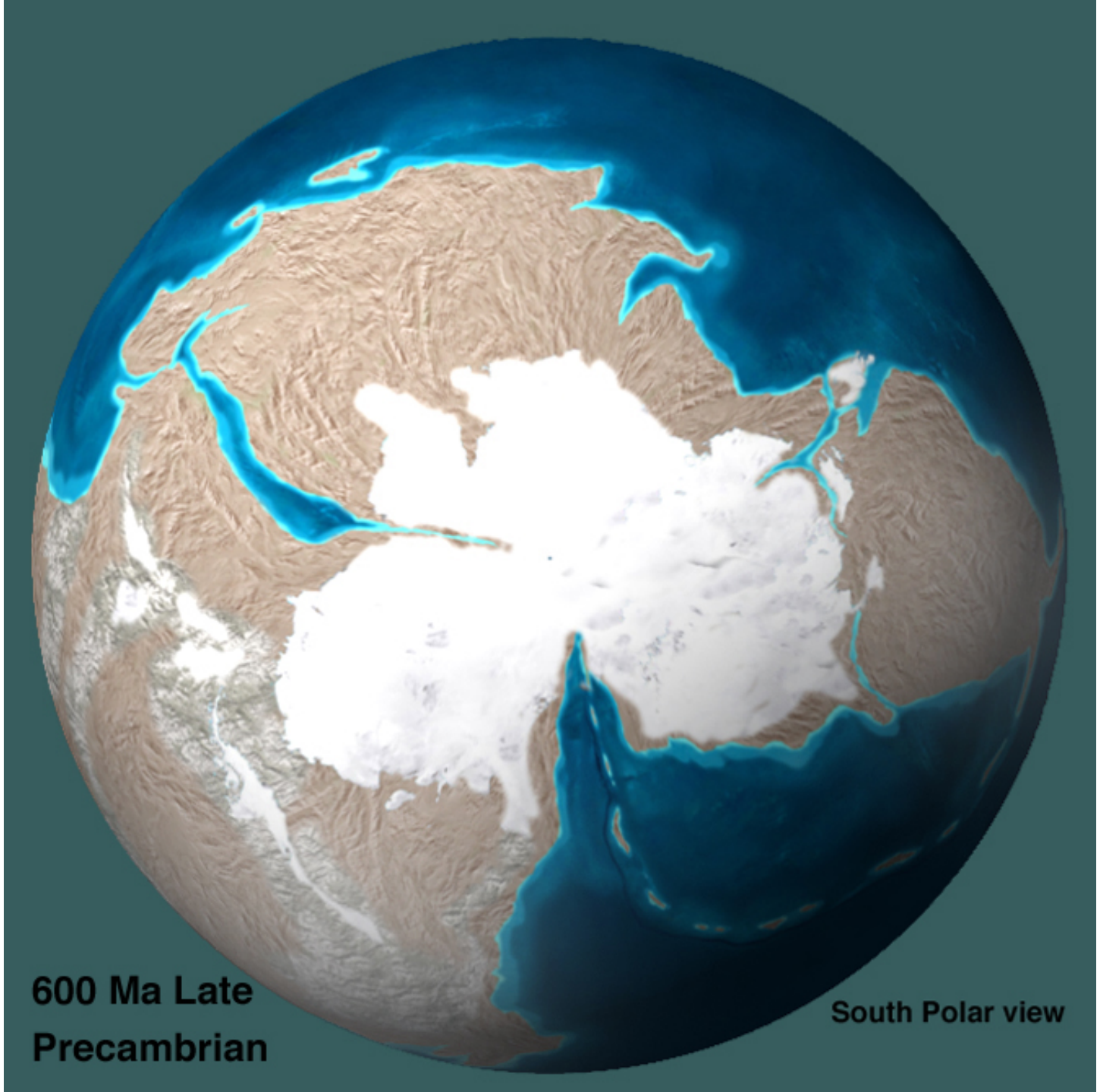
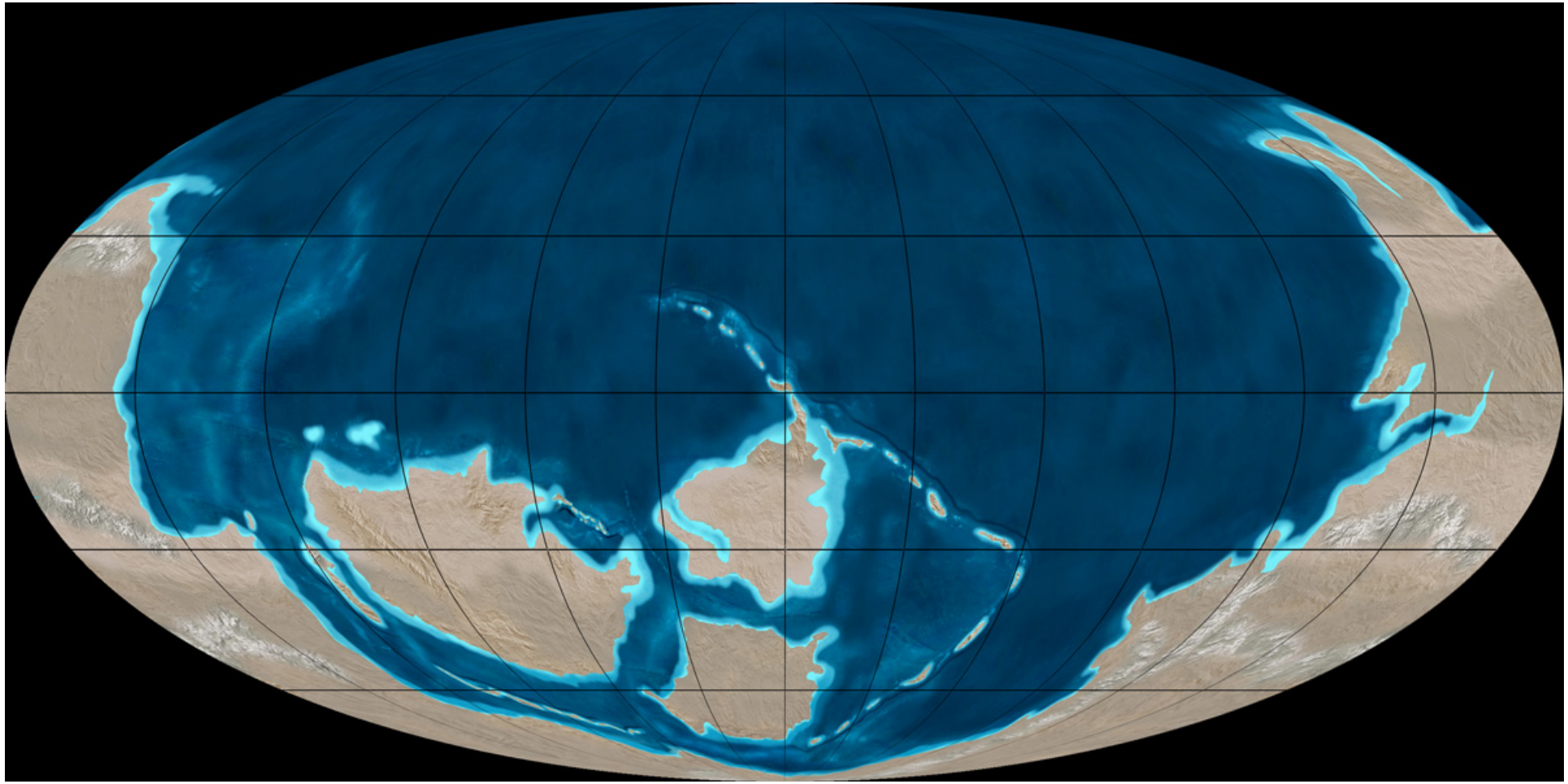
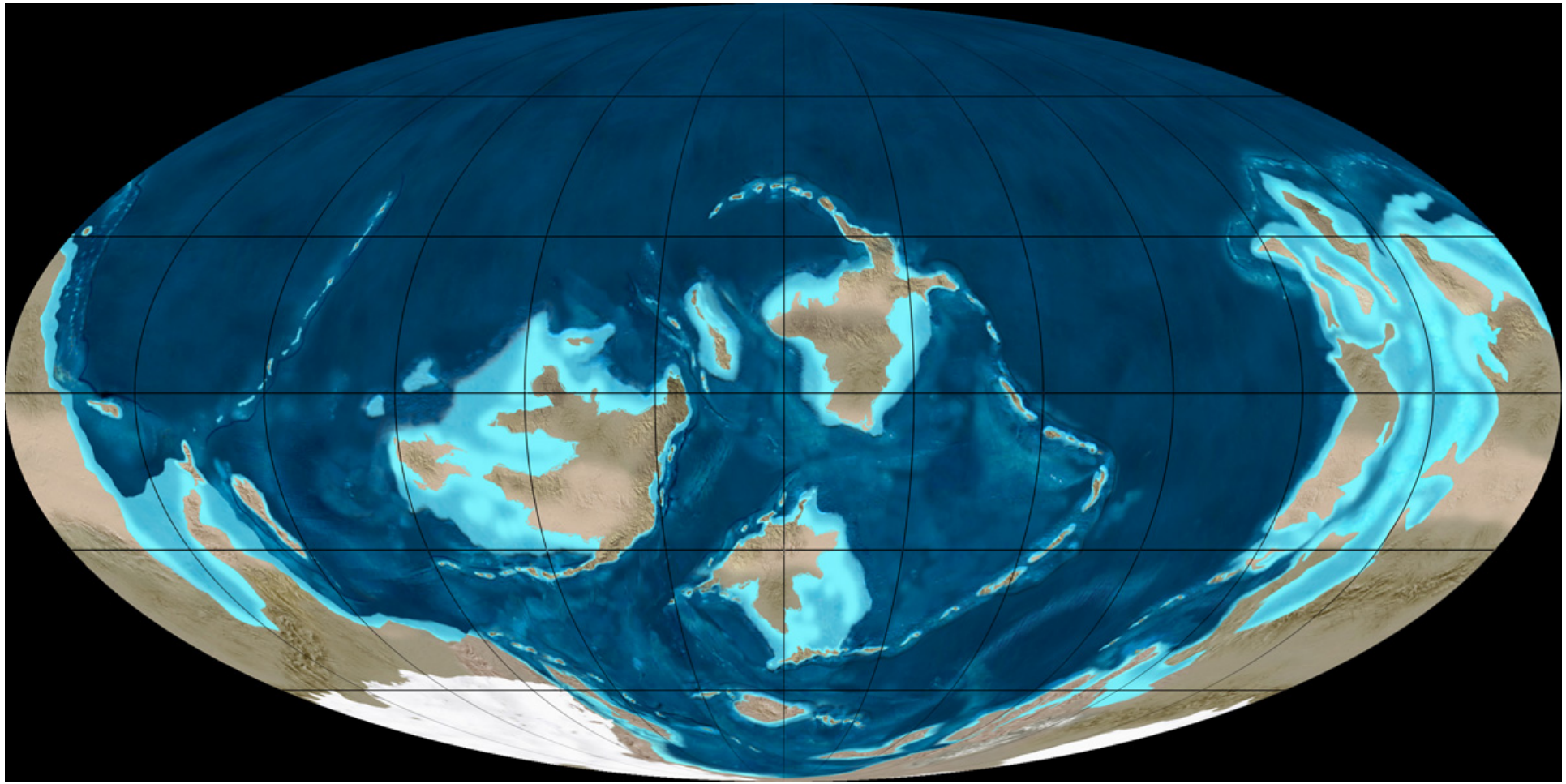

600 Ma Late
Precambrian
South Polar view

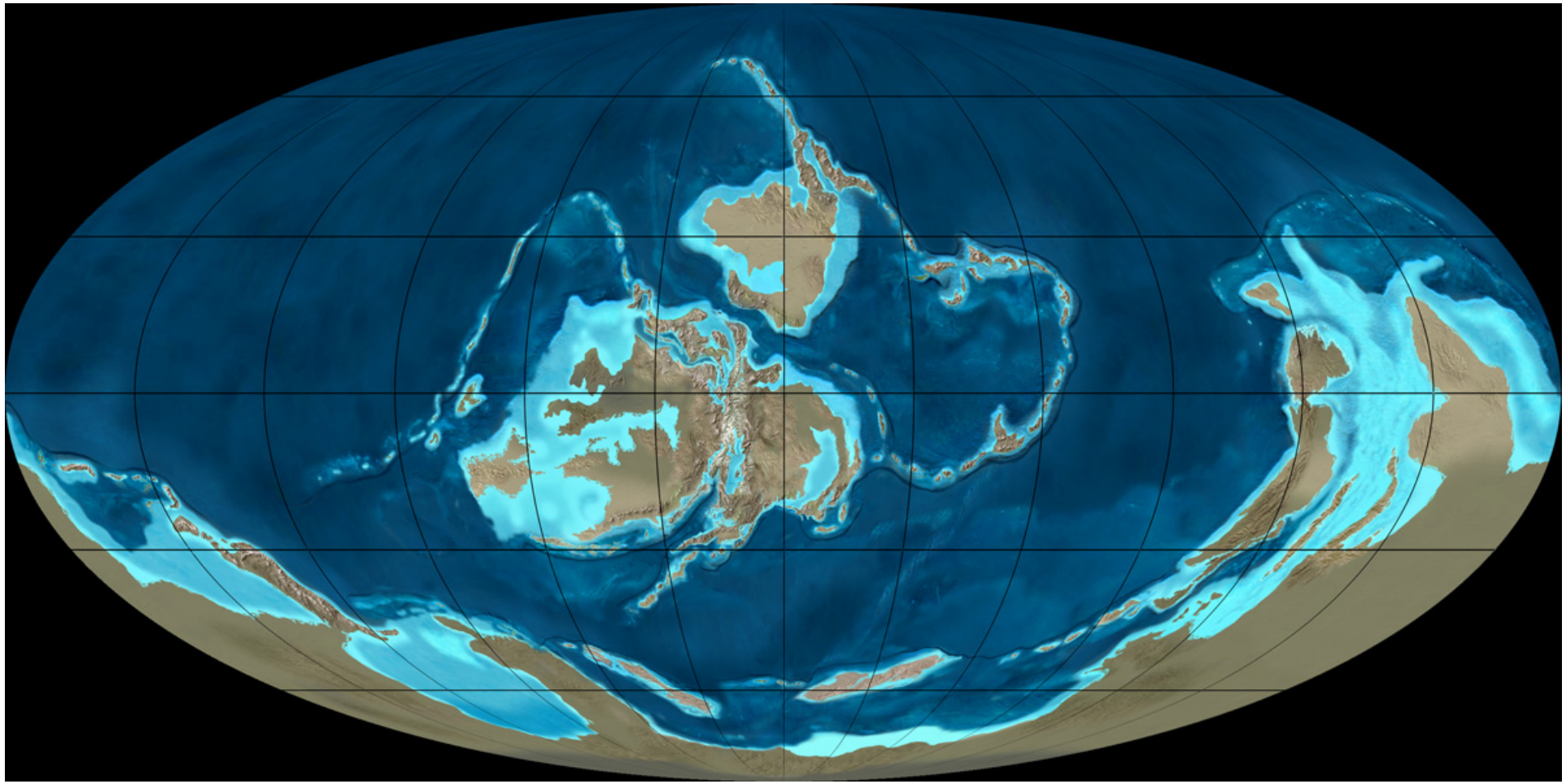
Cambrian 542 - 488 Mybp



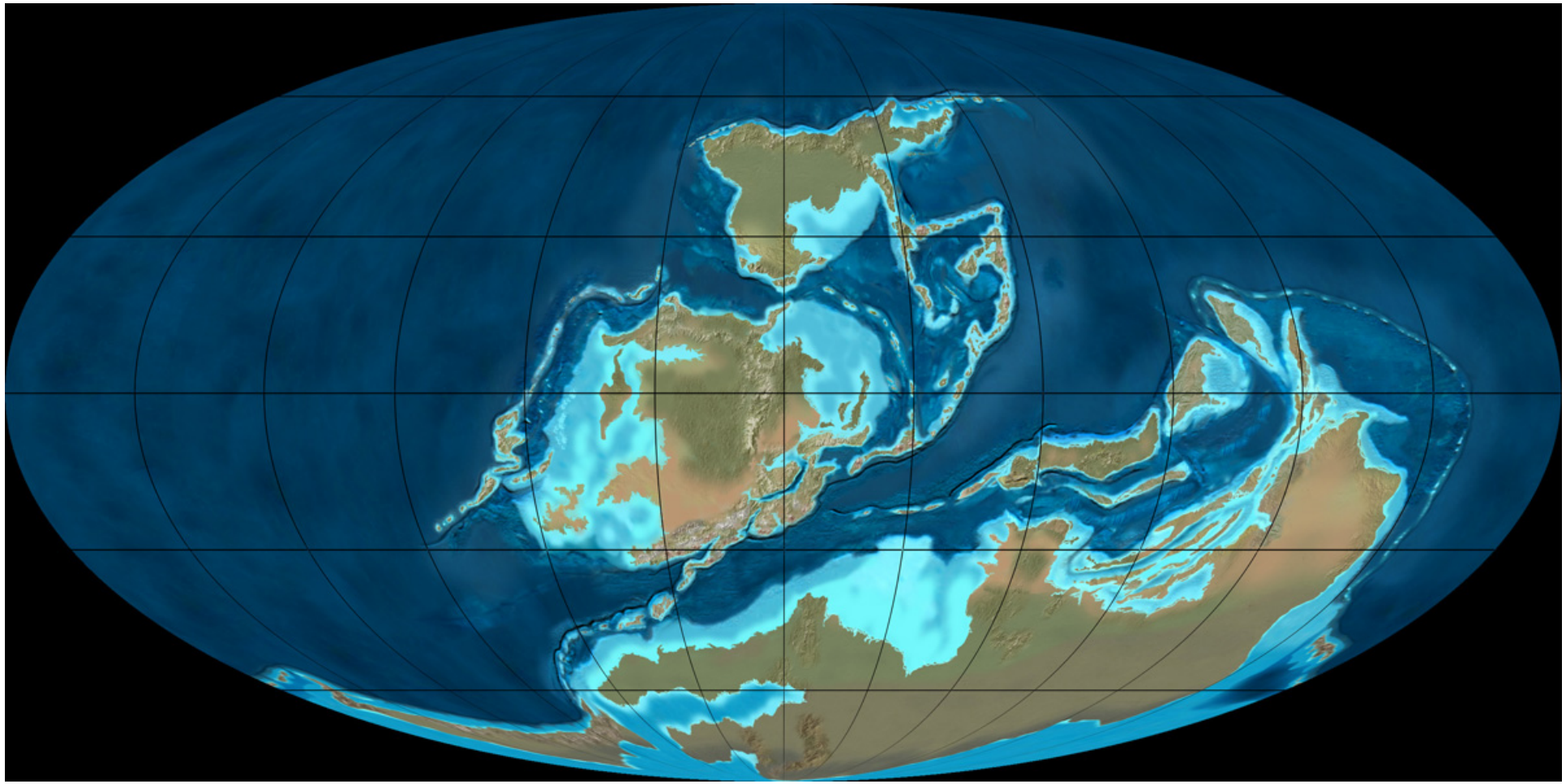
Ordovician 488 - 444 Mybp



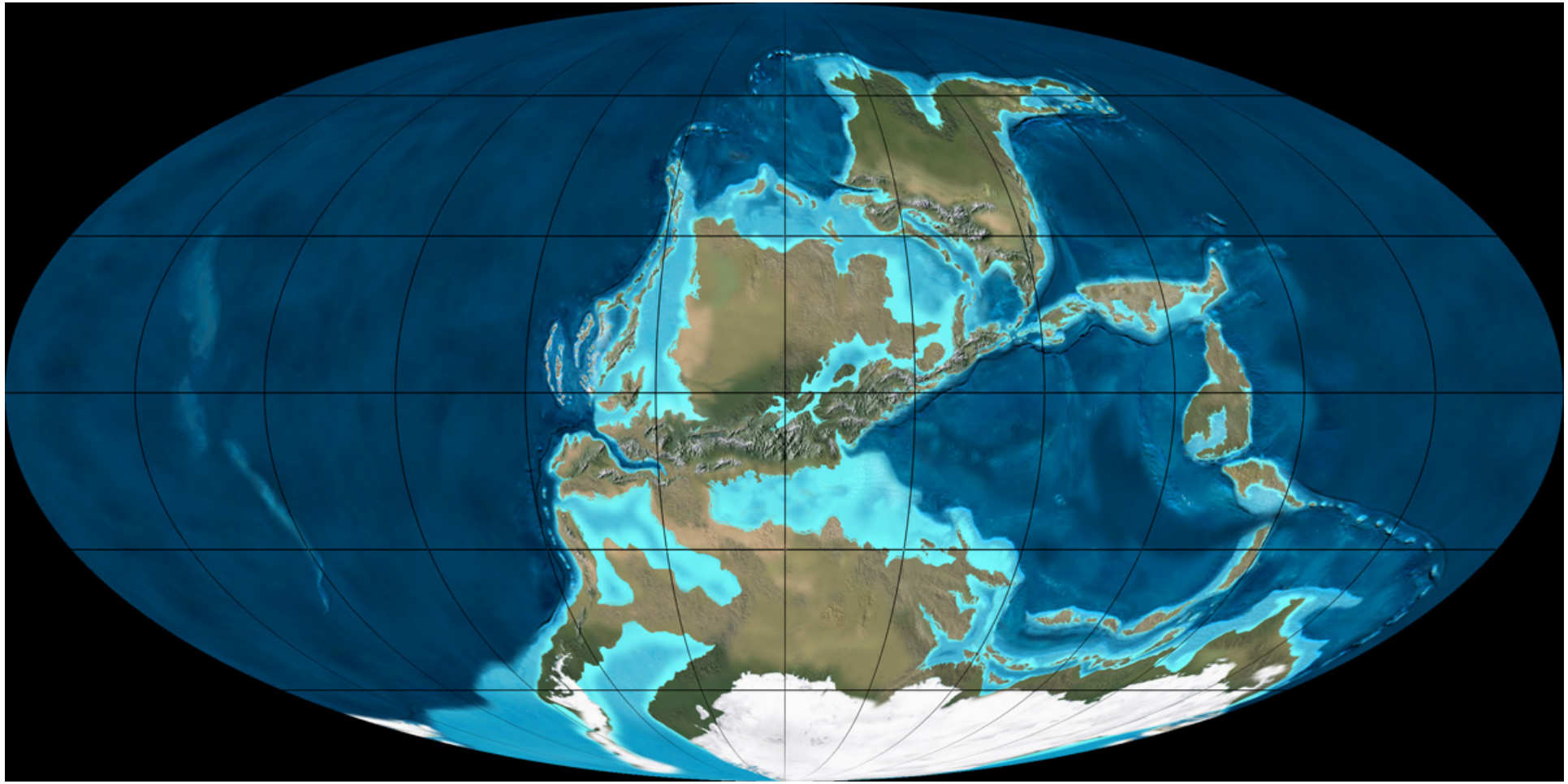
Silurian 444 - 416 Mybp



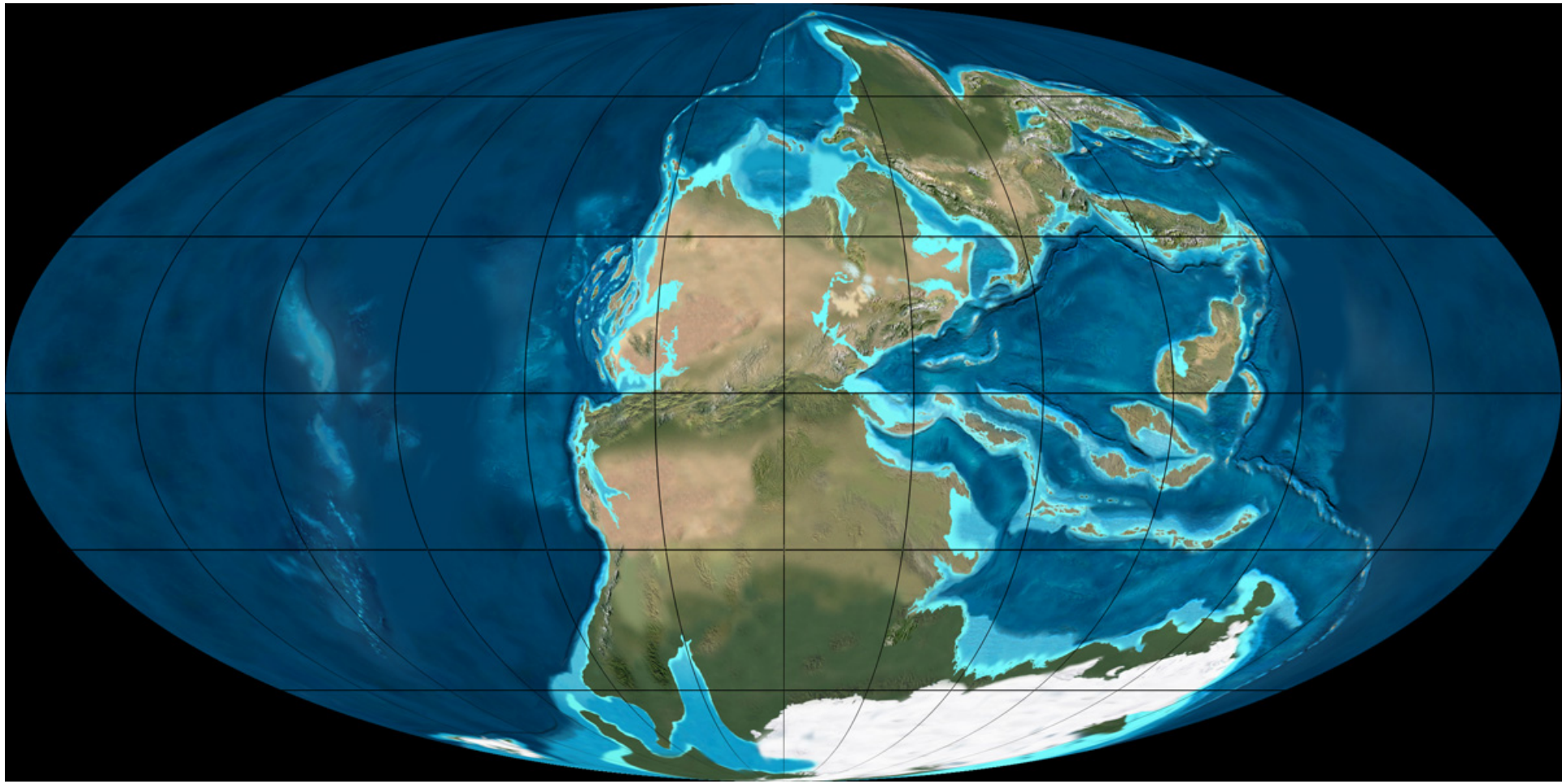
Devonian 416 - 360 Mybp



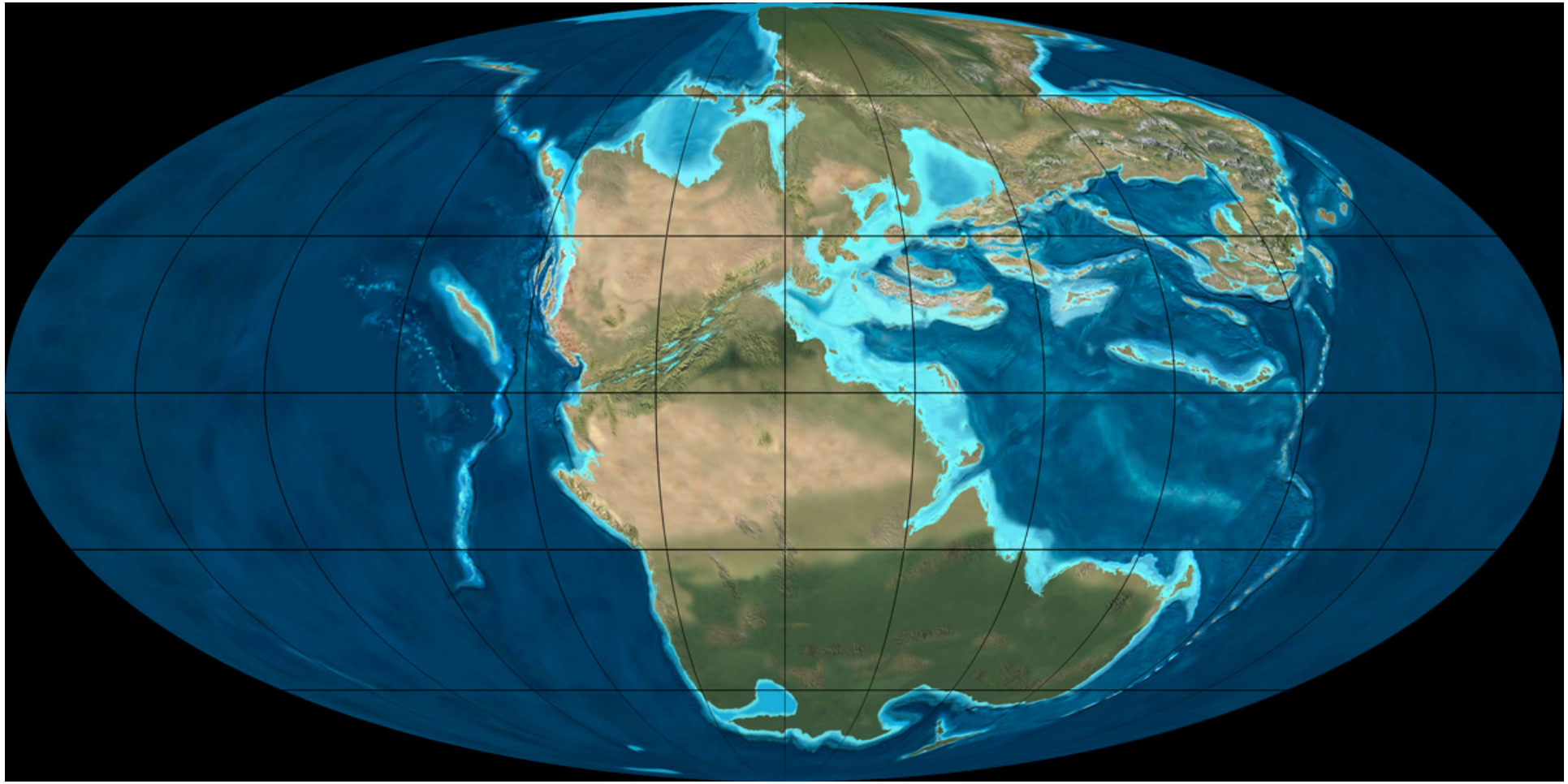
Carboniferous 360 - 300 Mybp



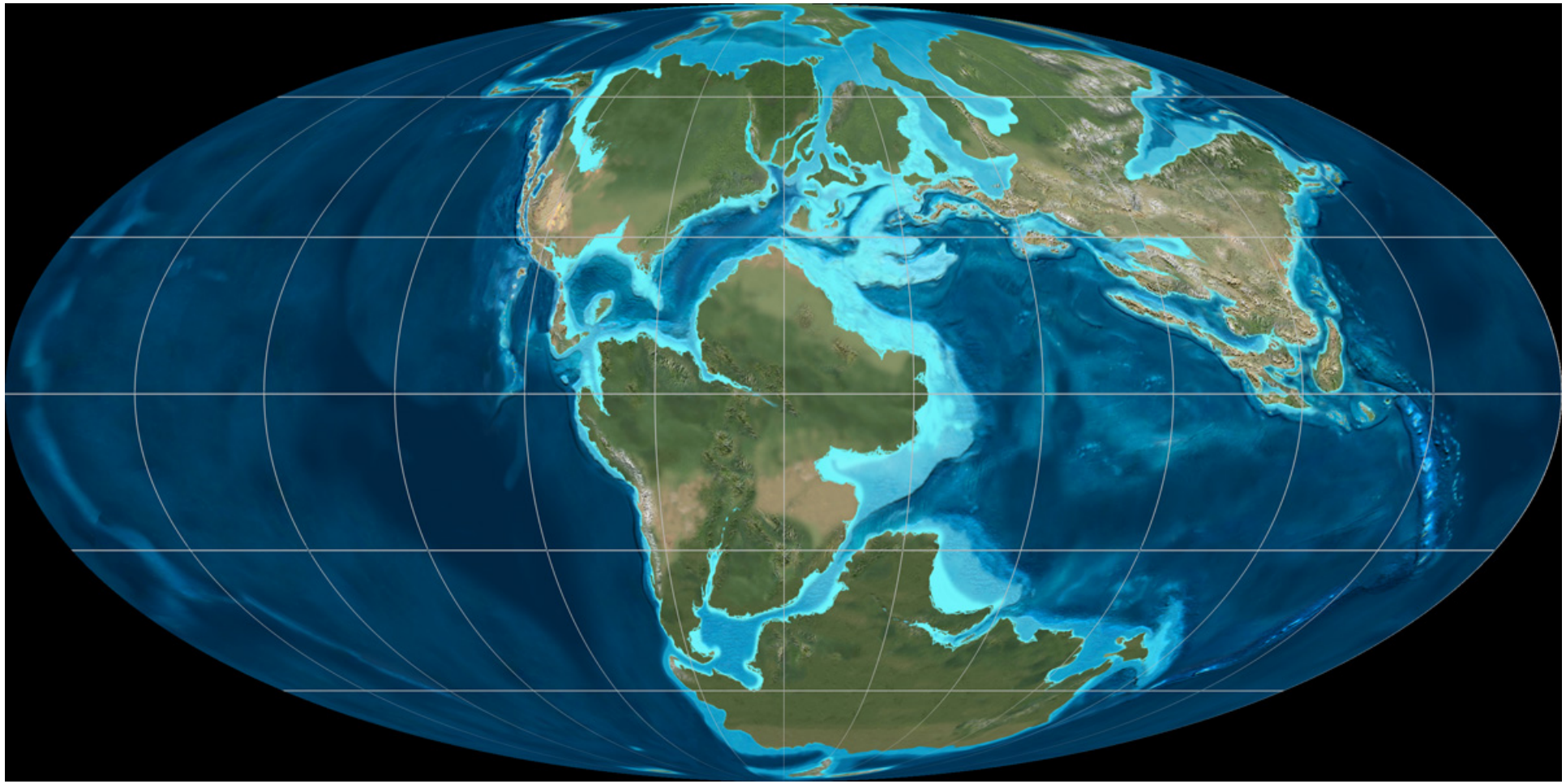
Permian 300 - 250 Mybp



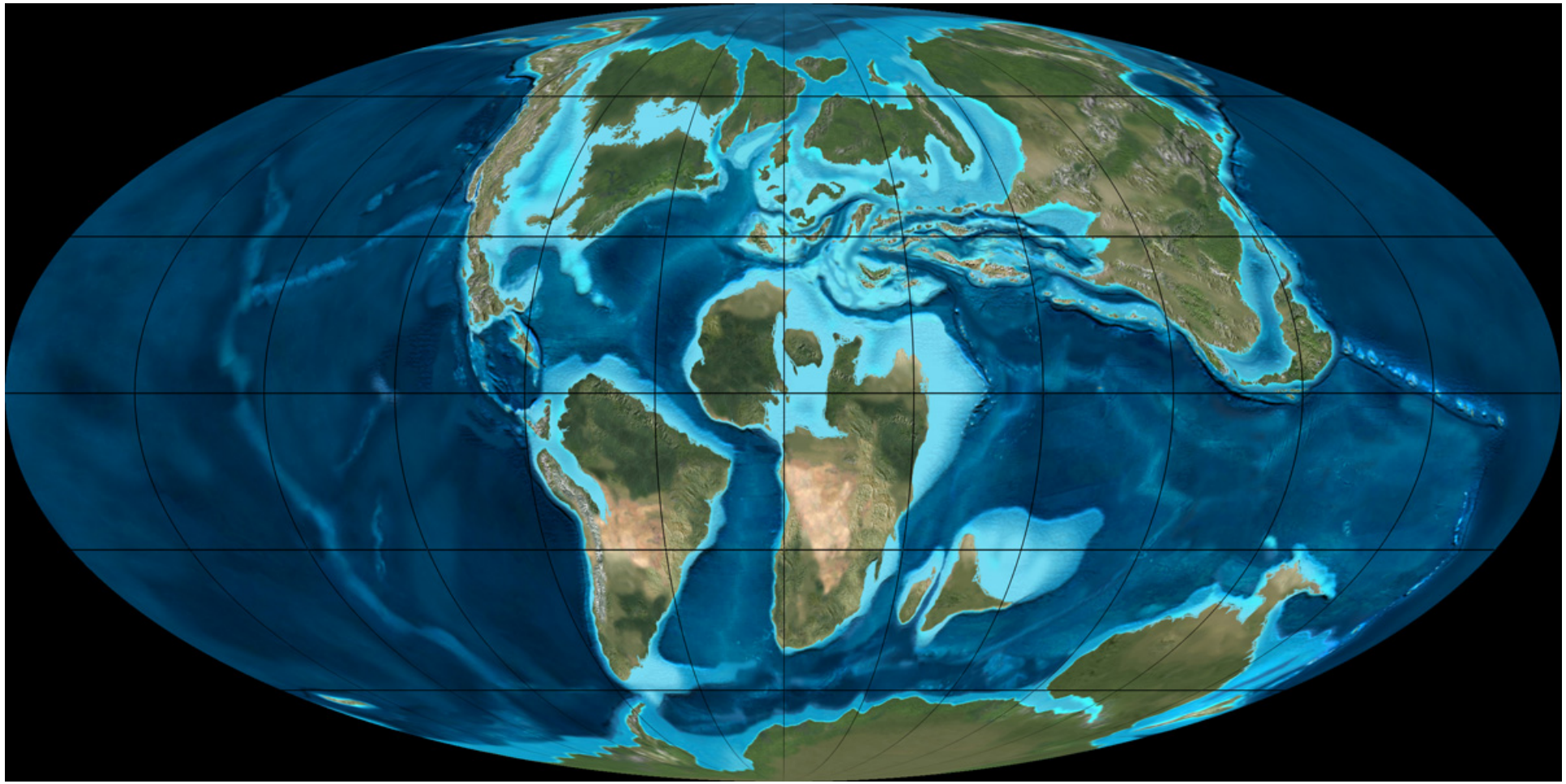
Triassic 250 - 200 Mybp



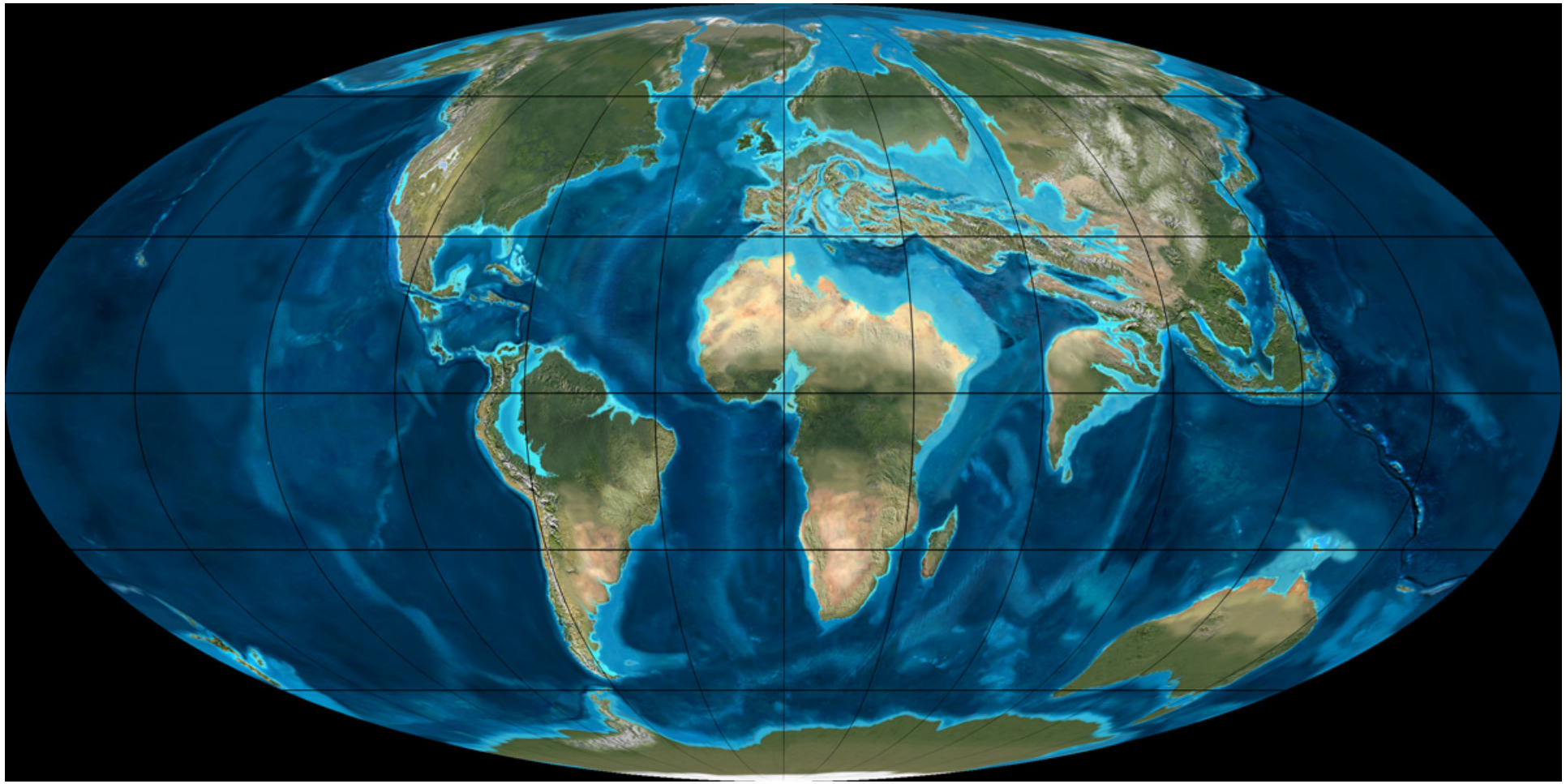
Jurassic 200 - 145 Mybp



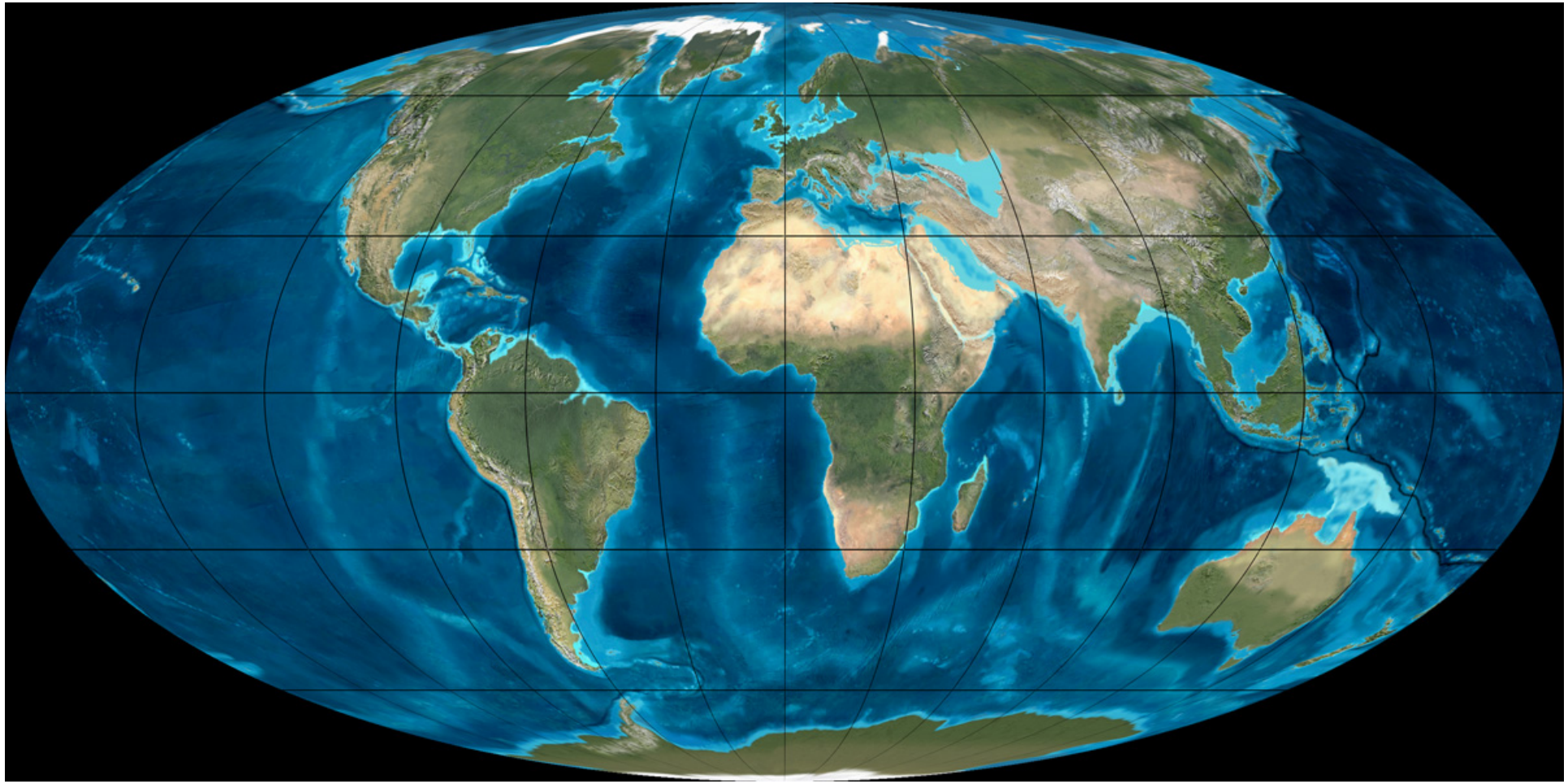
Cretaceous 145 - 65 Mybp



Paleogene 65 - 23 Mybp



Neogene 23 - 0 Mybp



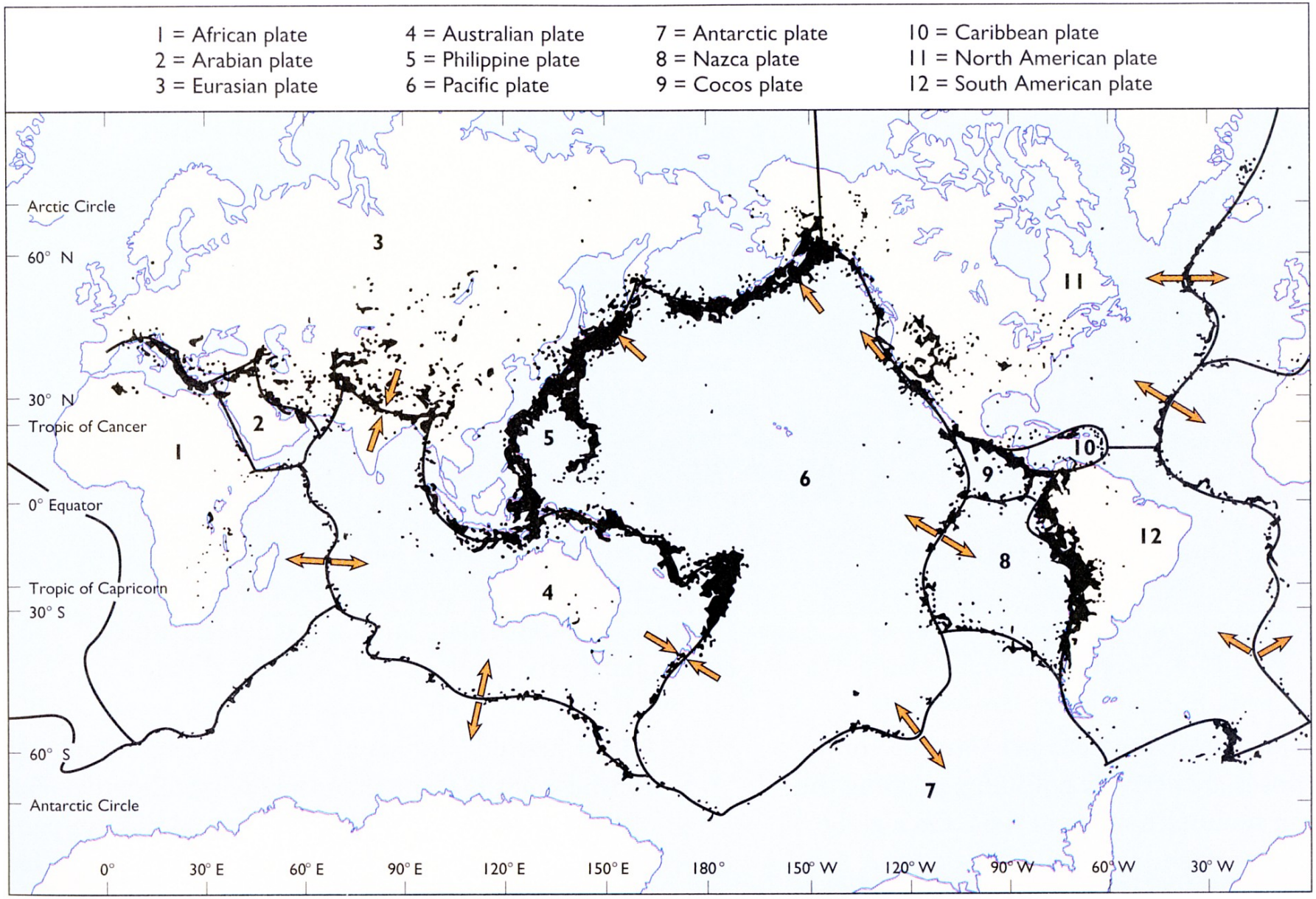
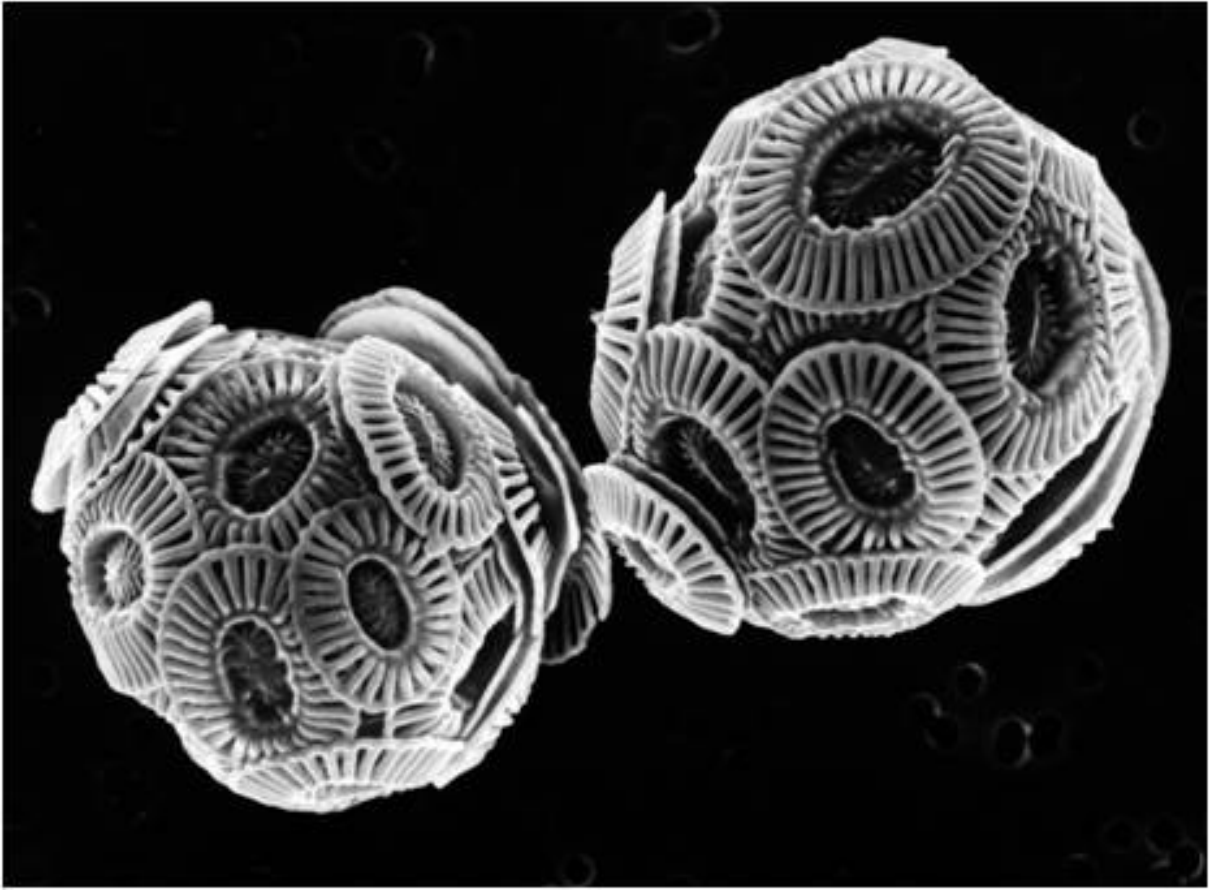
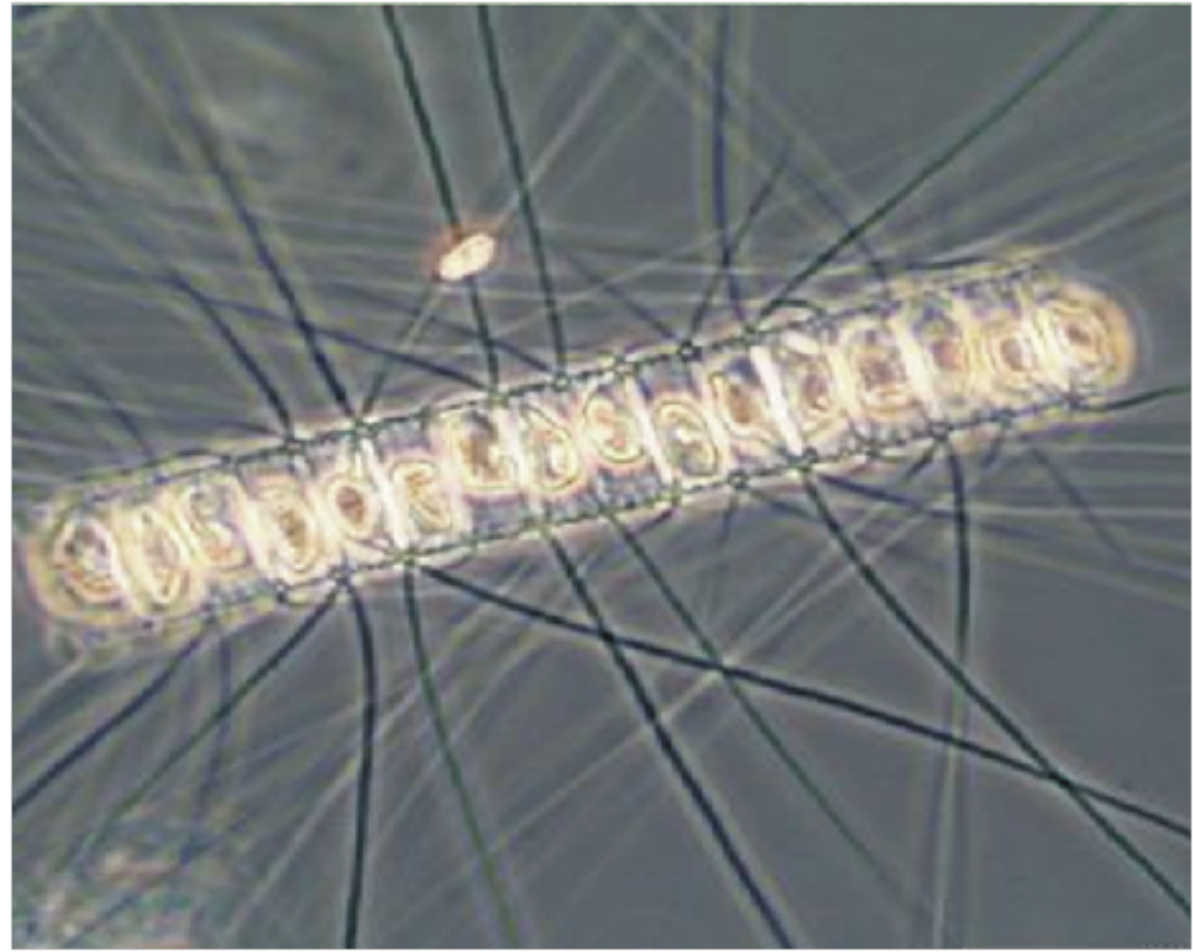


Figure 1.17. Lithospheric plates and earthquake occurrence [Fig. 3-7, Pinet, 2003].





Present Atmospheric Composition	Volcanic Emissions
78% N_2	Trace N_2
21% O_2	Trace O_2
1% Ar	Trace Ar
Trace S	Trace S
0.041% CO_2	10% CO_2
0-4% H_2O	85% H_2O

Table 1.1. A comparison of the concentrations of gases in the present atmosphere and in modern volcanic emissions.

A conundrum!

The atmosphere has ~ 5 x 10^18 kg of mass.
The hydrosphere has 300 times as much mass.
The lithosphere has 5000 times as much mass.
The biosphere has 0.0002 times as much mass

Summary points

1) Energy comes from a variable sun, which controls our climate and causes natural variability.
2) Memory of the “local” cosmic dust's angular momentum explains the sense of rotation of the solar system.
3) The early atmosphere was blown away by strong solar variability.
4) Crustal plates recycling on a liquid core allow for exchange of constituents with the atmosphere and oceans.
5) The rotating molten core is a geodynamo, which provides for a magnetic shield from the solar wind and other particles from outer space.
6) The present atmosphere was outgassed, with rain, photosynthesis, and rock formation accounting for our current mixture.