

Unlocking Ancient Antarctic Climates and Landscapes

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for

Museum of Discovery & Science
Distinguished Lecture Program
Jan 6, 2021

Sedimentary Geology

- Study of sedimentary rocks
- Direct record of what happened on our planet's surface
- Life, climate, landscapes, etc.



Sedimentary Geology

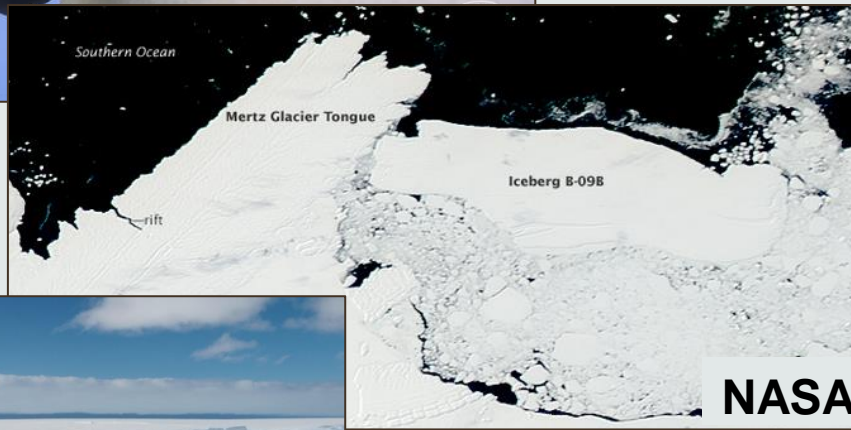
- Study of sedimentary rocks
- Direct record of what happened on our planet's surface
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The “Icicy Continent”



AAD



NASA



BAS

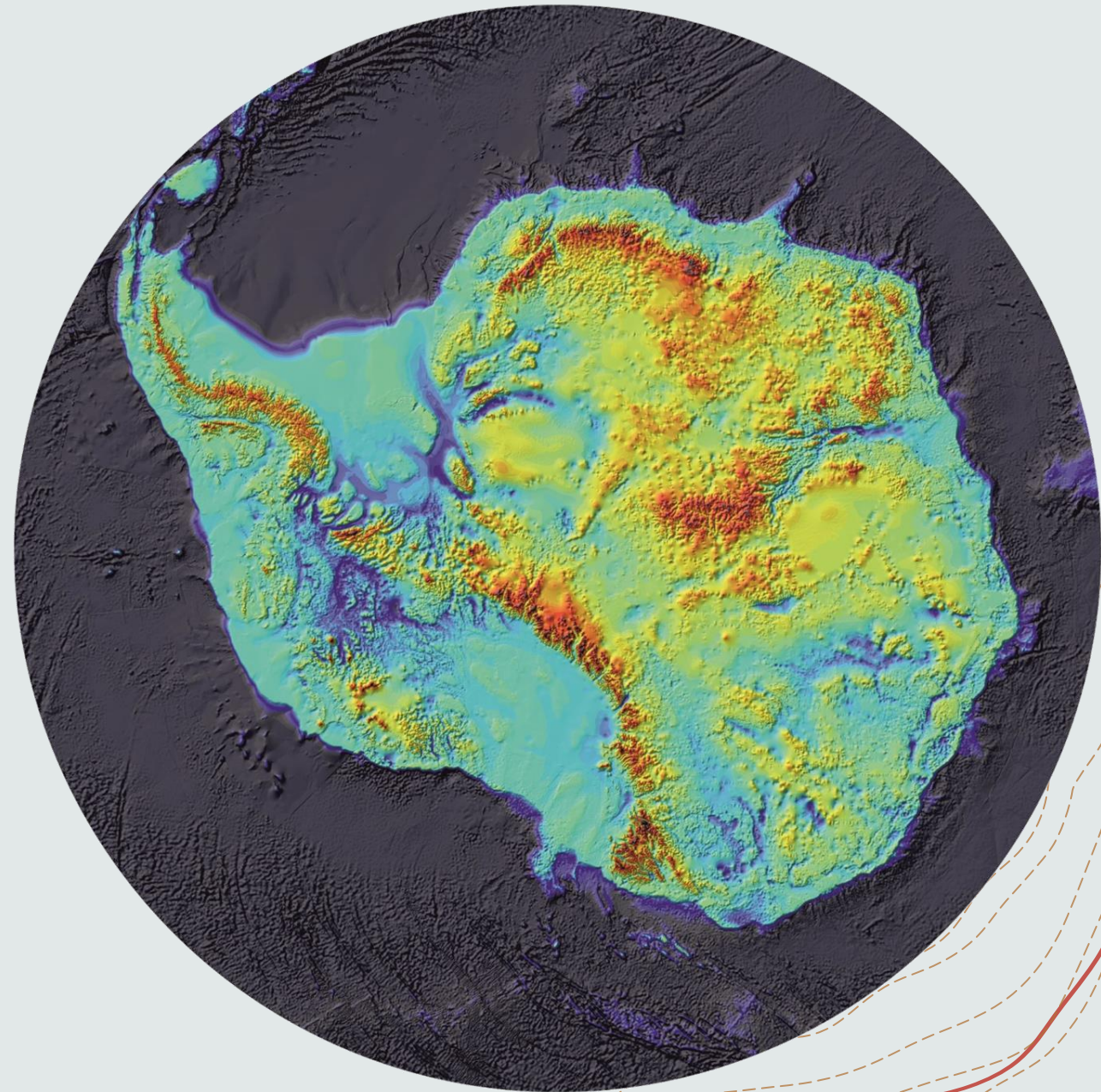


Map of Antarctica

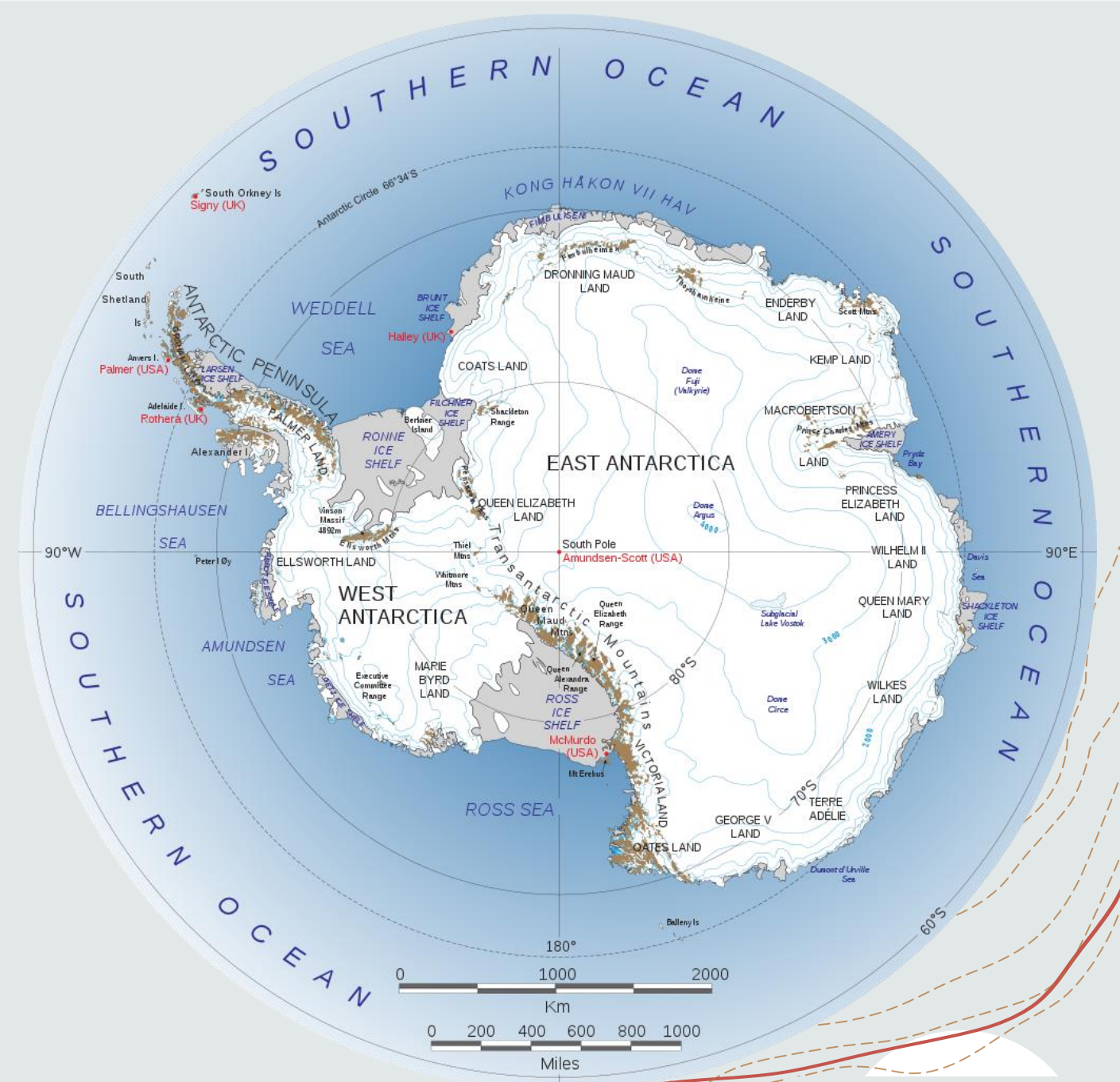
Atlas of the World 8th Ed. physical map of ocean floor around Antarctica. Map by National Geographic

The **Sub-glacial** **Continent**

- + Mountain ranges the height of the Rockies!
- + Valleys below sea level!
- + Everything in between!

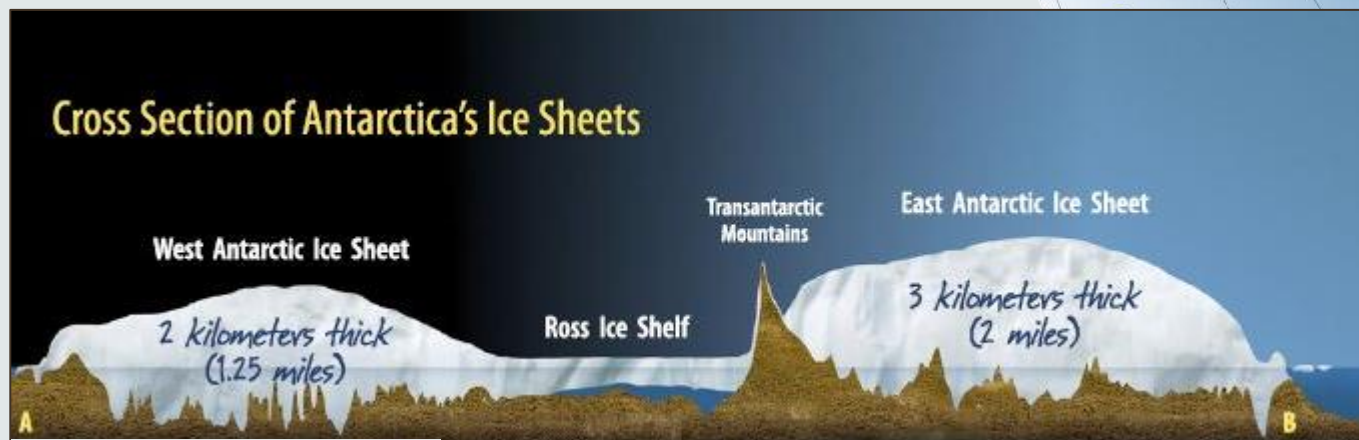


- 3% of Antarctica consists of rock protruding above the ice sheets



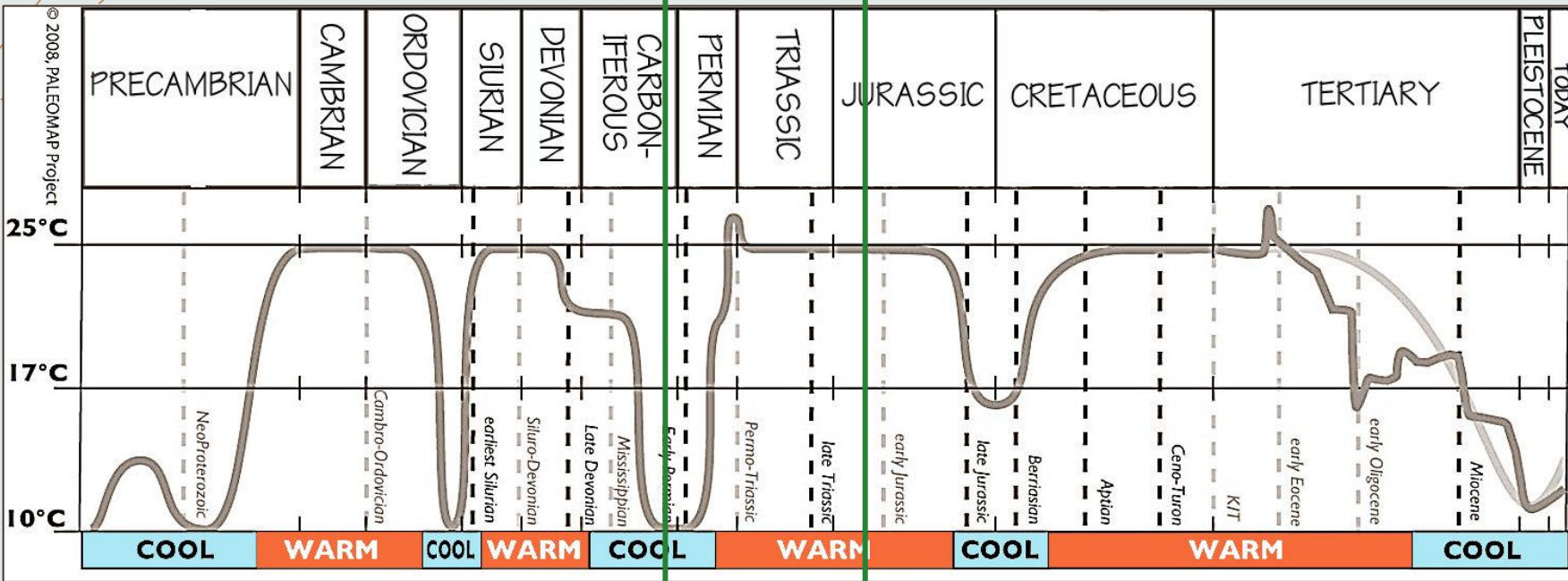
Transantarctic Mountains

- Major mountain range that protrudes above the ice
- Location of most of our research



Geologic-Scale Climate Change

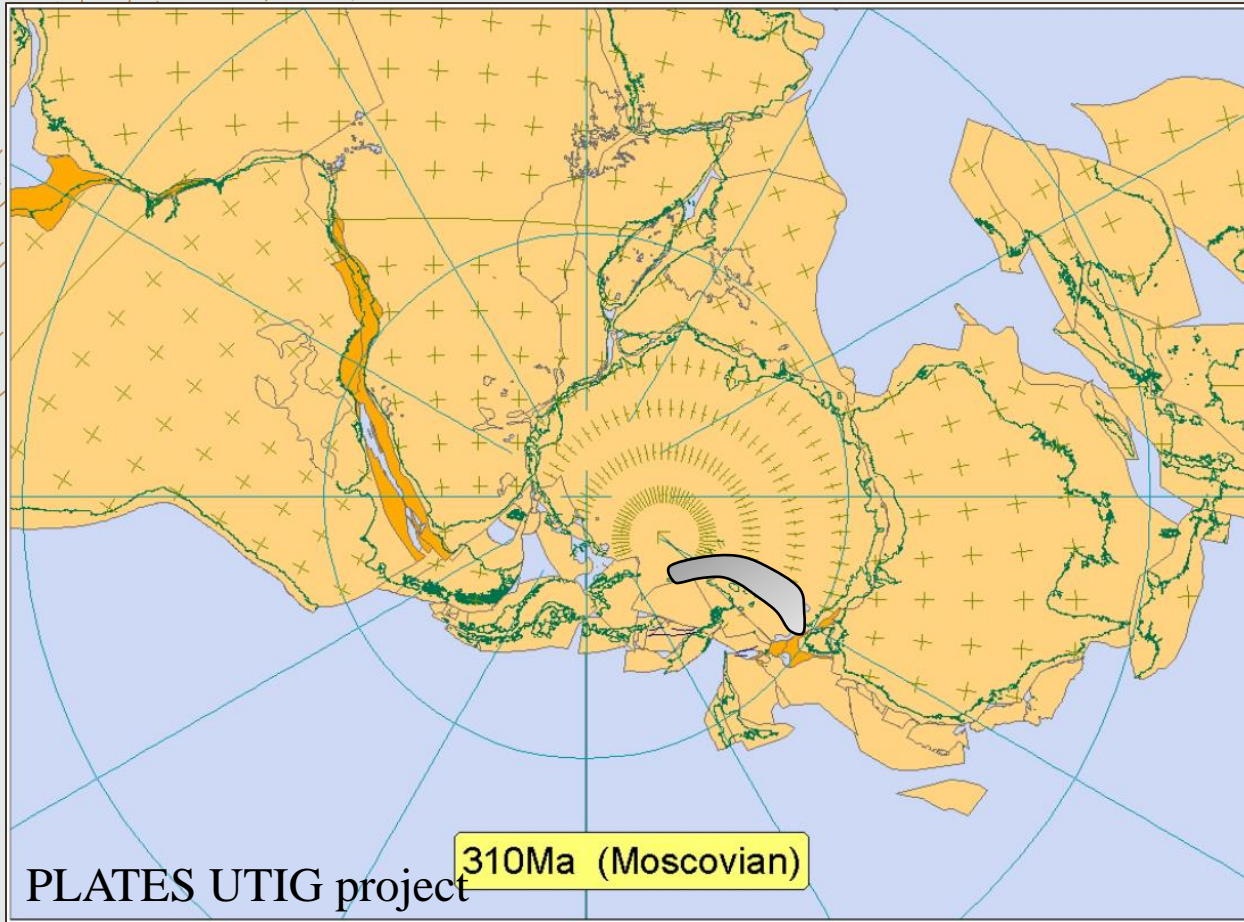
~300 Ma ~180 Ma



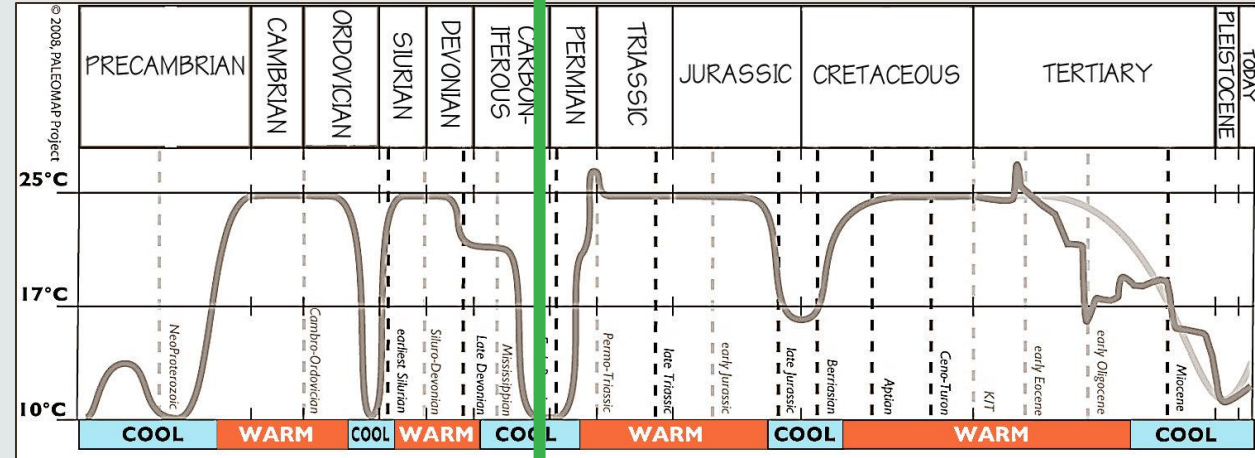
Transantarctic Mtns



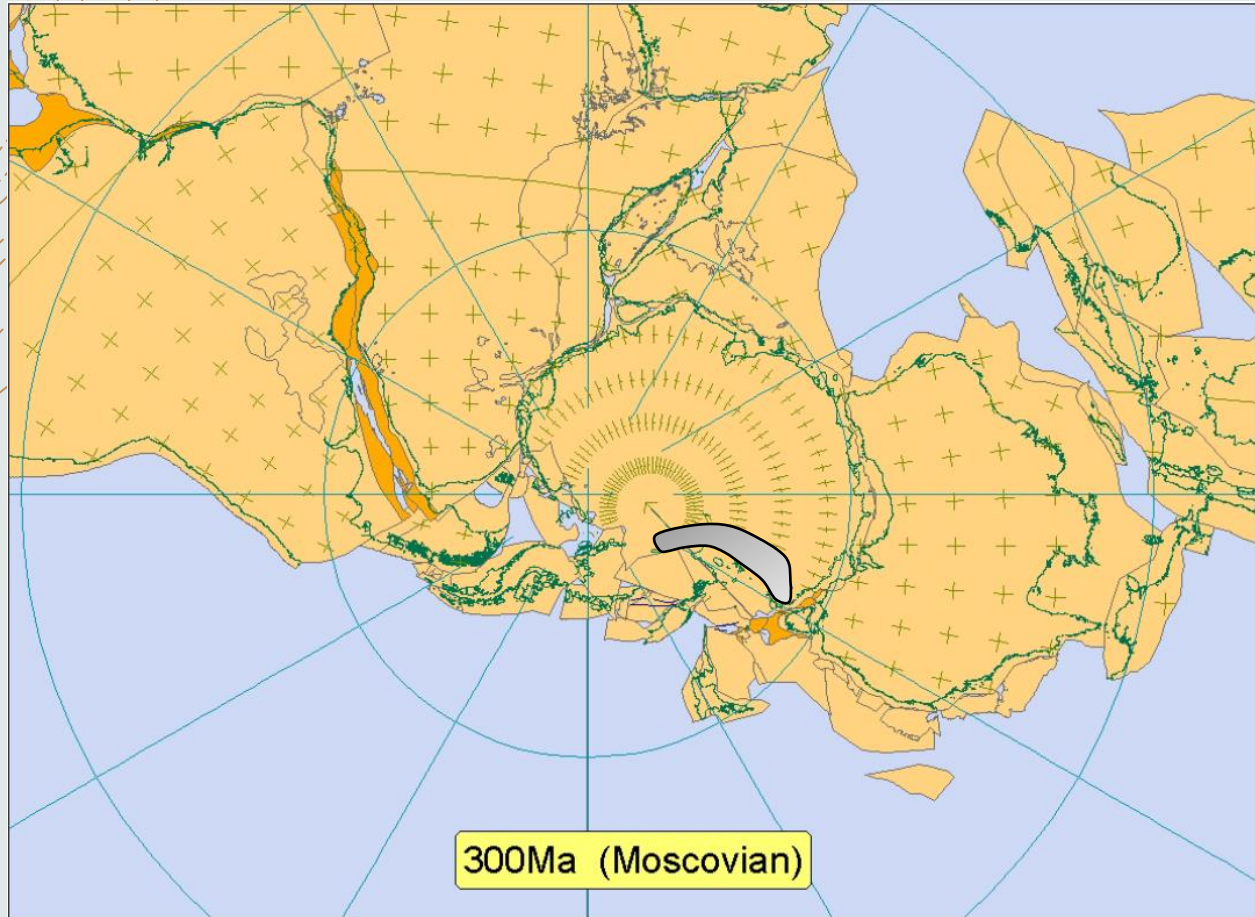
Antarctica: The South Polar Continent



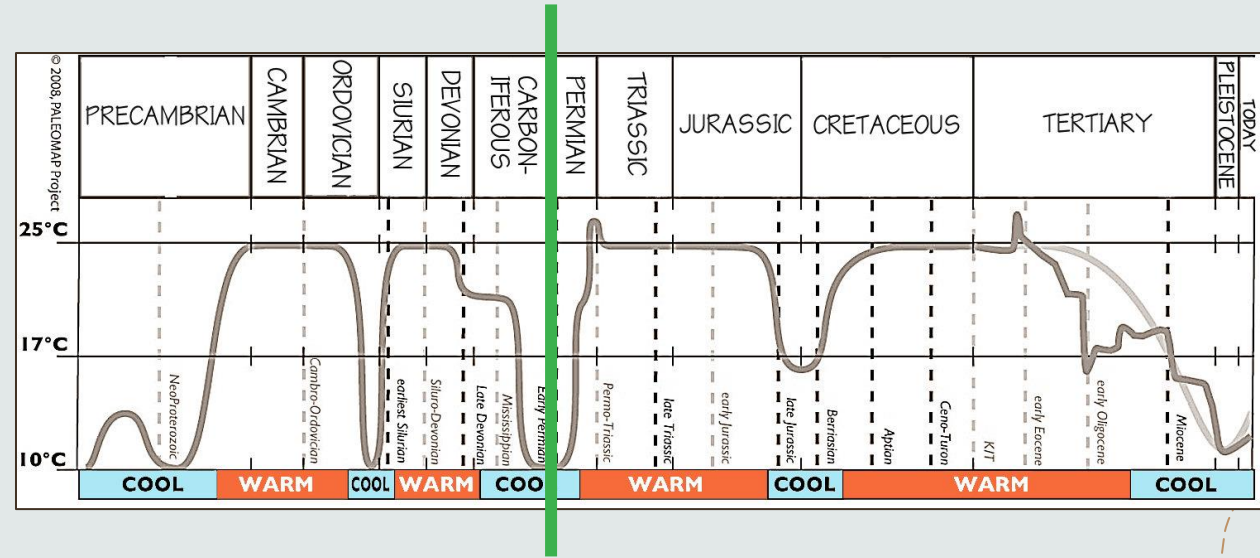
Carboniferous



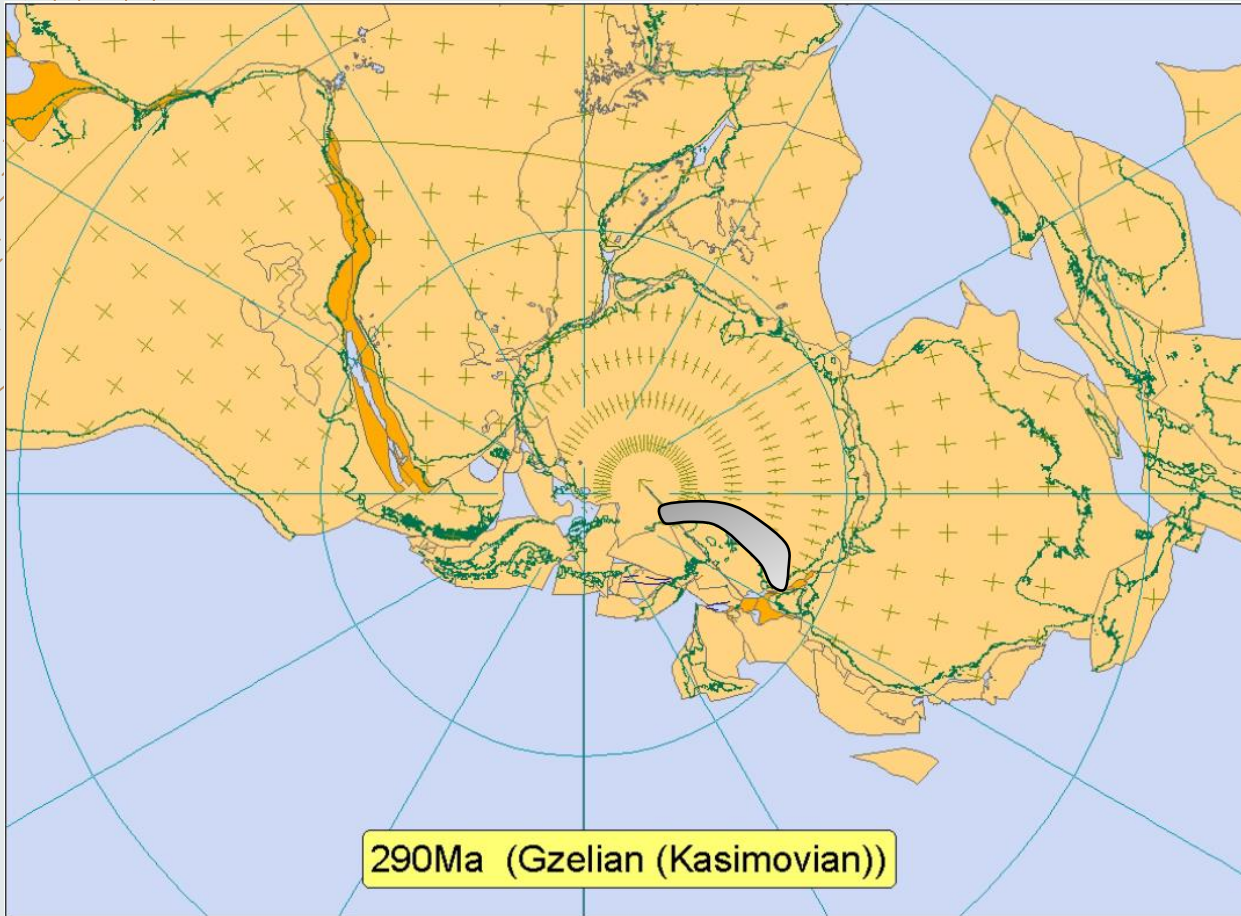
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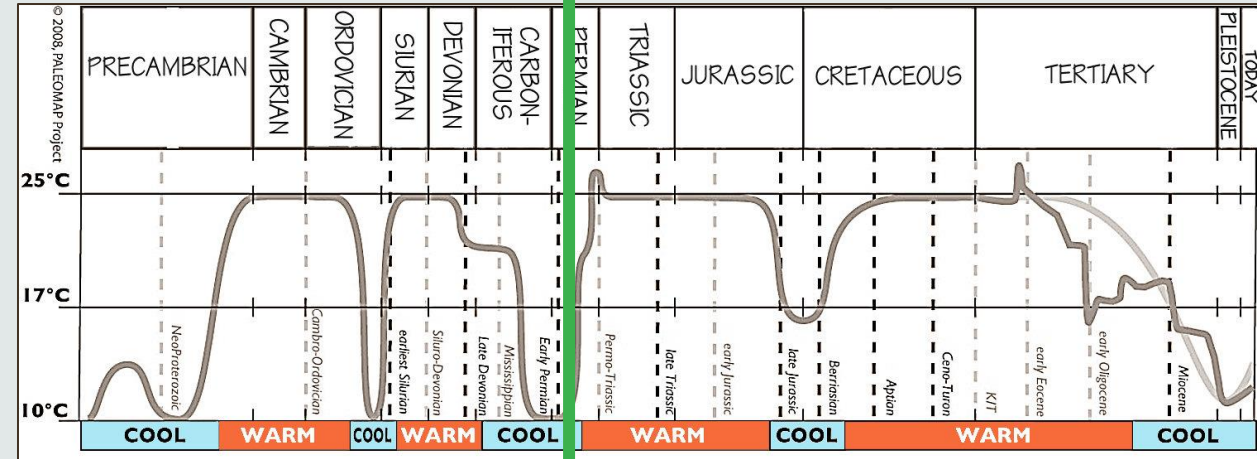
Carboniferous-Permian
Boundary



Antarctica: The South Polar Continent



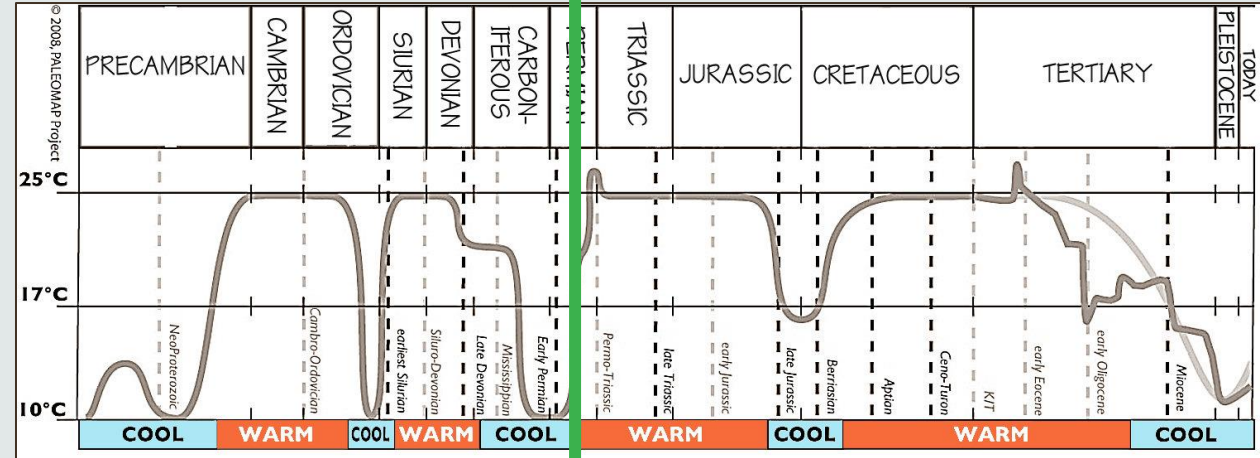
Permian



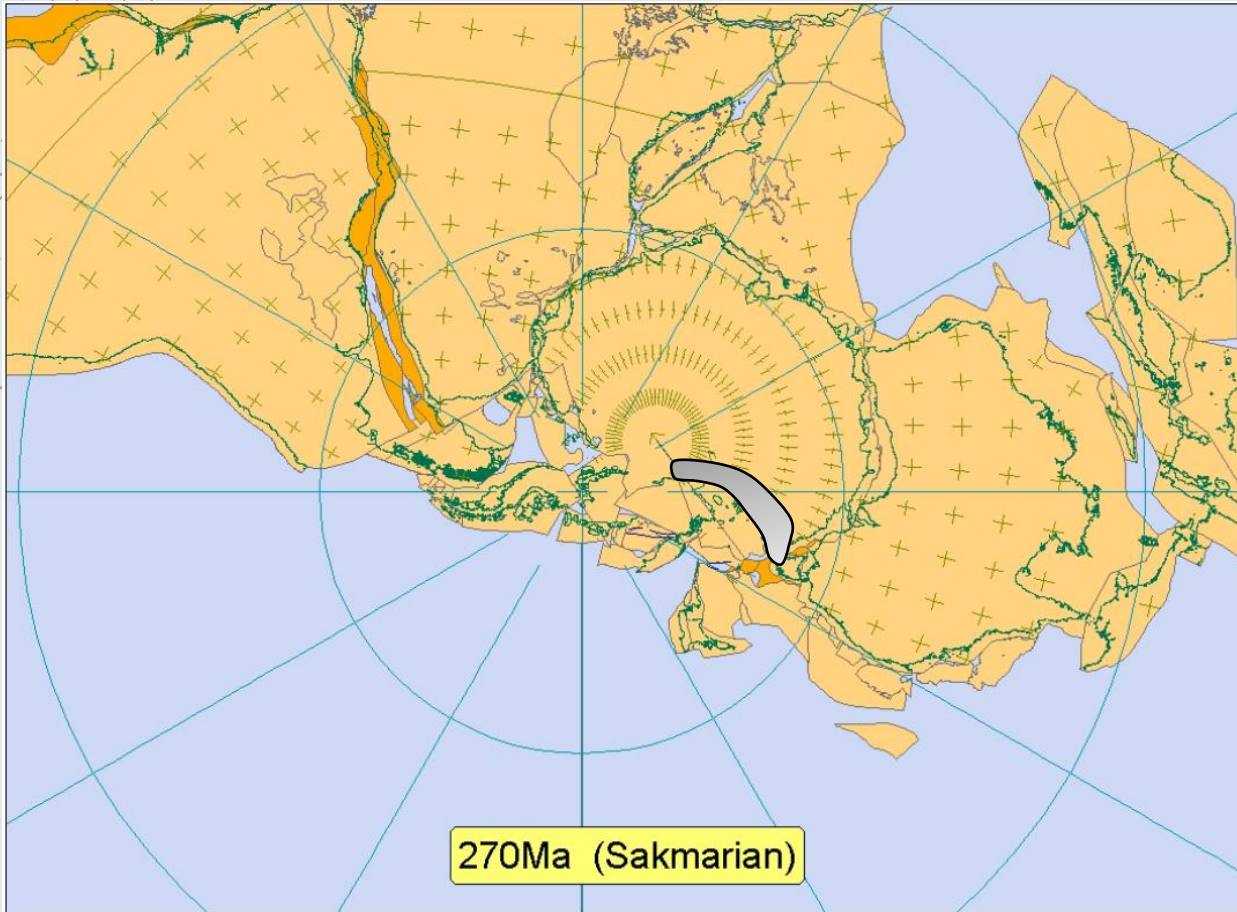
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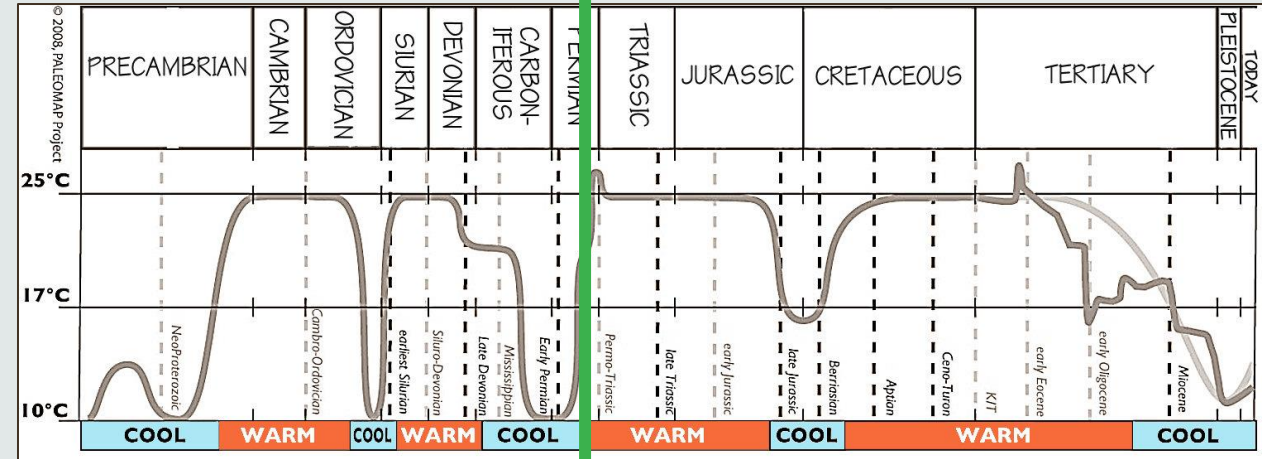
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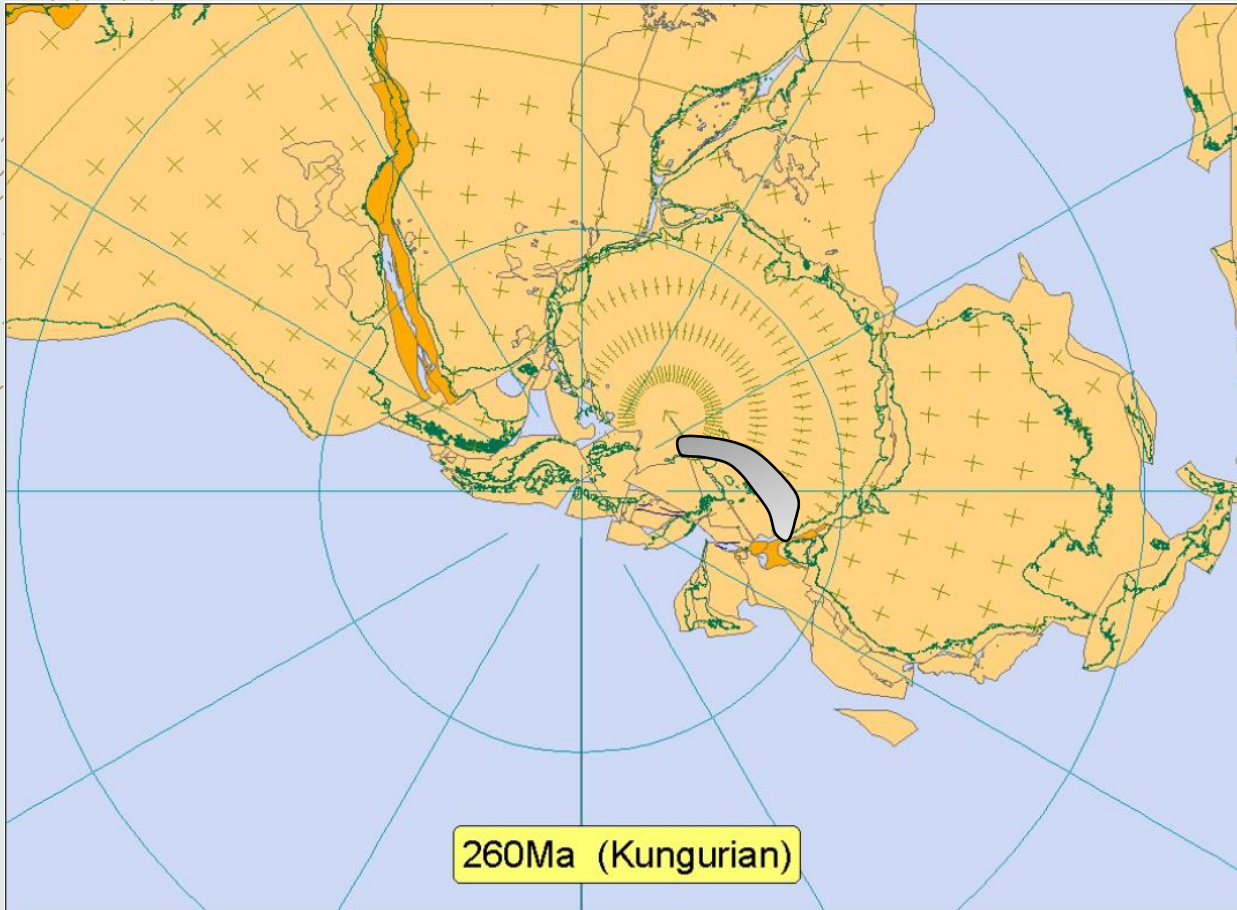
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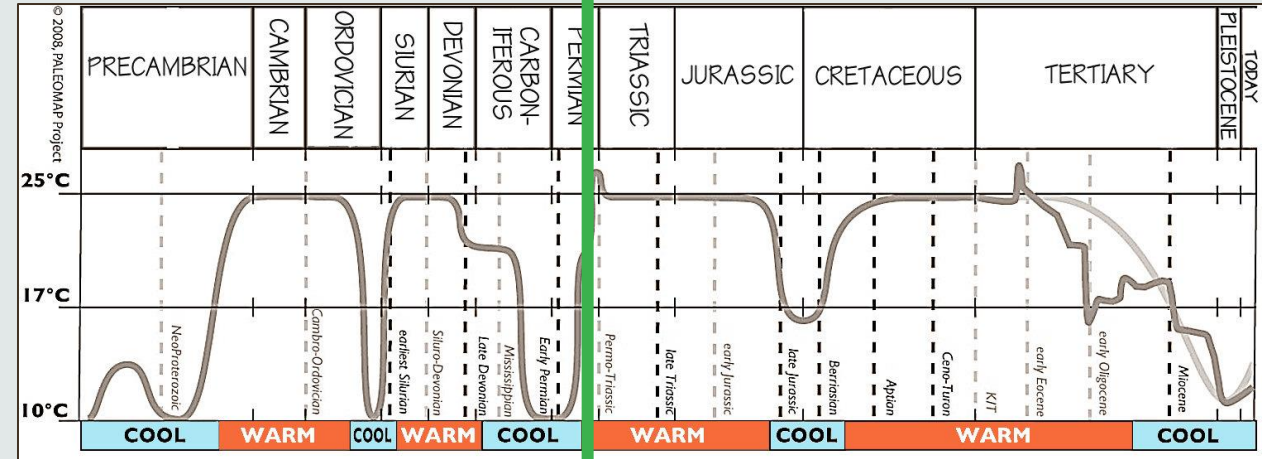
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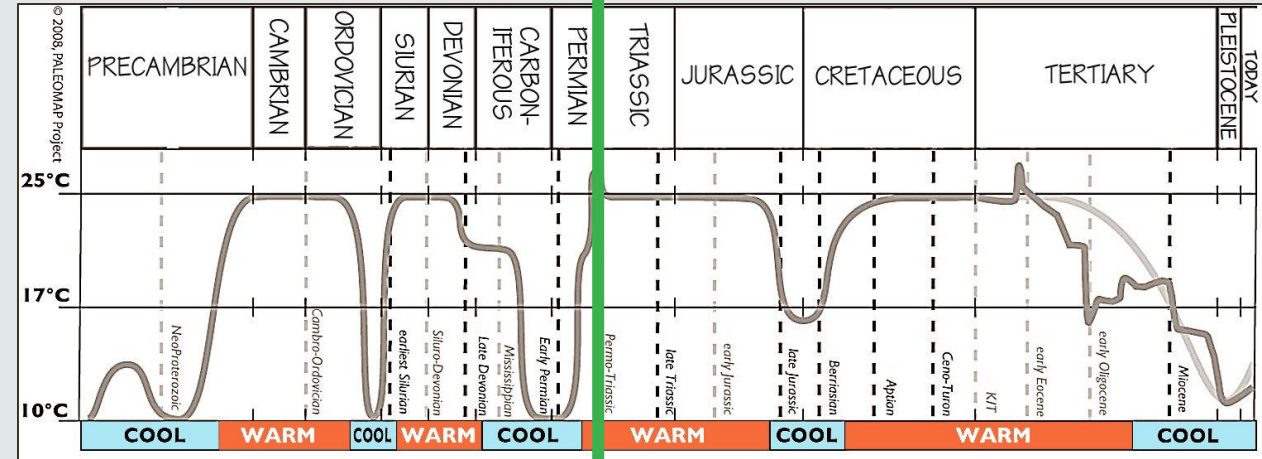
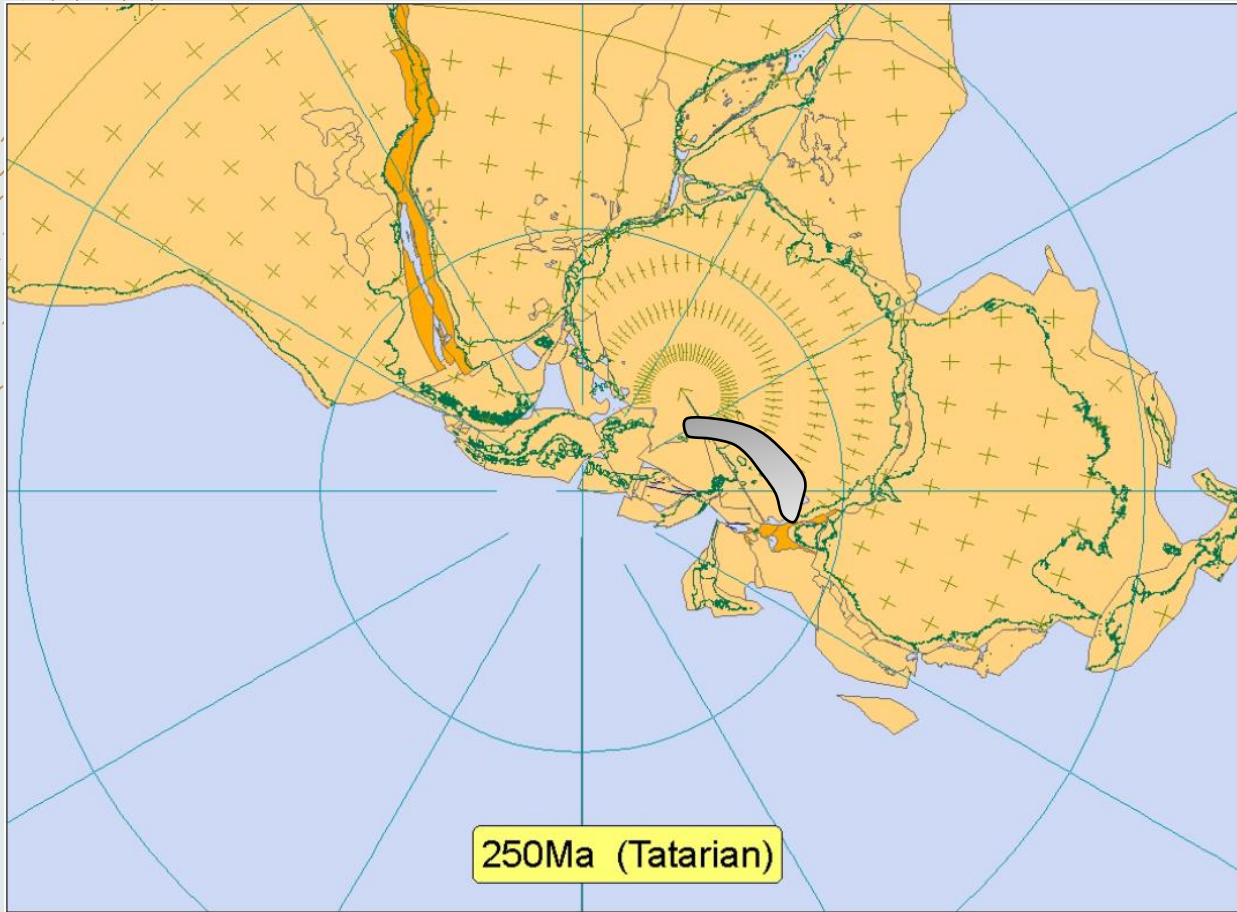
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Permian

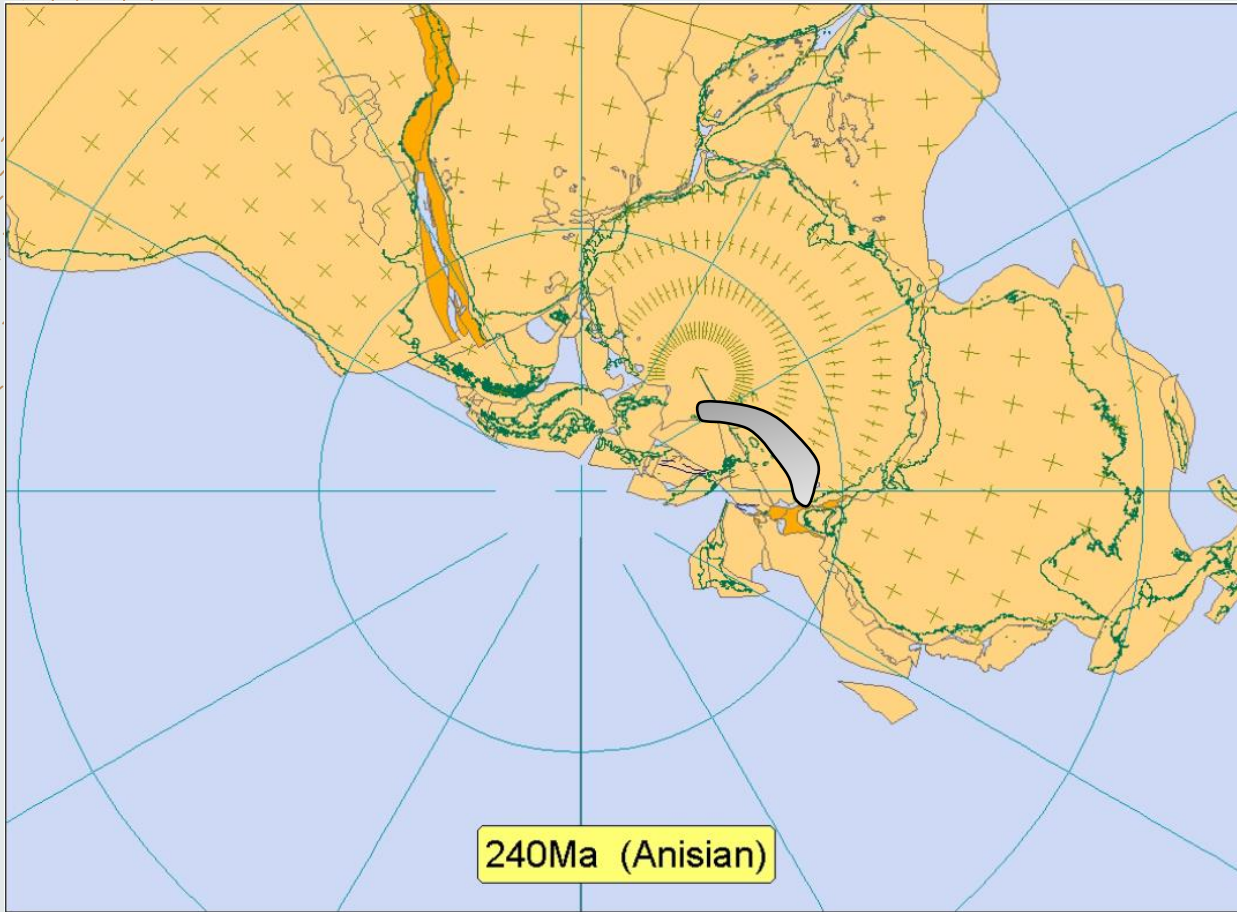


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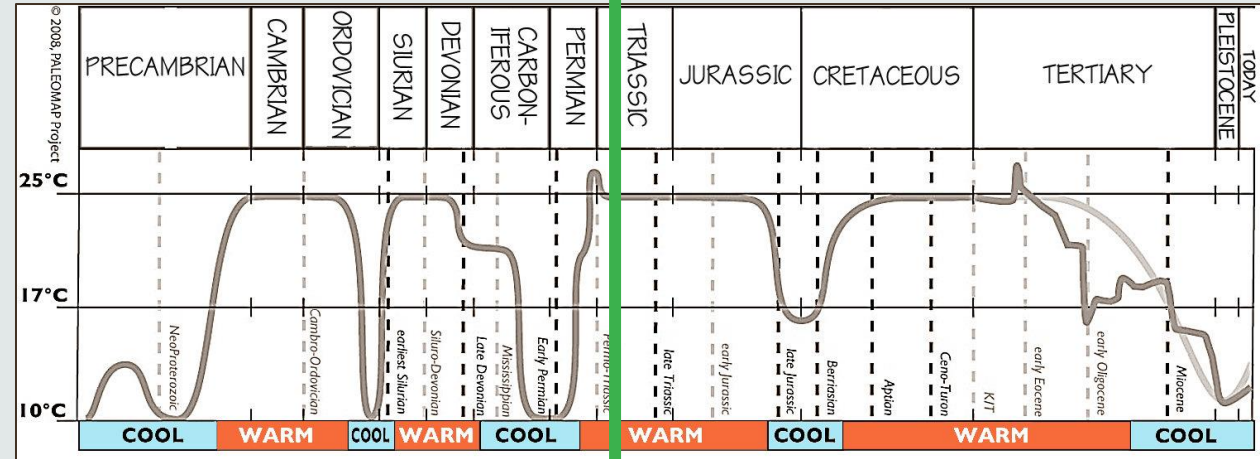


Permian-Triassic Boundary

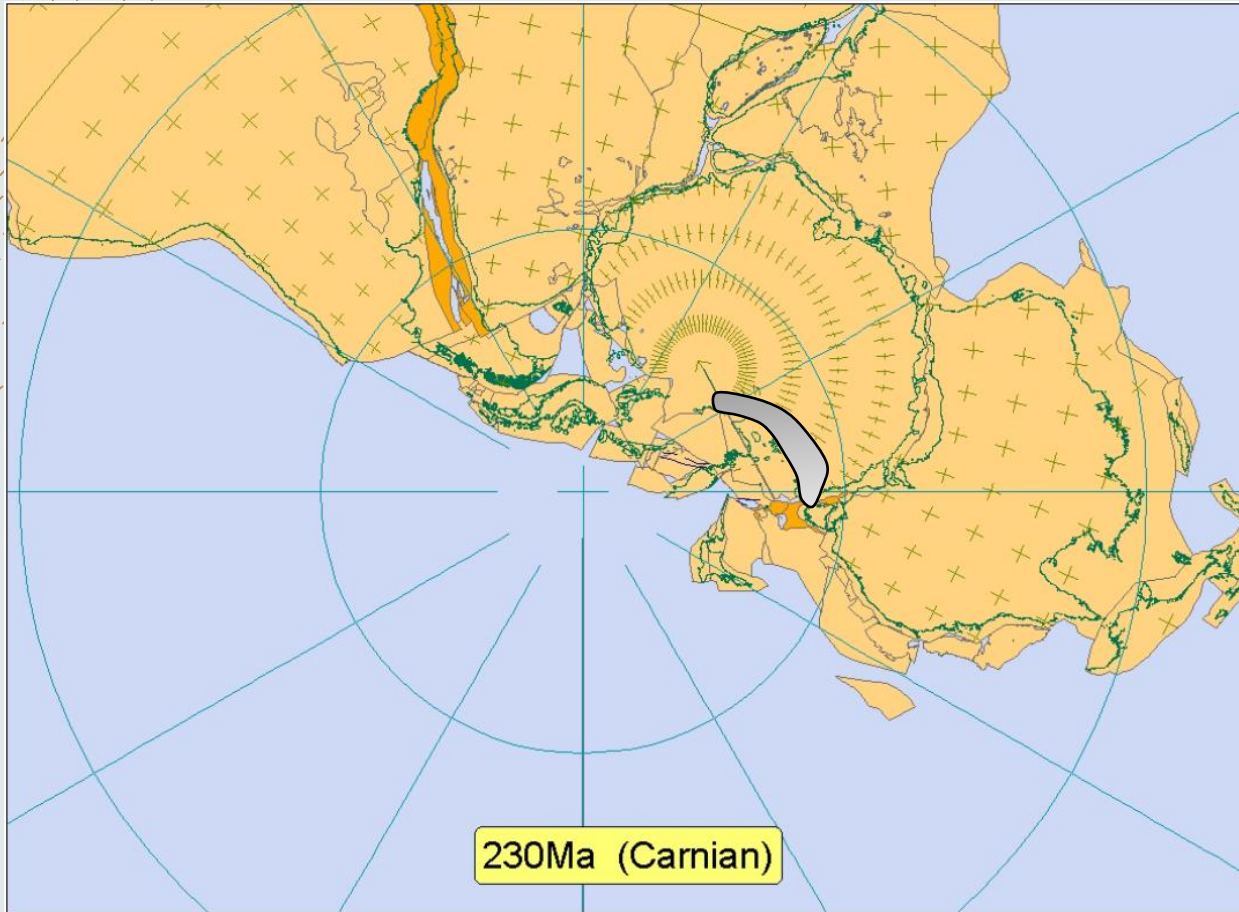
Antarctica: The South Polar Continent



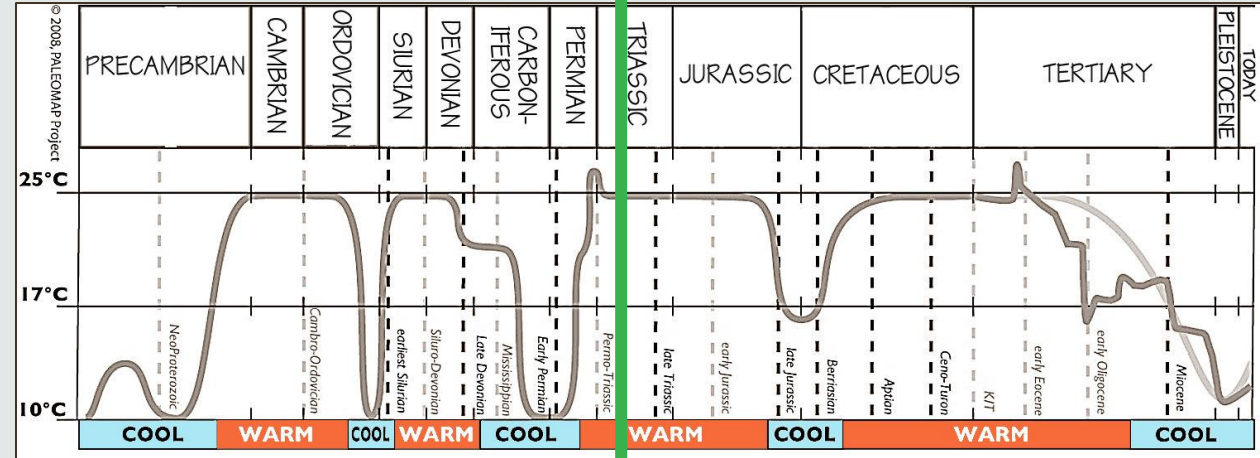
Triassic



Antarctica: The South Polar Continent



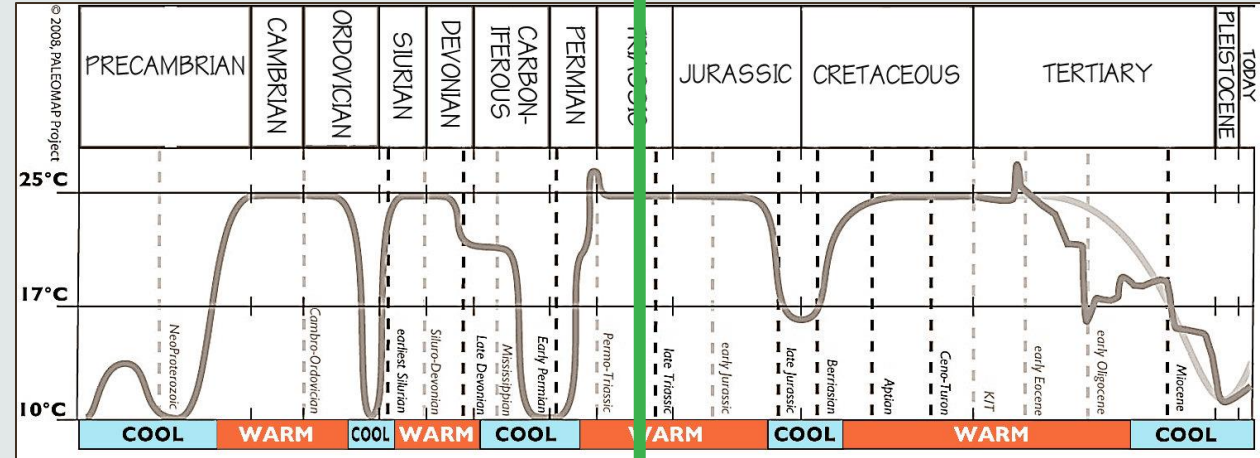
Triassic



Antarctica: The South Polar Continent



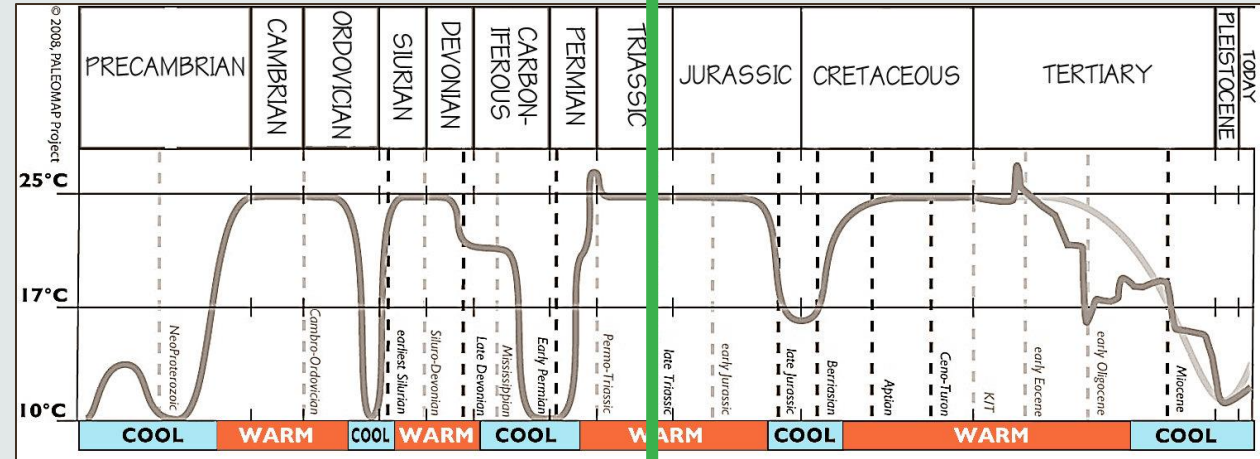
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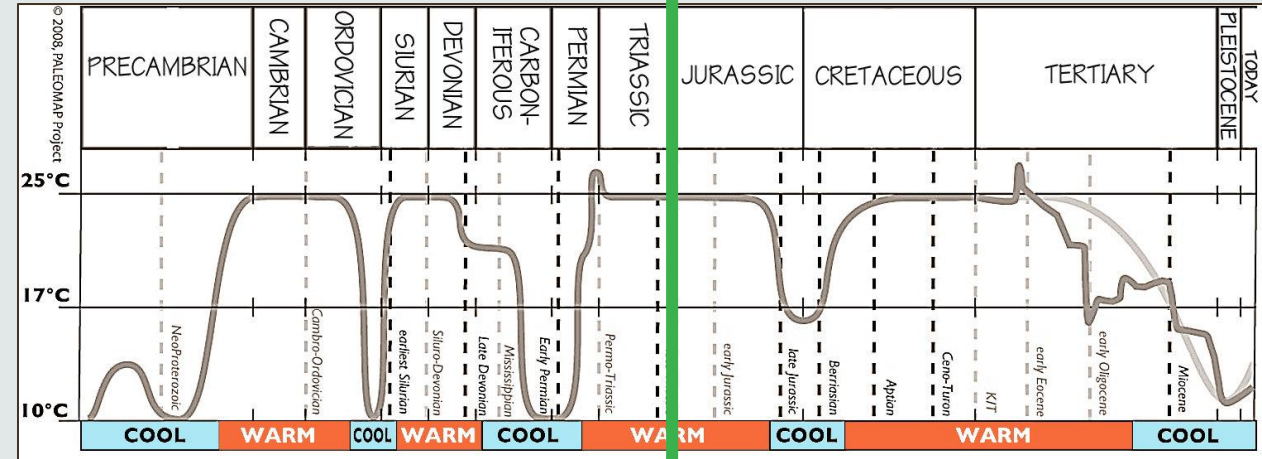
Antarctica: The South Polar Continent



Triassic



Antarctica: The South Polar Continent

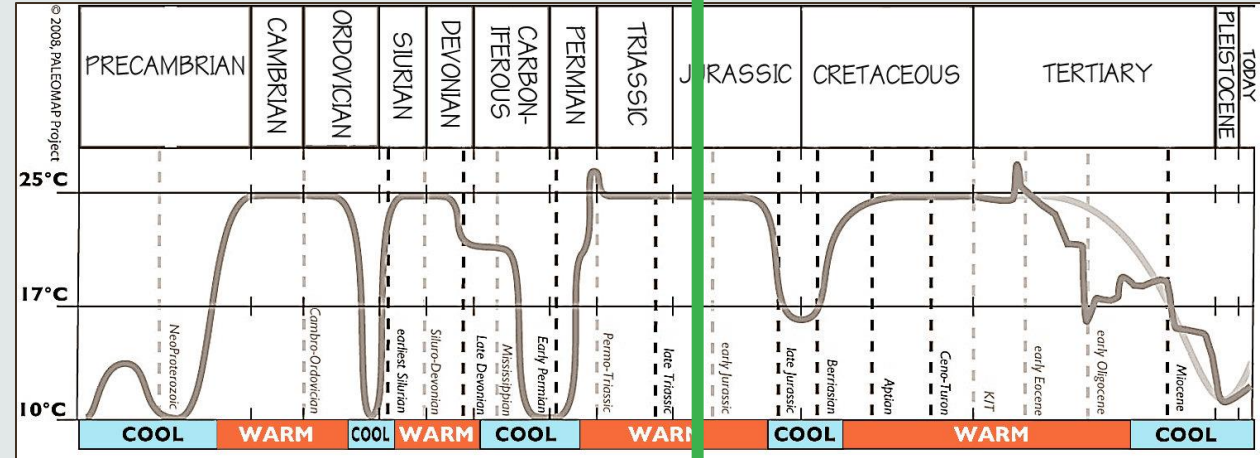


Triassic-Jurassic Boundary

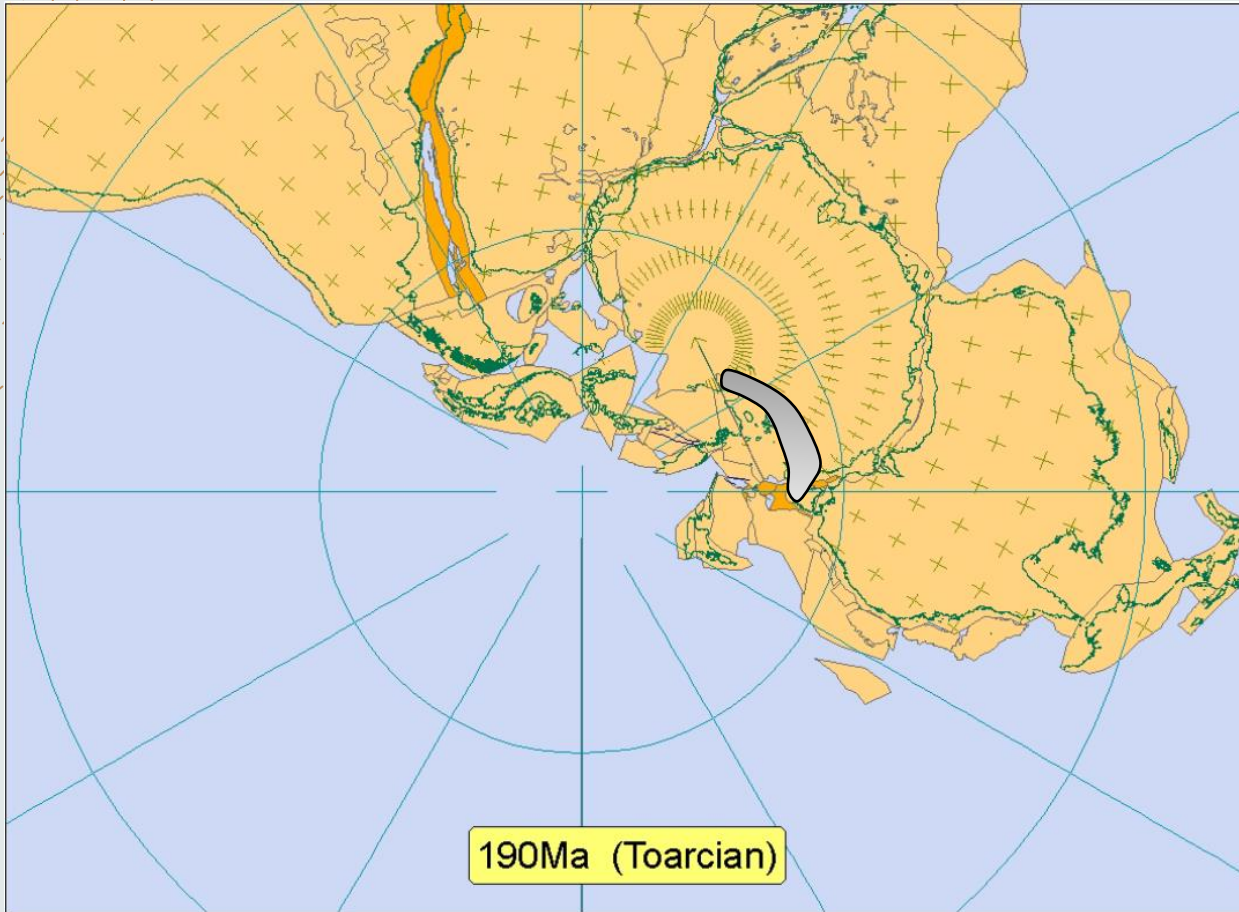
Antarctica: The South Polar Continent



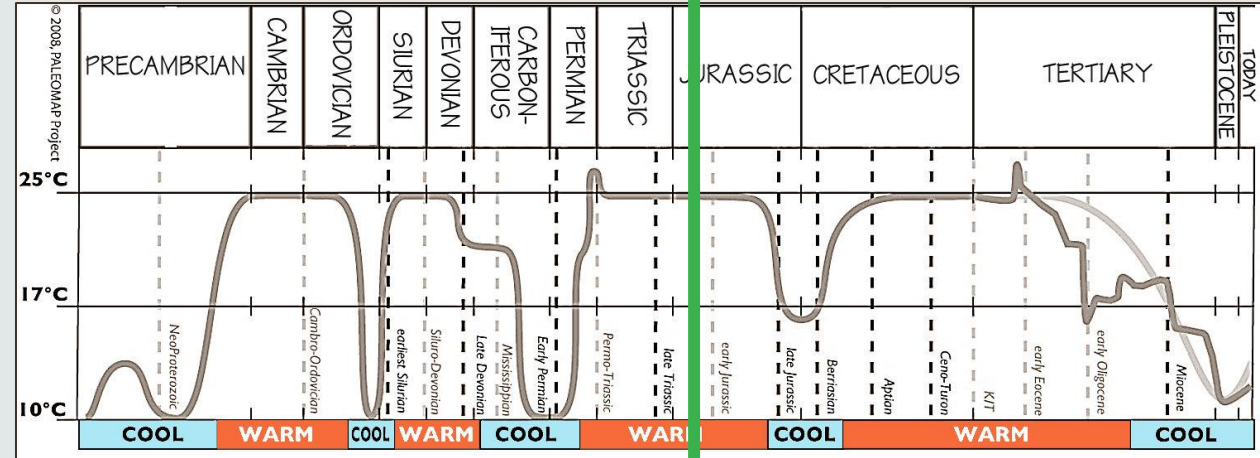
Jurassic



Antarctica: The South Polar Continent



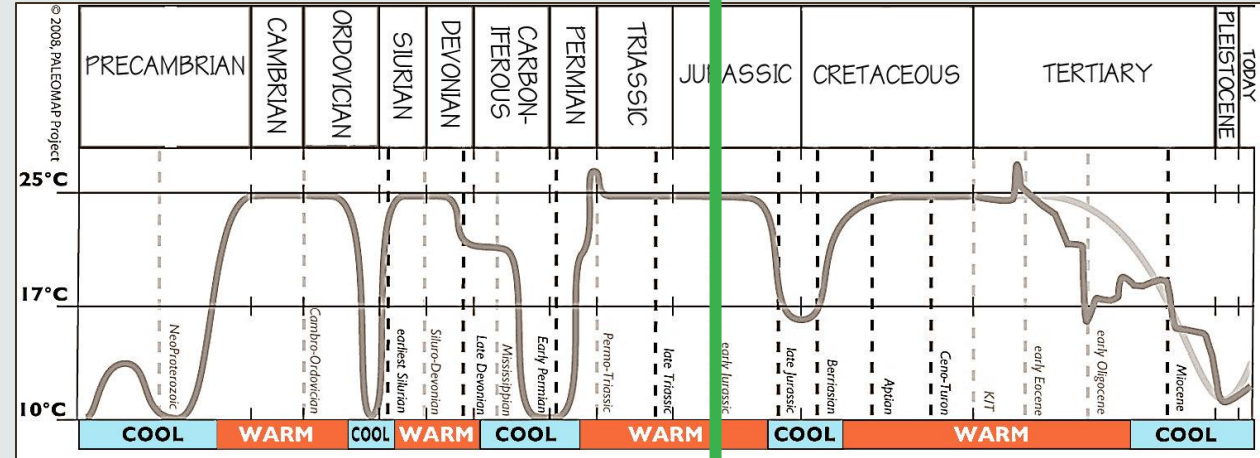
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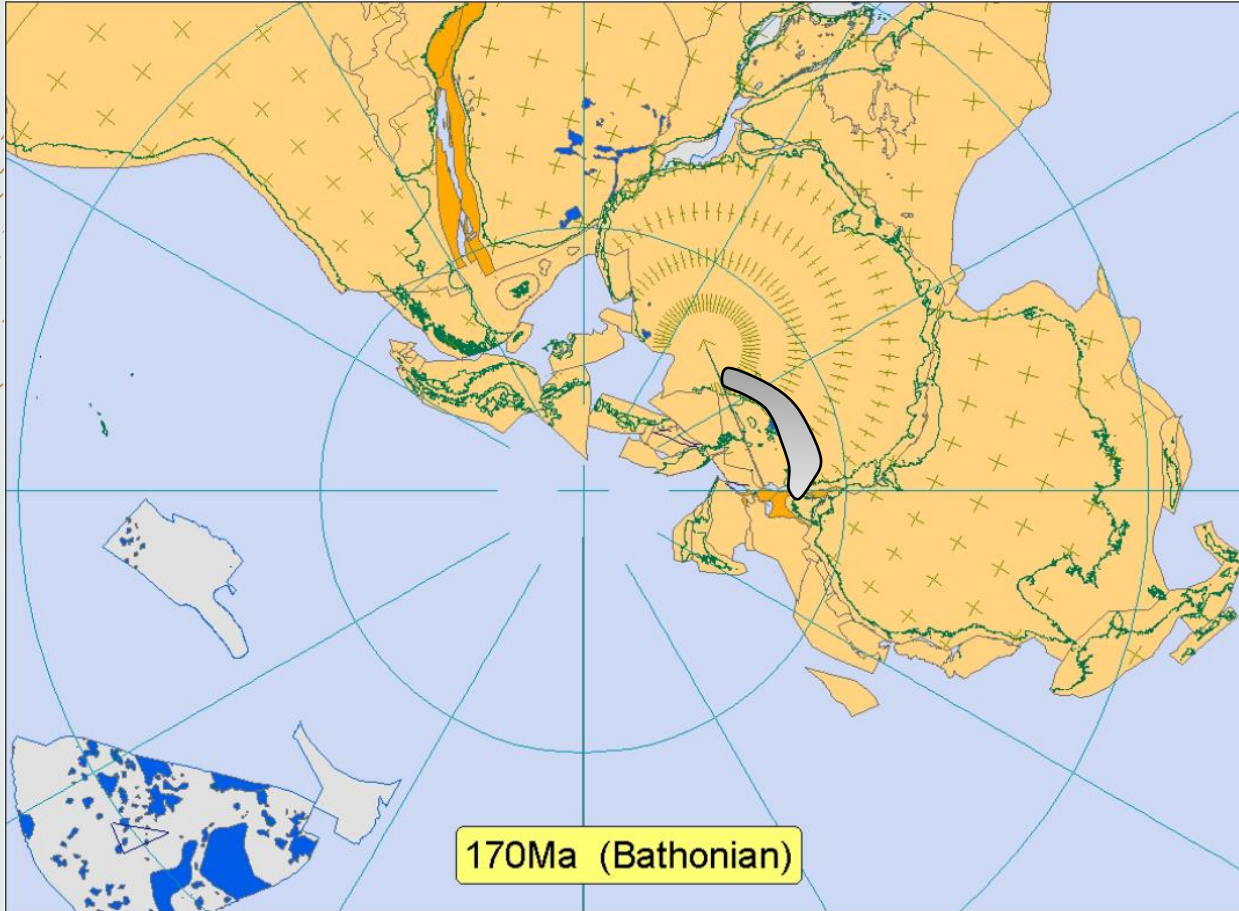
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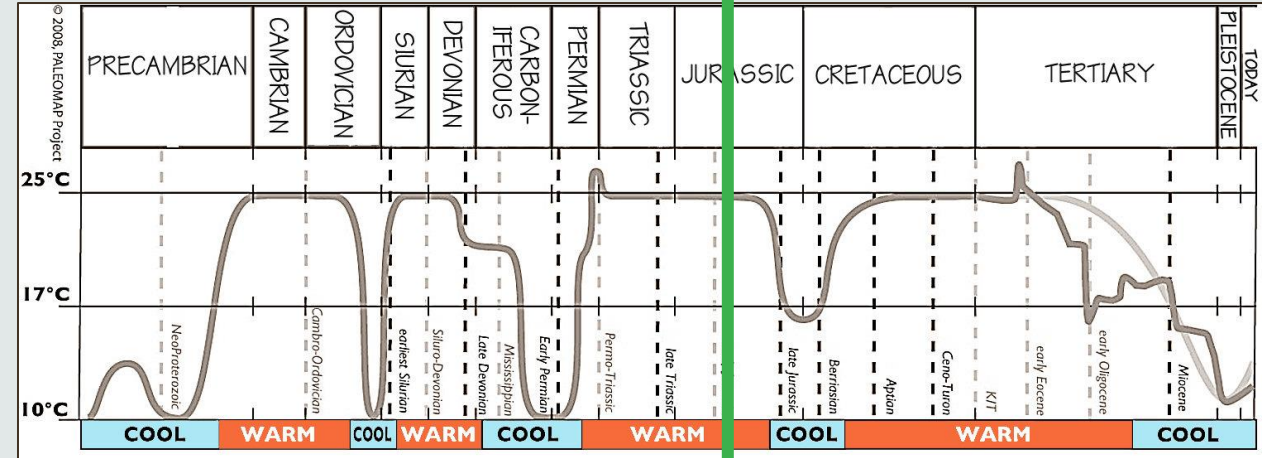
Jurassic



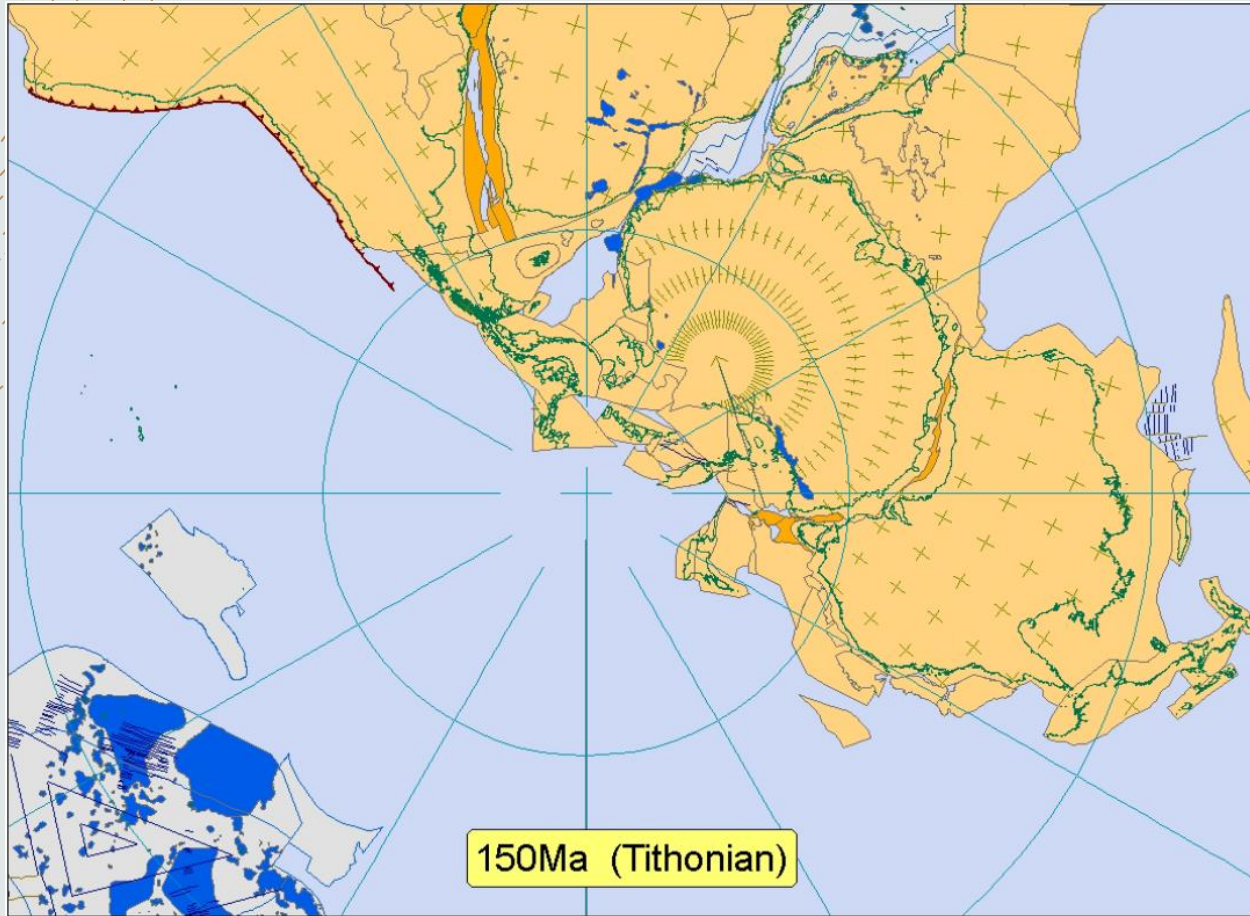
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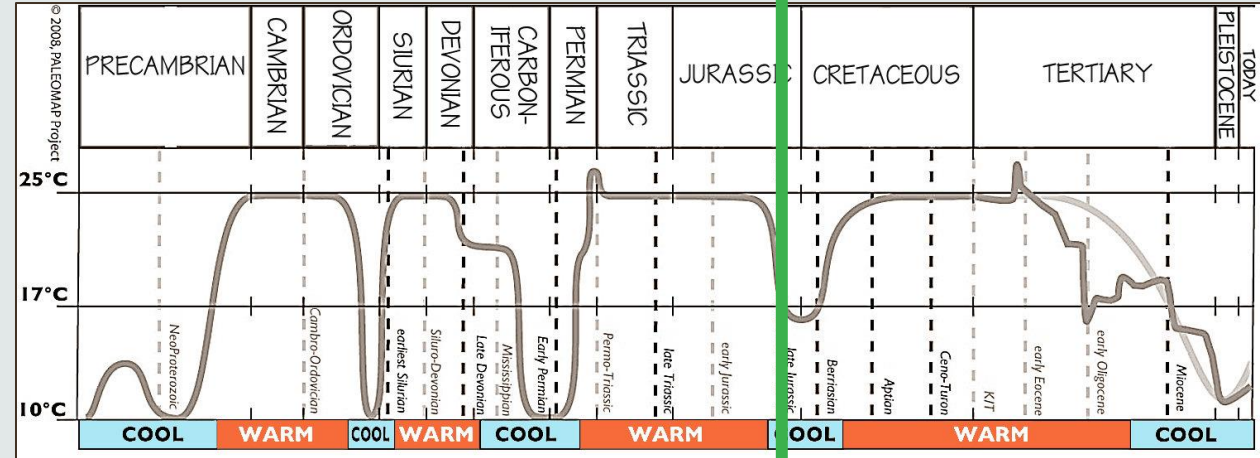
Jurassic



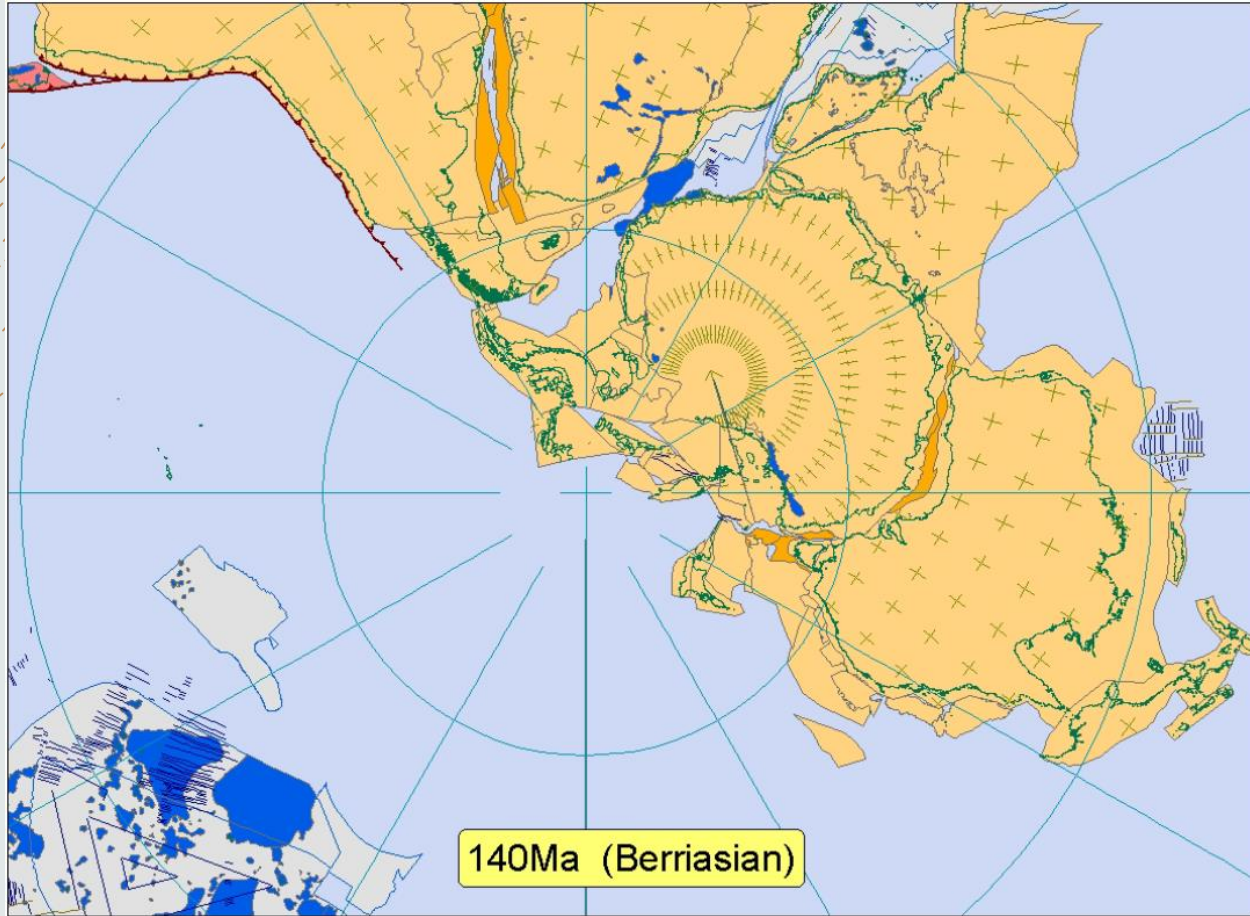
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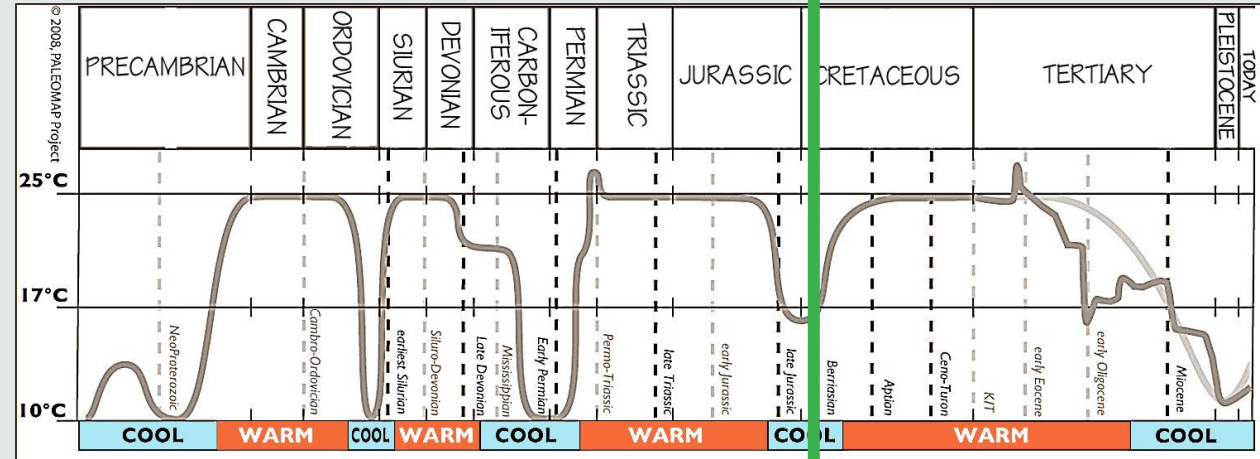
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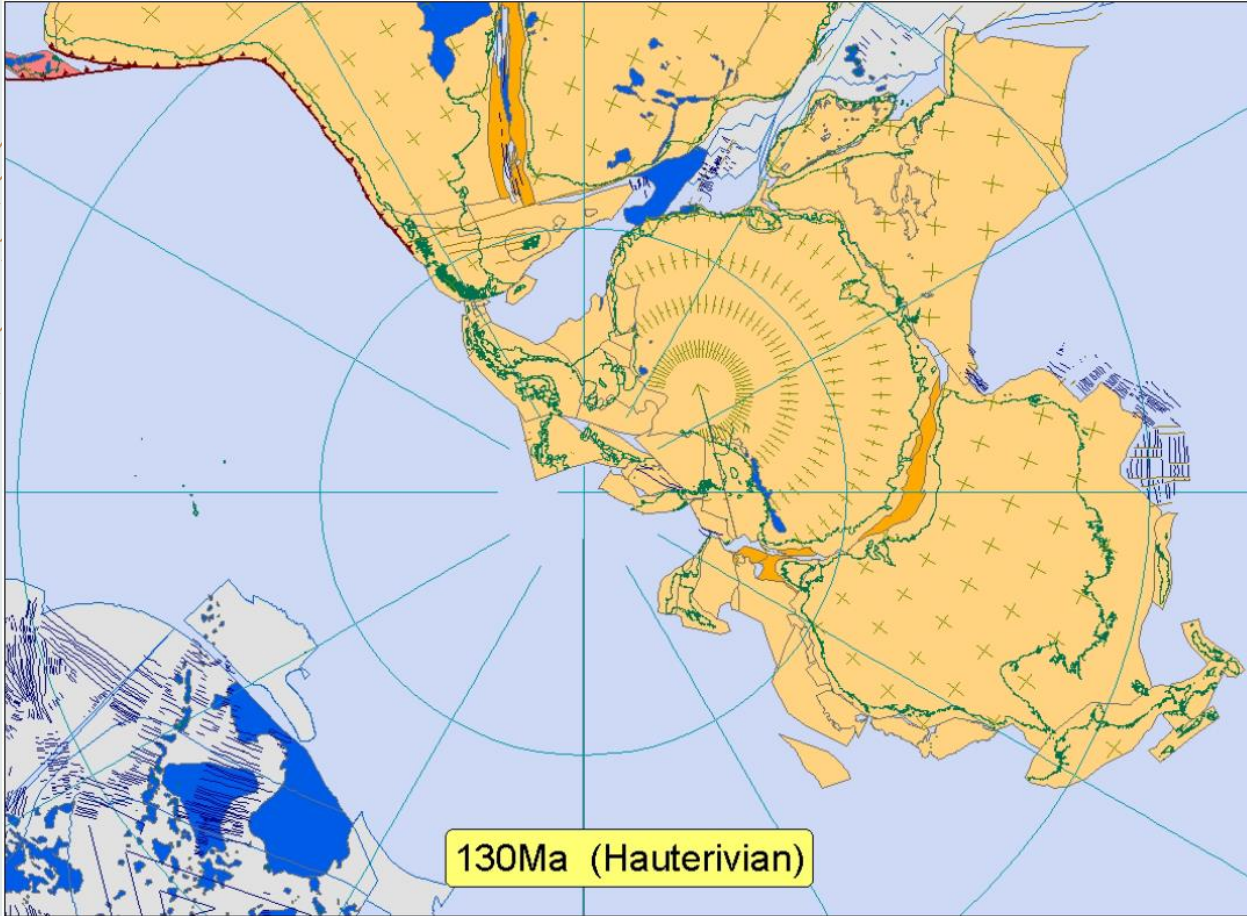
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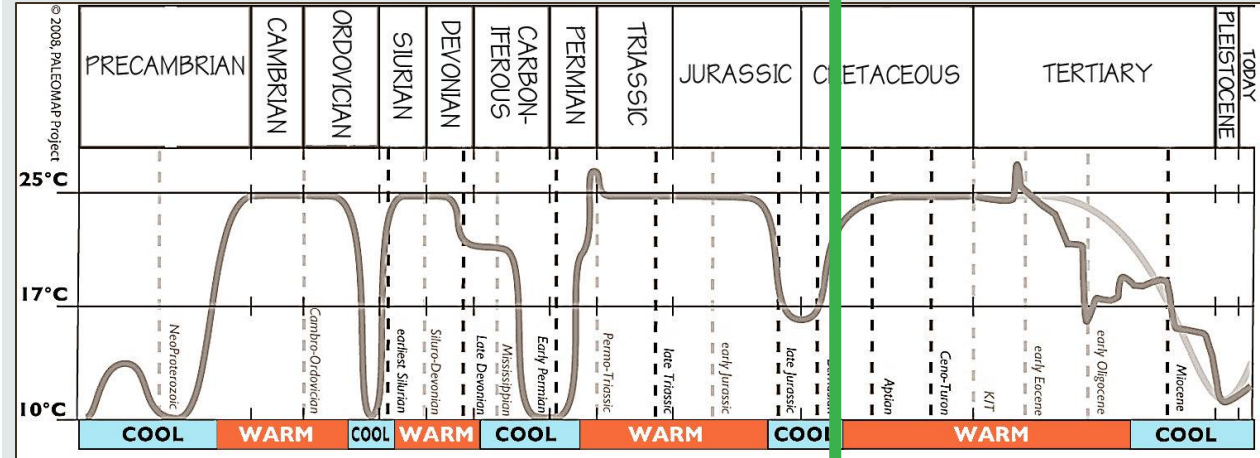
Cretaceous



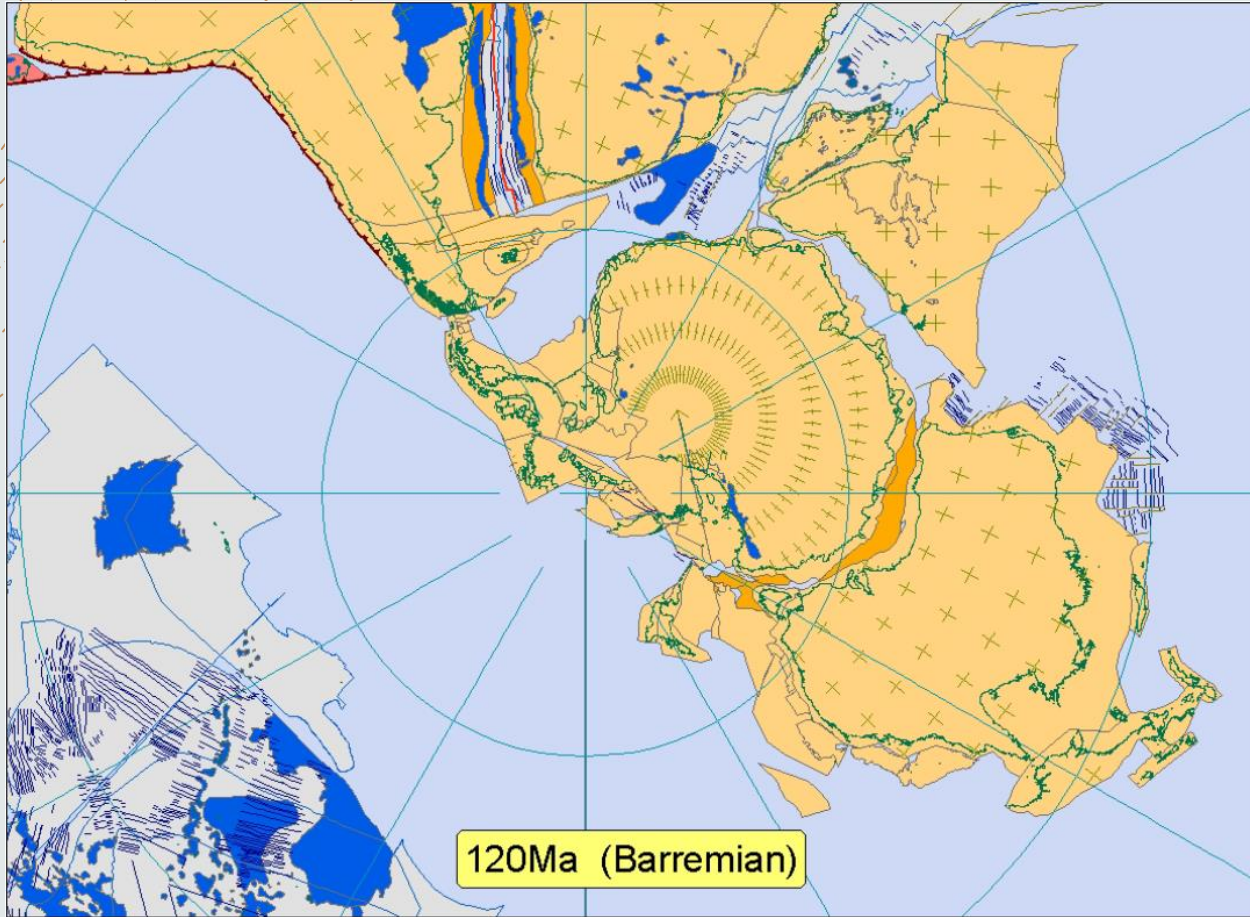
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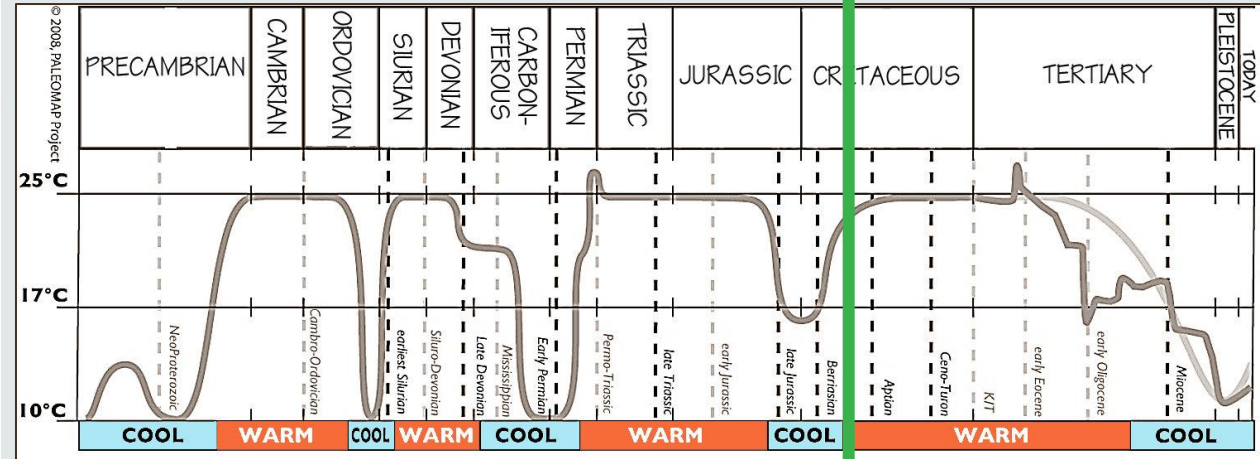
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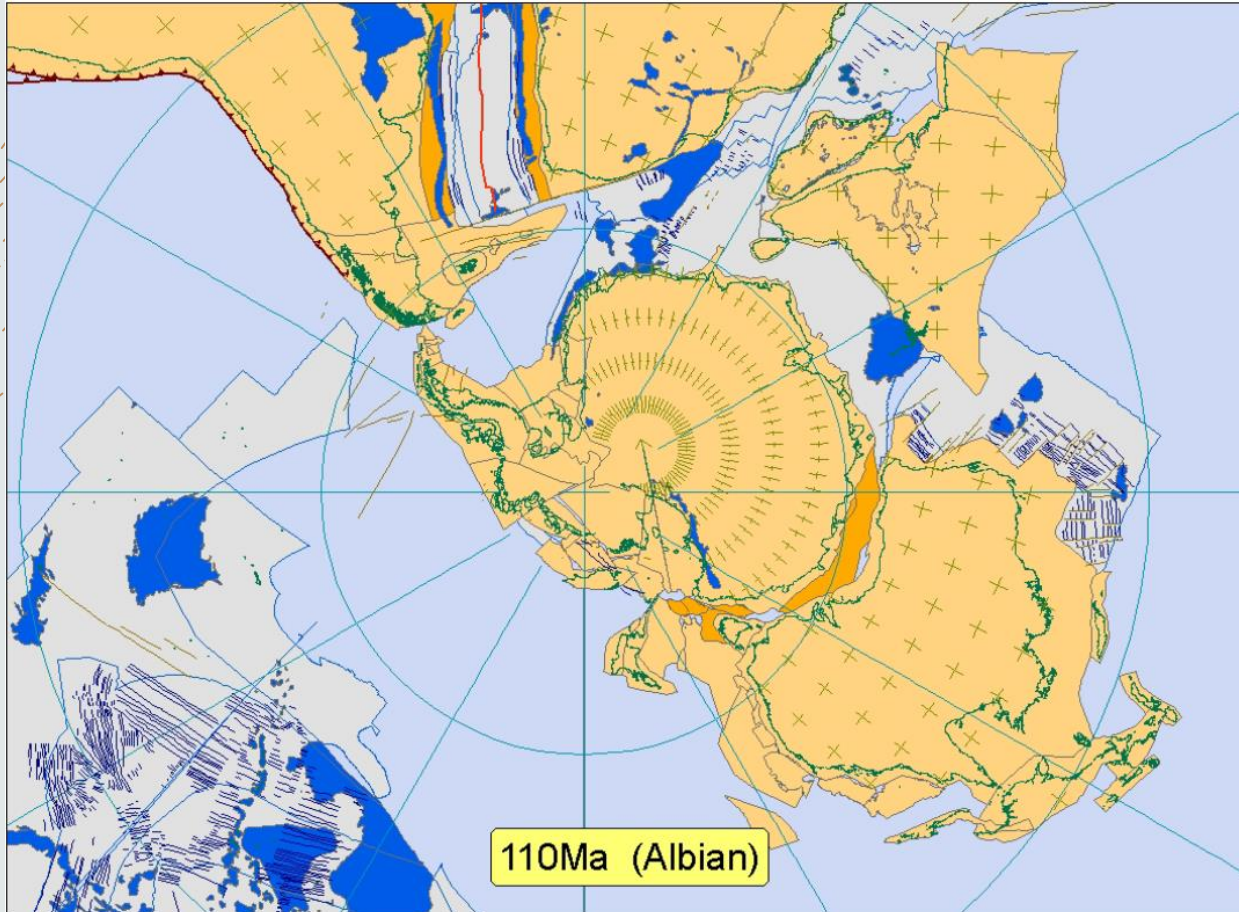
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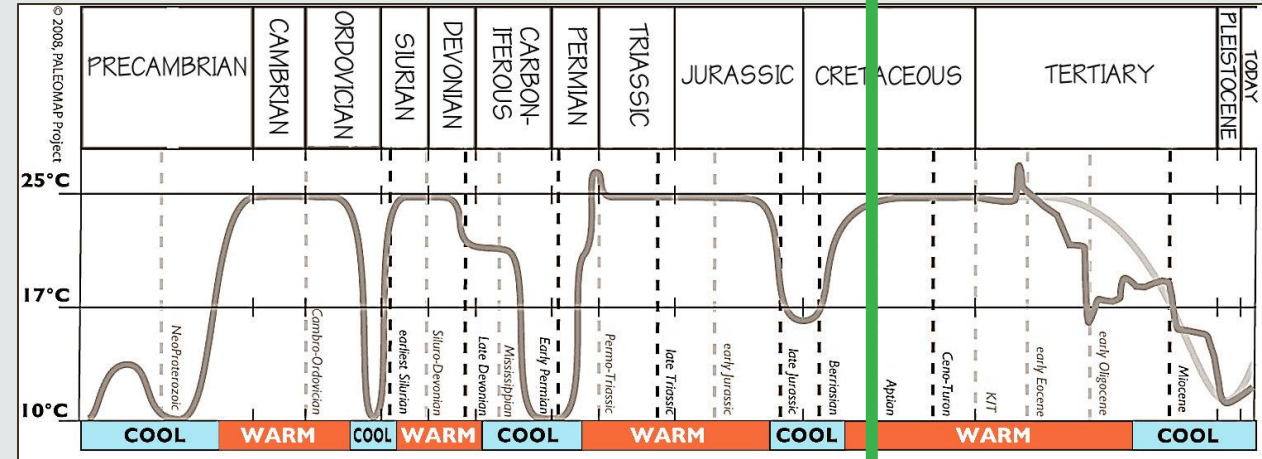
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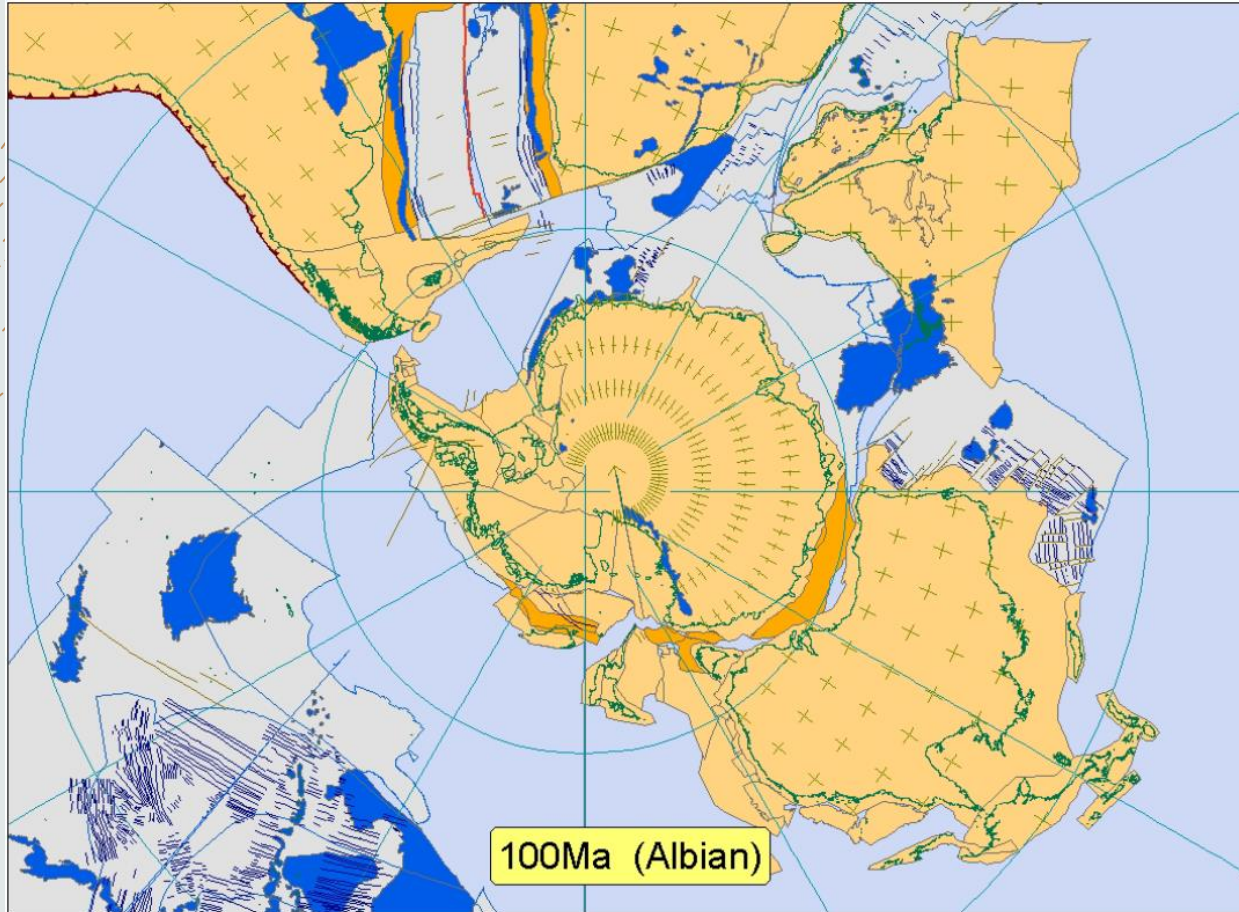
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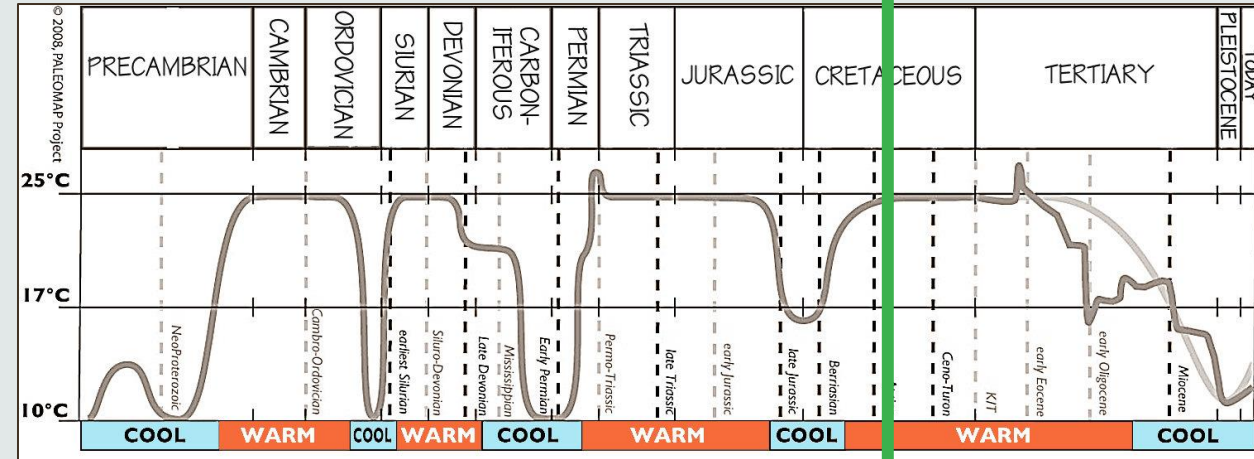
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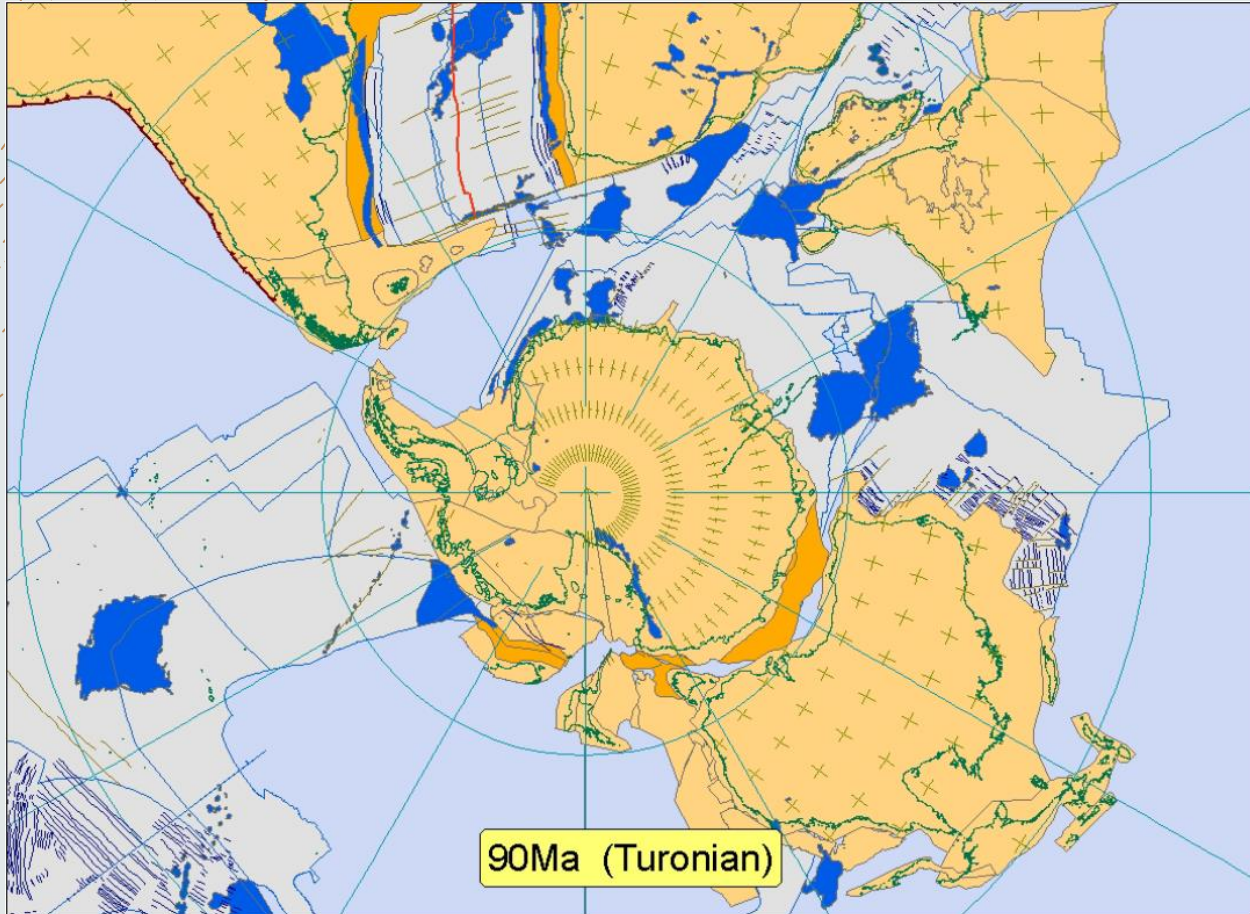
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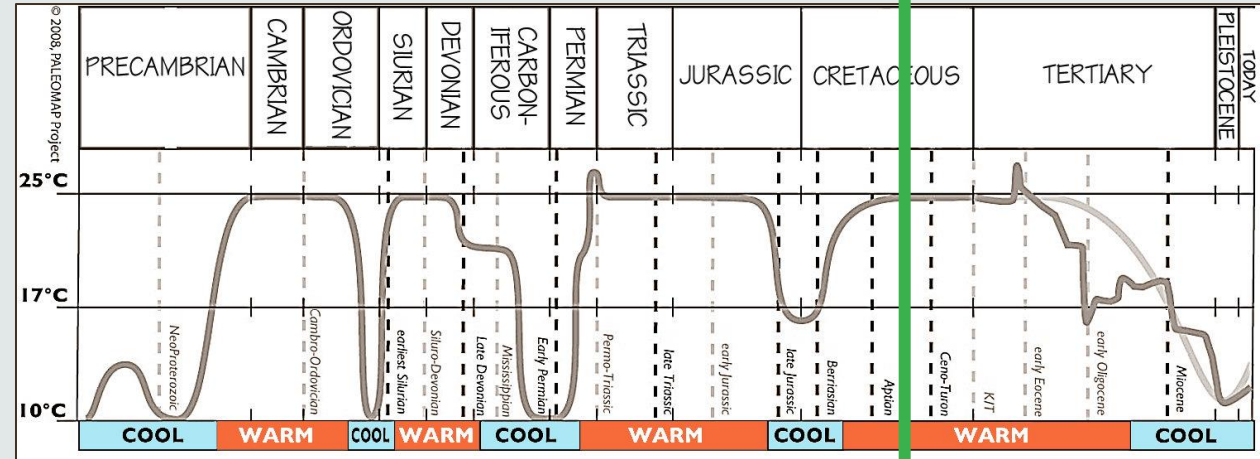
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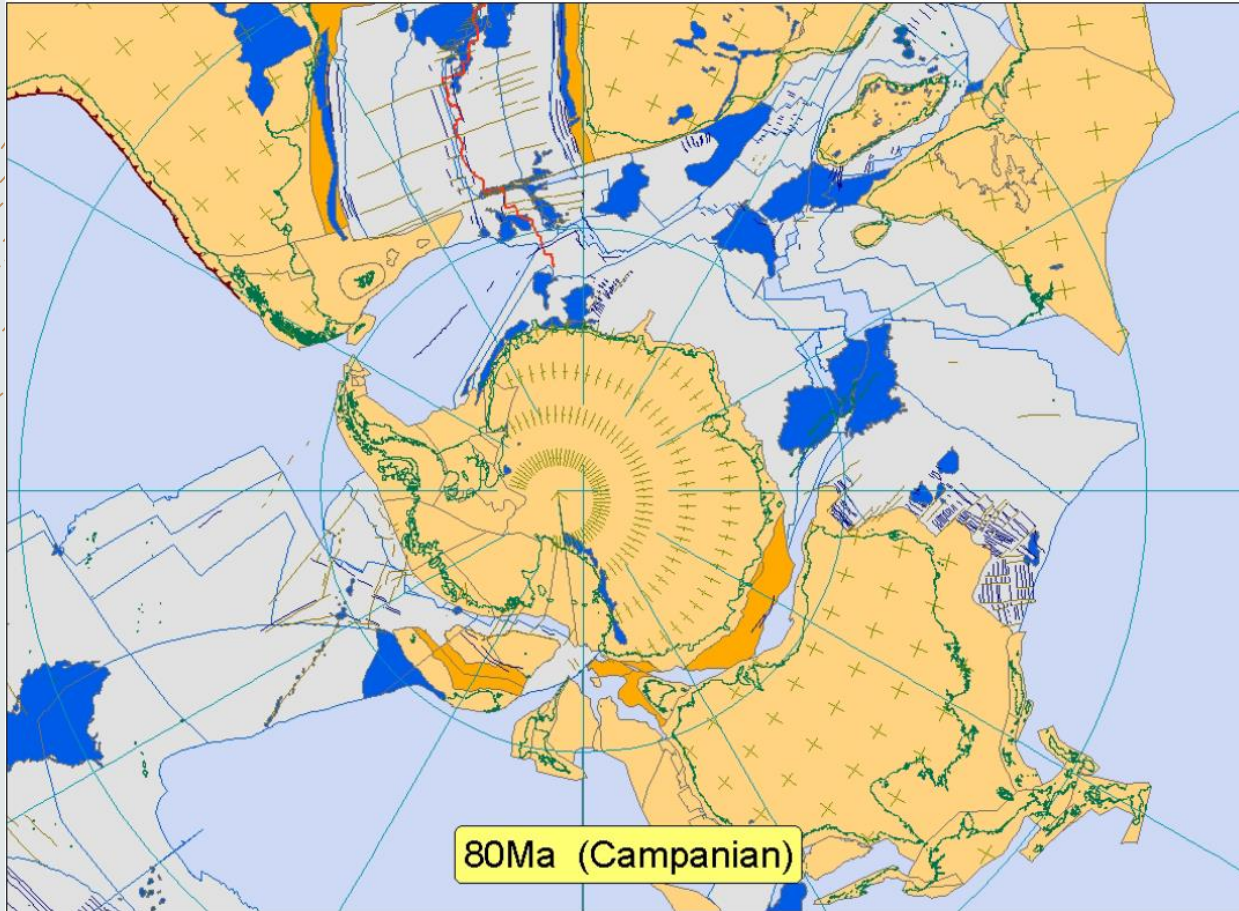
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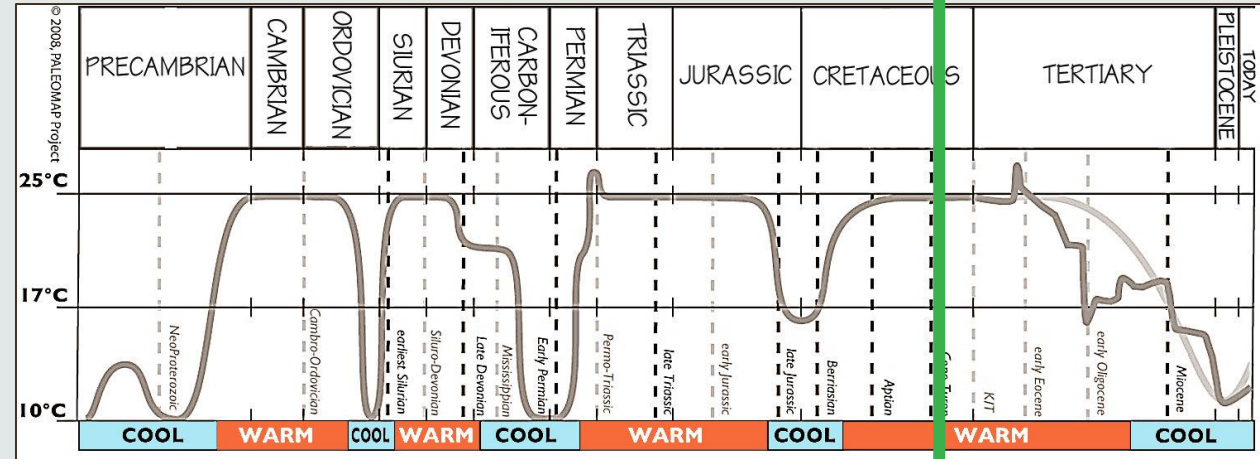
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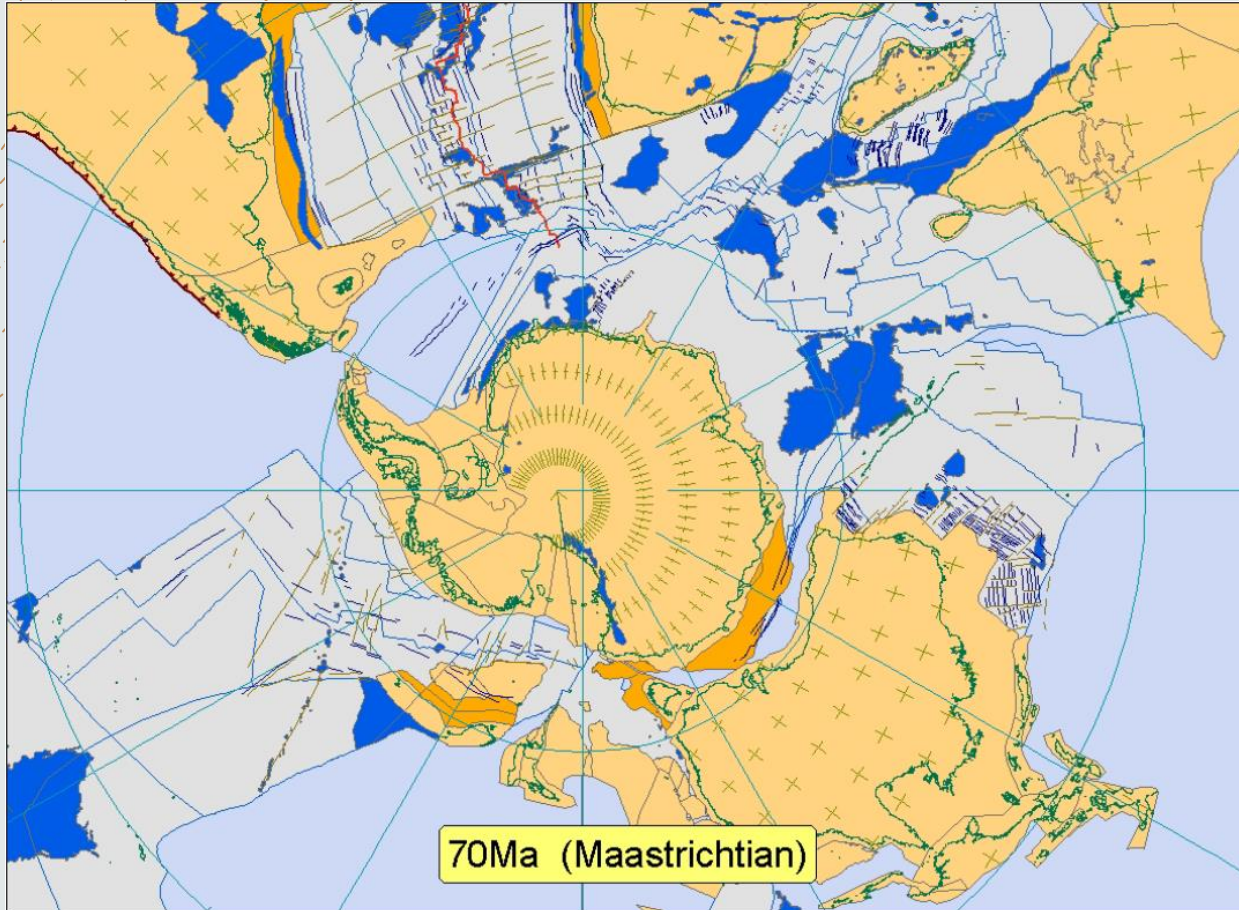
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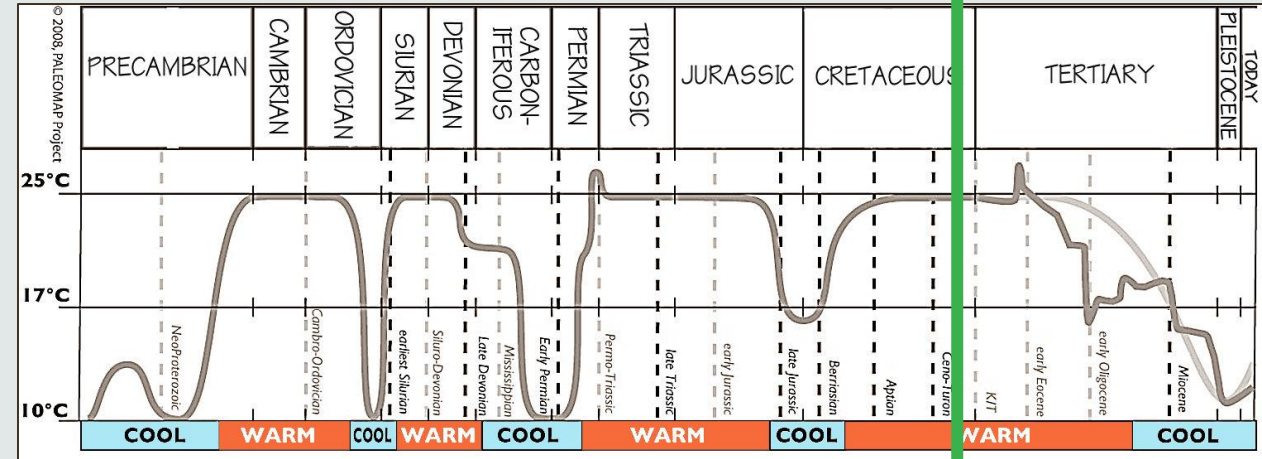
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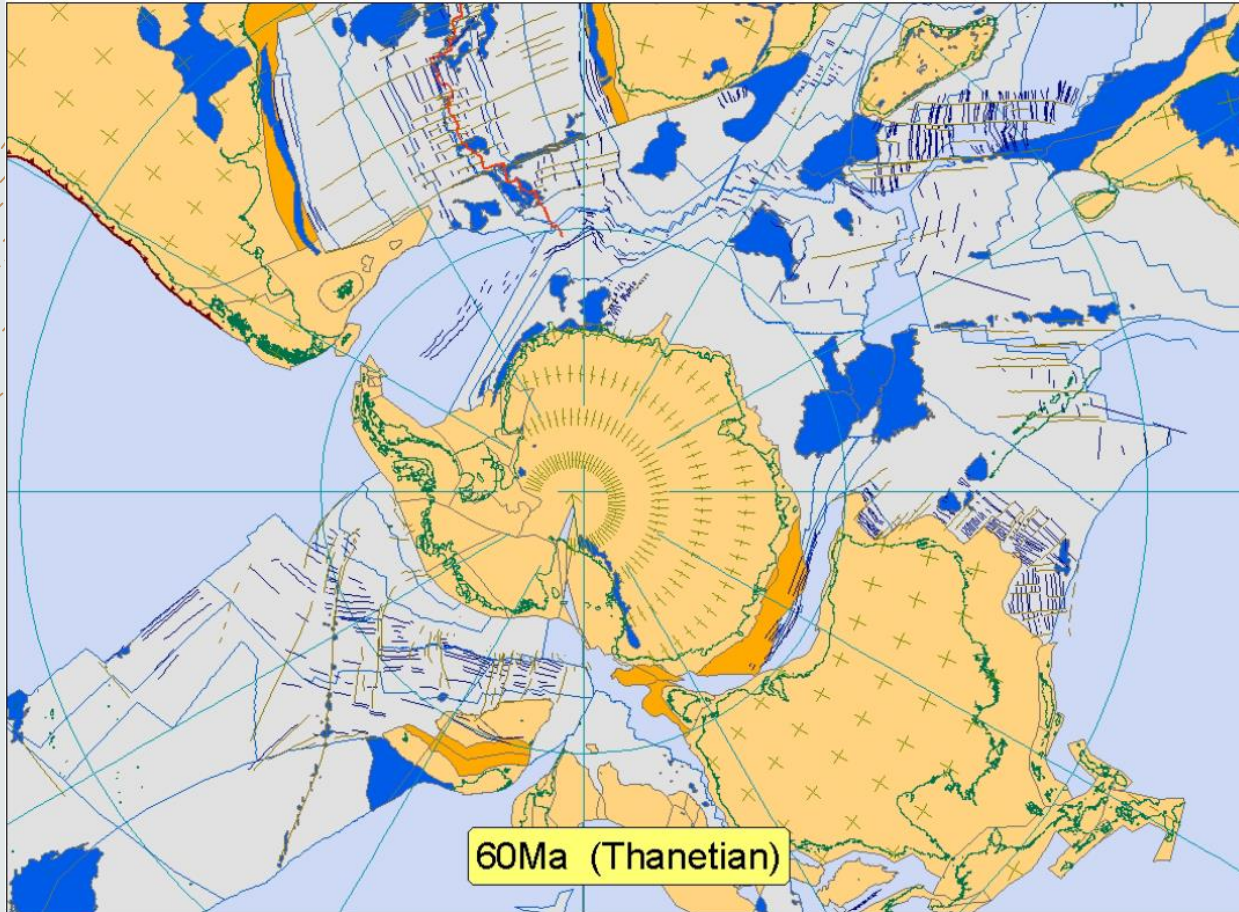
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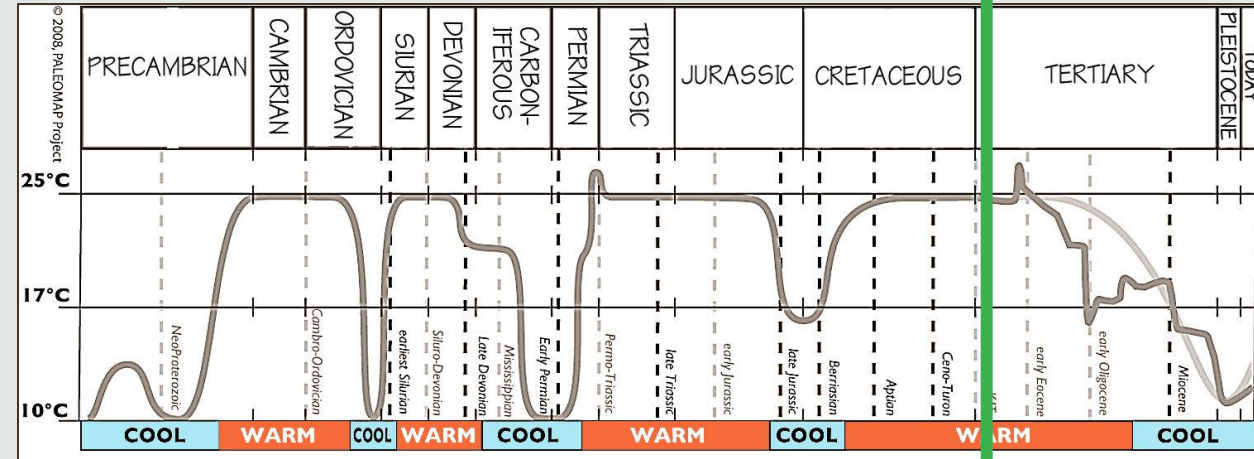
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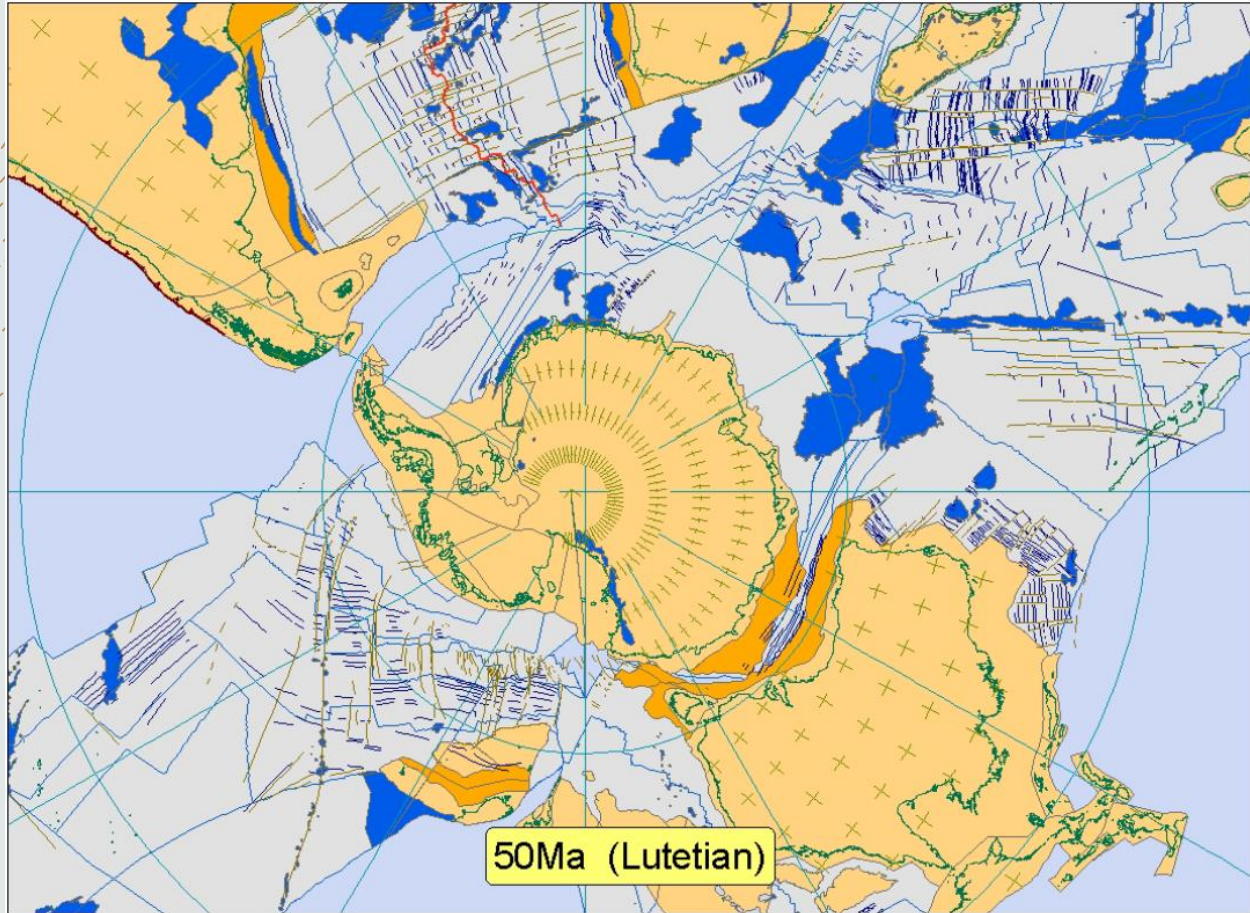
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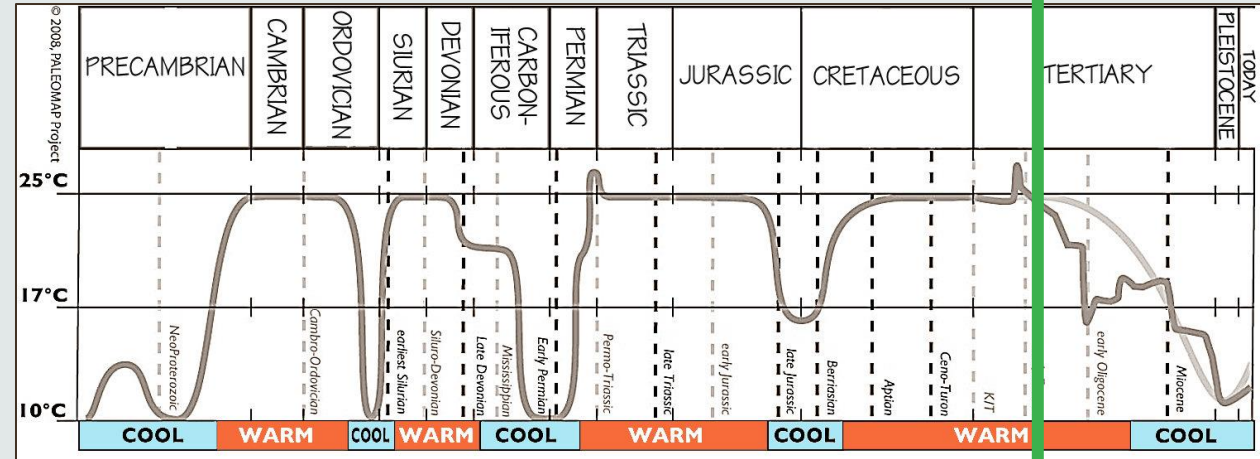
Paleocene



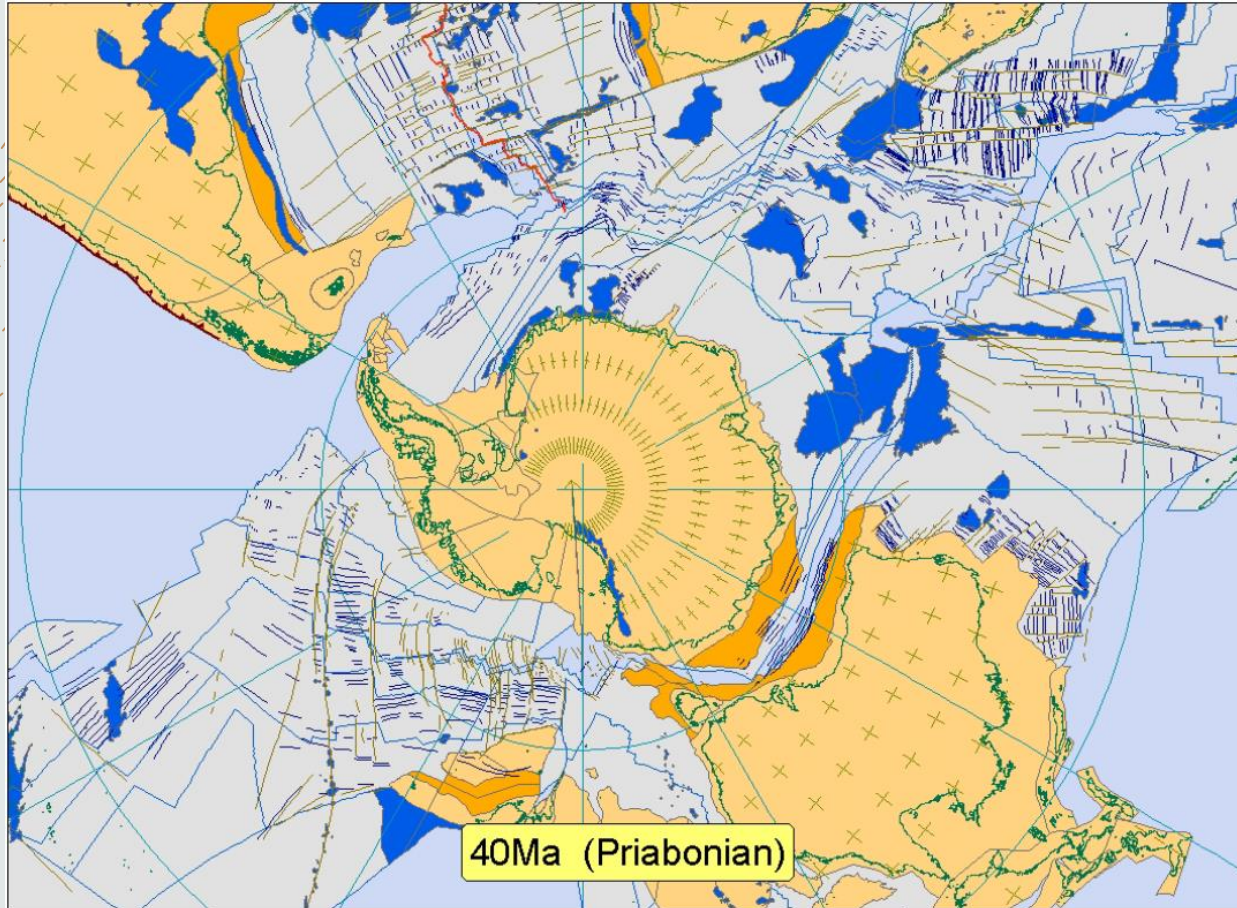
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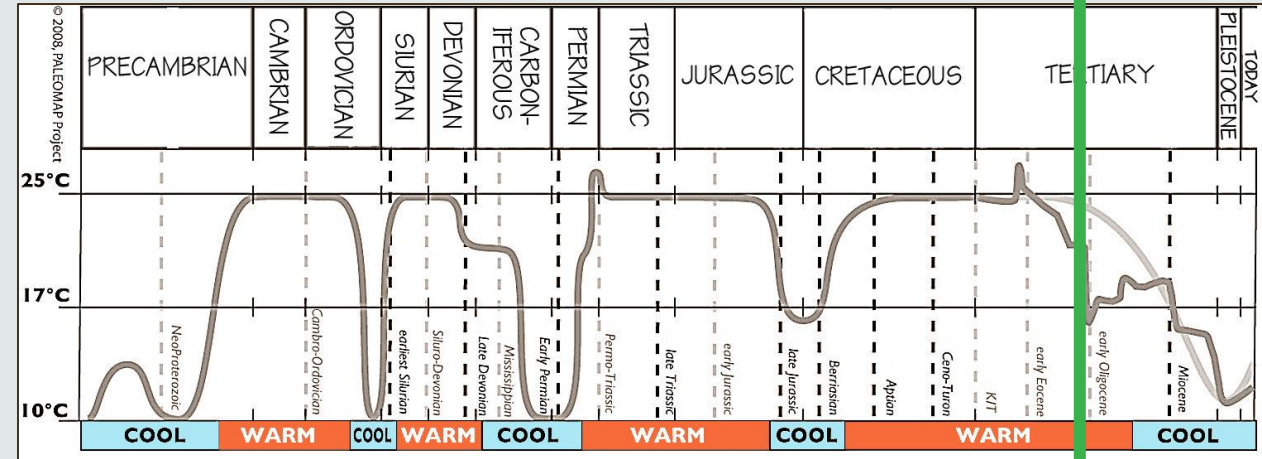
Eocene



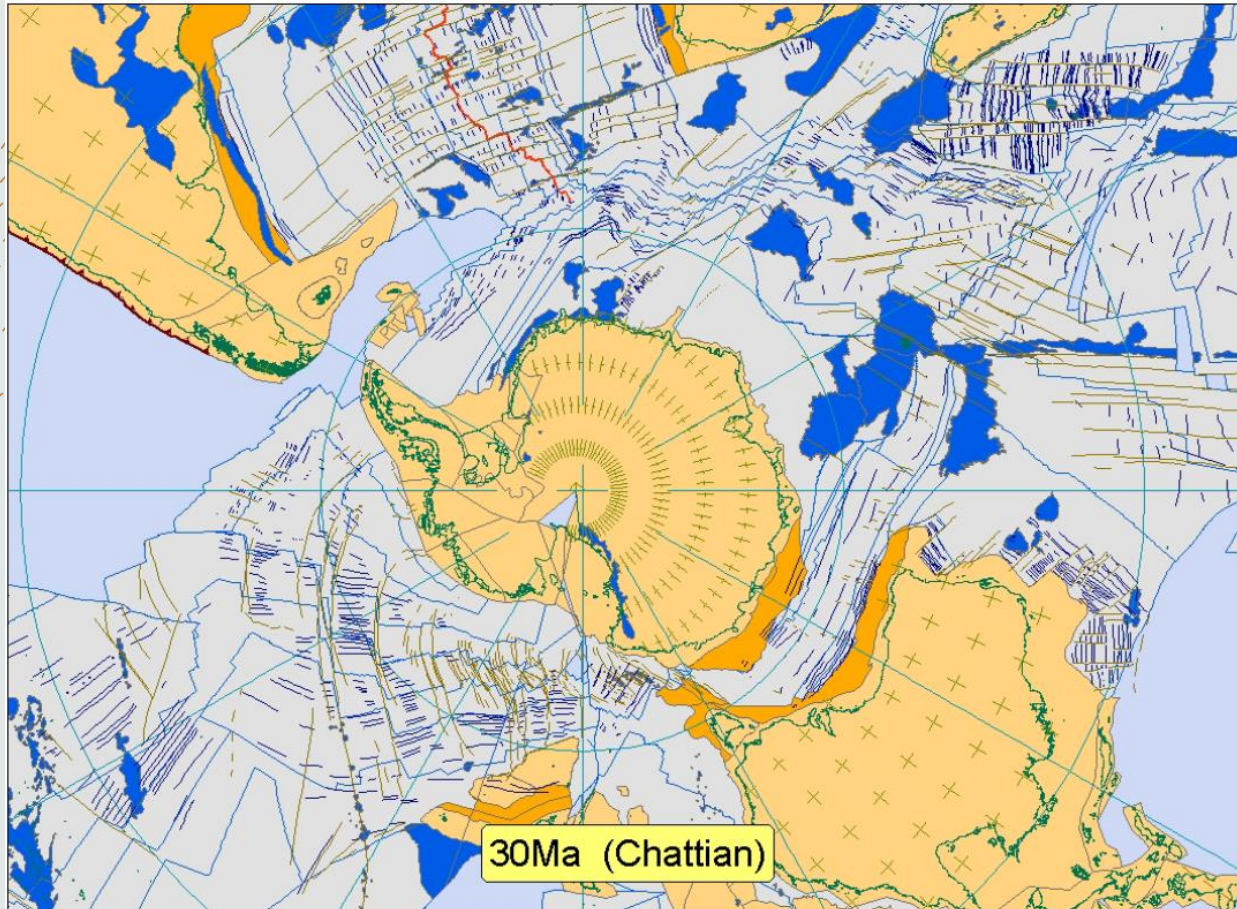
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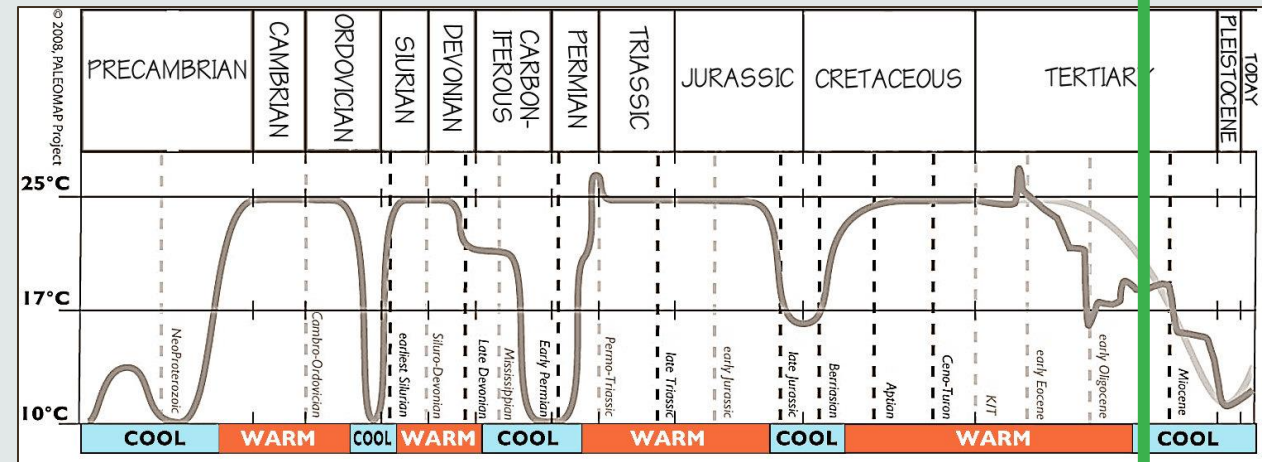
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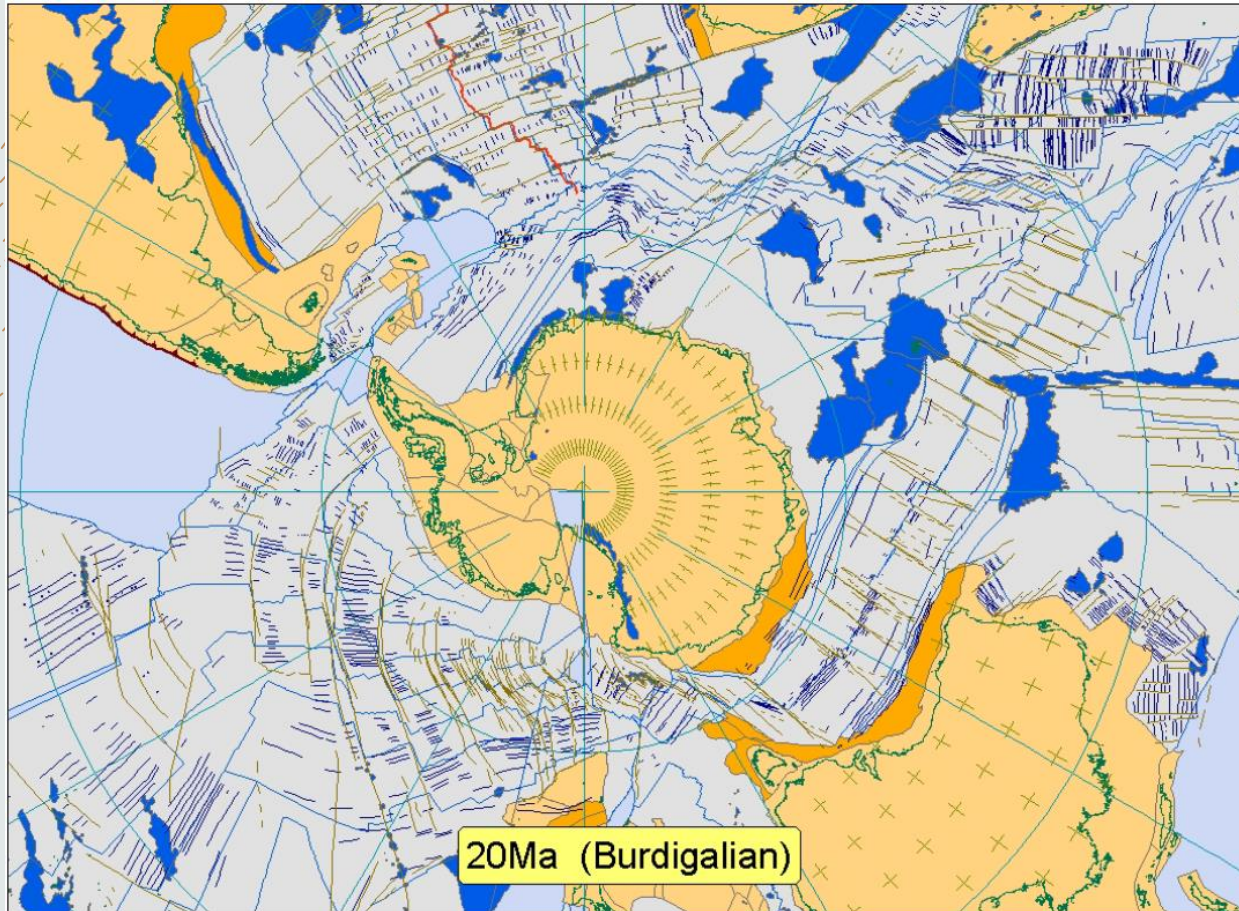
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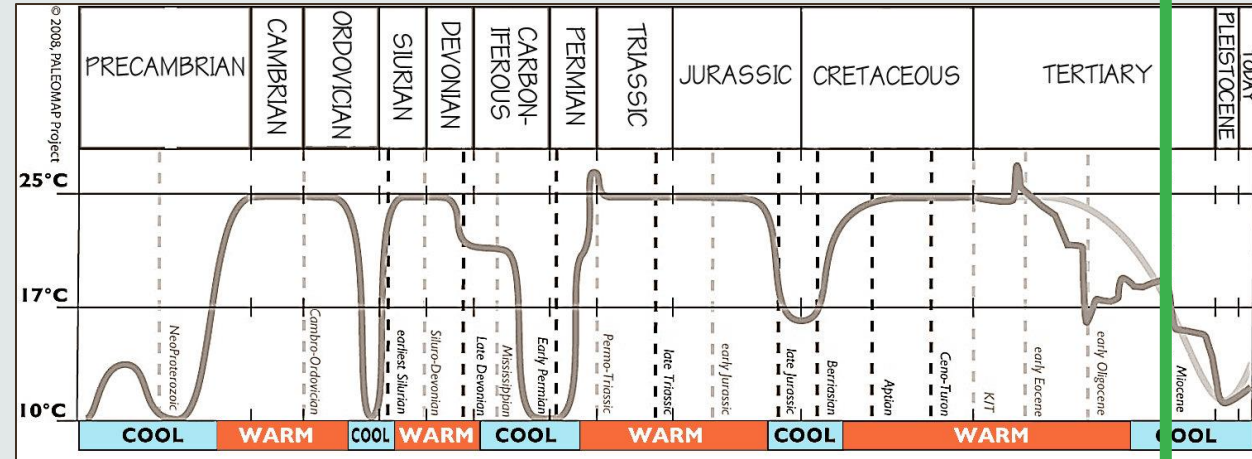
Ogliocene



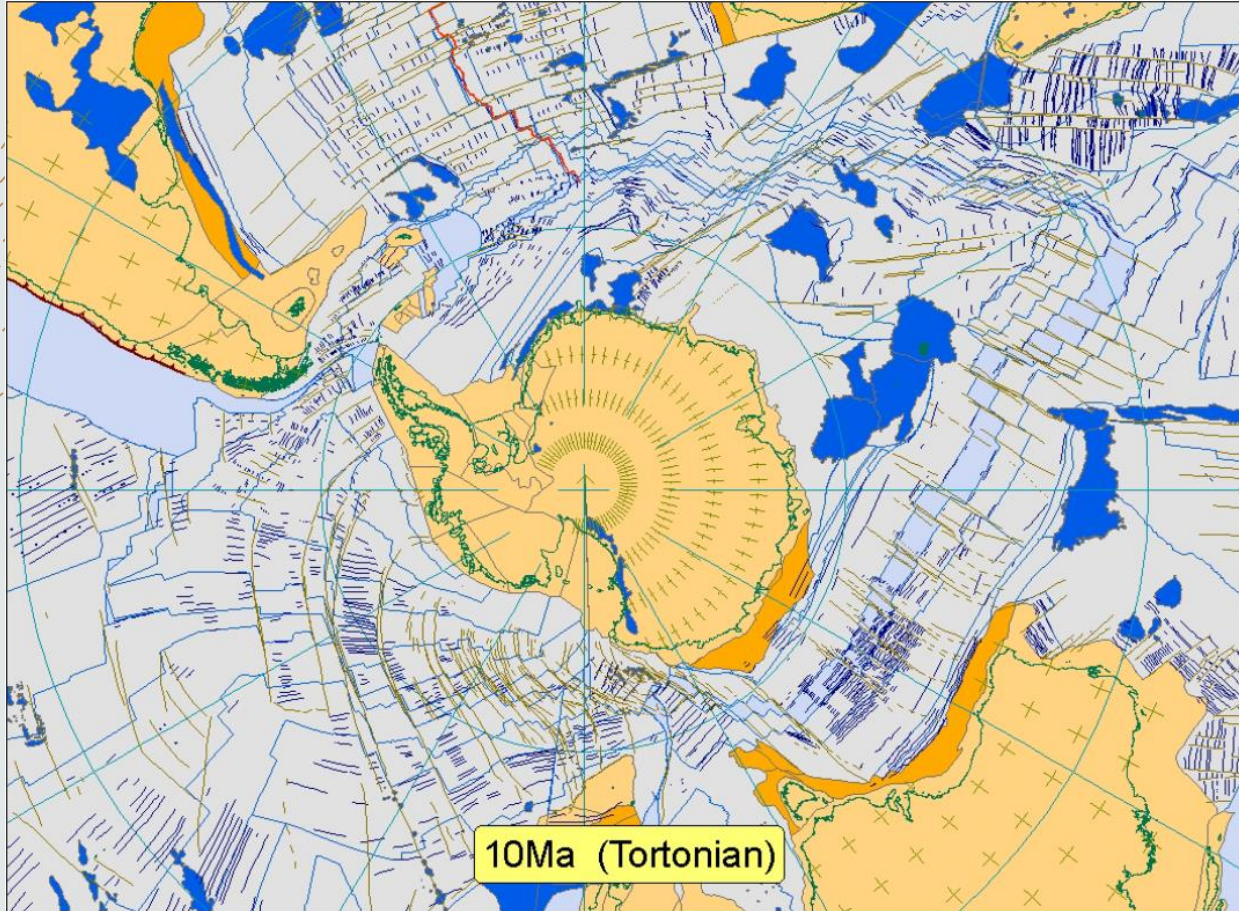
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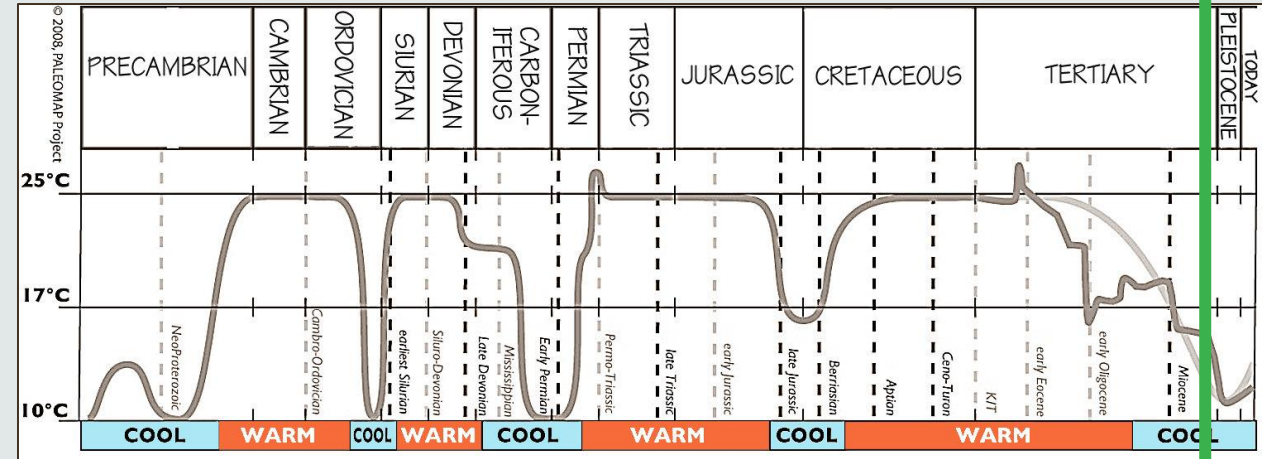
Miocene



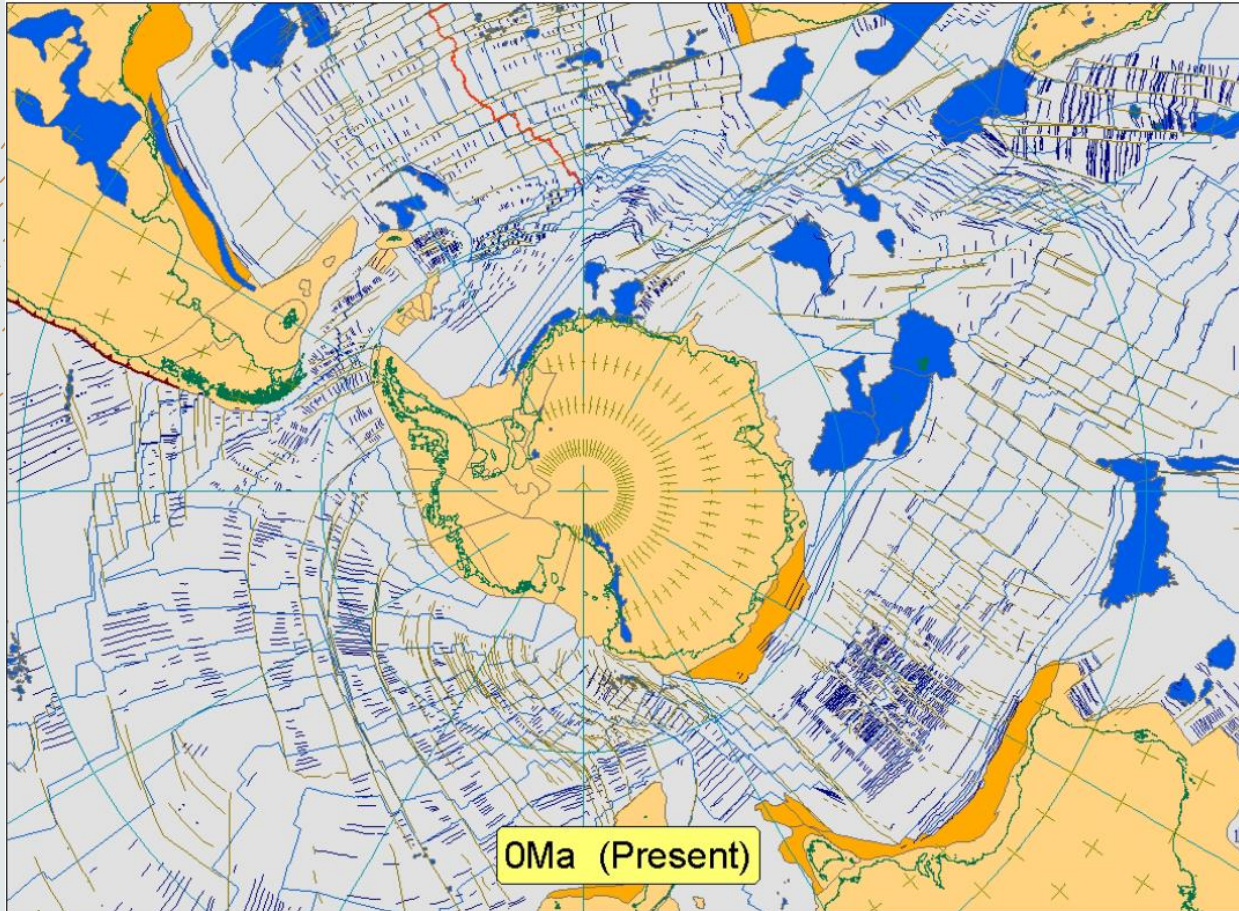
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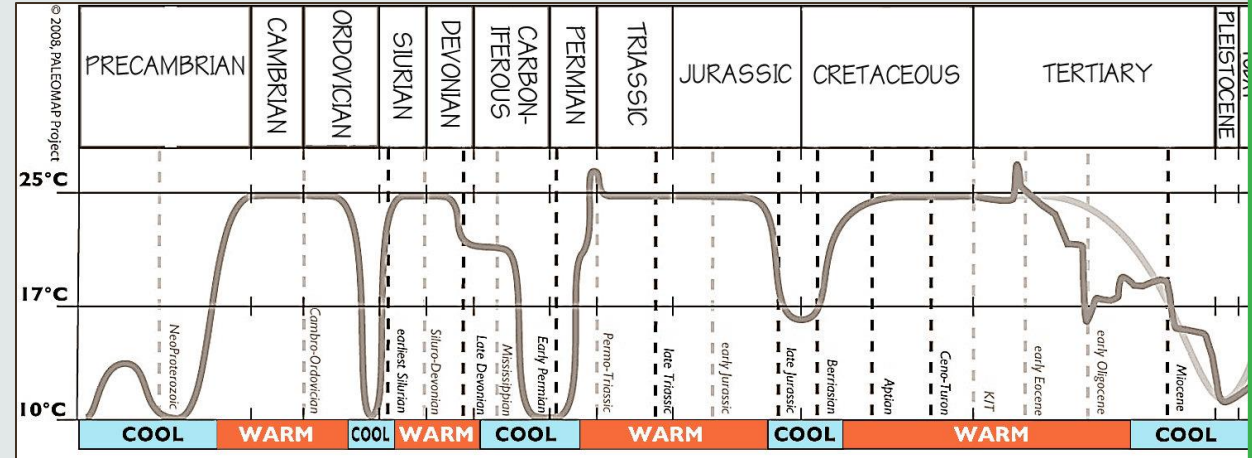
Miocene



Antarctica: The South Polar Continent



Holocene



Take-Aways

- Transantarctic Mountains were **located in the South Polar Circle, but we not glaciated** for most of the last 300 million years
 - **Sedimentary rocks in the Transantarctic Mountains record dramatic changes** in the Earth's climate over ~120 Ma
 - These **changes were primarily driven by global climate fluctuations**
-
- How did these fluctuations influence the evolution of life?

