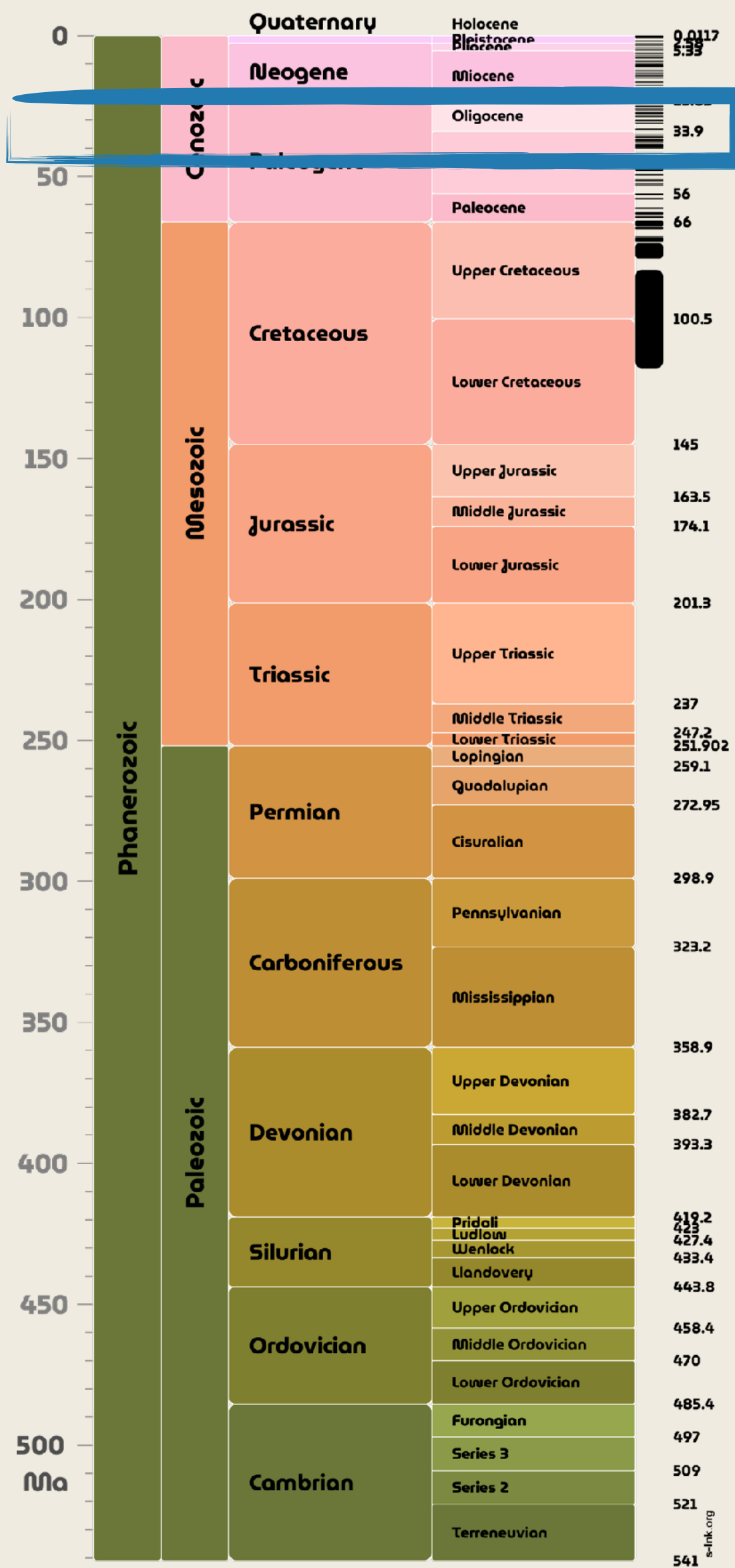
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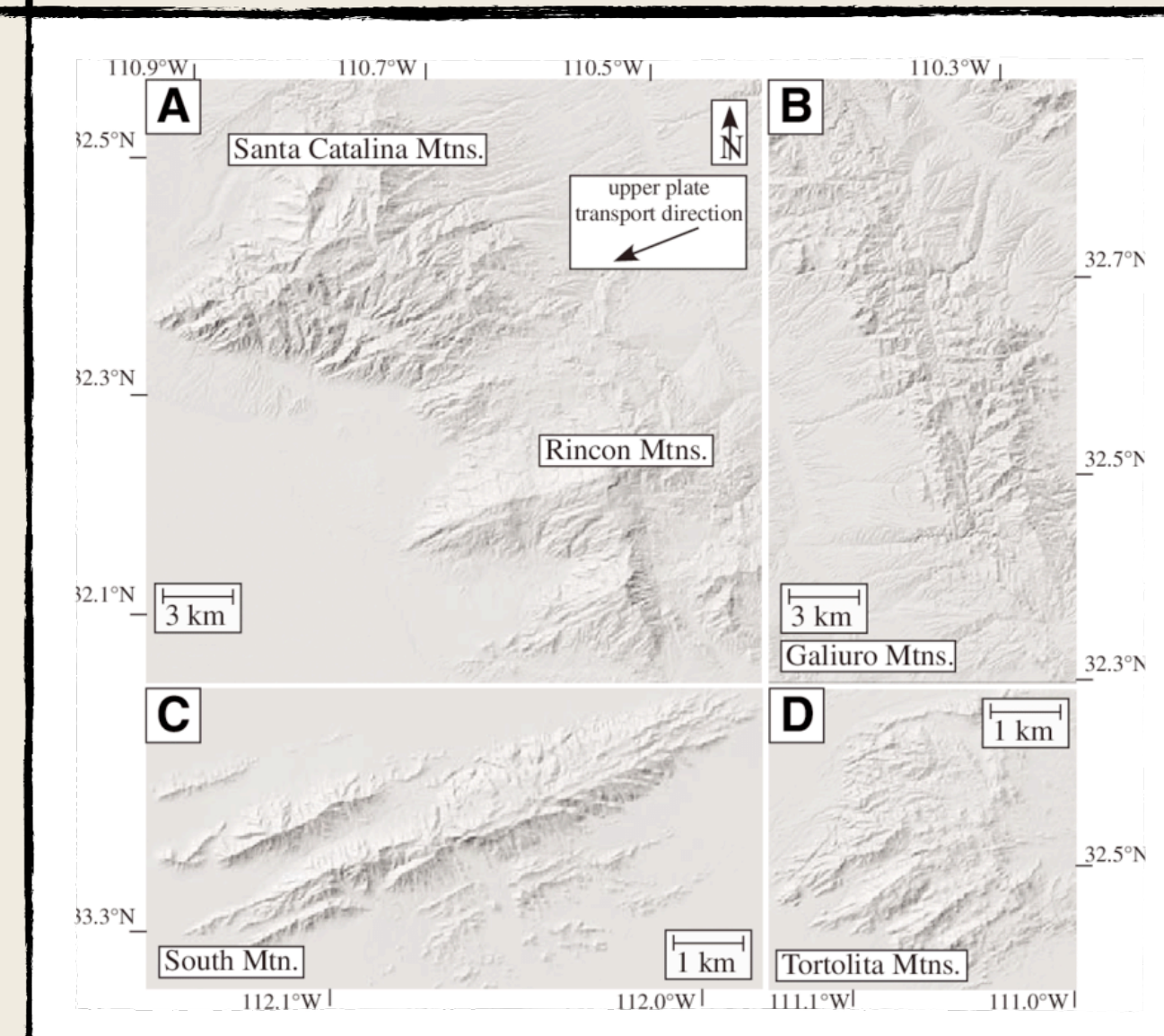
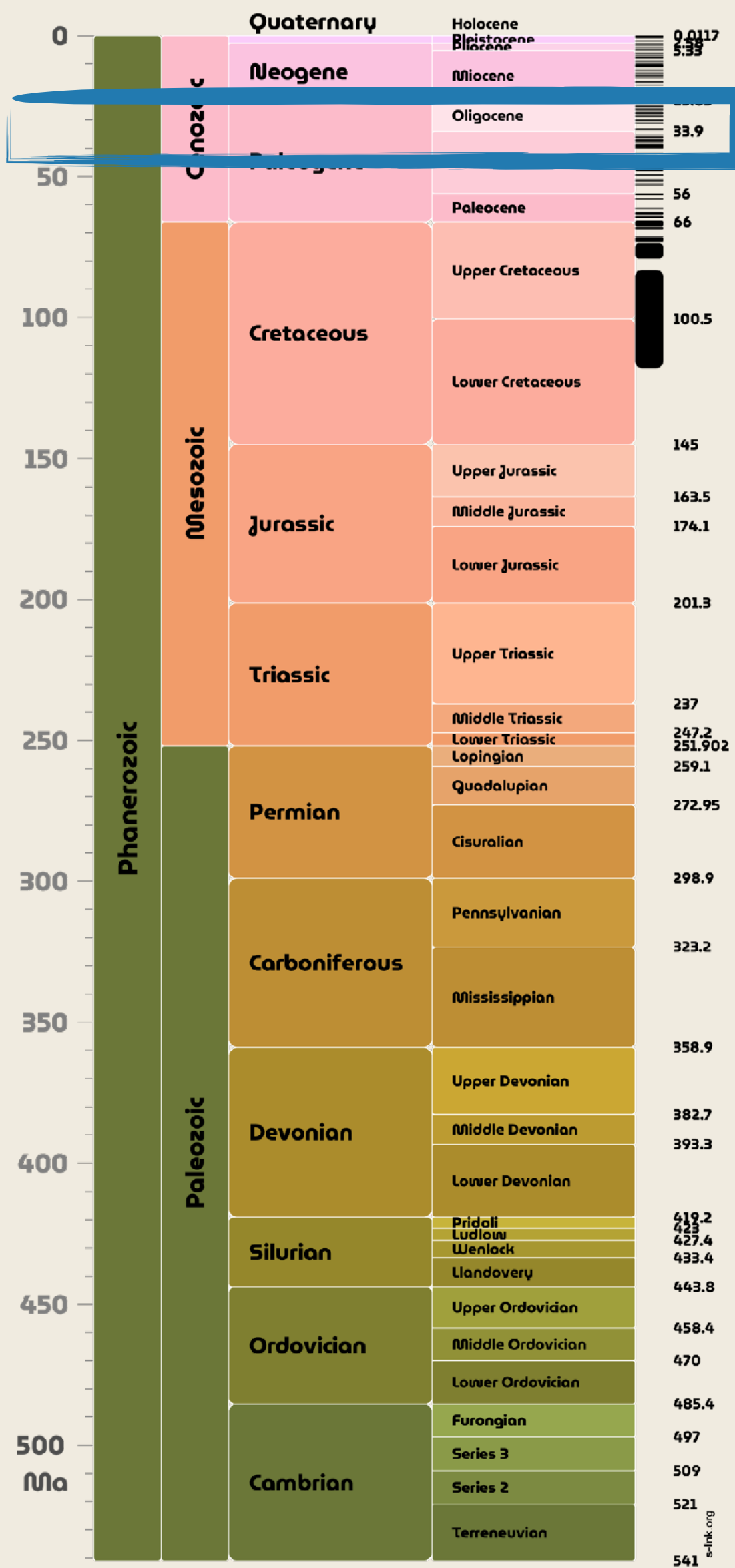
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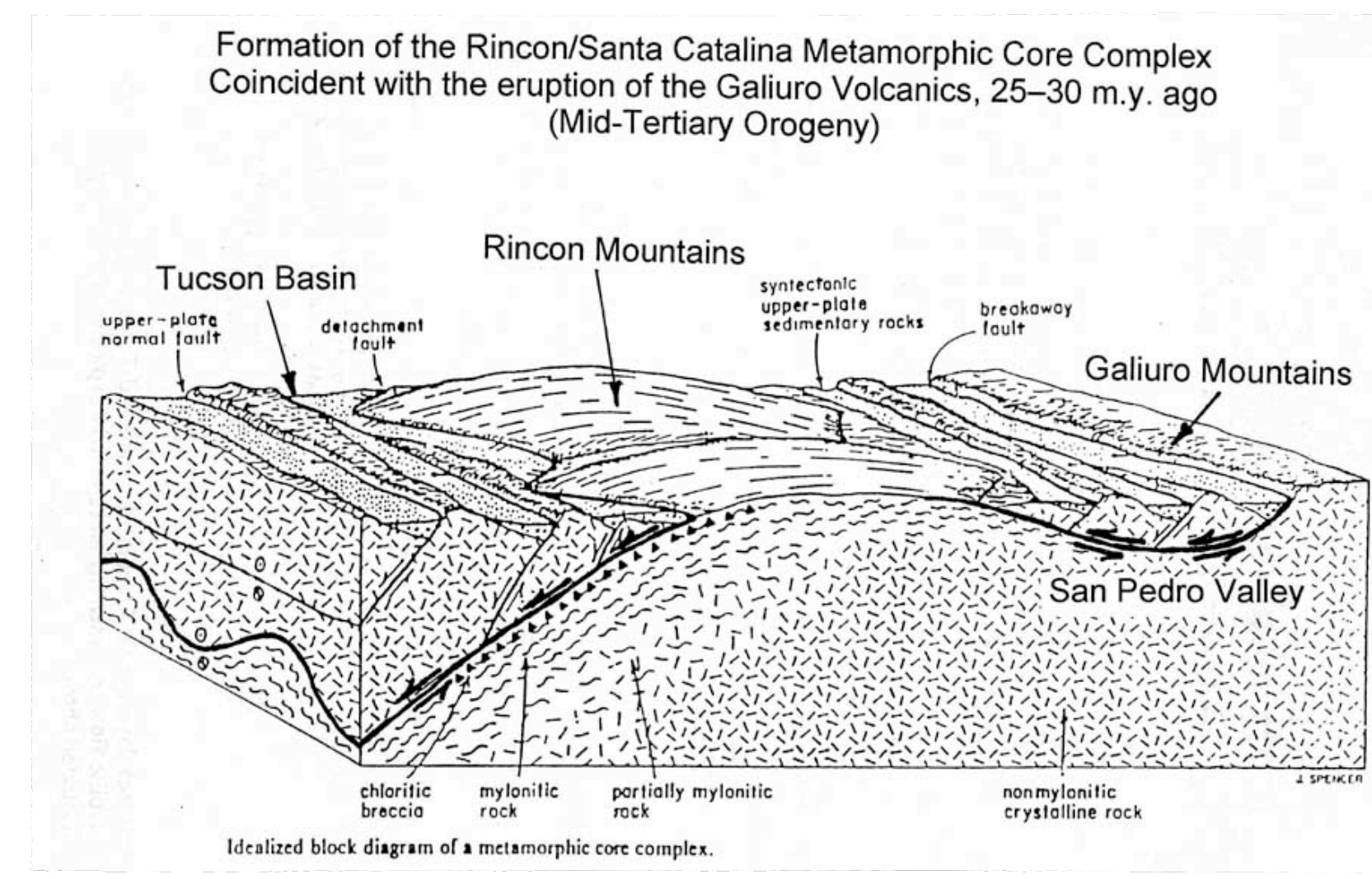
Splitting Open the Mountains



The White Tanks, Muhadagi Do'ag (South Mts.), and Babad Do'ag (Santa Catalina-Rincon Mts.)

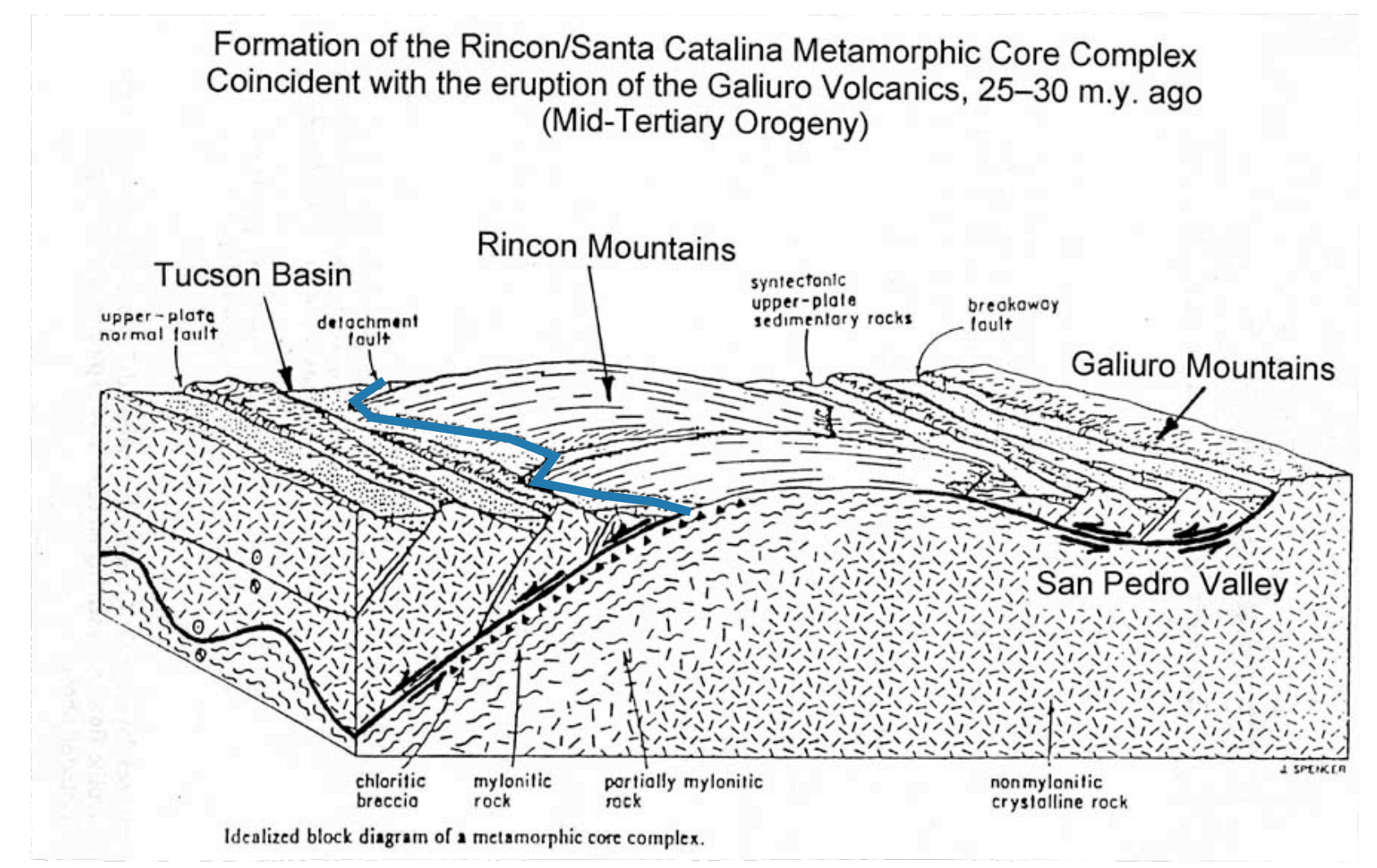
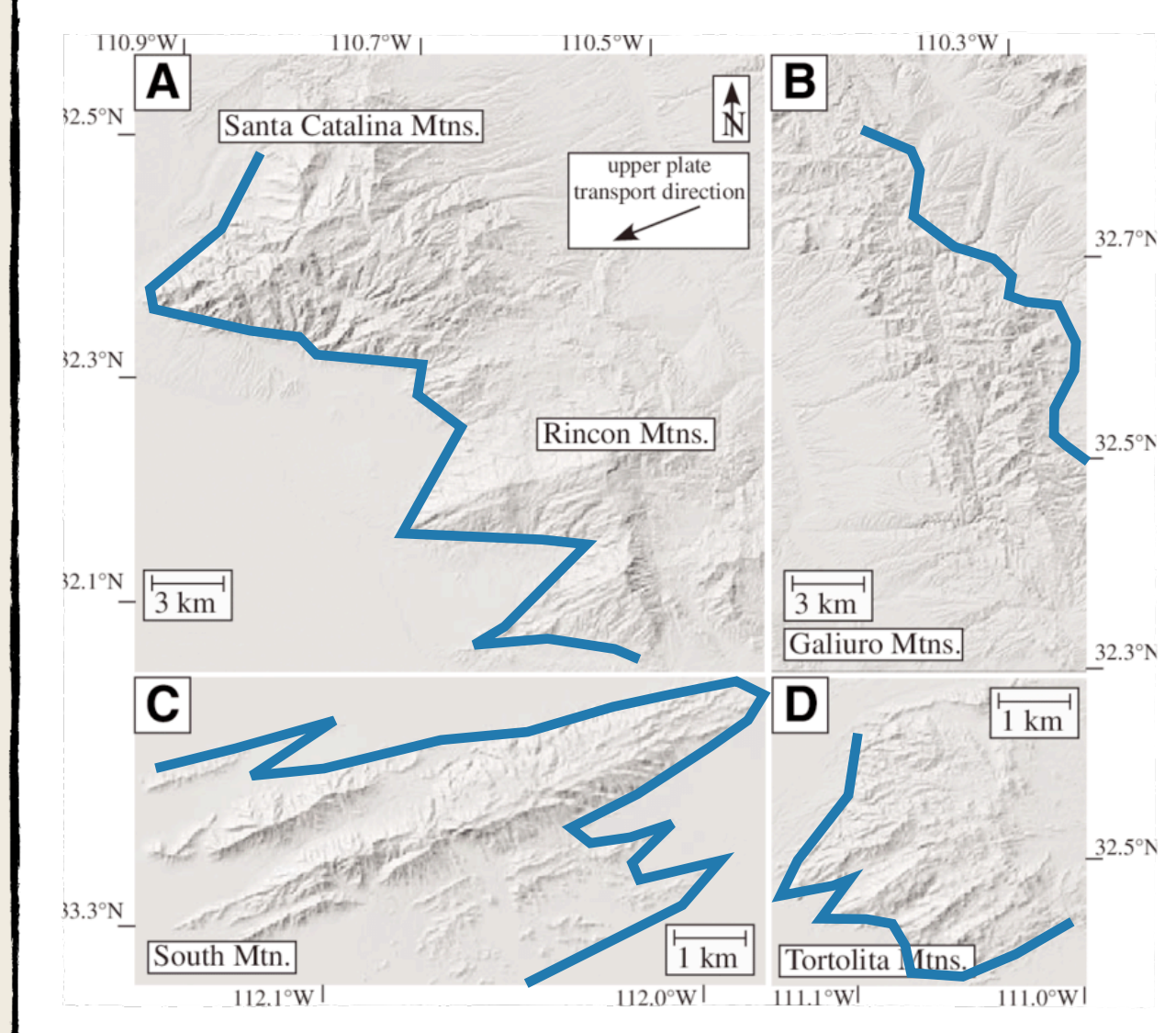
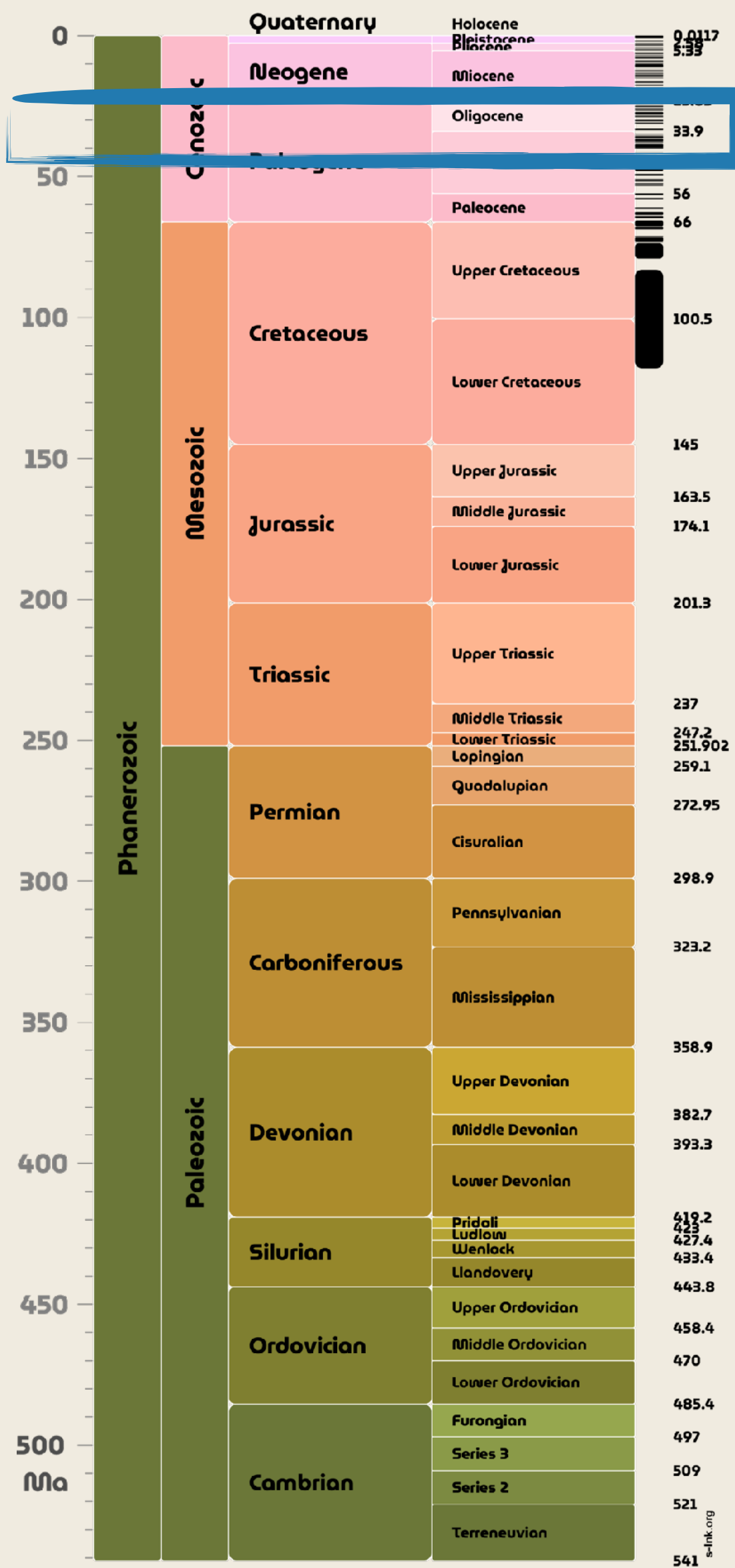


Pelletier et al. (2009)



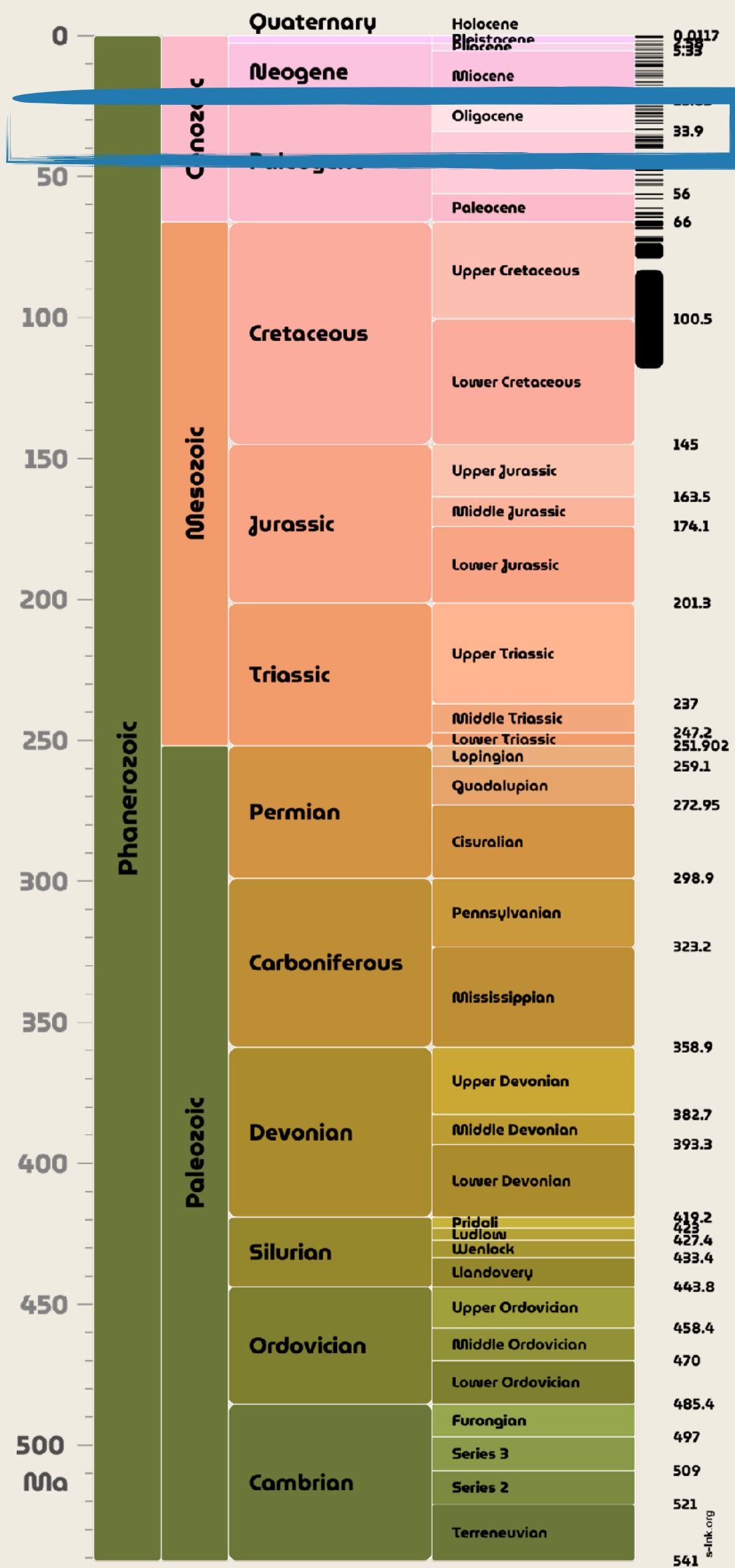
Whitney et al. (2013)

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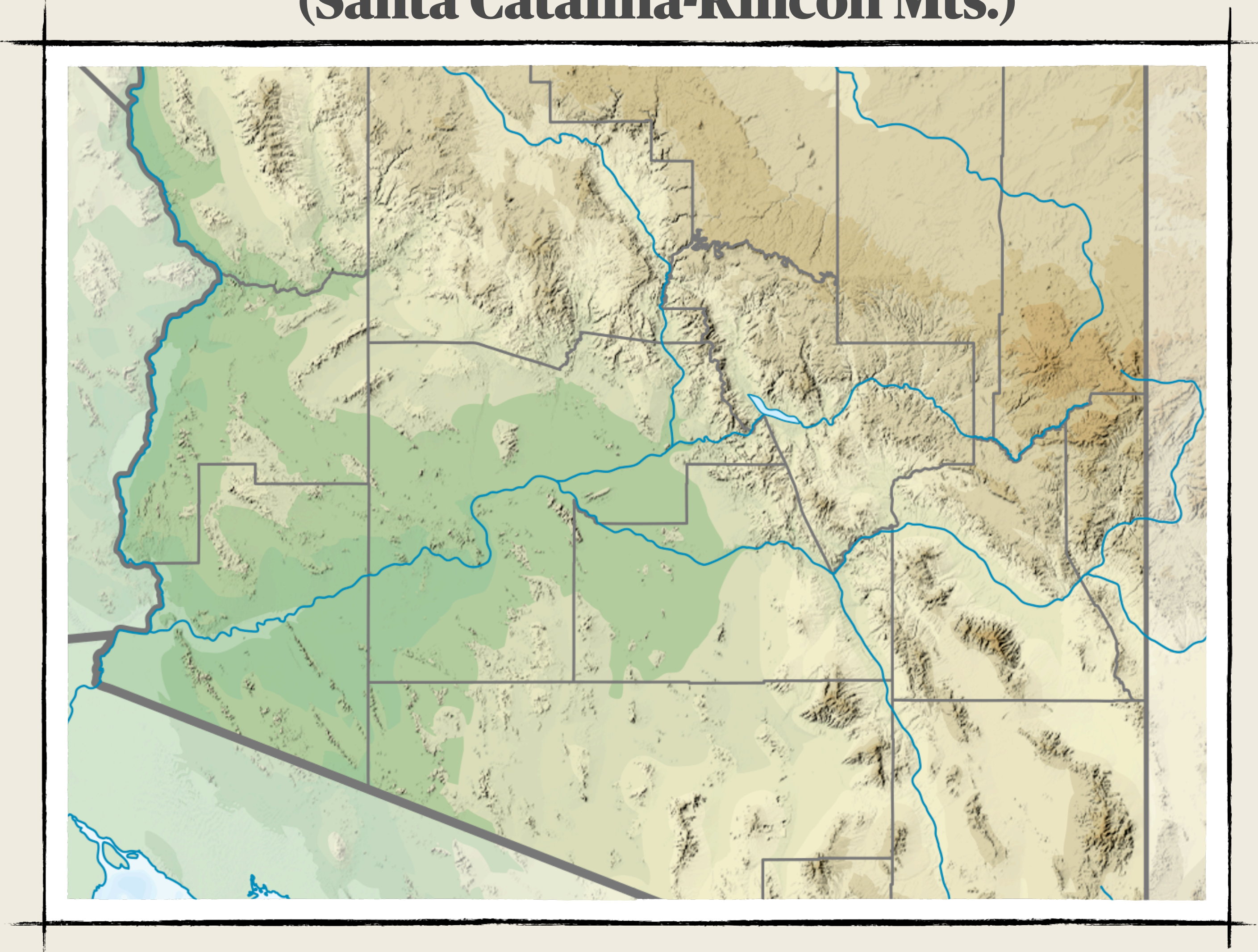


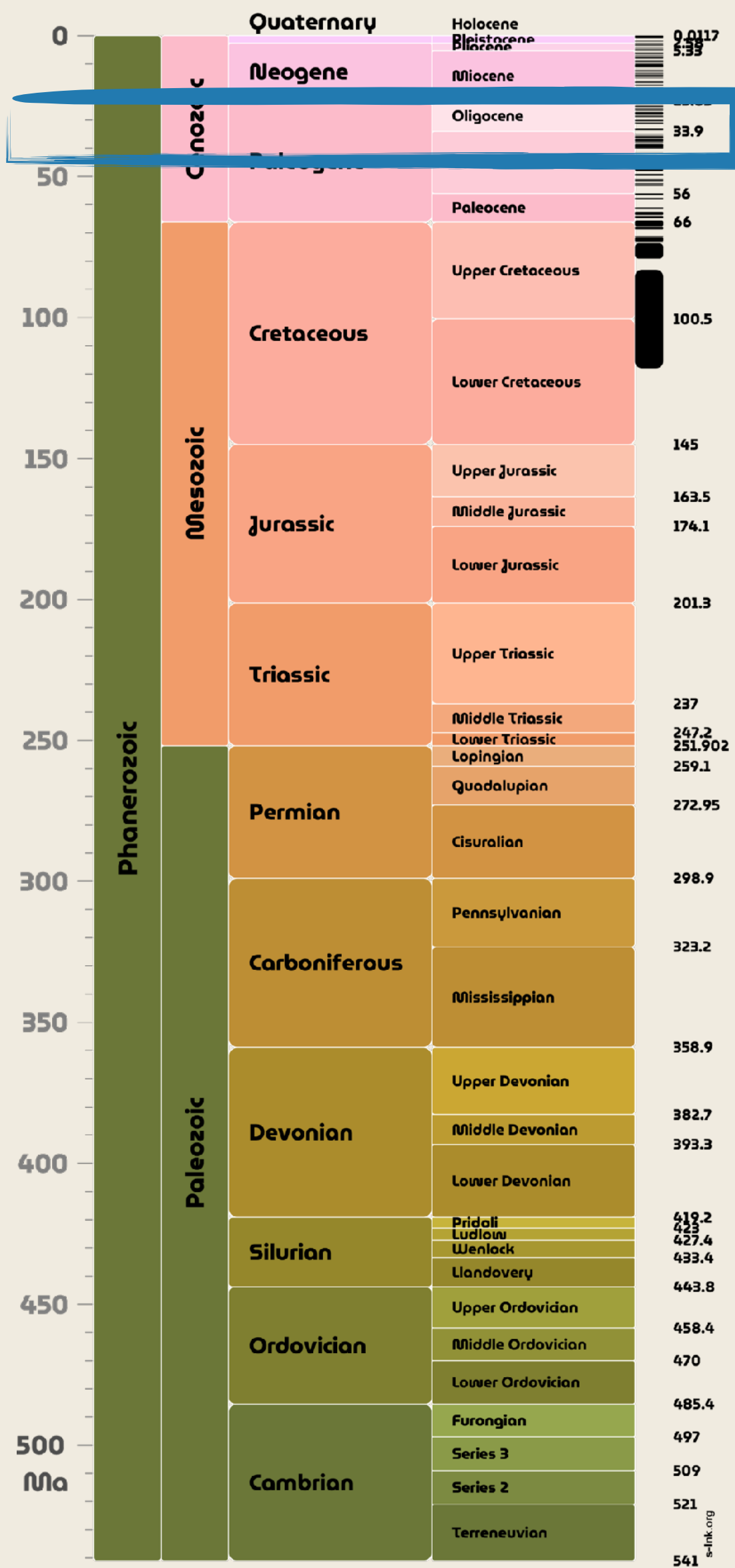
Pelletier et al. (2009)

Whitney et al. (2013)

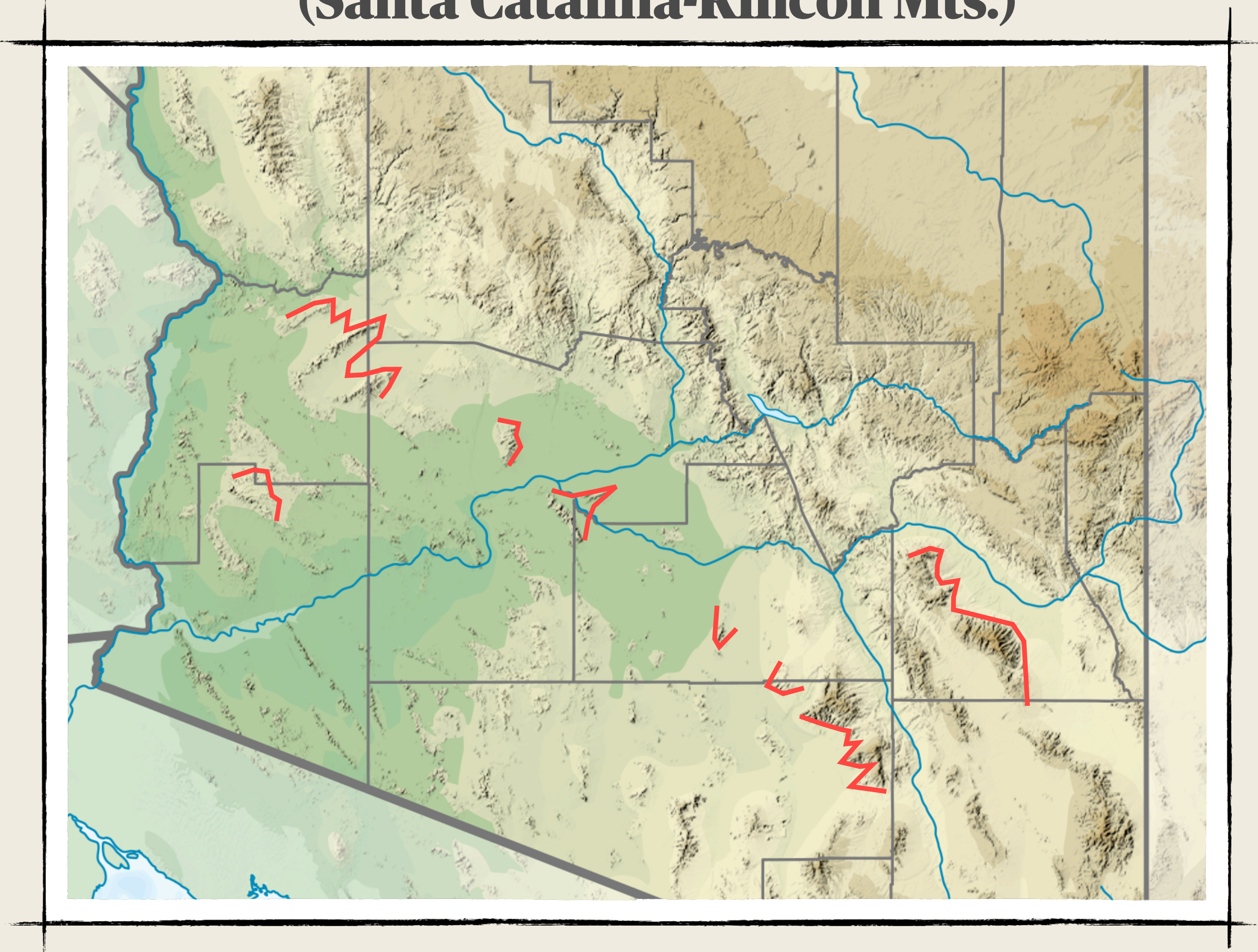


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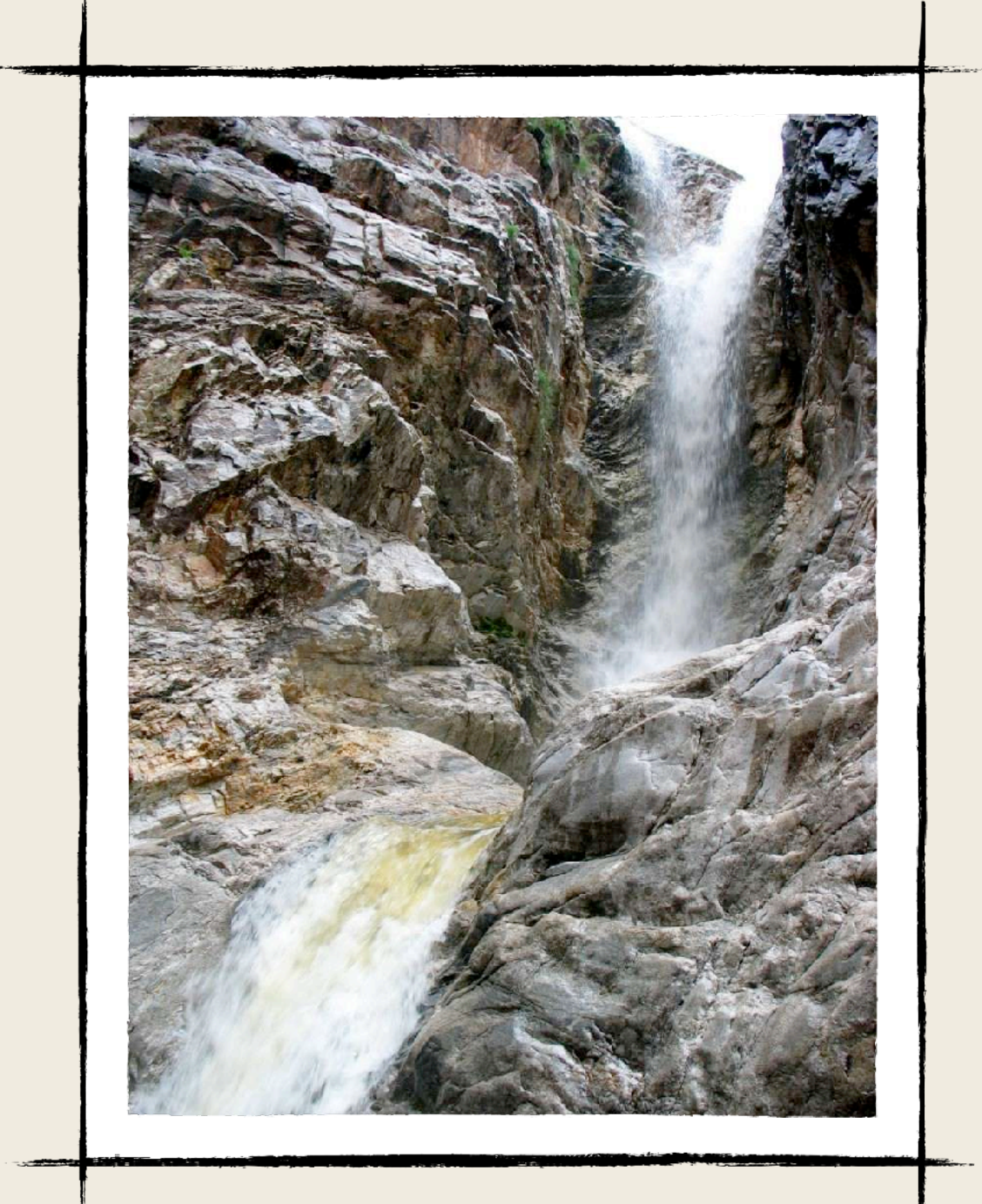
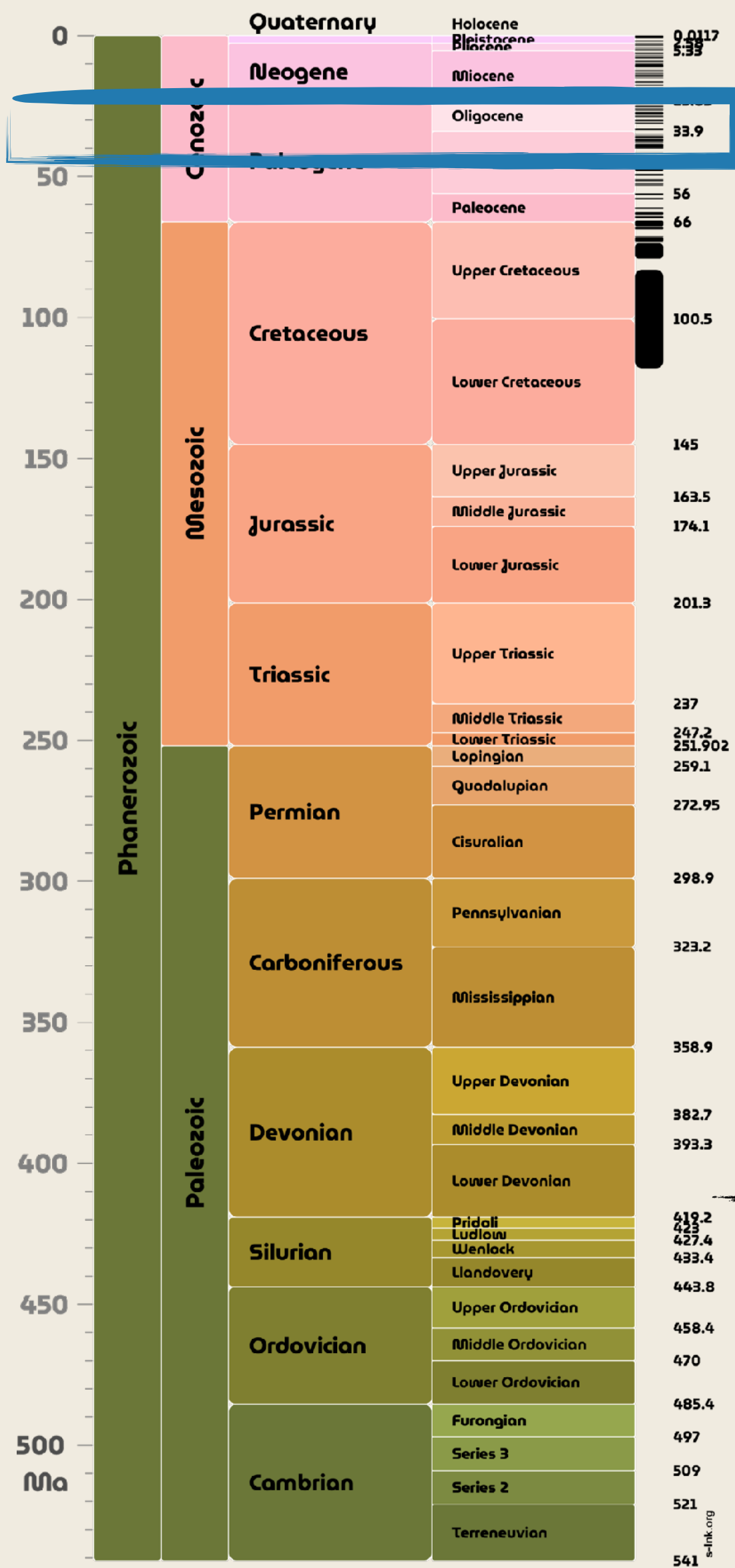




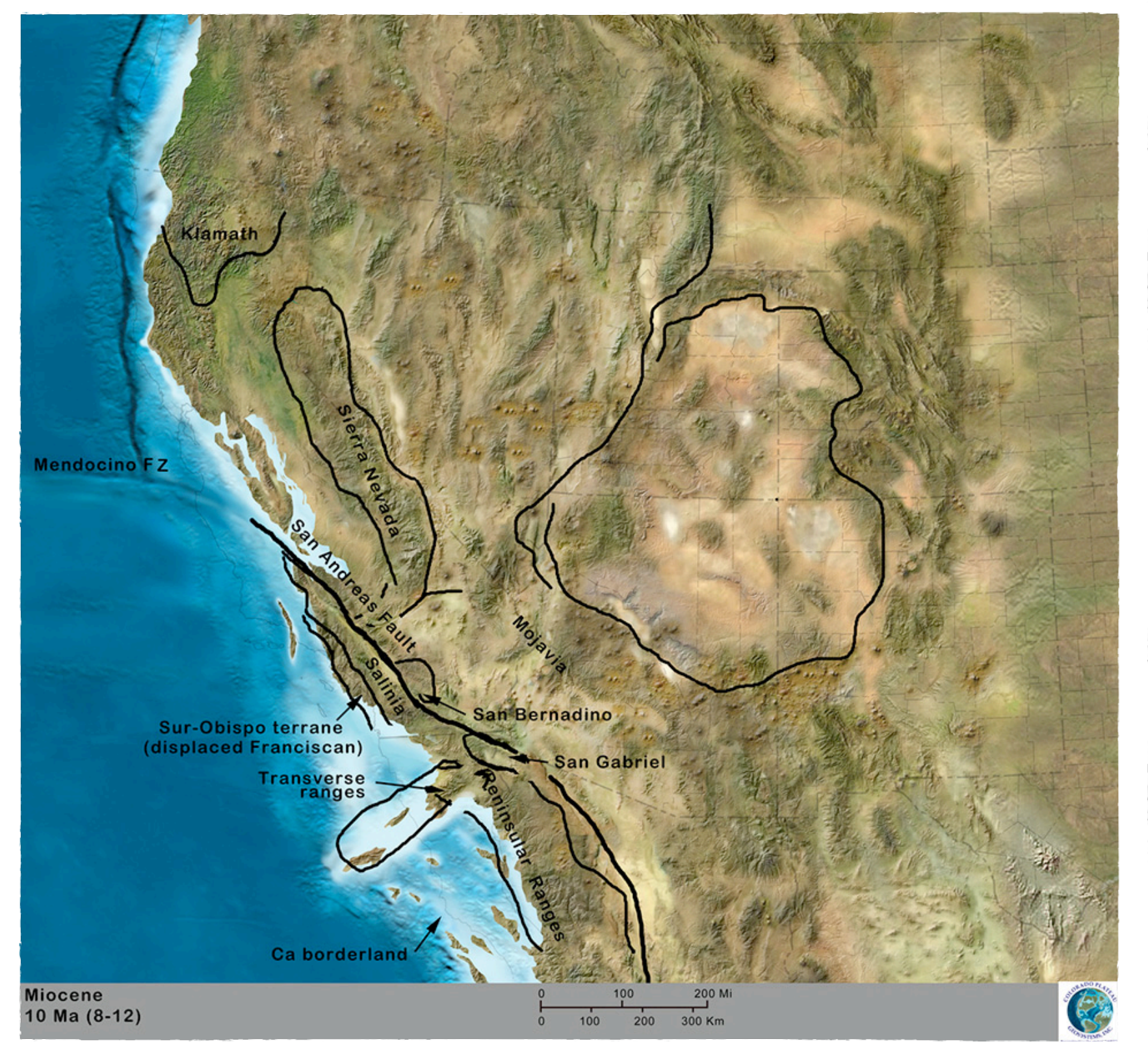
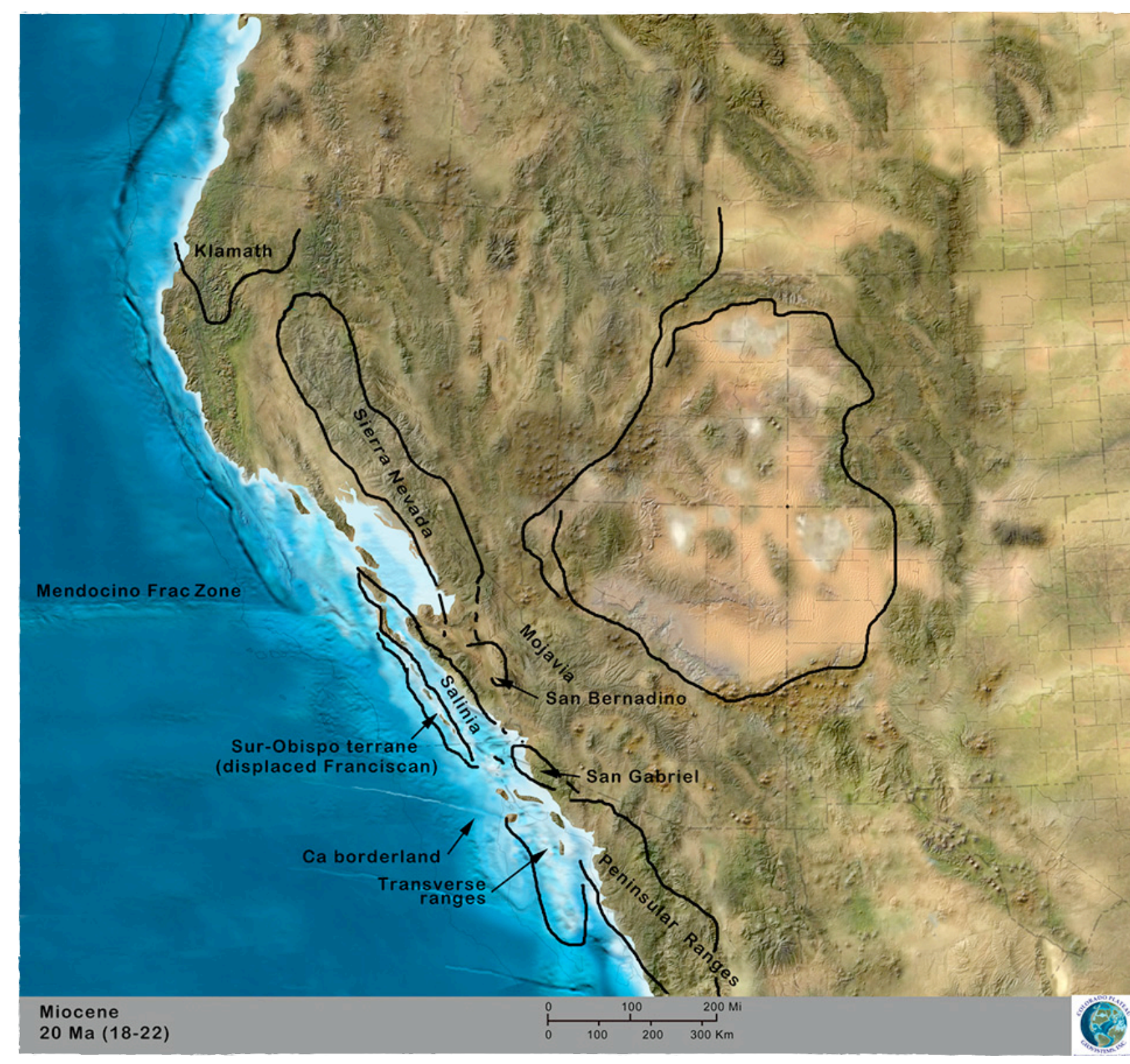
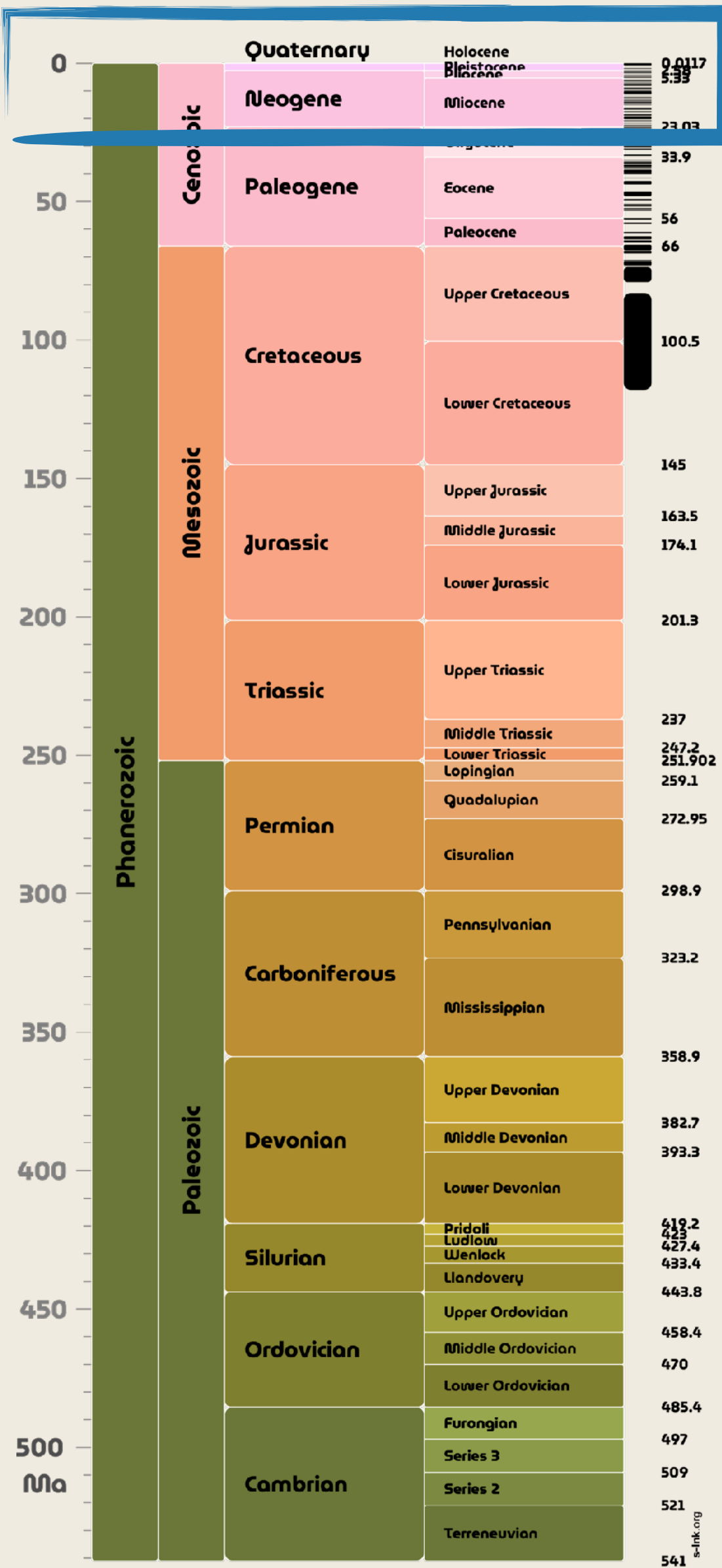
The White Tanks, Muhadagi Do'ag (South Mts.), and Babad Do'ag (Santa Catalina-Rincon Mts.)



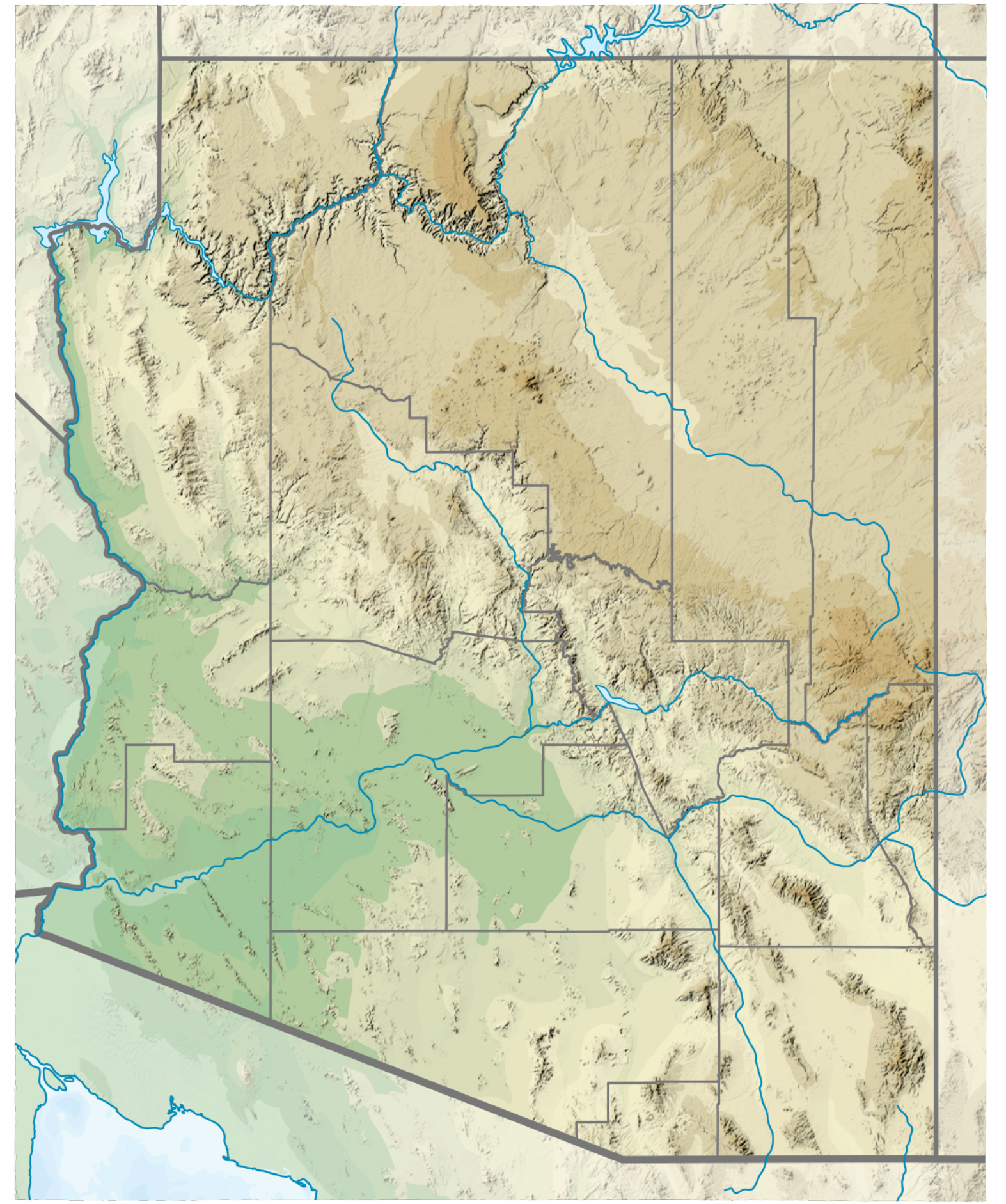
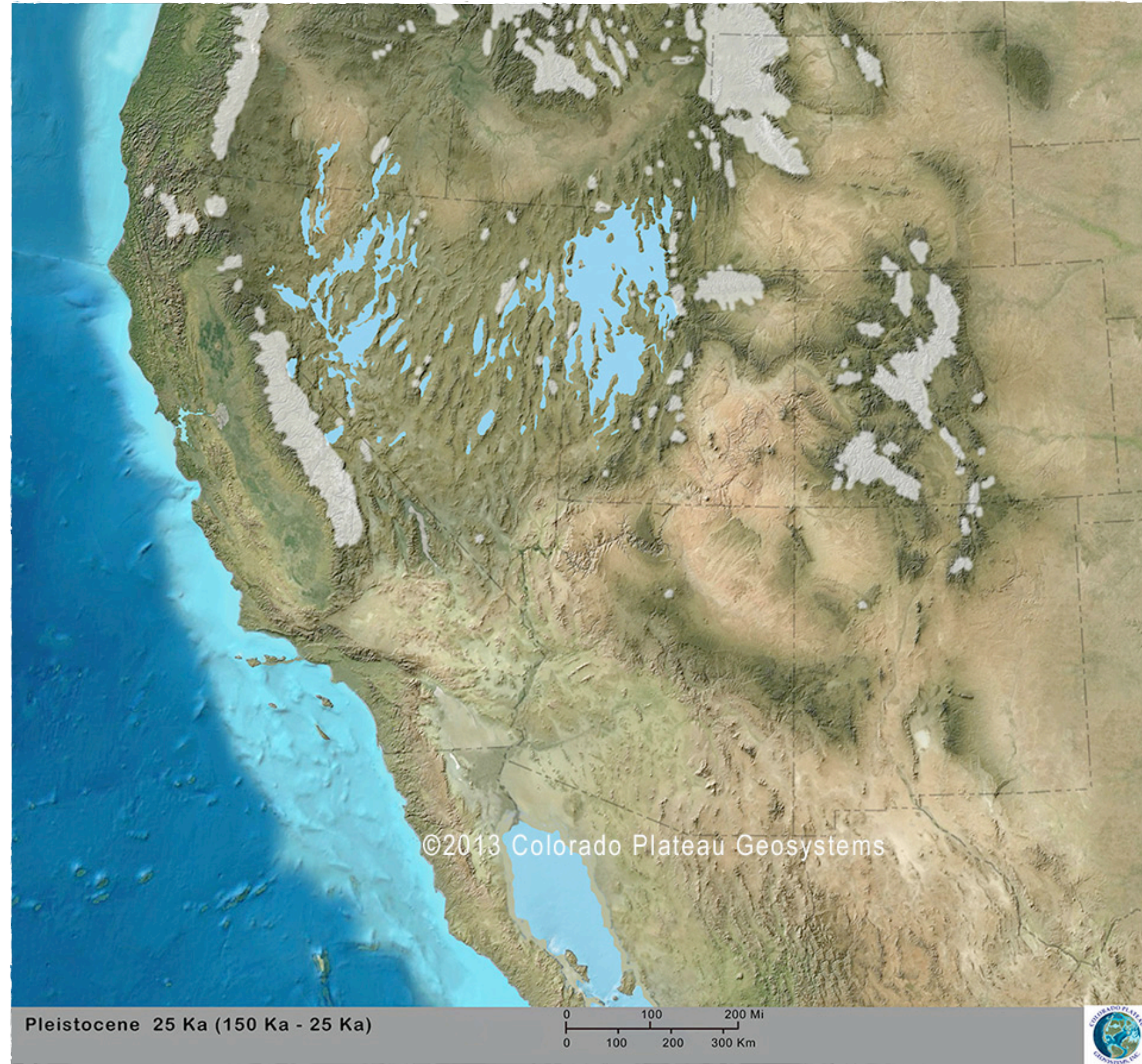
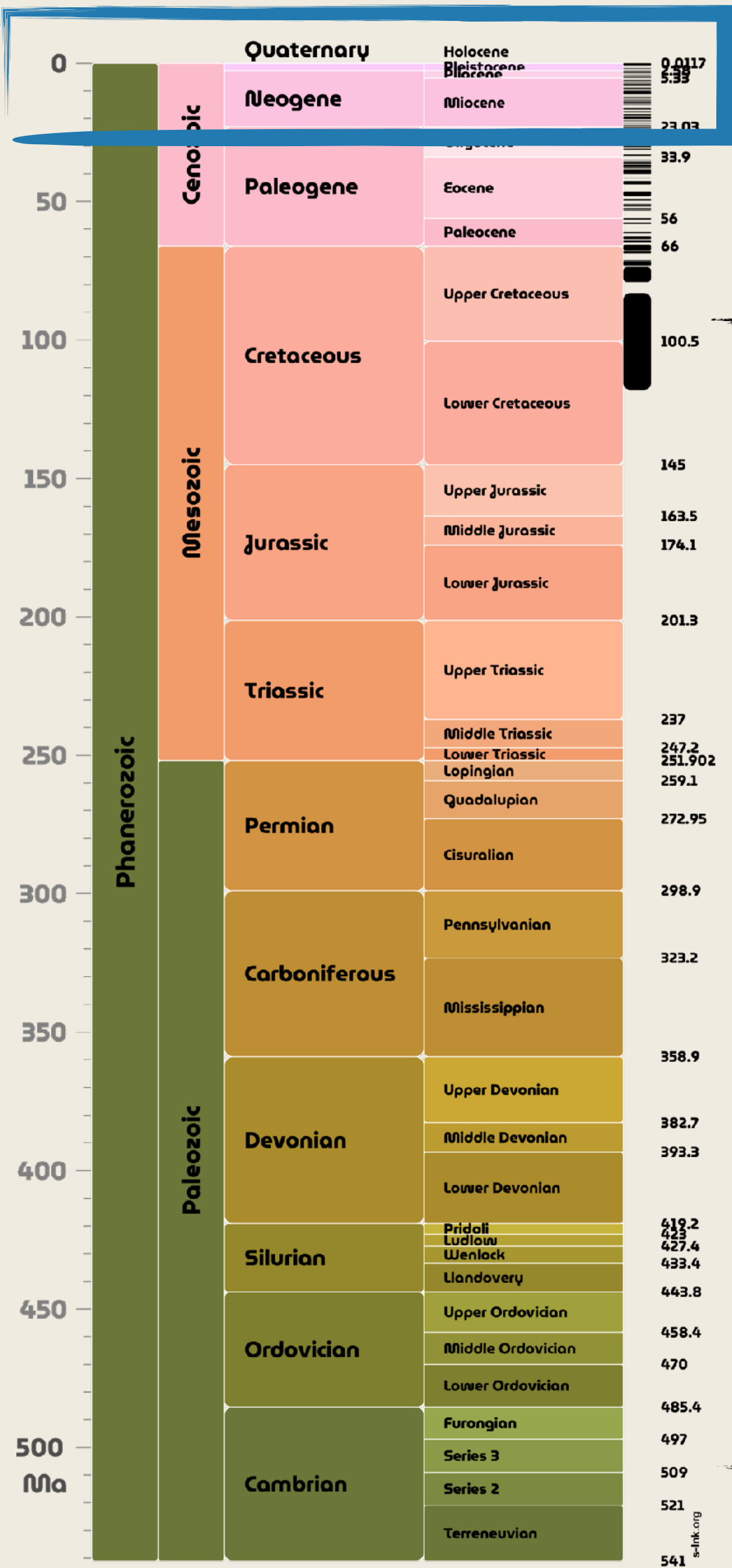
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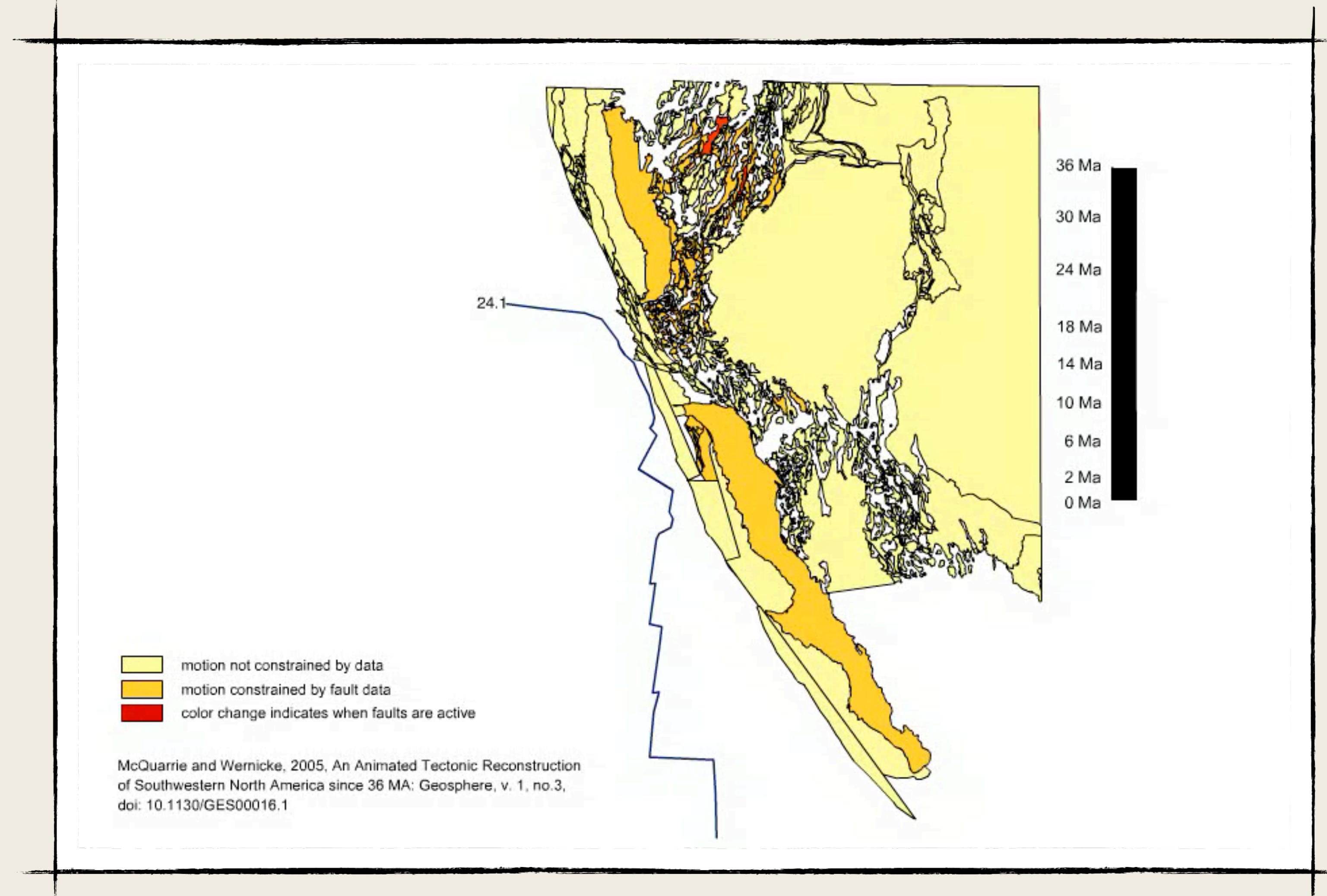
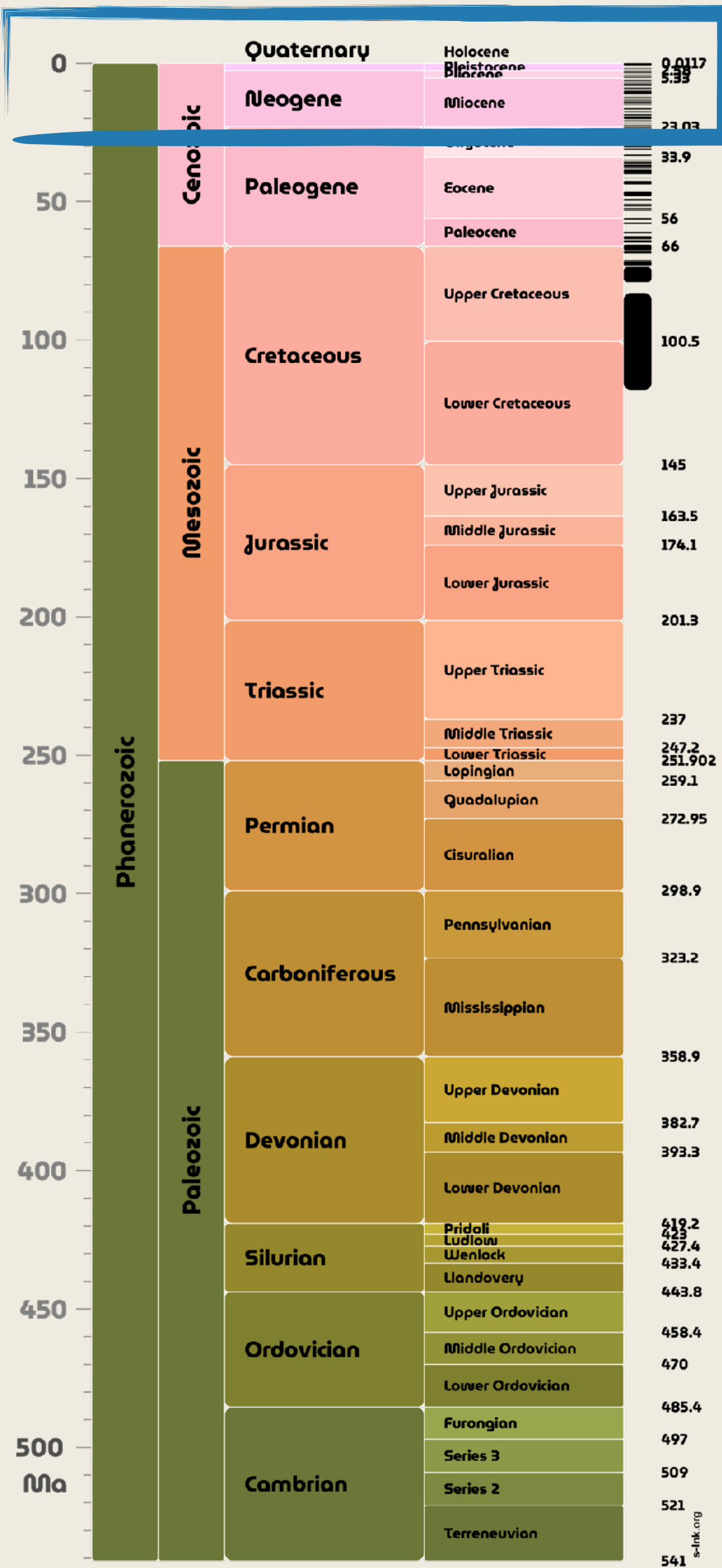
The Phoenix Mountains and the Basin & Range



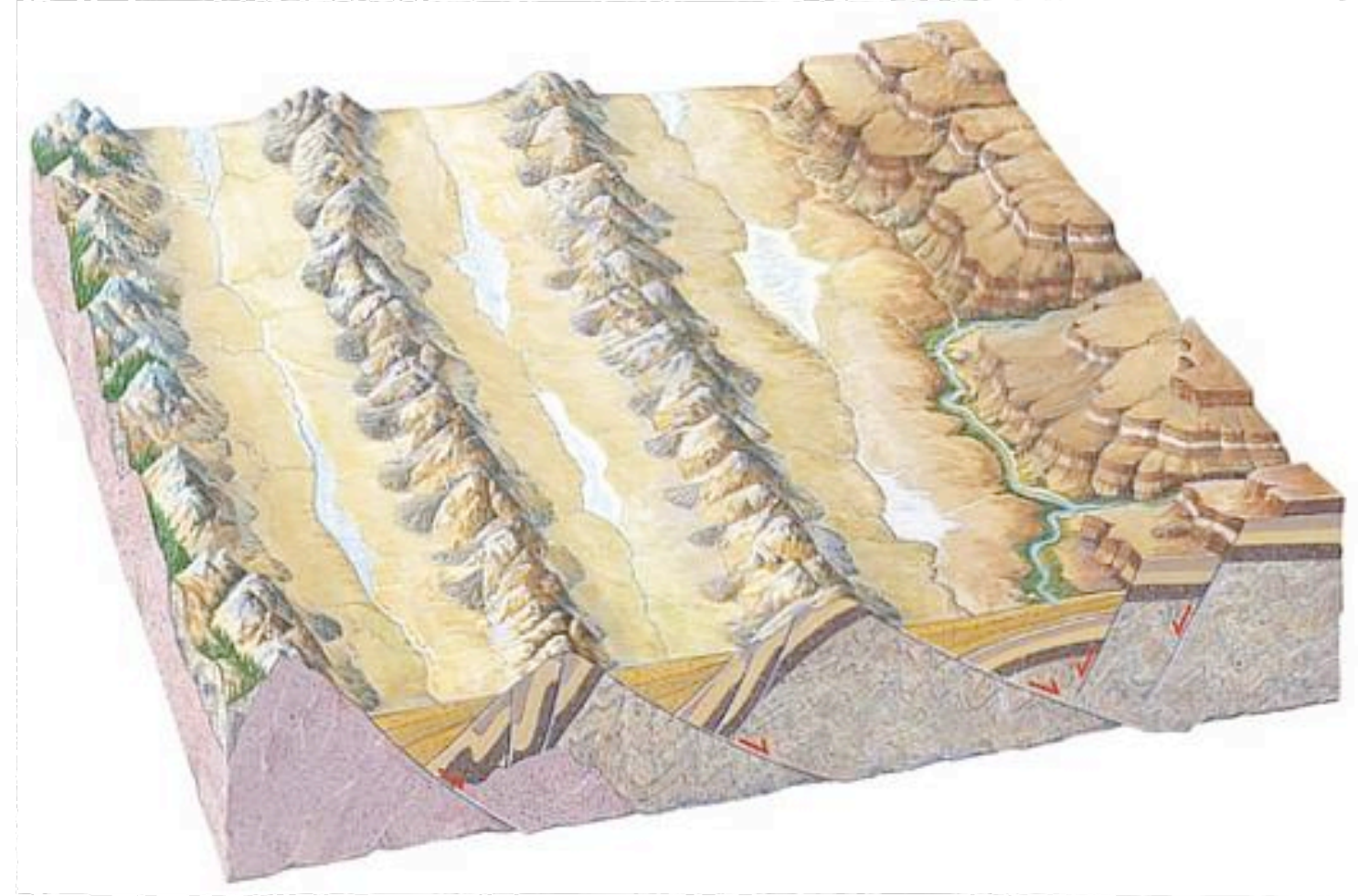
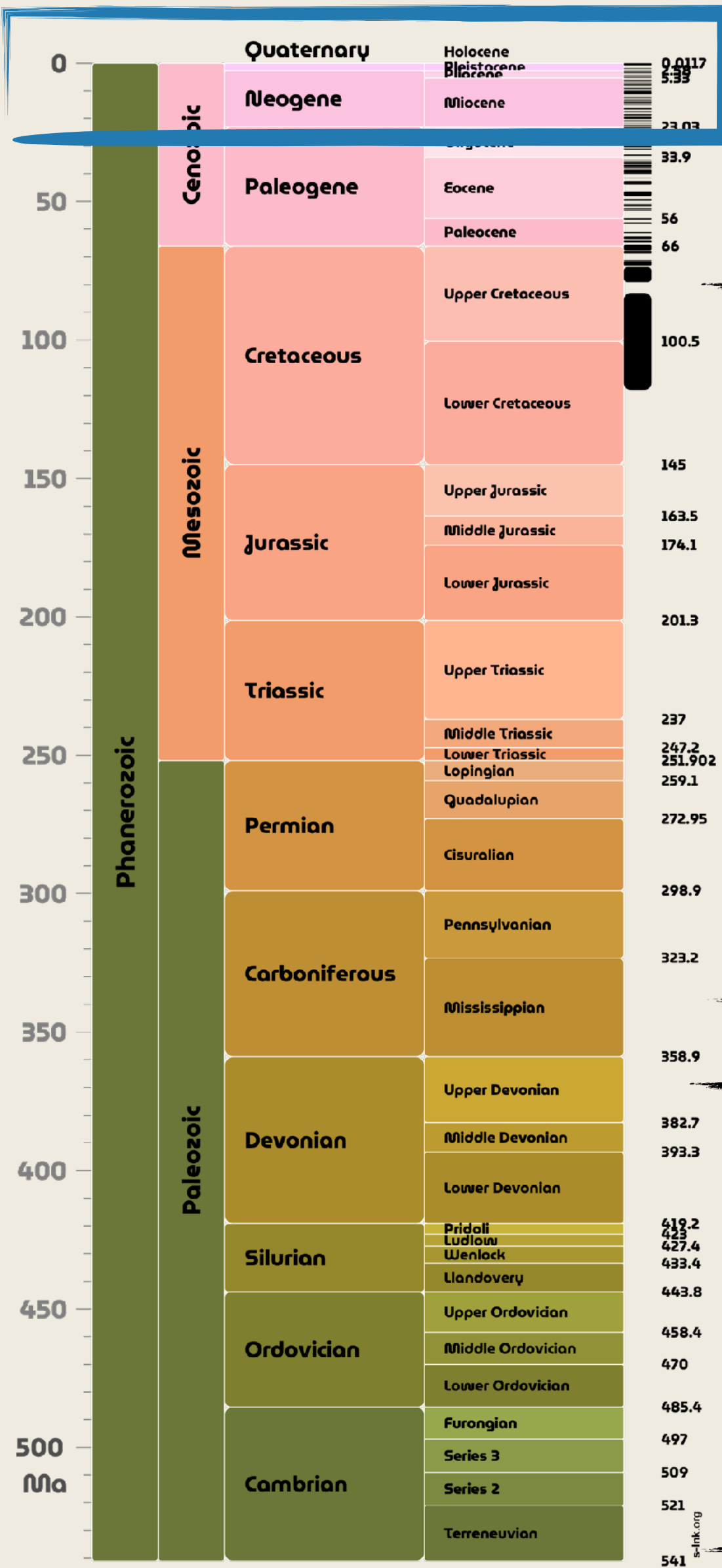
The Phoenix Mountains and the Basin & Range



The Phoenix Mountains and the Basin & Range



The Phoenix Mountains and the Basin & Range



Volcanoes, Beasts, and Adventure 0 My!

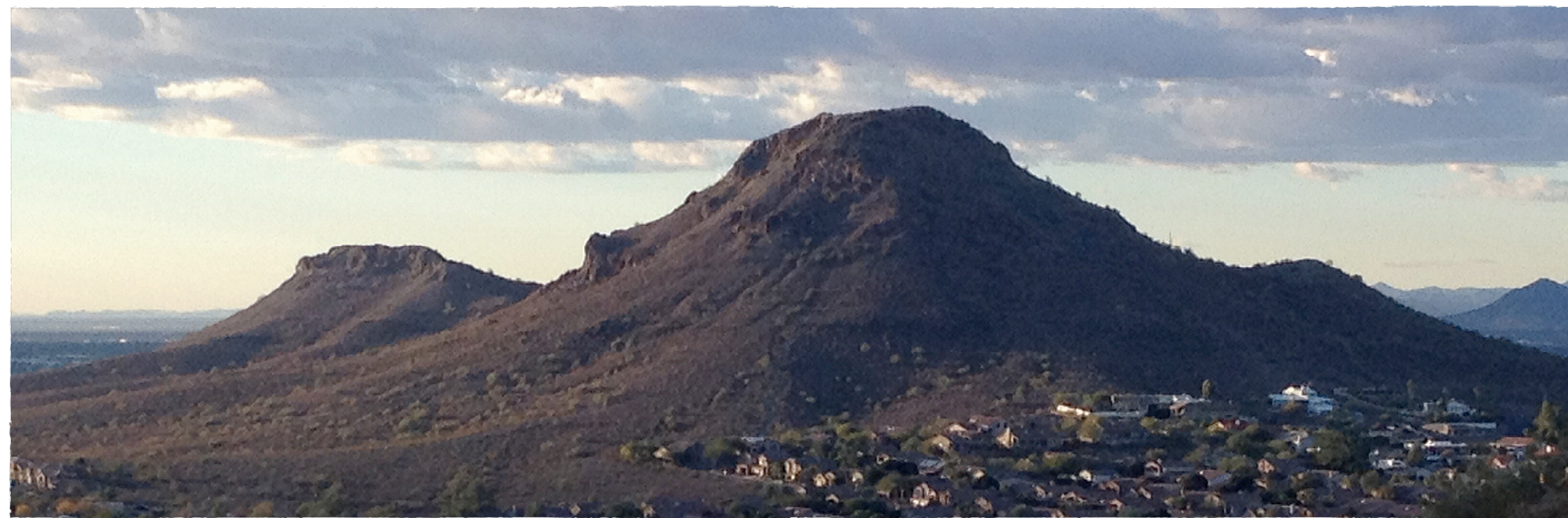
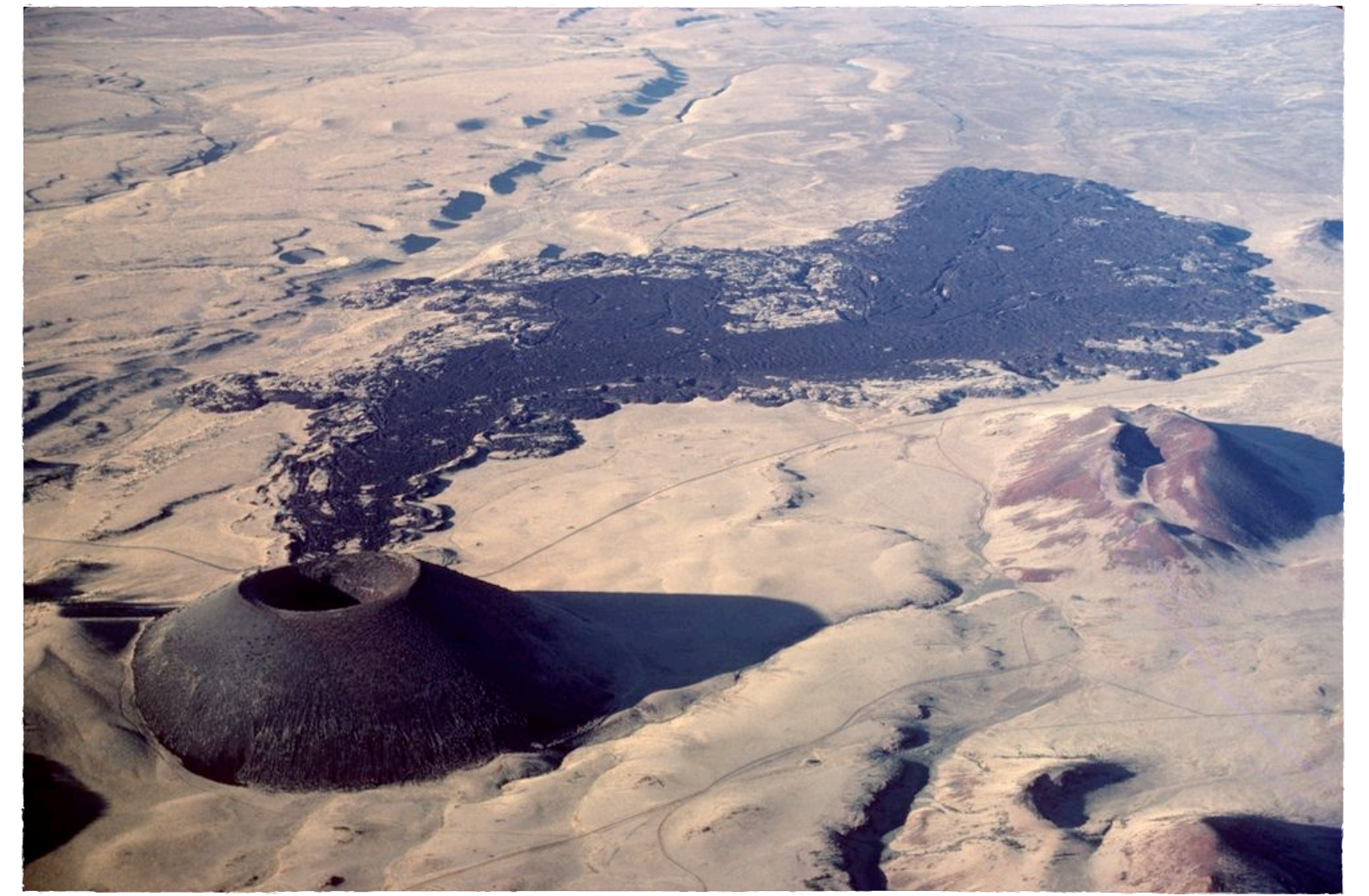
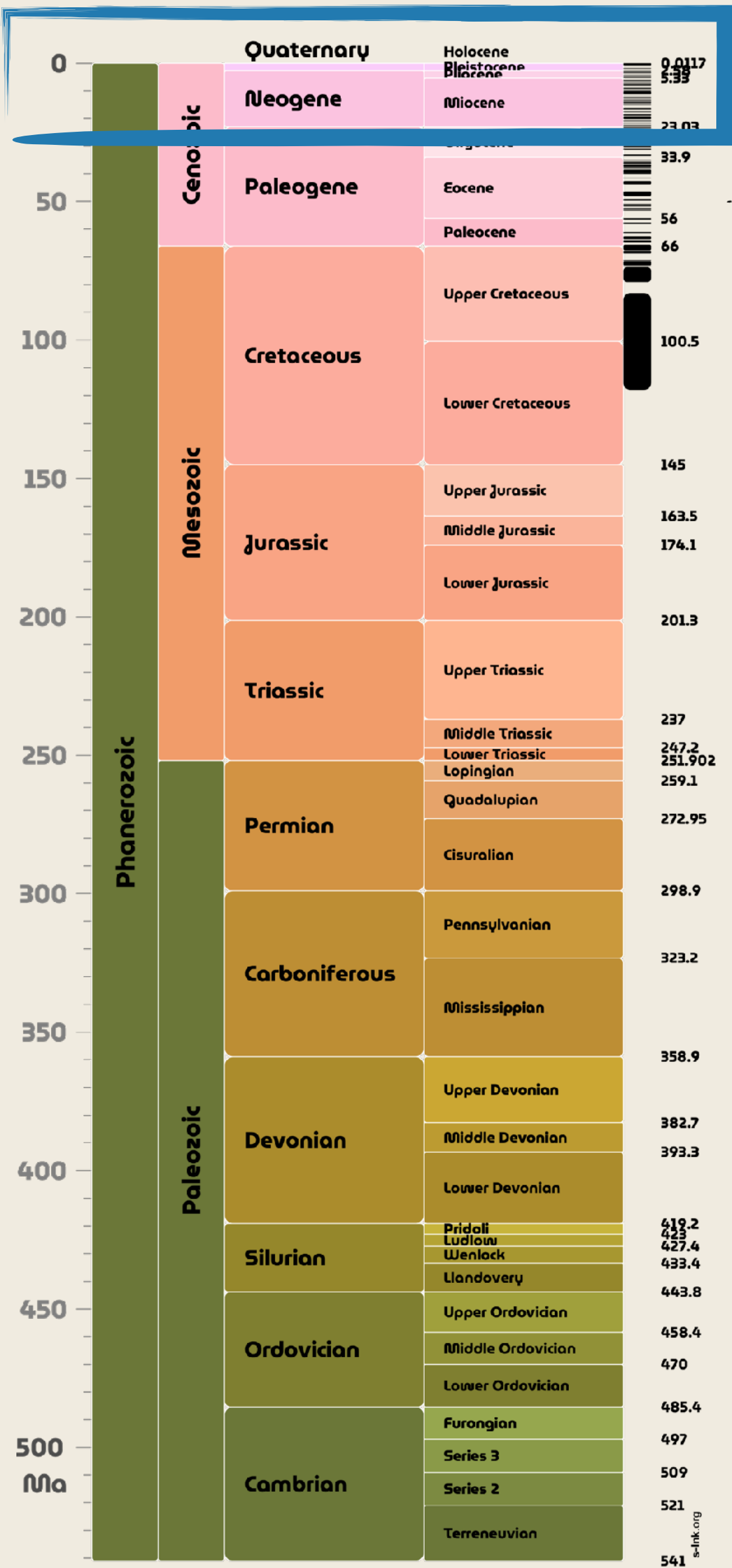


Photo: Michael Schneider, Christopher on Peakery

Volcanoes, Beasts, and Adventure 0 My!

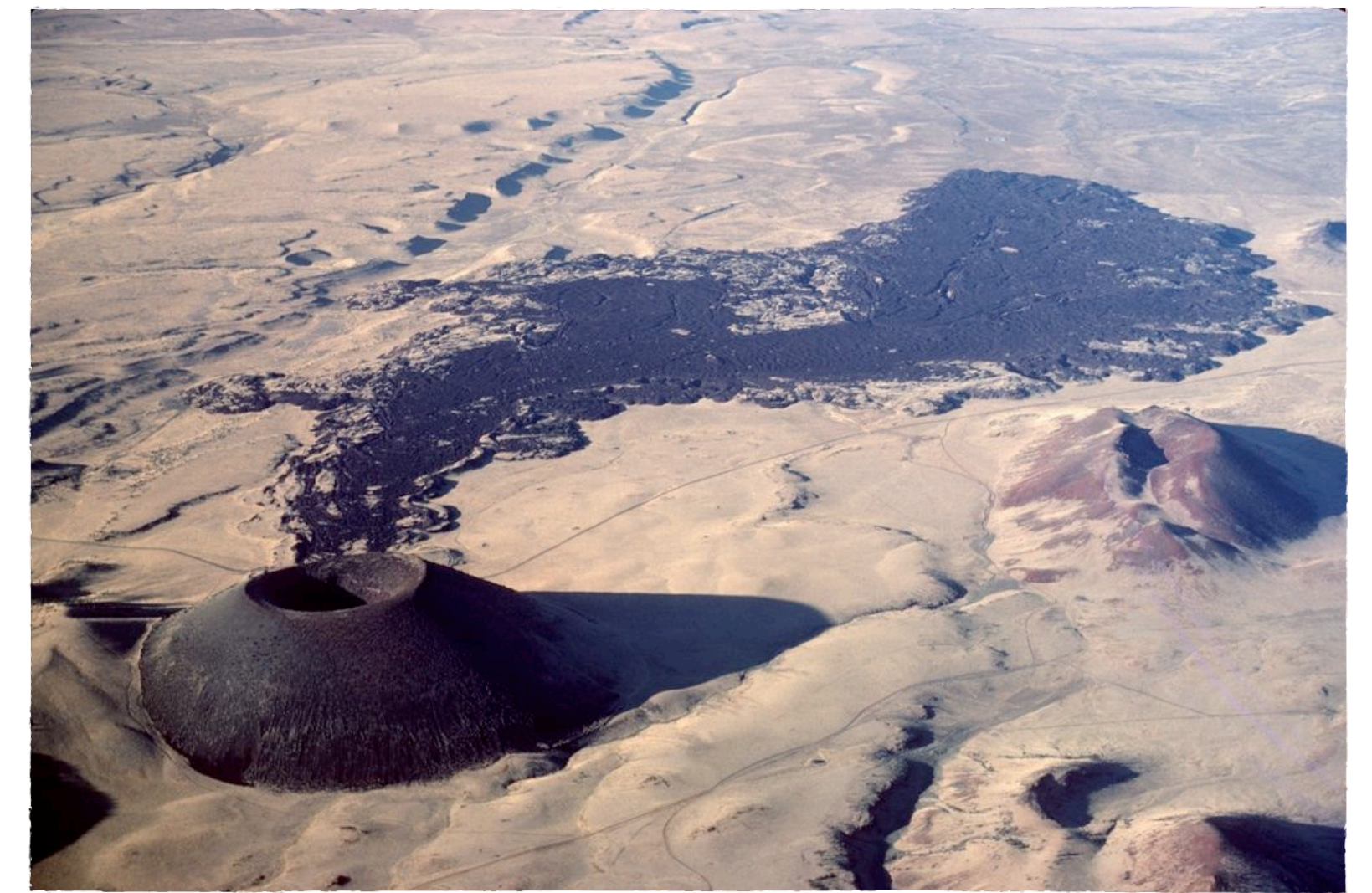
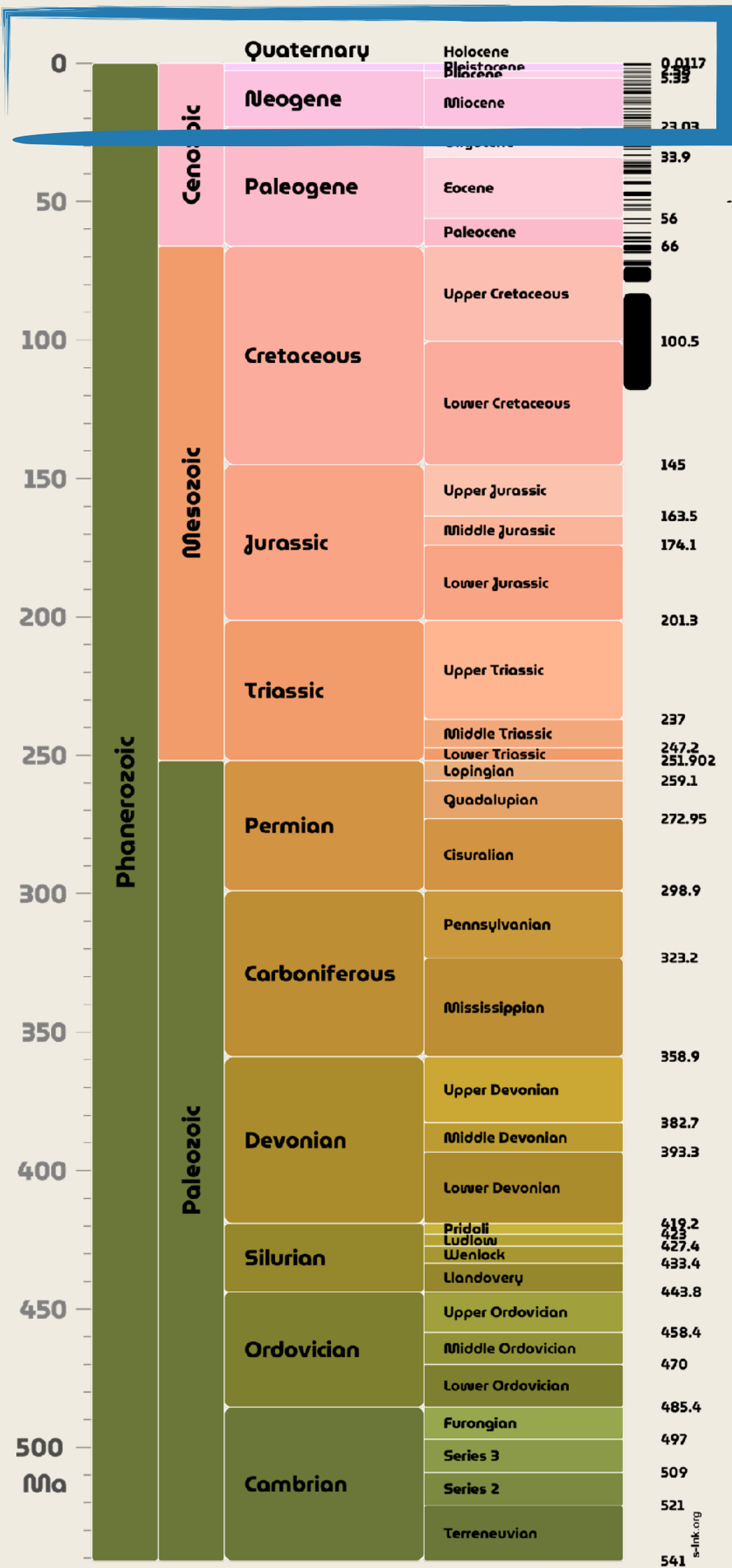
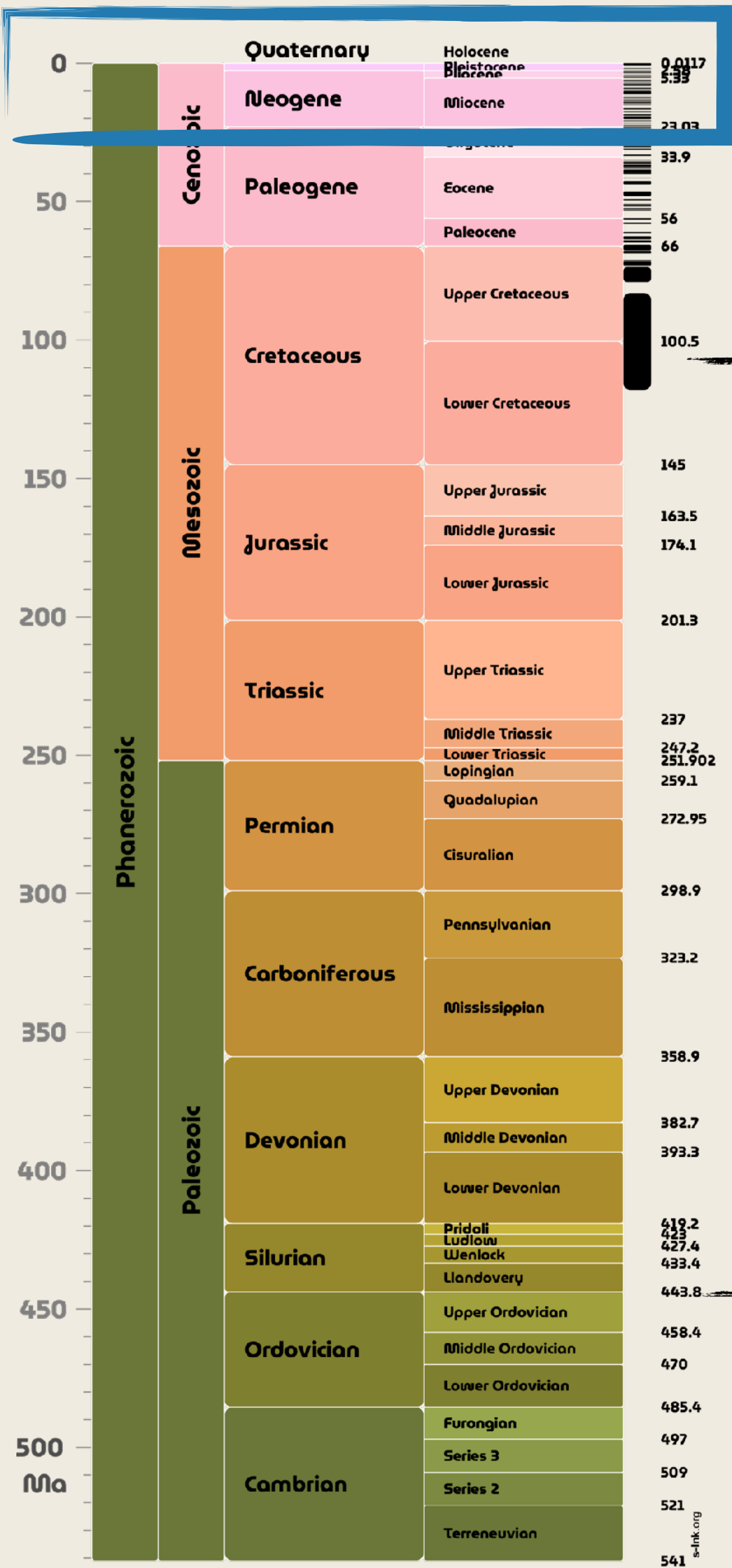
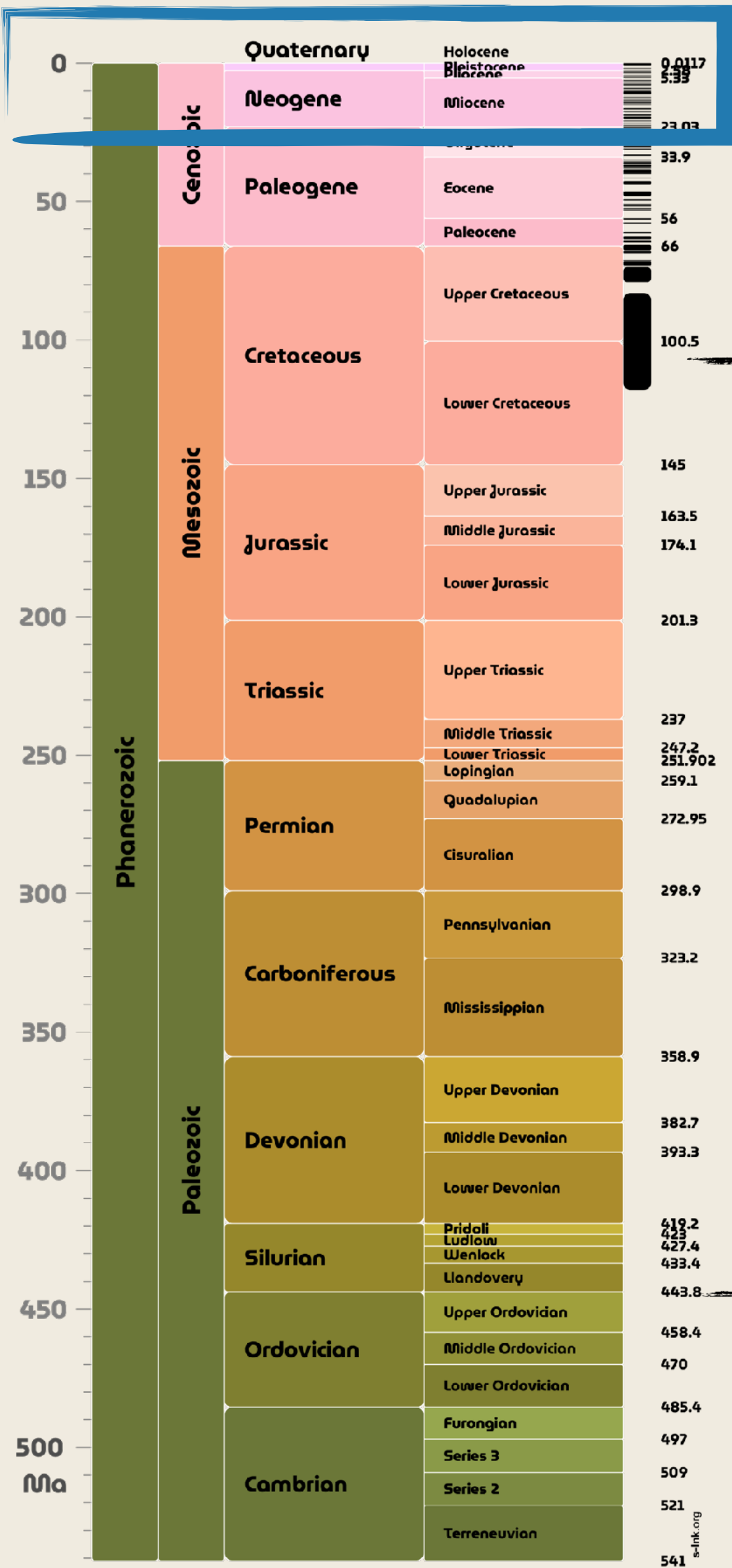


Photo: Michael Schneider, Christopher on Peakery

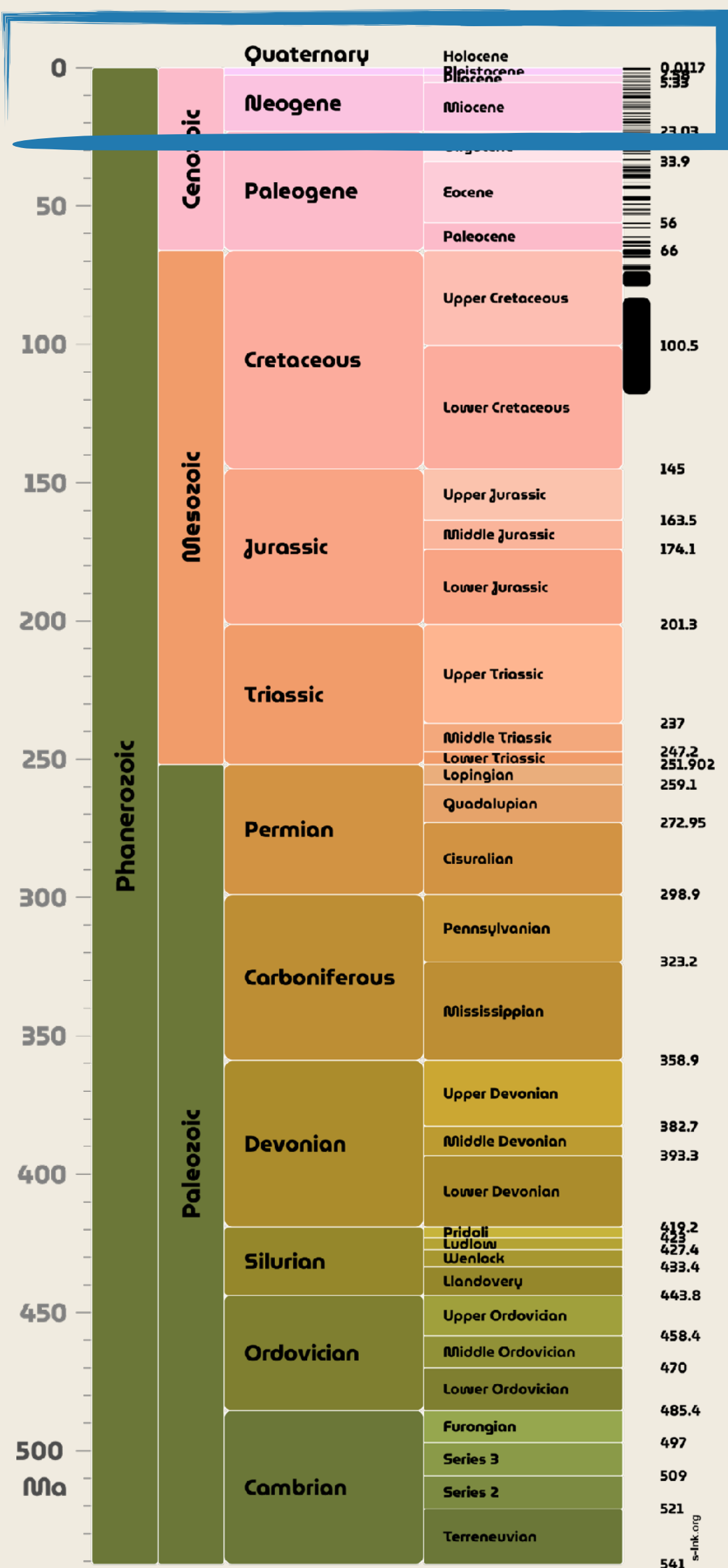
Volcanoes, Beasts, and Adventure 0 My!



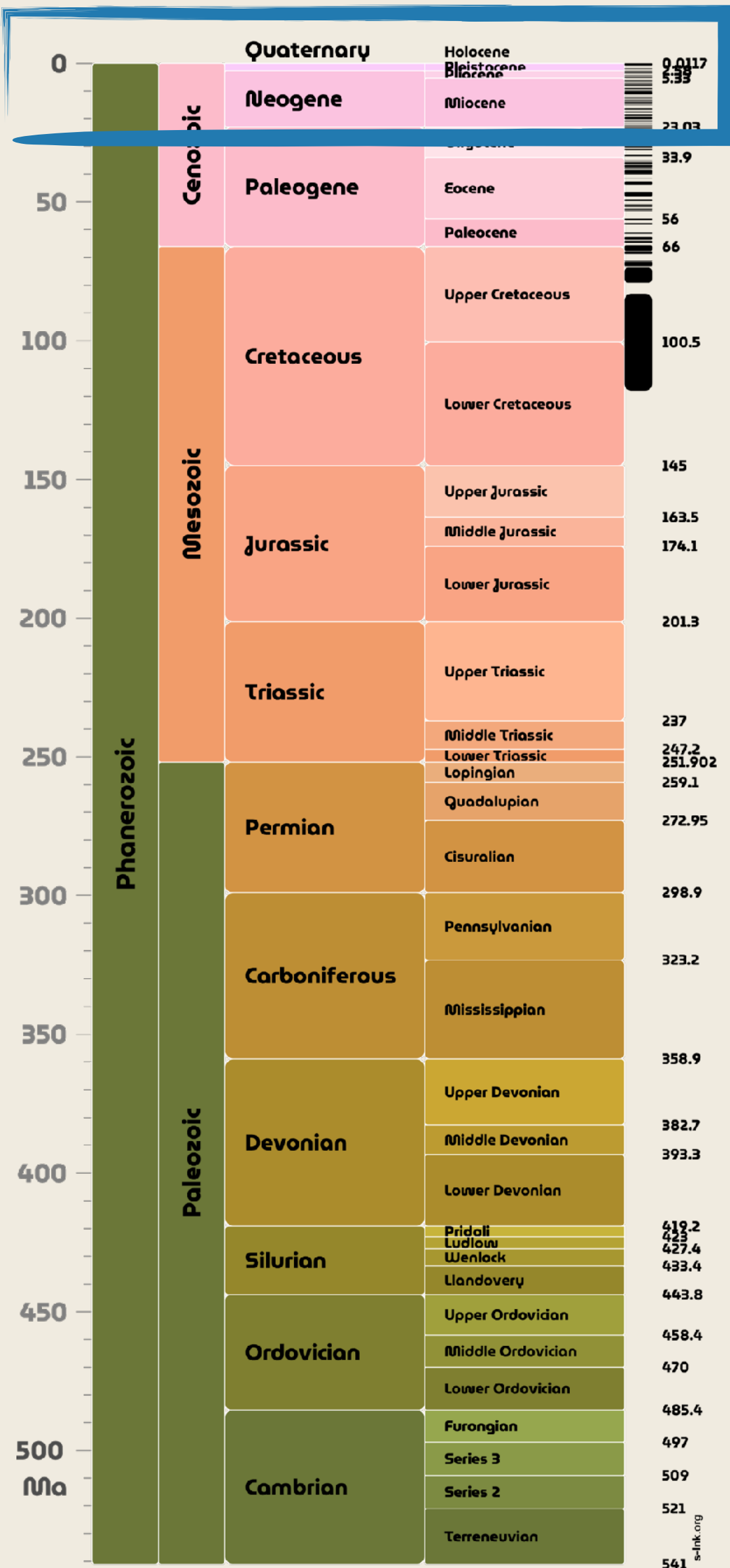
Volcanoes, Beasts, and Adventure 0 My!



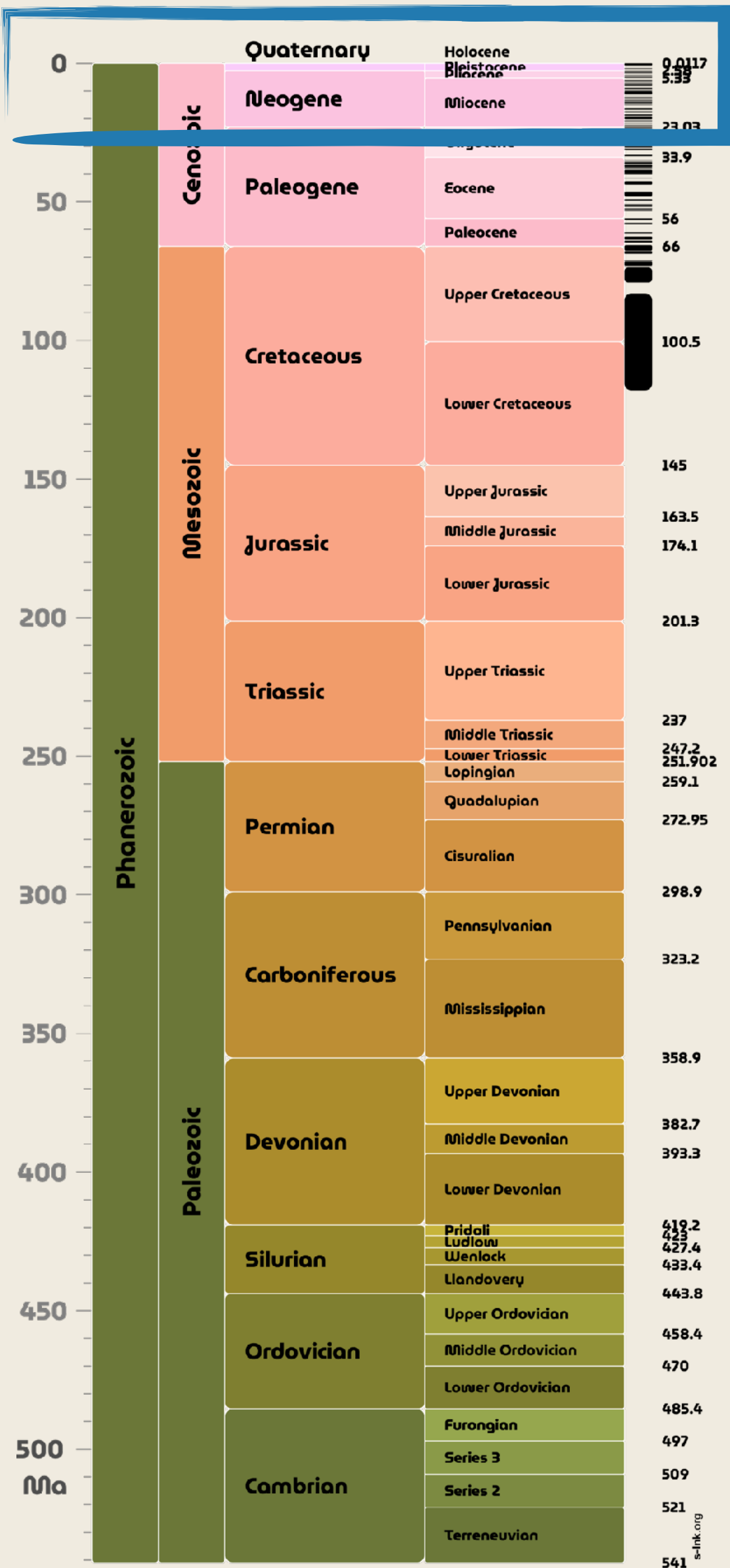
Volcanoes, Beasts, and Adventure 0 My!



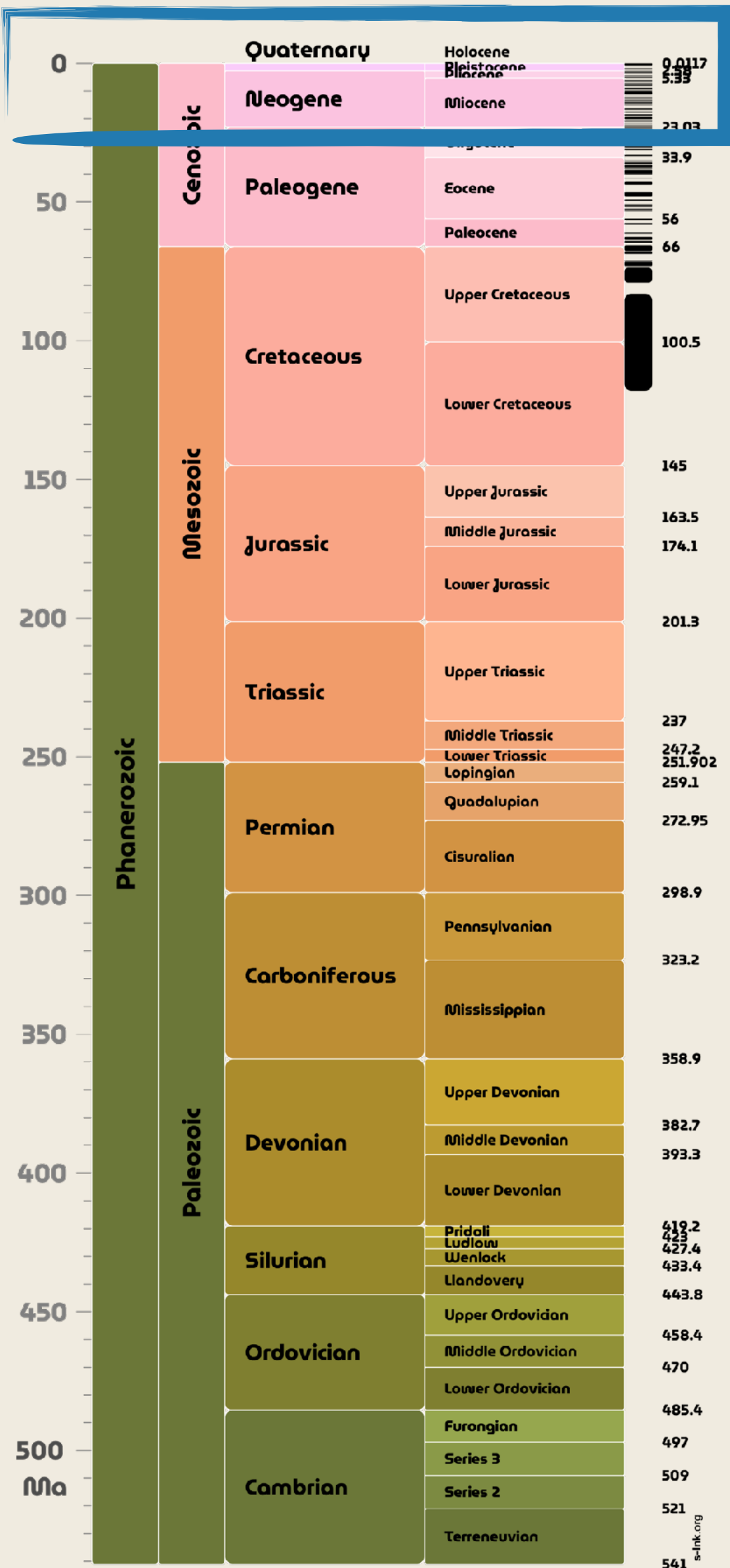
Volcanoes, Beasts, and Adventure 0 My!



Volcanoes, Beasts, and Adventure 0 My!



Volcanoes, Beasts, and Adventure 0 My!

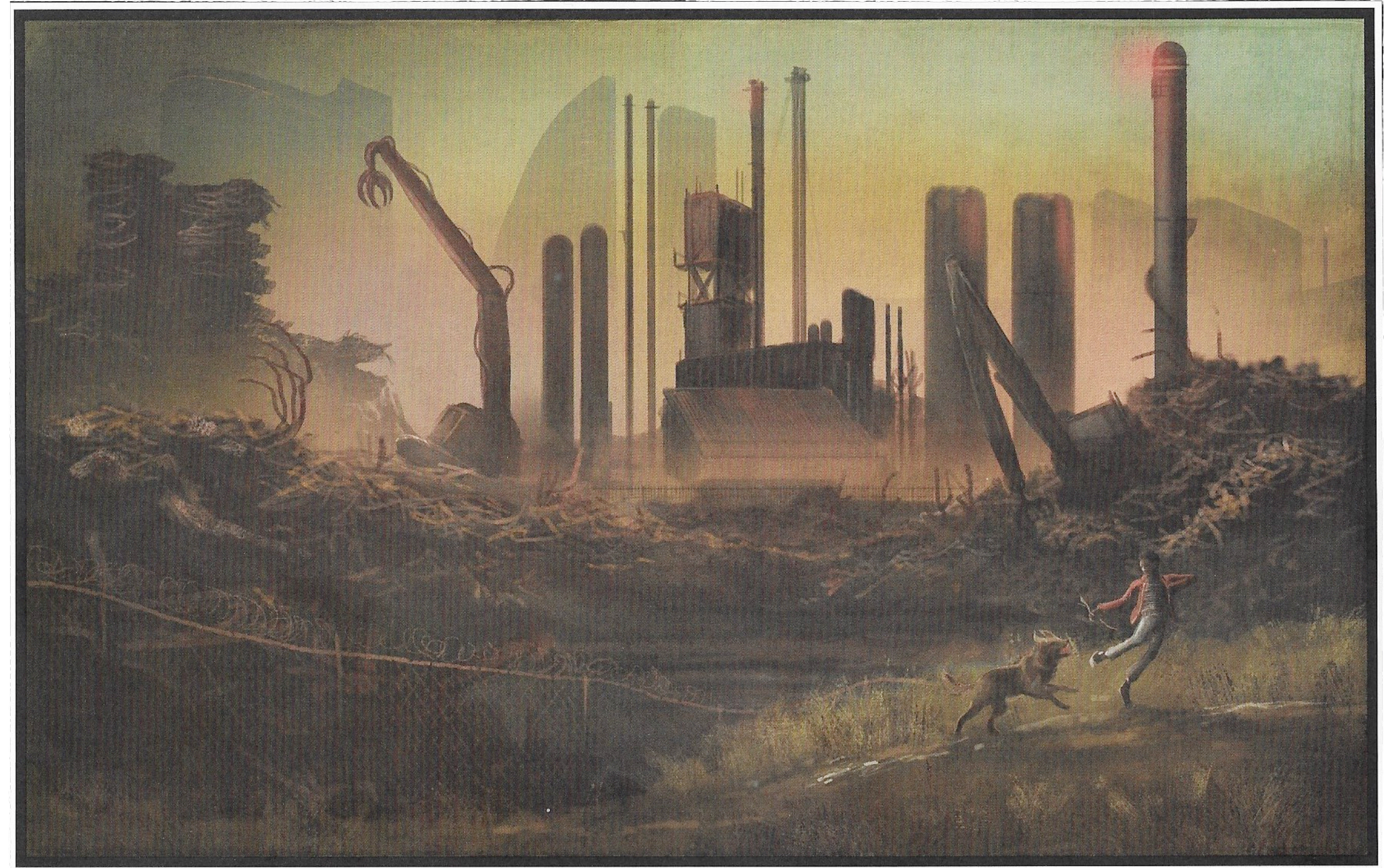


Mark Witton (2020)

What will be our geological story?

SCIENTIA POTENTIA EST = Knowledge is Power

"Technofossils"



A sense of wonder and adventure.

