

Projet 3D

Procedural Tectonic Planets

Juan José Parra Díaz
Timothée Bonetti

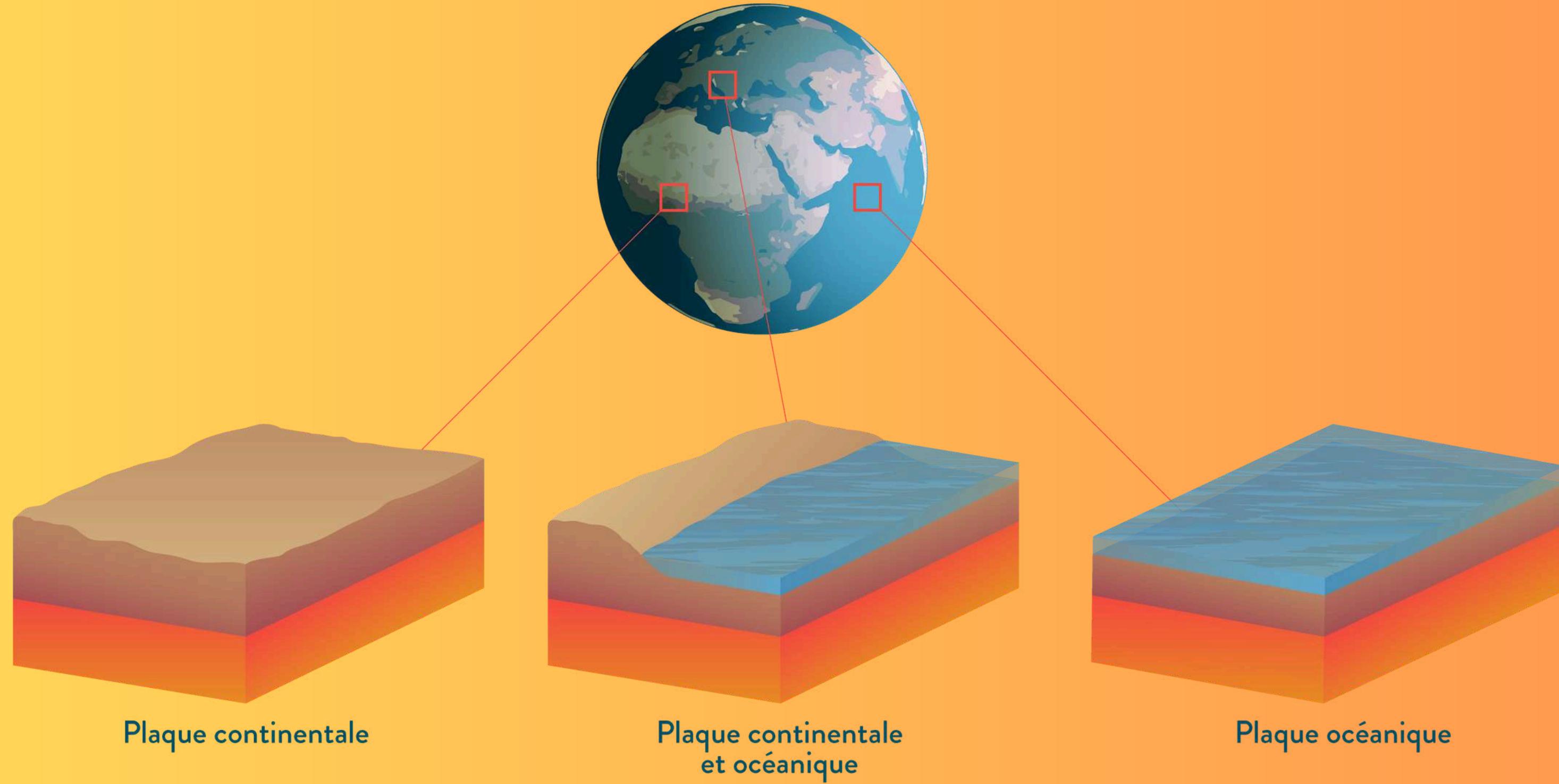
"Procedural method for authoring synthetic tectonic planet"

Implementation of:

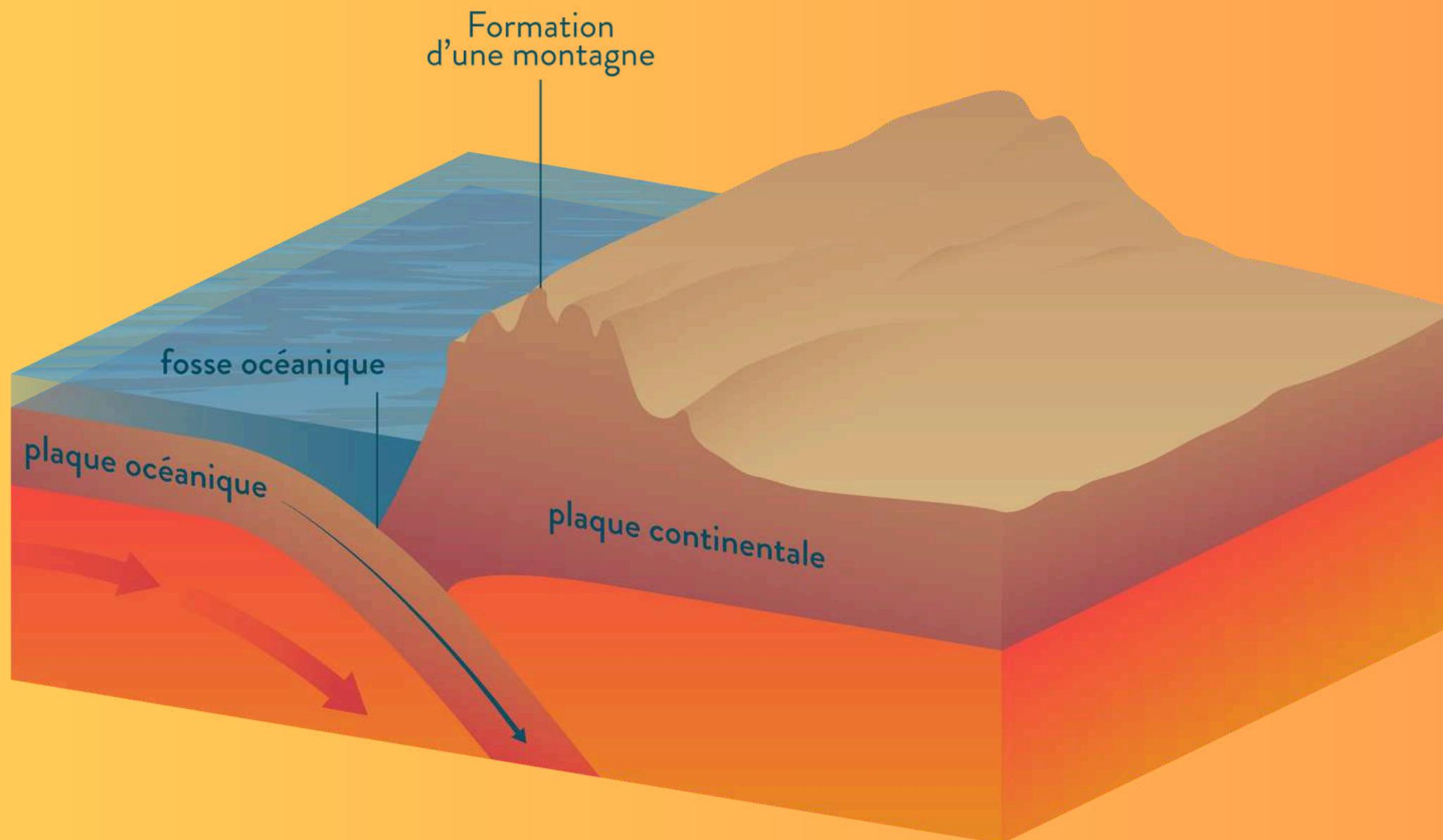
Procedural Tectonic Planets

Yann Cortial, Adrien Peytavie, Eric Galin, Eric Guérin

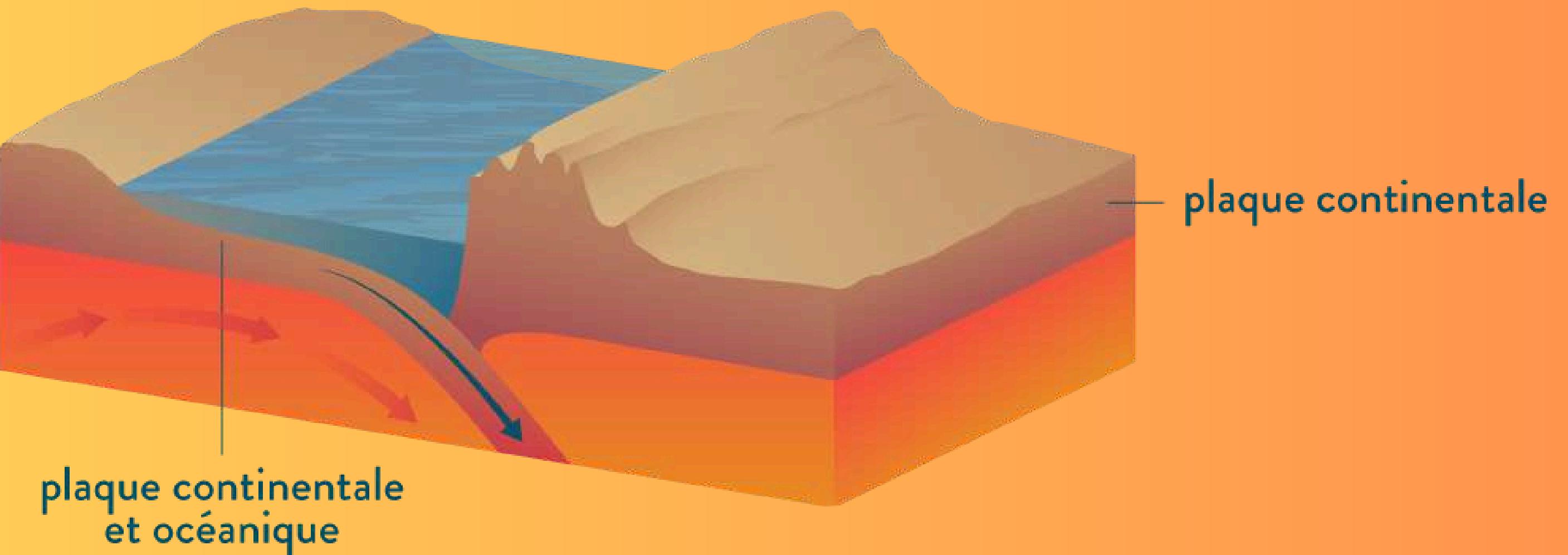
Geology



Subduction



Collision



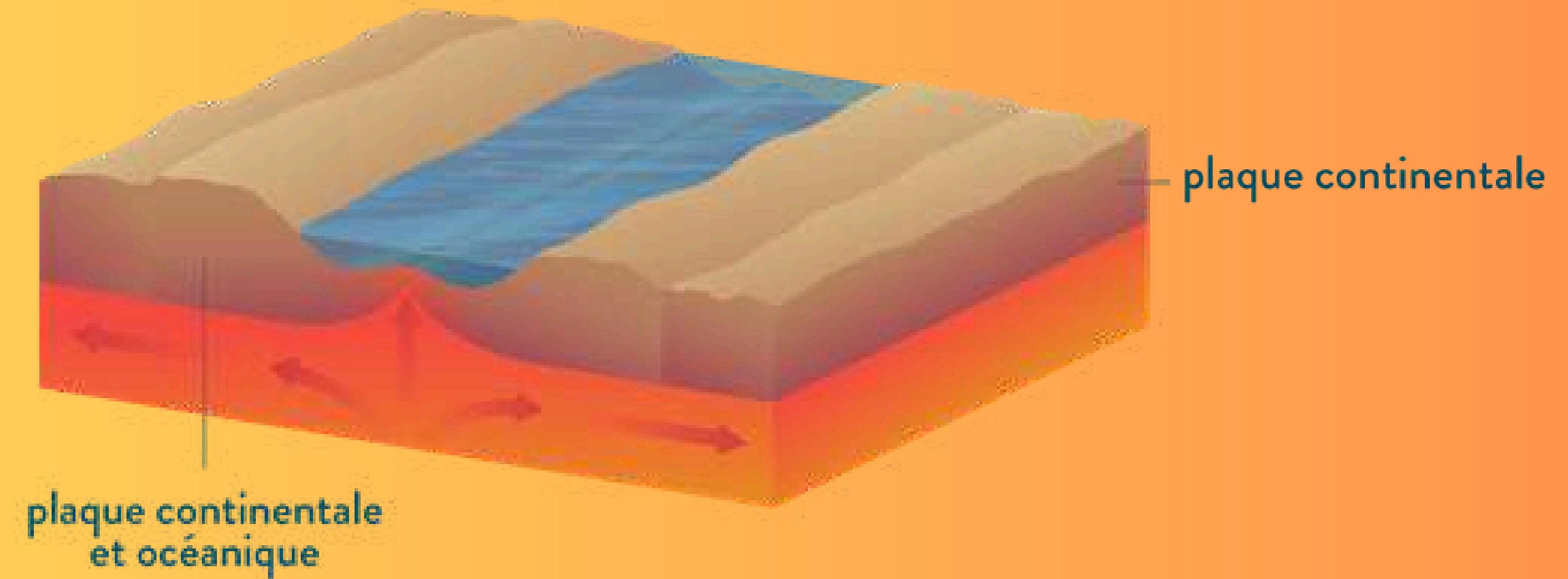
Collision



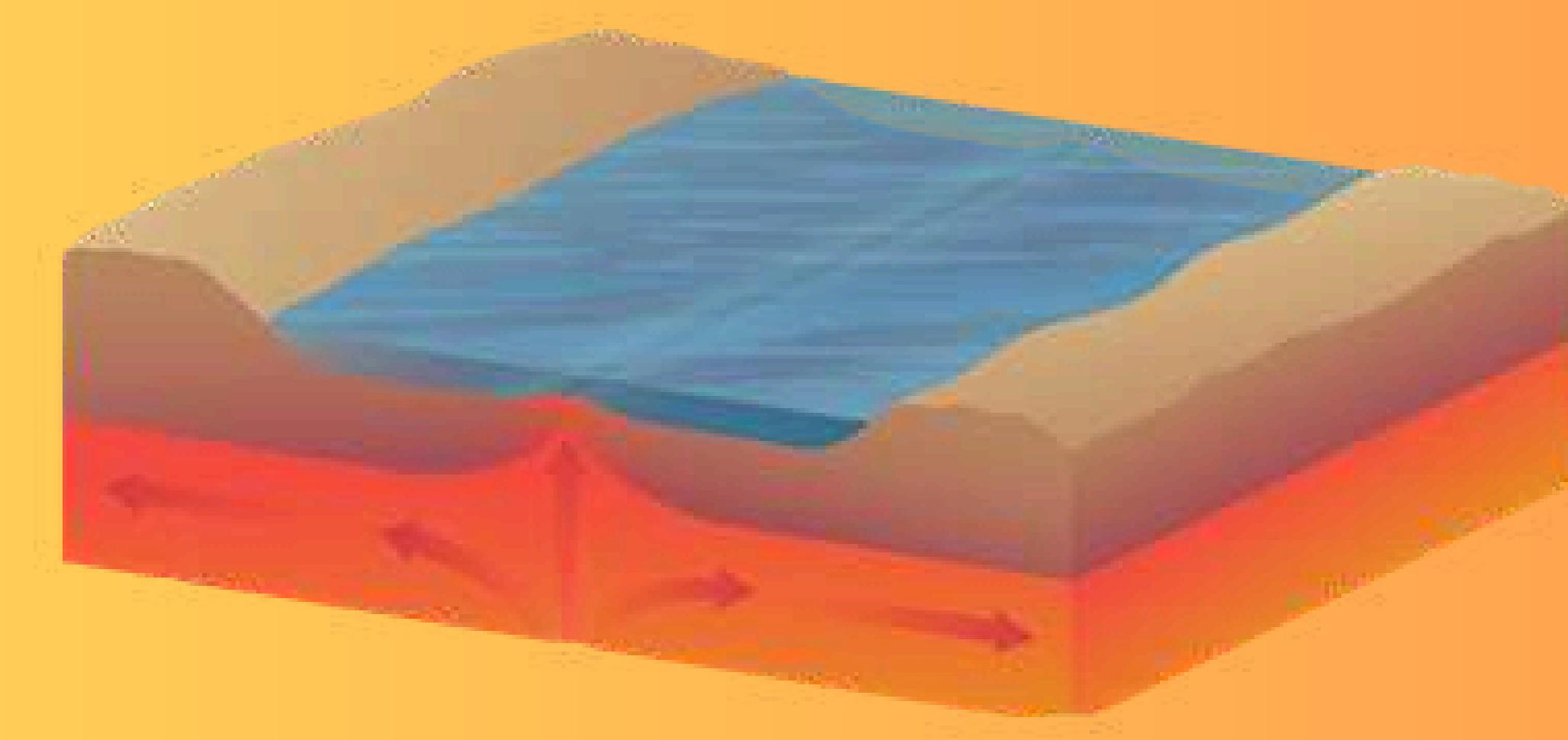
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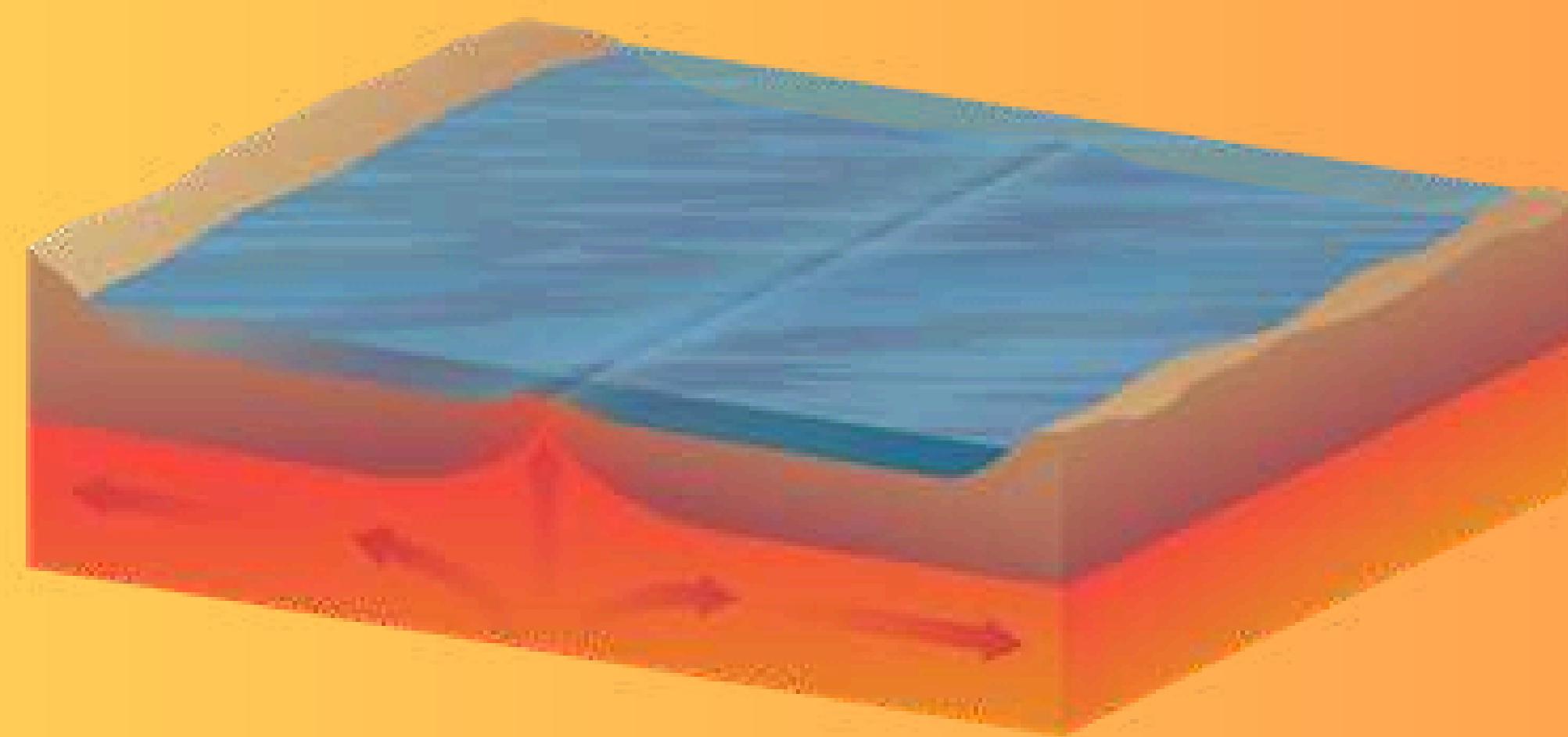
Oceanic Crust Generation



Oceanic Crust Generation



Oceanic Crust Generation



Mouvement des plaques tectoniques à l'échelle de la planète

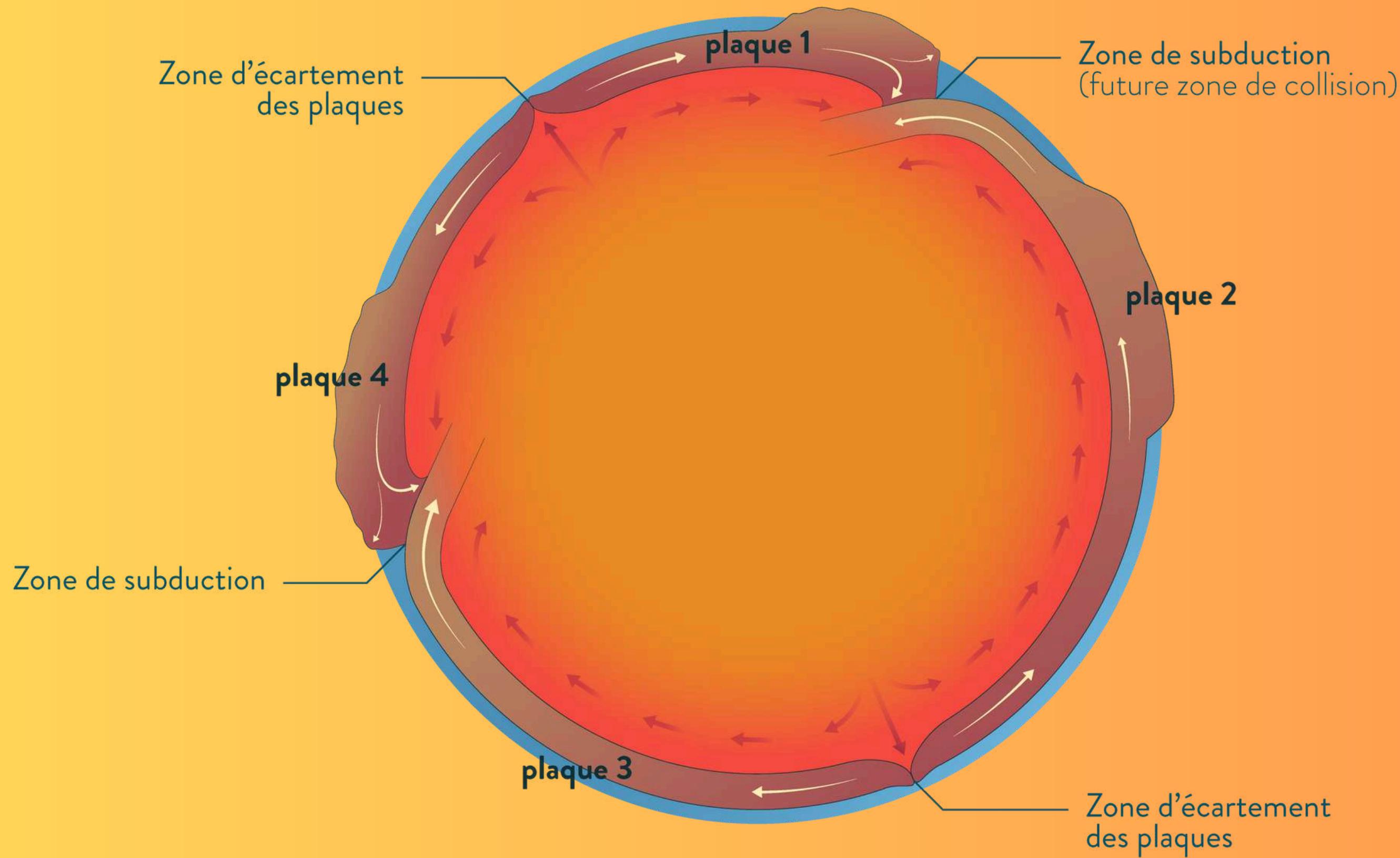


Plate rifting

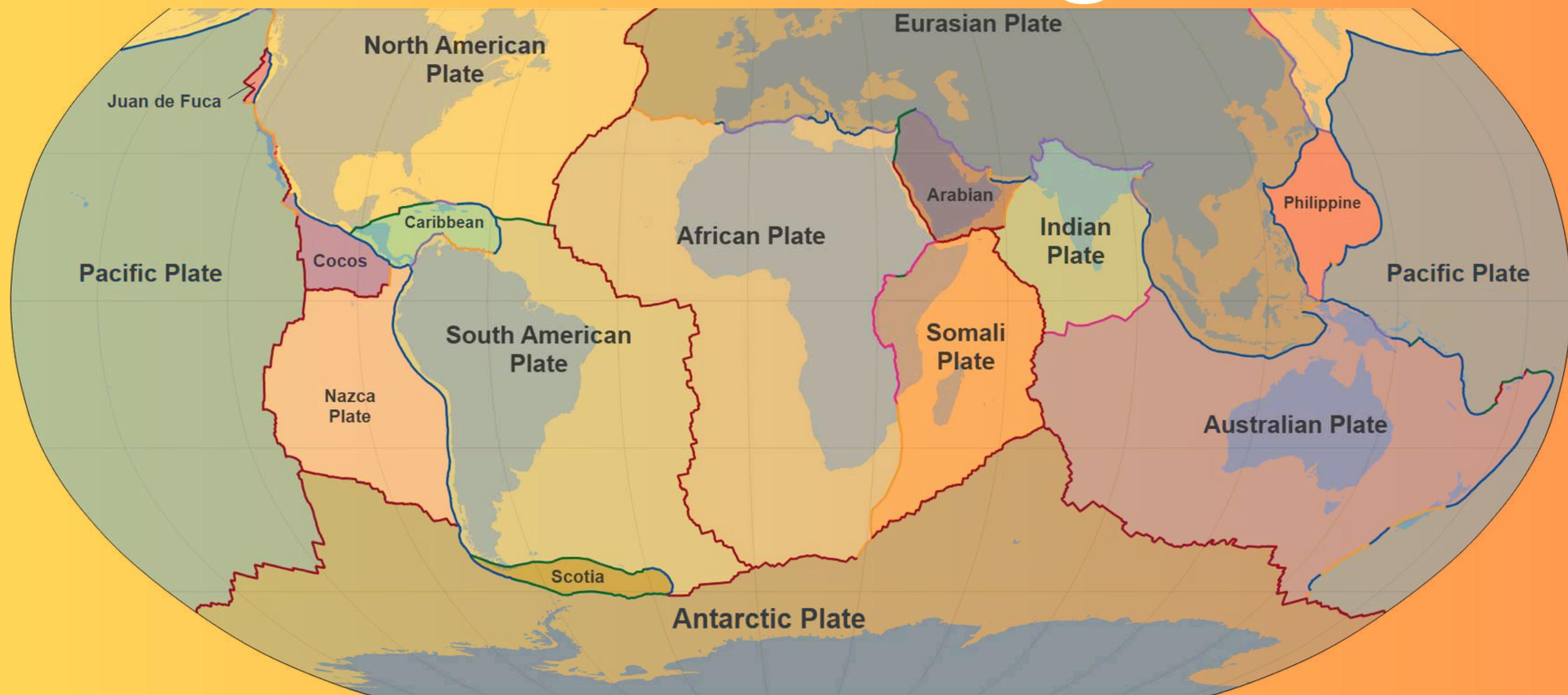


Plate rifting

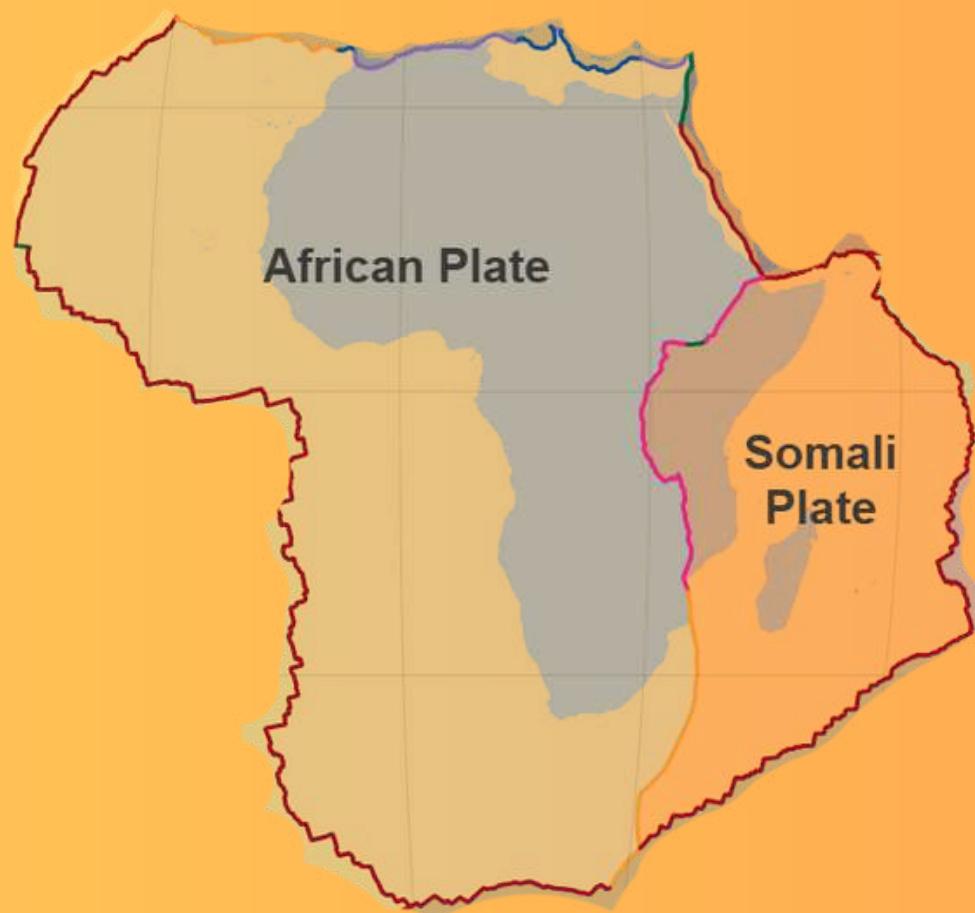
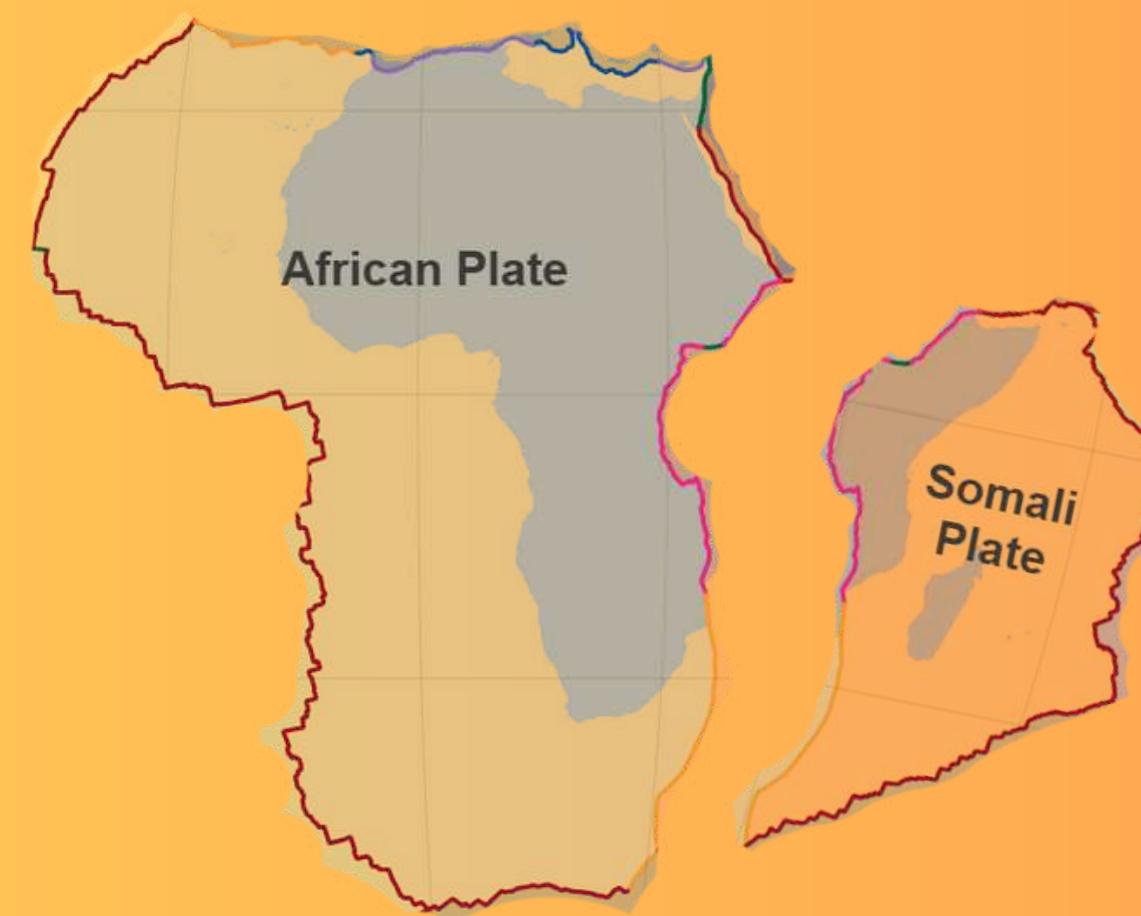
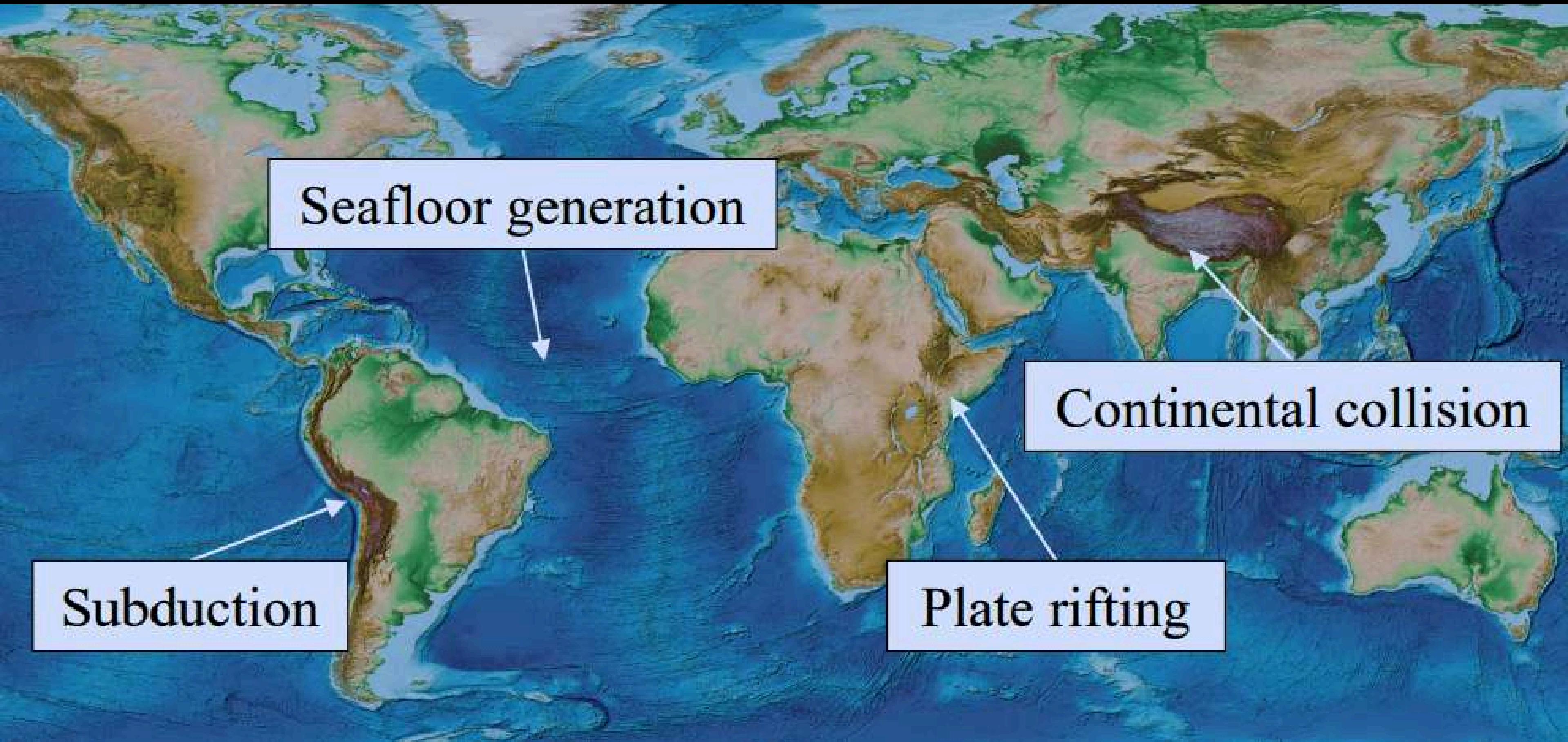


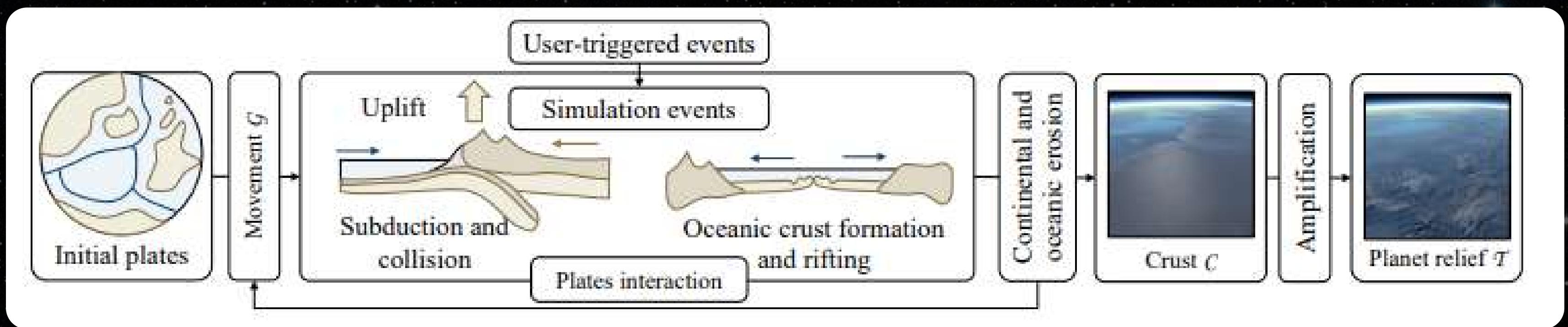
Plate rifting



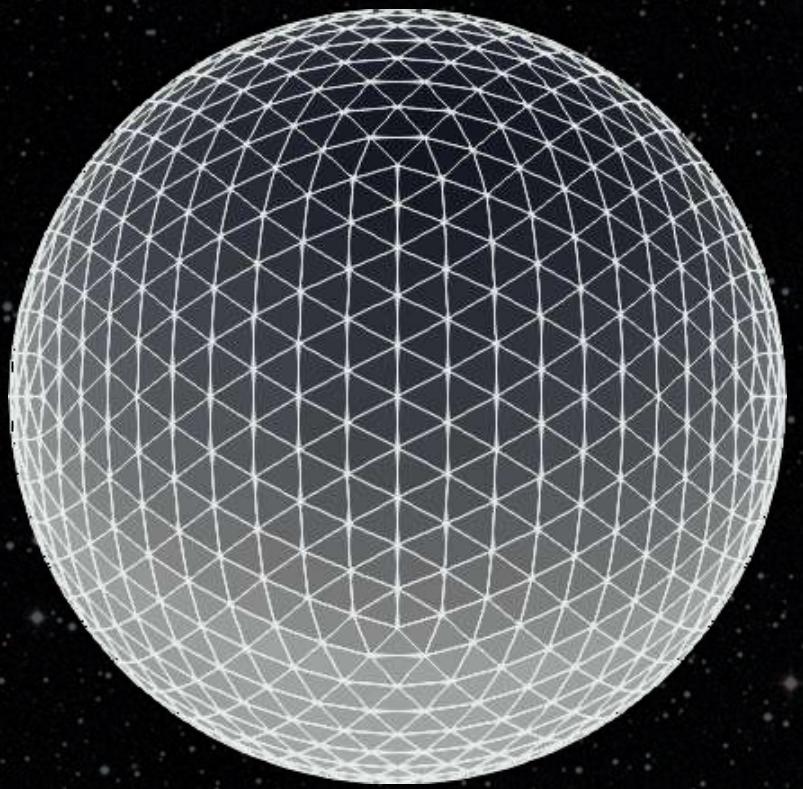




Implementation

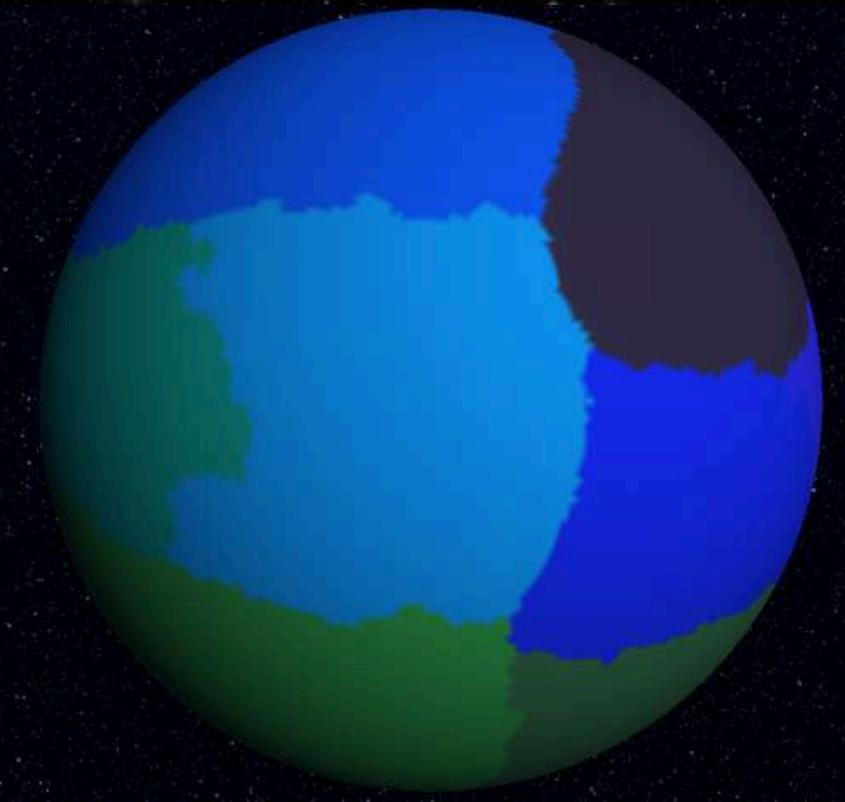


Implementation core



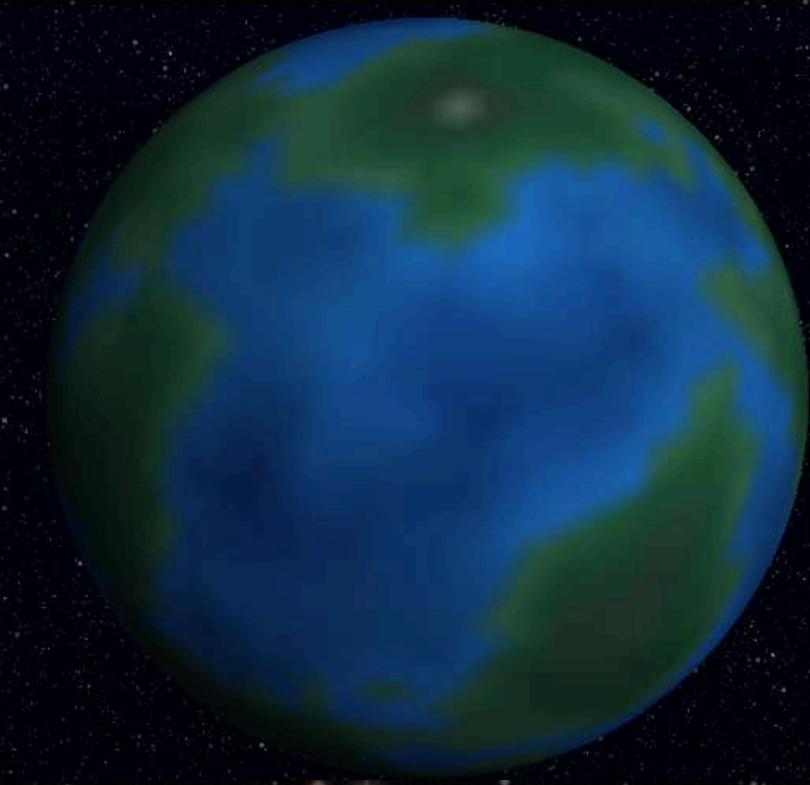
Planet

Fibonacci sphere sampling



Plates

Voronoi cells

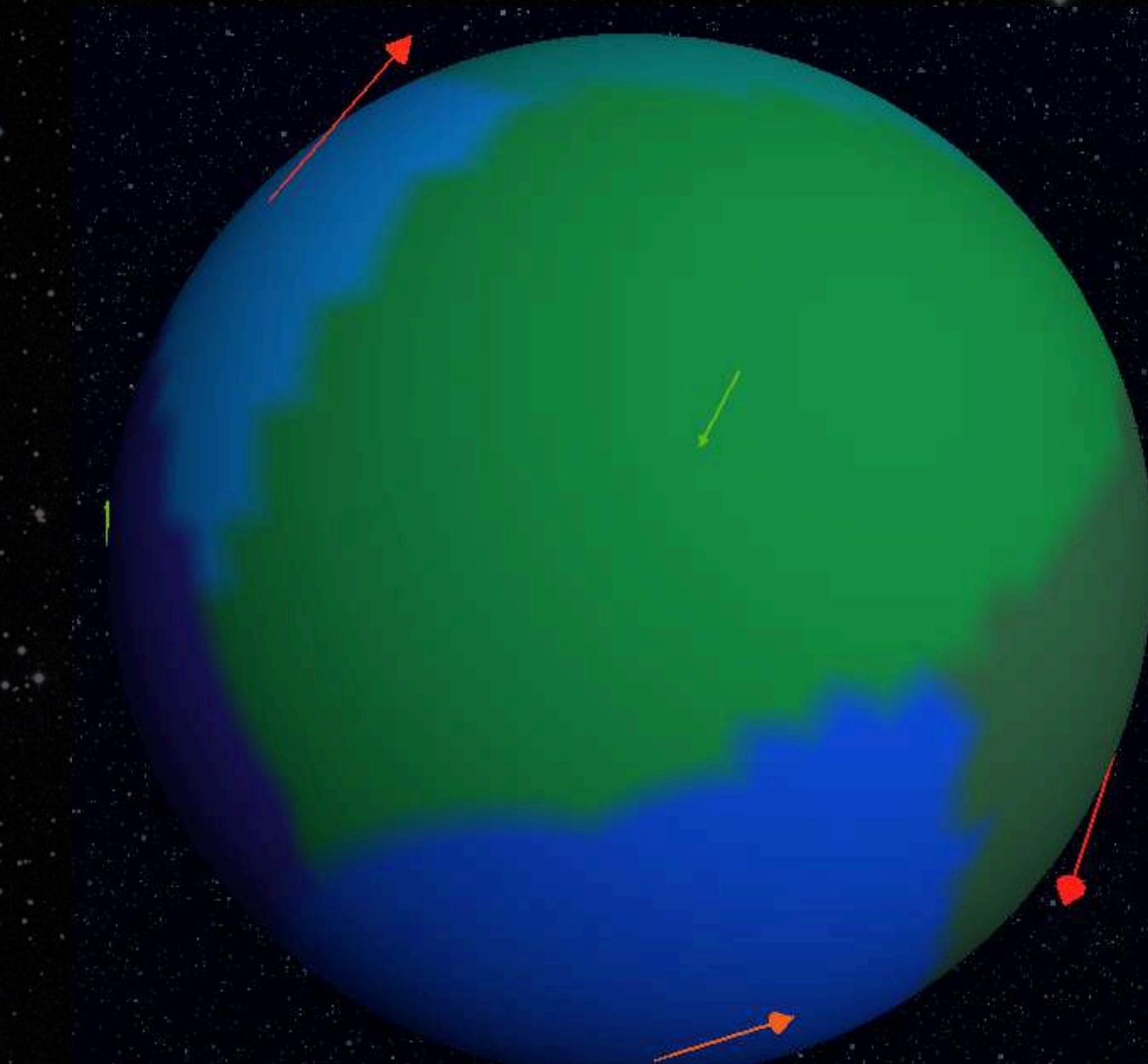
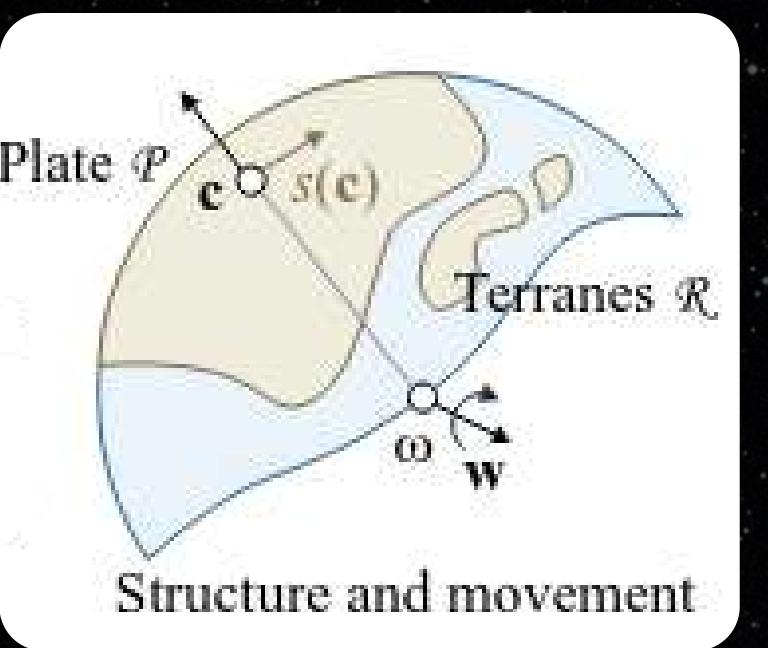


Crust

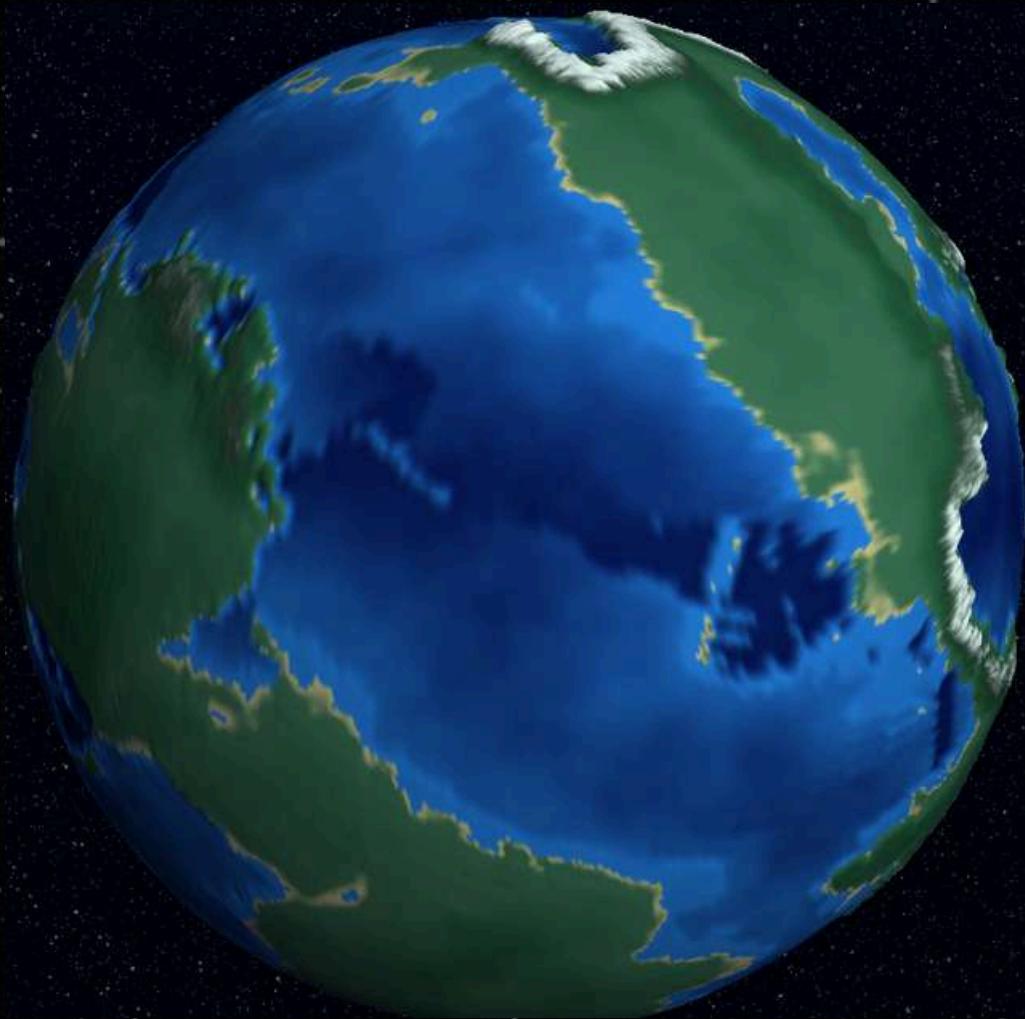
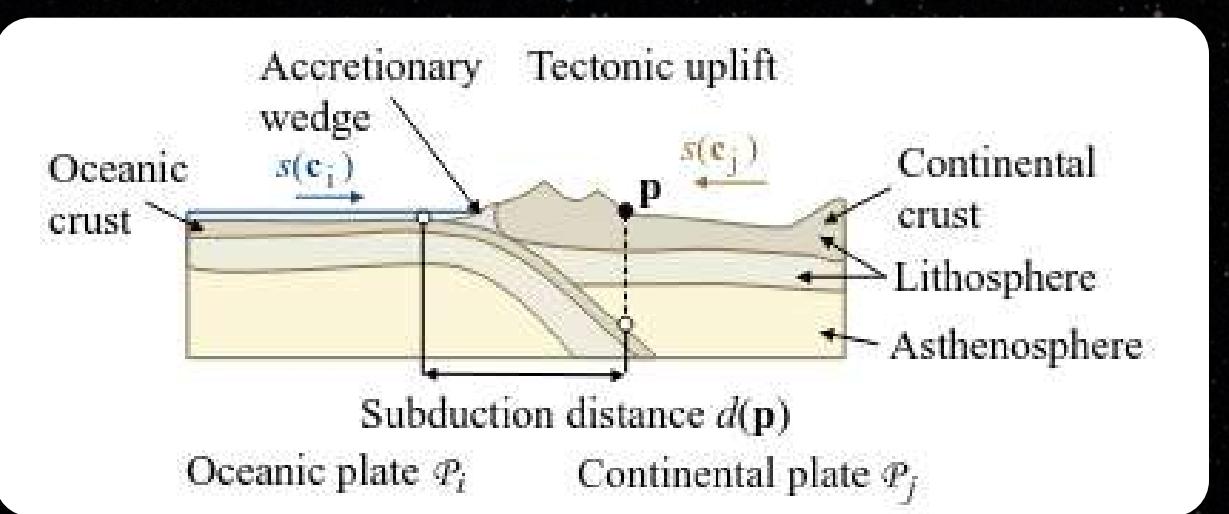
Assigned with noise map

Movement

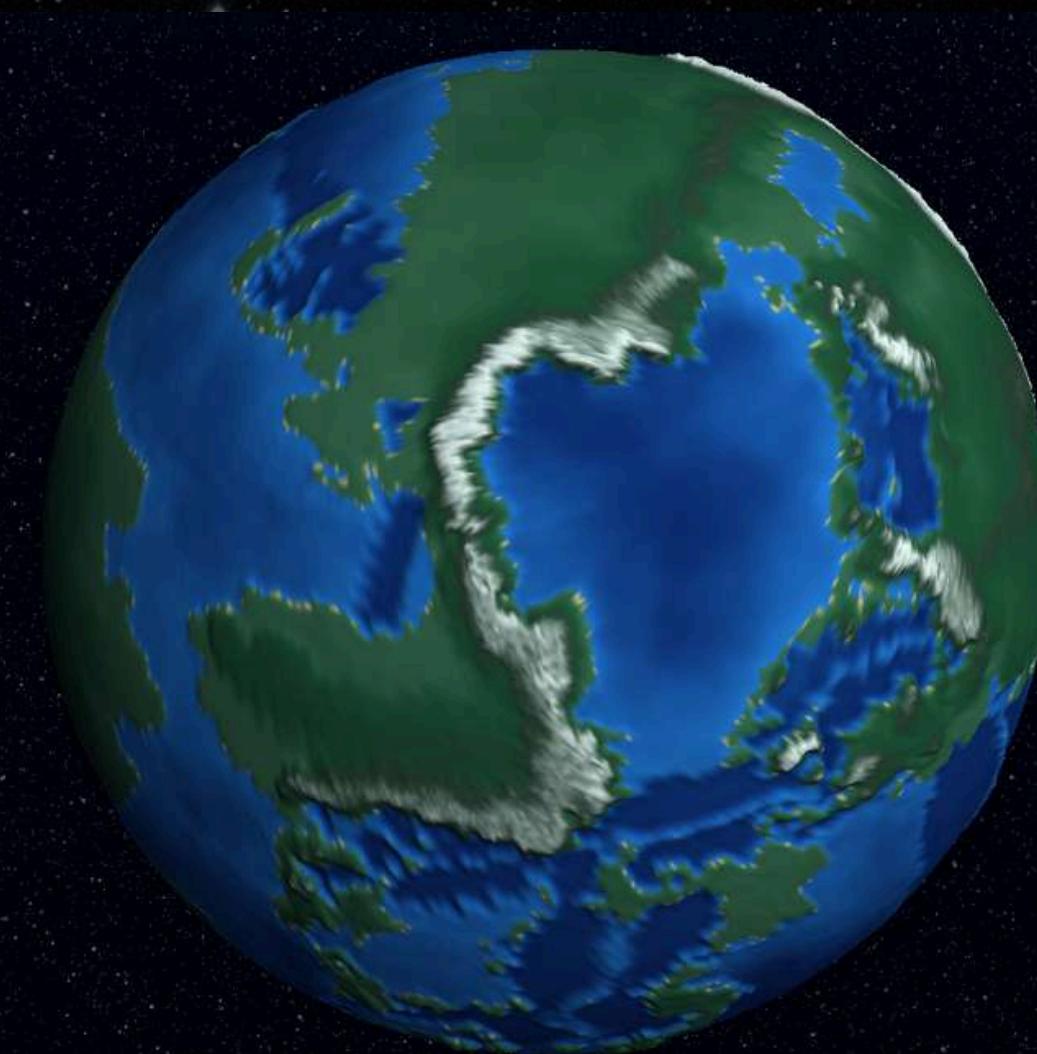
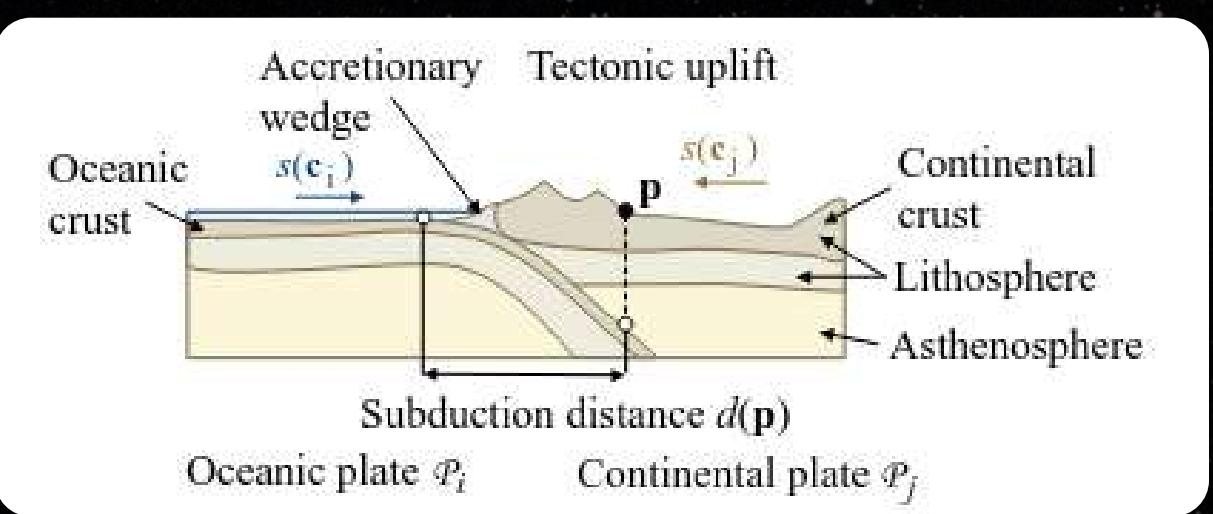
Rigid geodetic movement



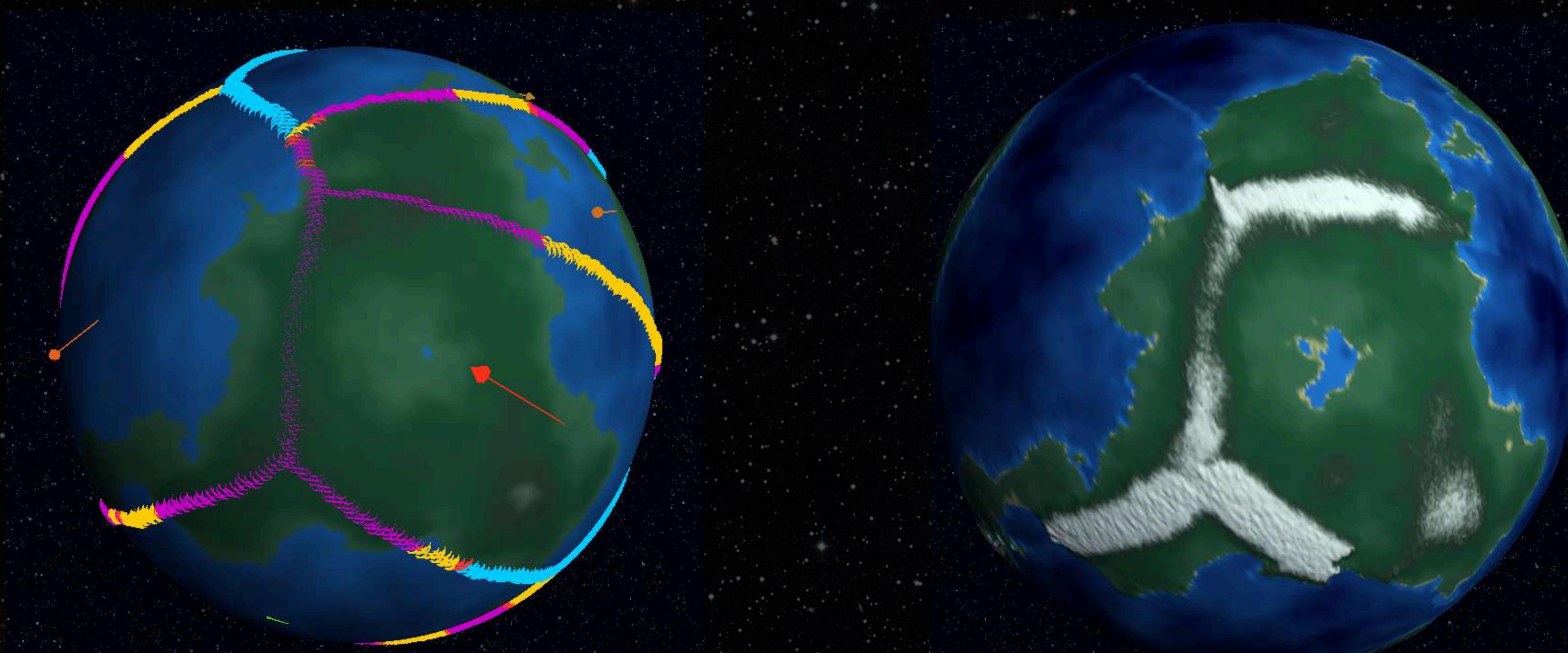
Subduction

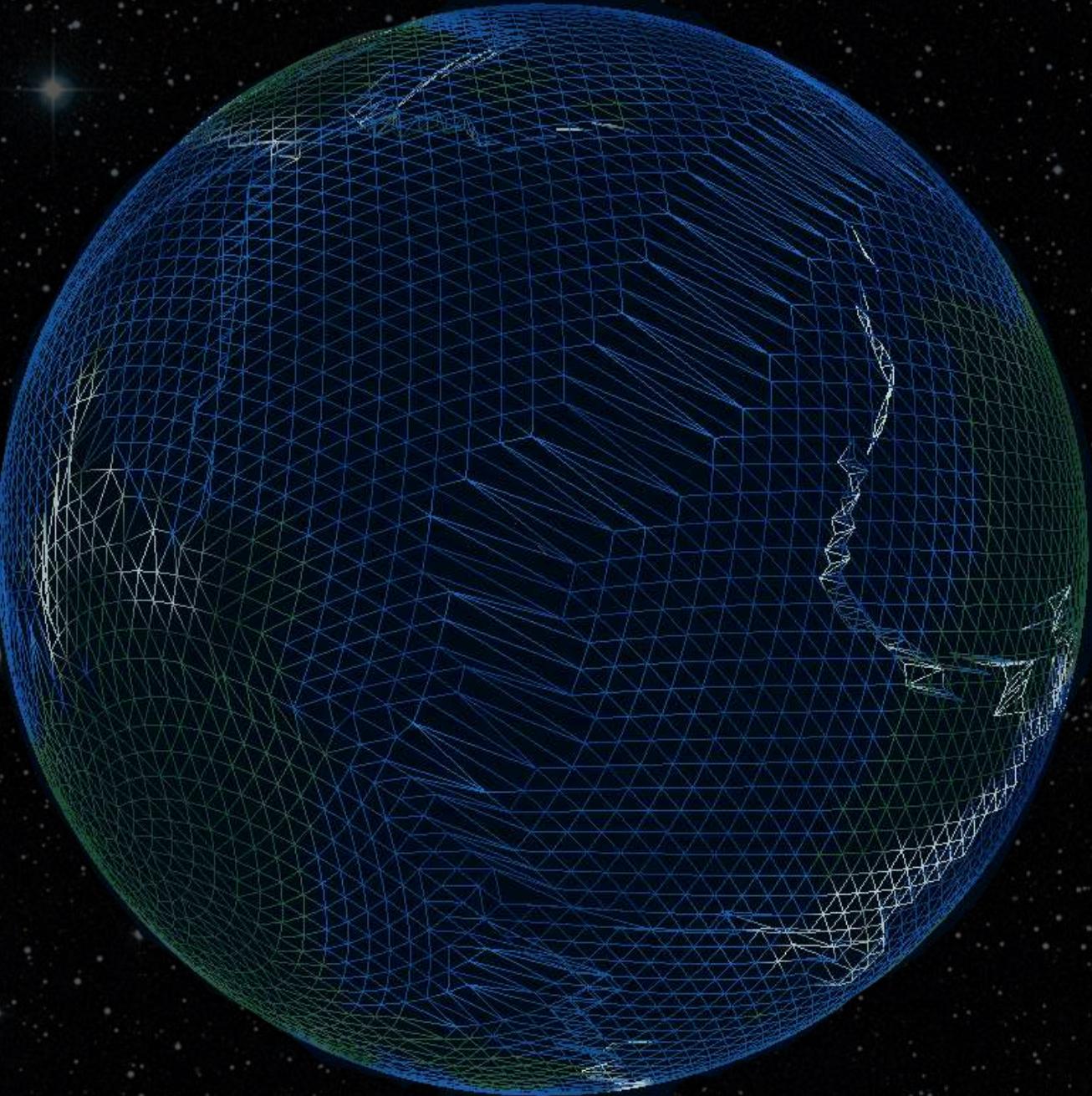


Subduction

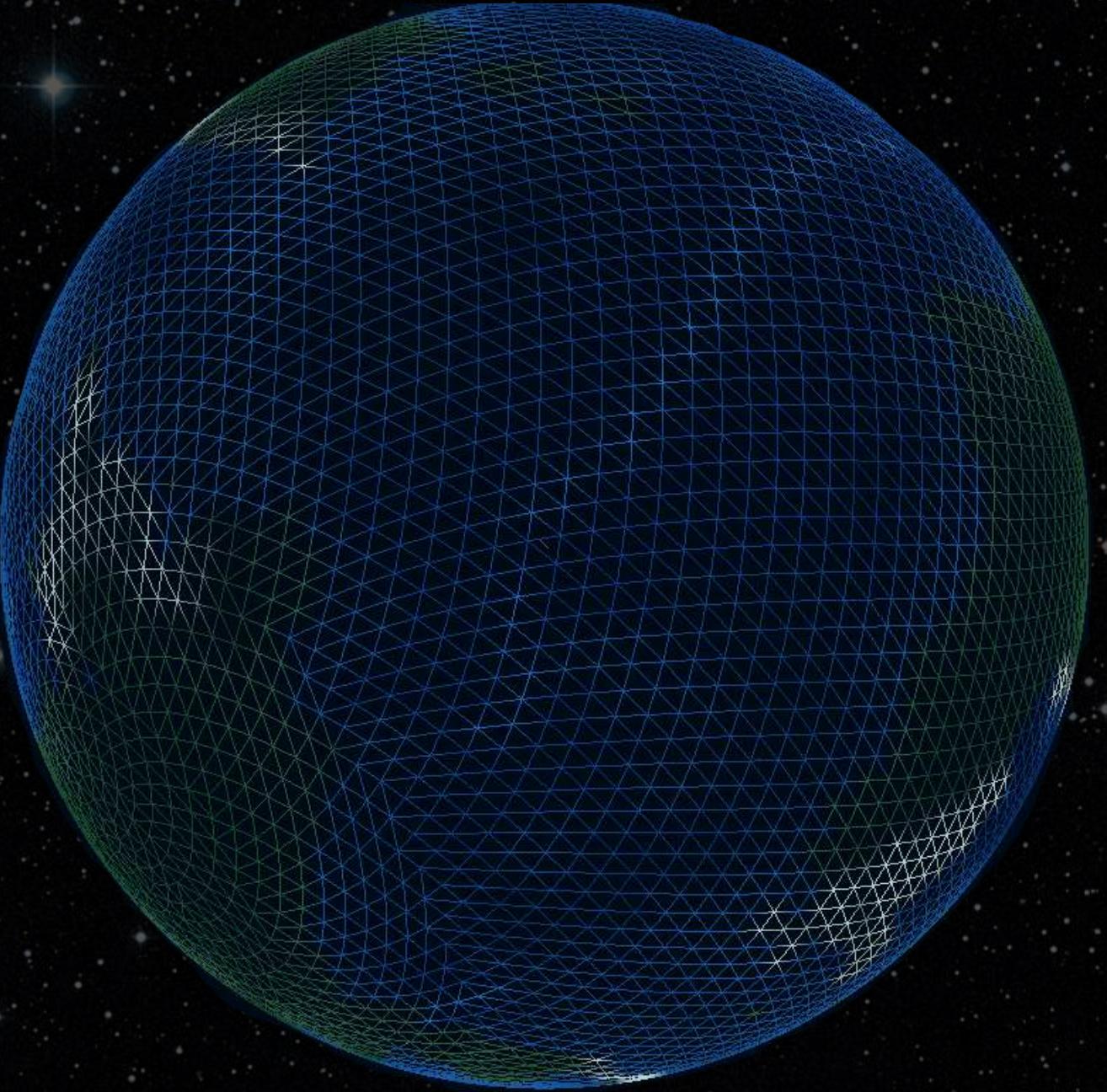


Continental collision



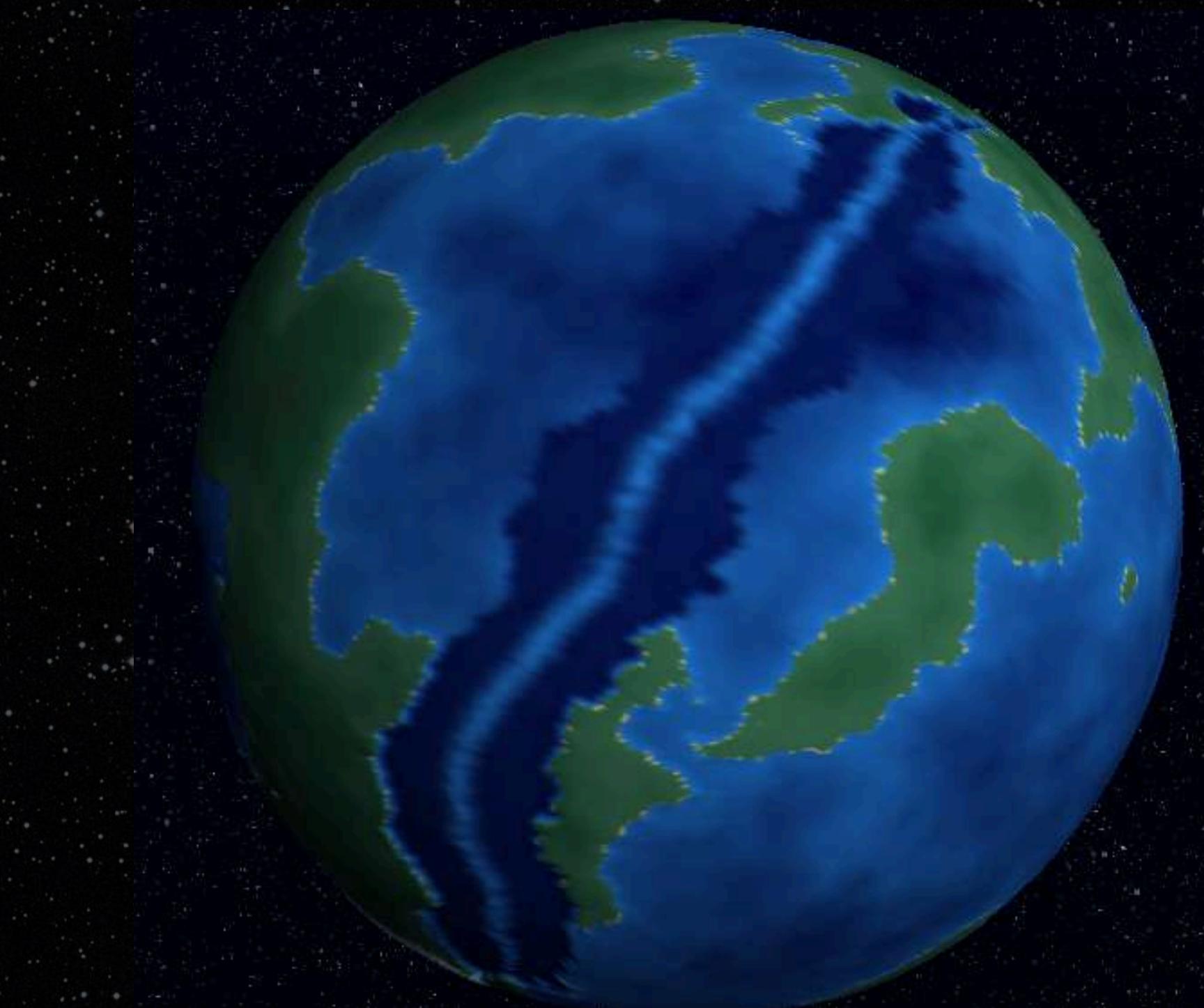
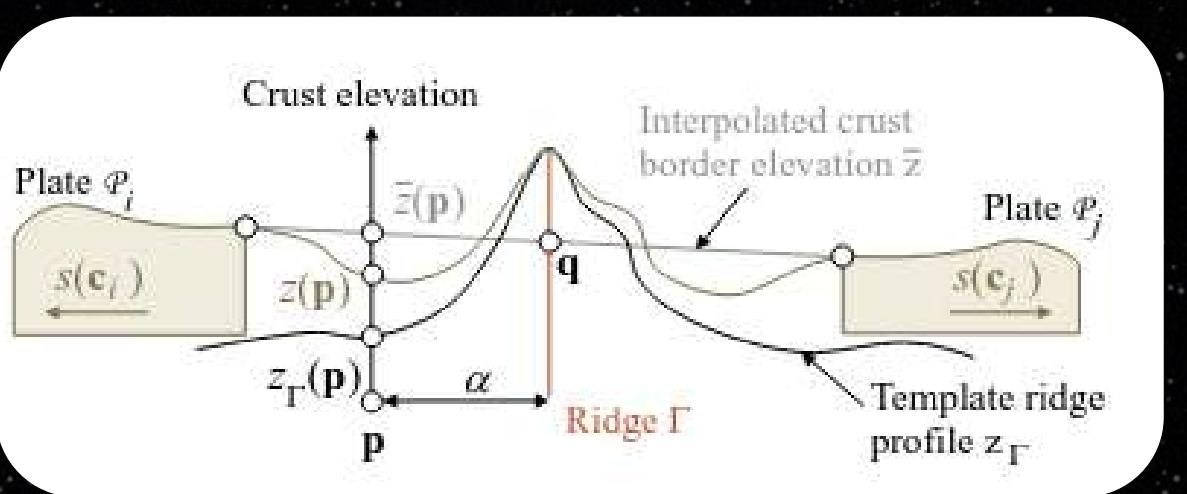
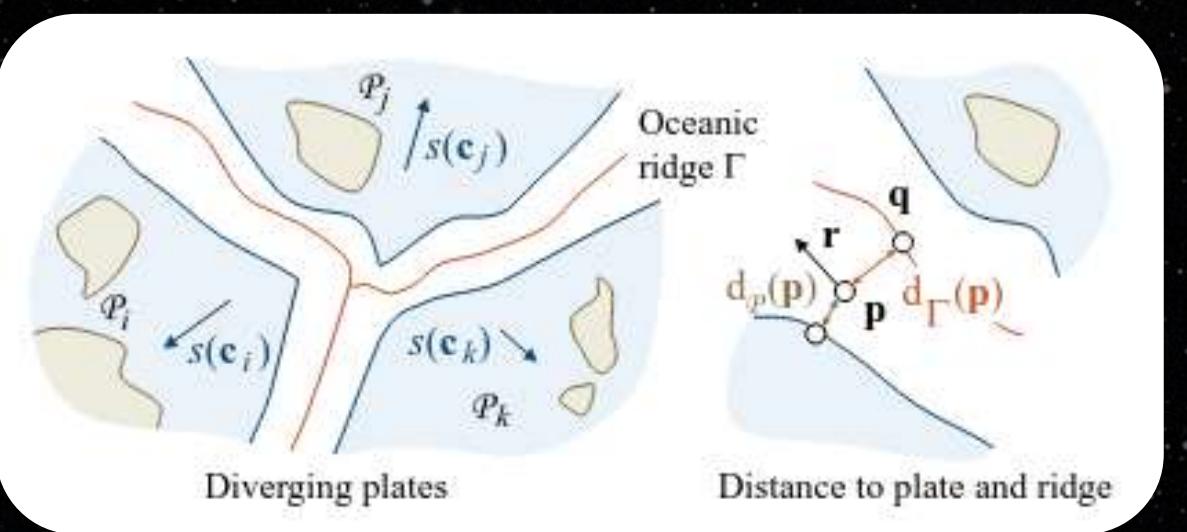


Remeshing

A wireframe sphere, composed of a blue and green mesh, is centered in the upper left portion of the image. It is set against a dark background filled with numerous small, glowing stars of varying sizes.

Remeshing

Oceanic Crust generation



Erosion

Continental erosion and oceanic dampening

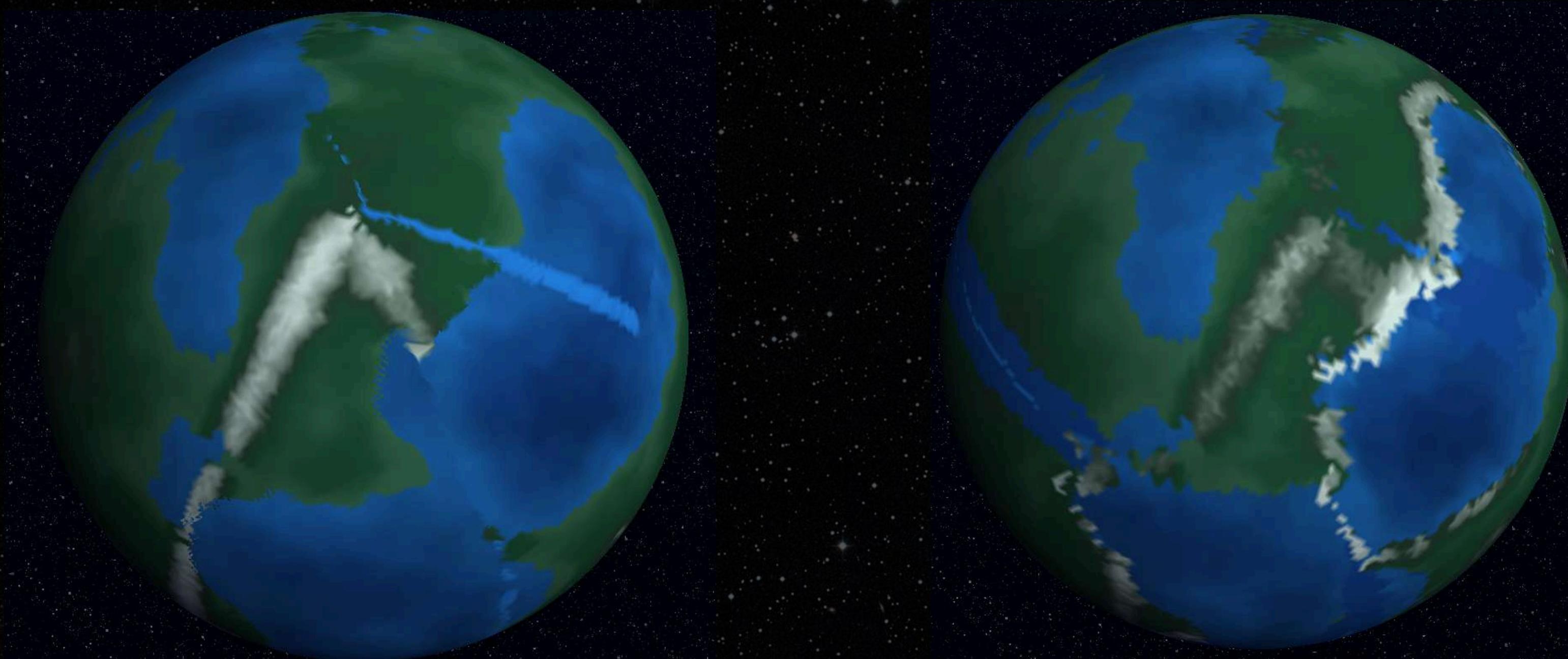
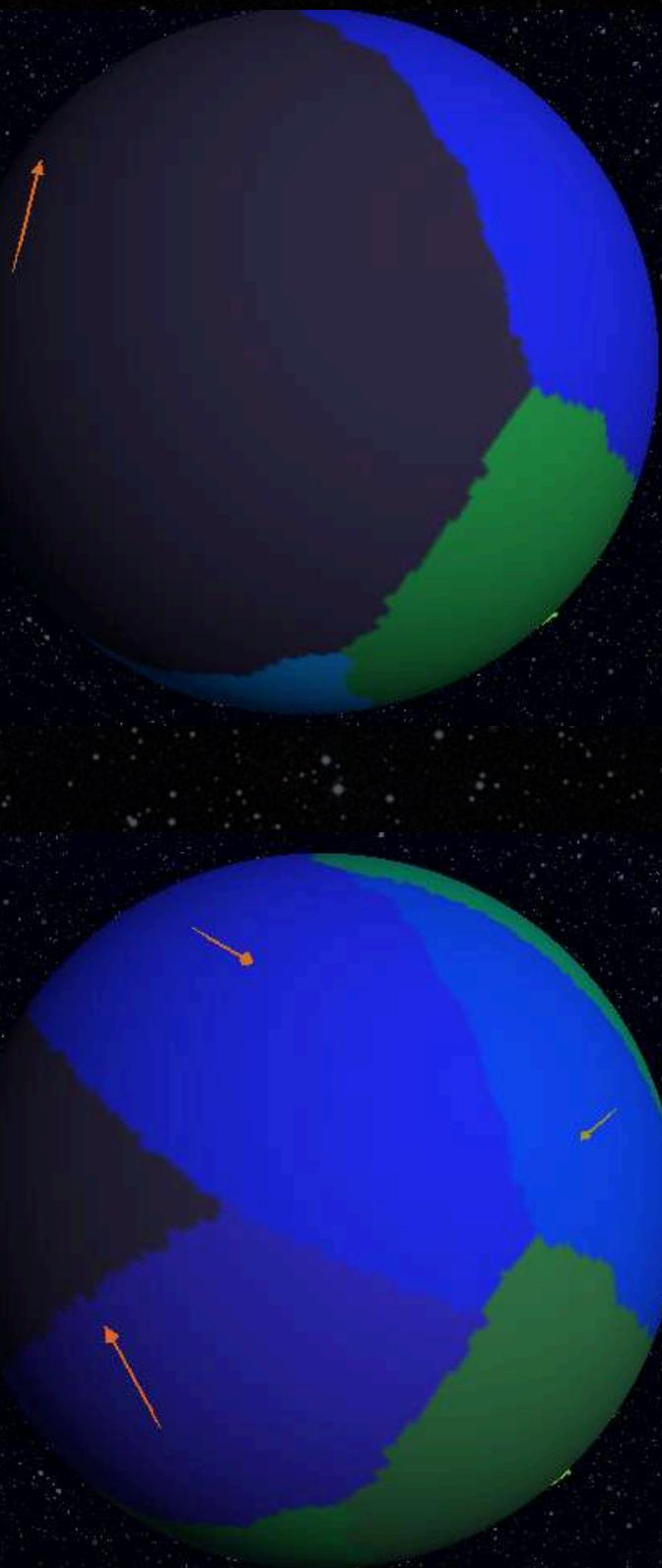
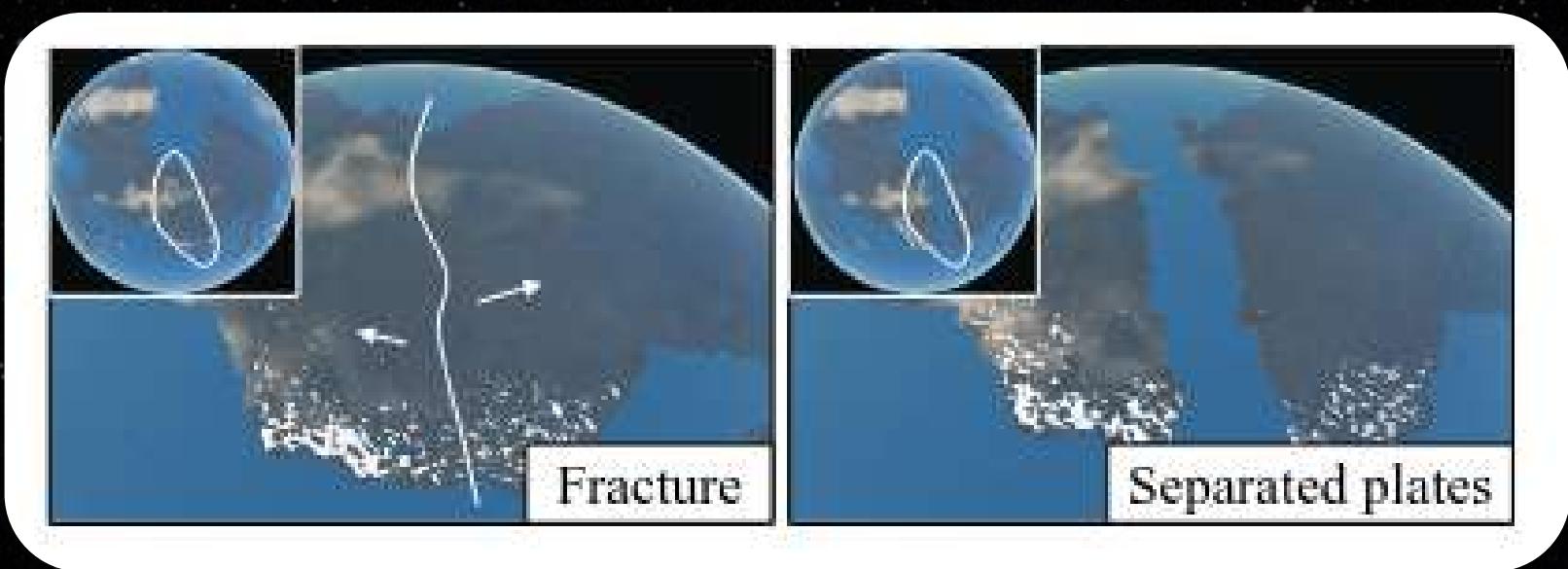
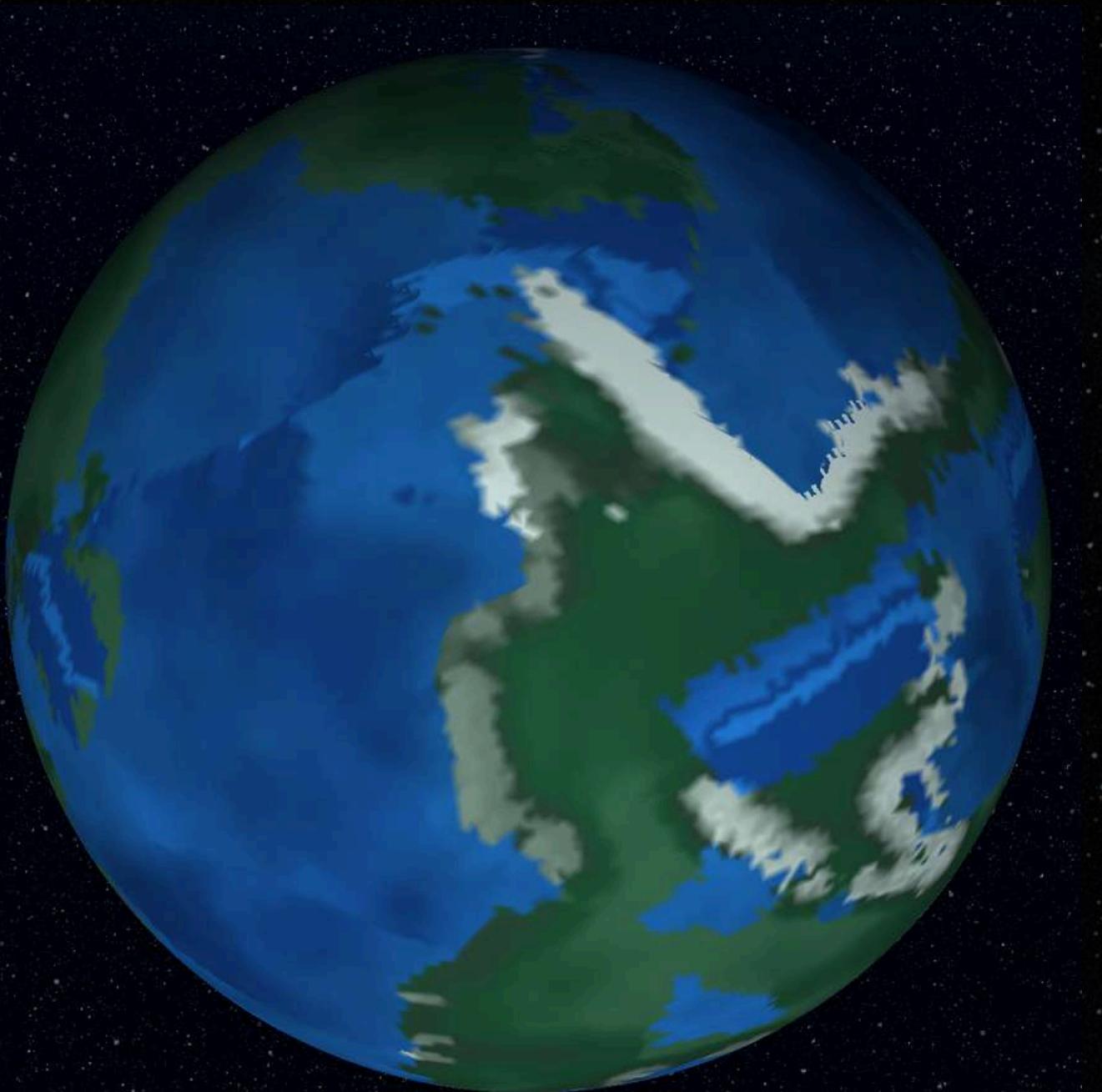


Plate rifting



Amplification

High quality remeshing
Height variation
Noises
Smooth



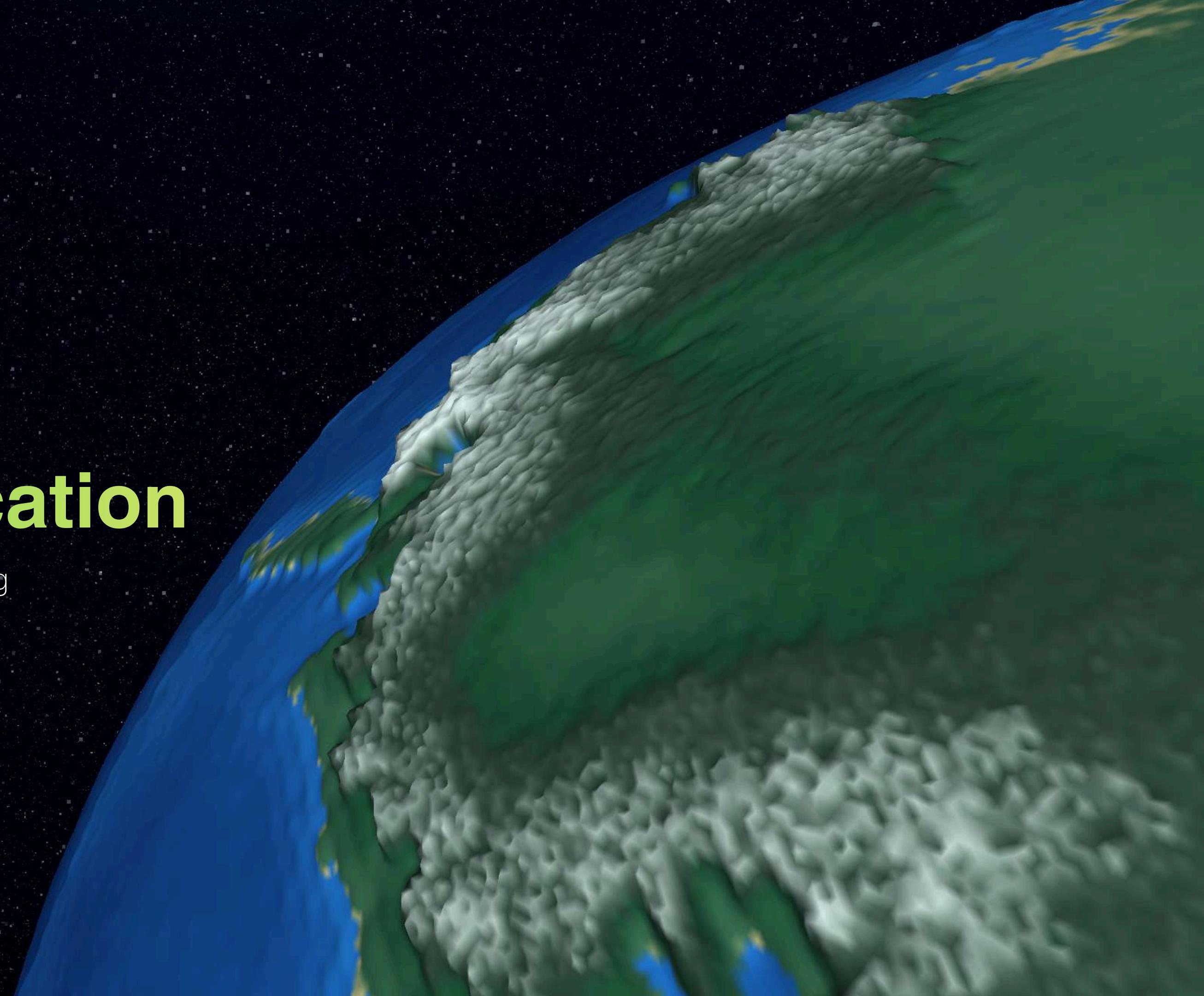
Amplification

High quality remeshing
Height variation
Noises
Smooth

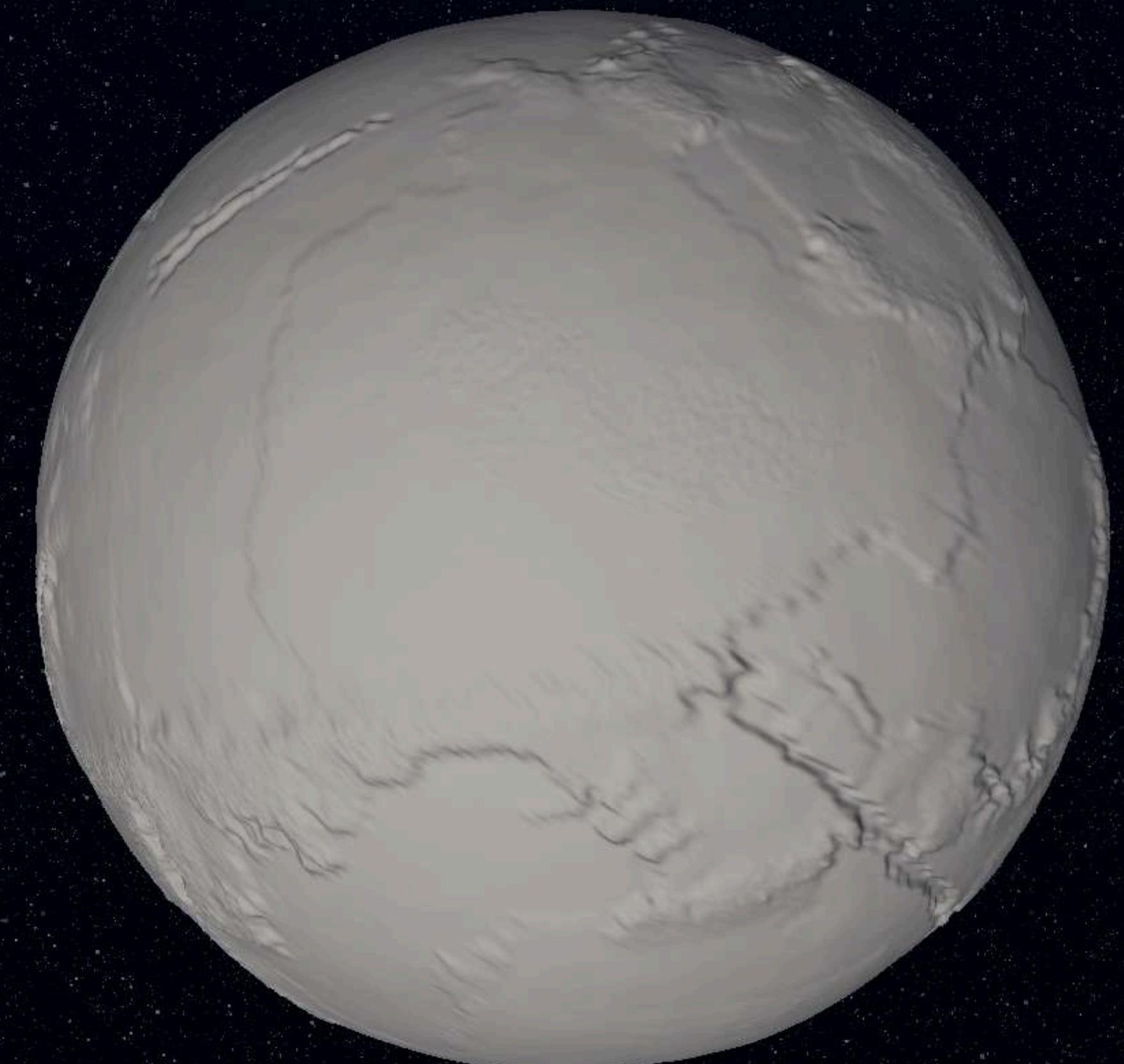


Amplification

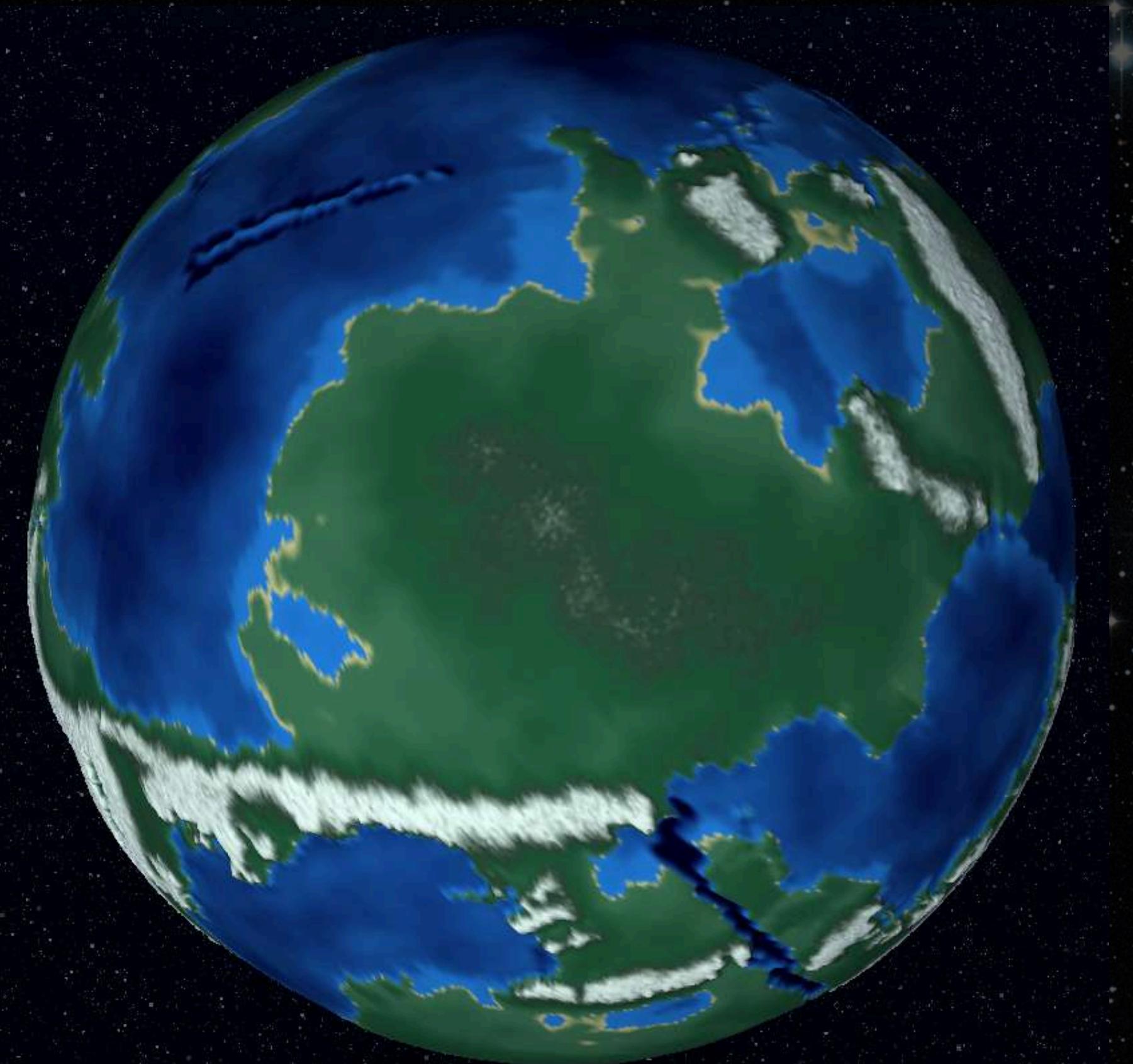
High quality remeshing
Height variation
Noises
Smooth

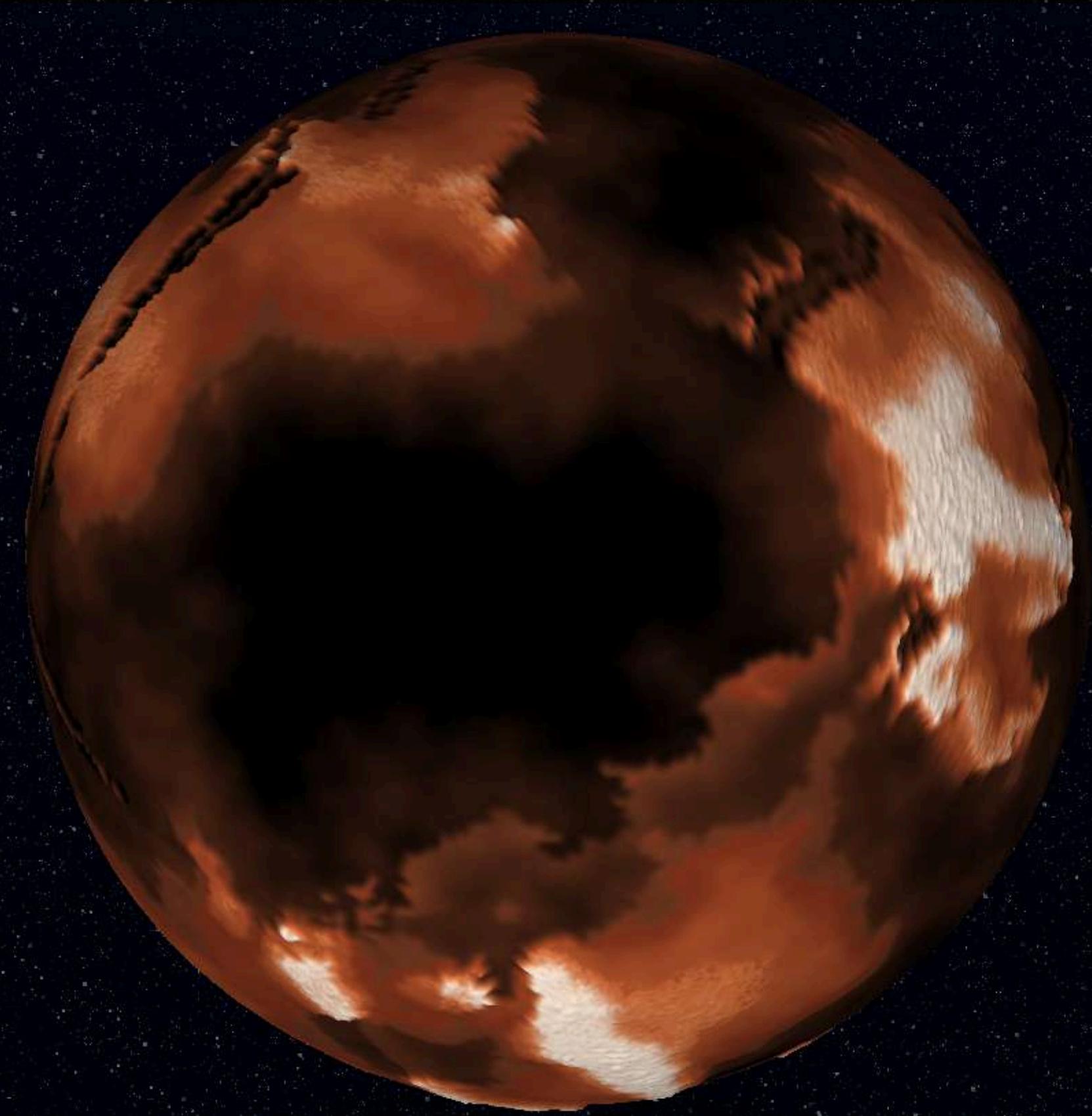


Results



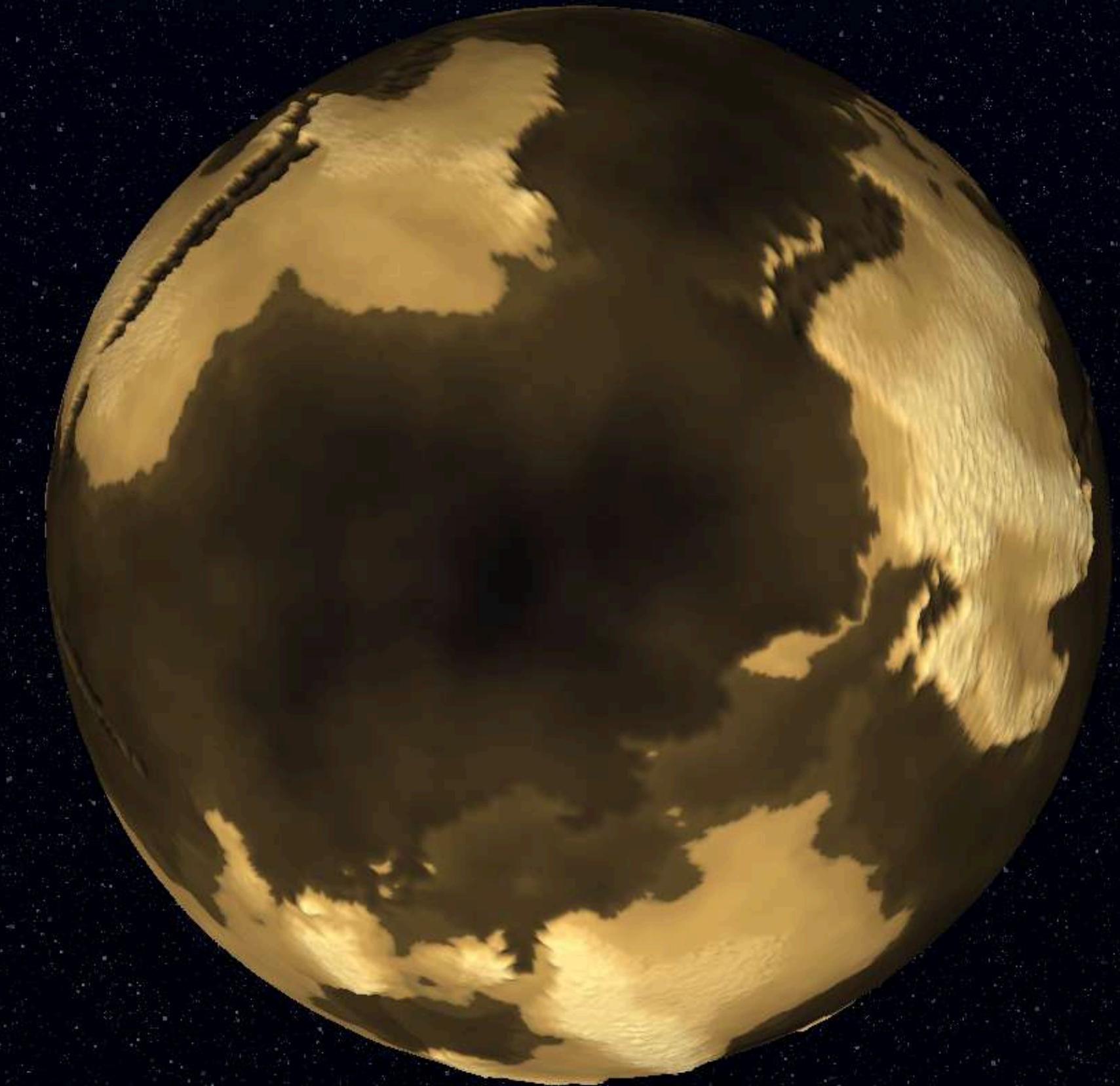
Earth

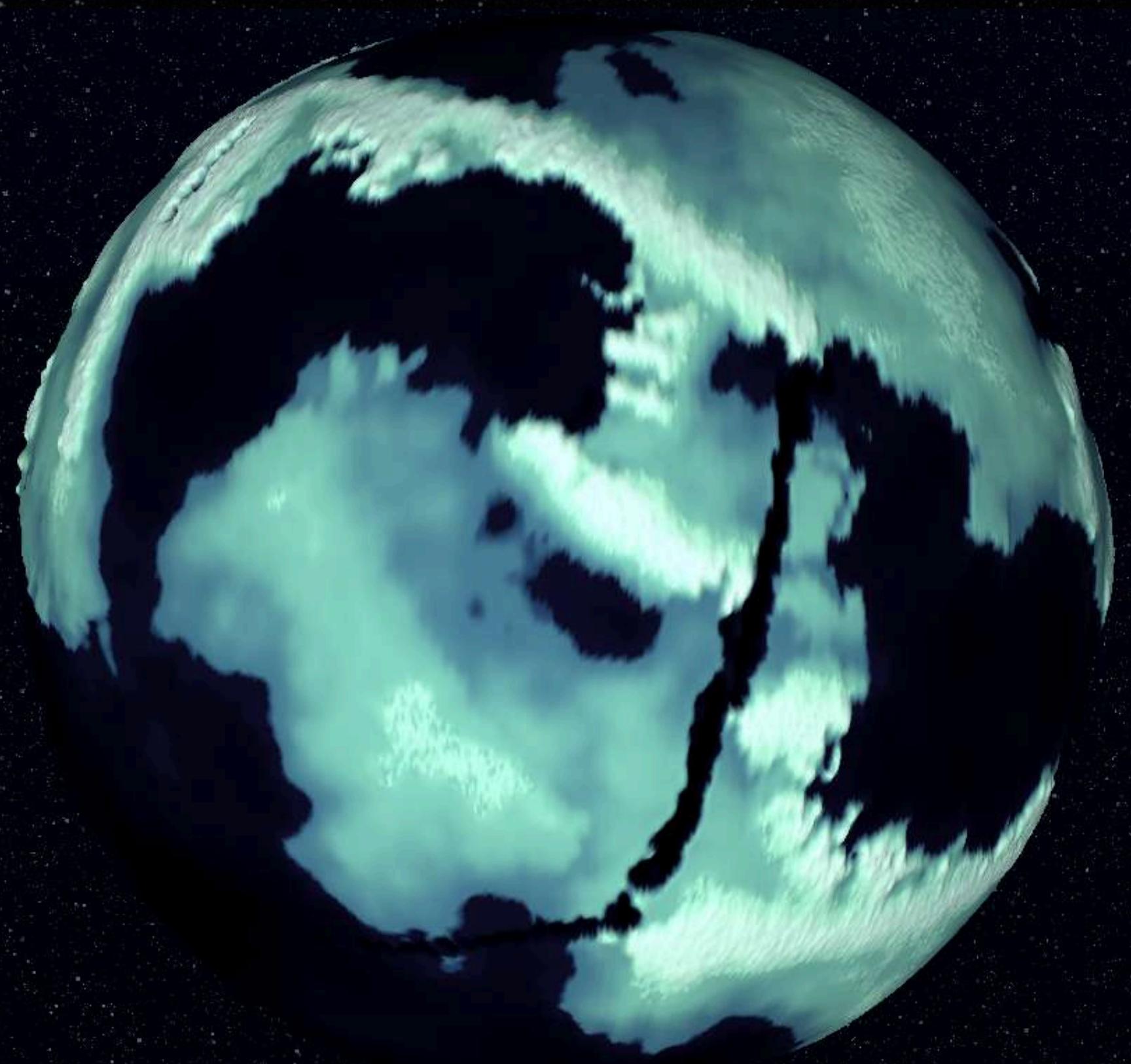




Mars

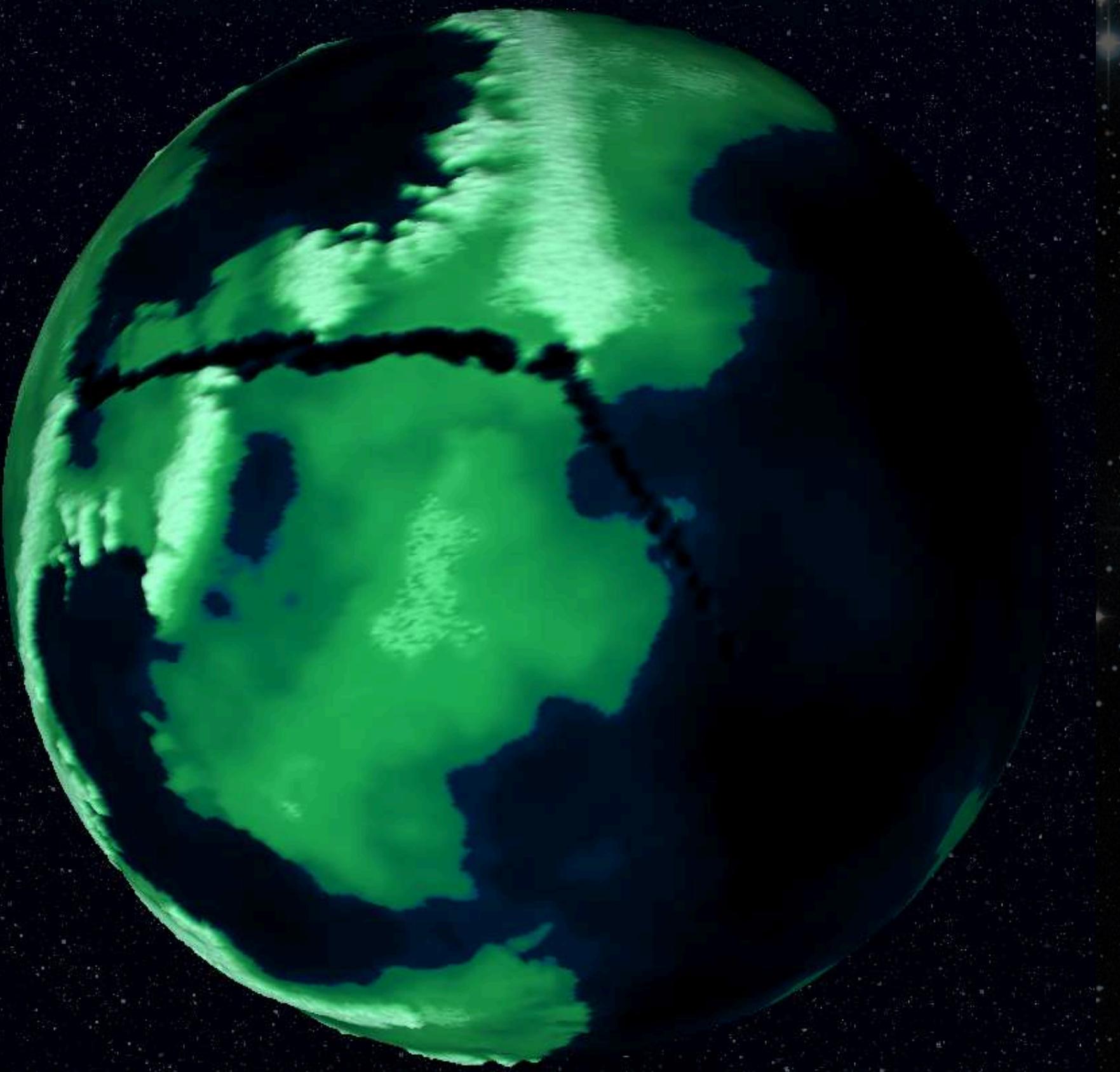
venus

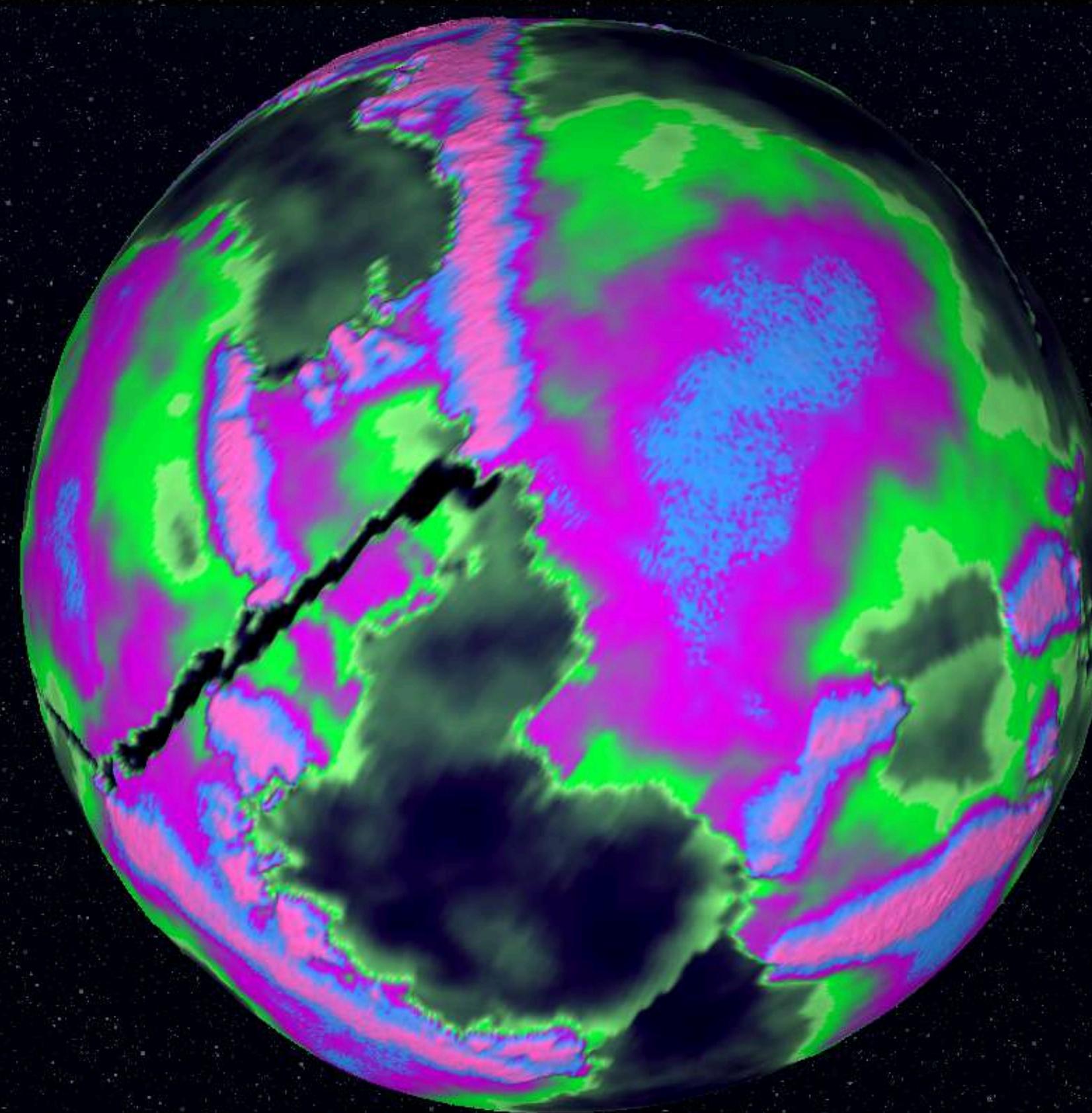




Ioth

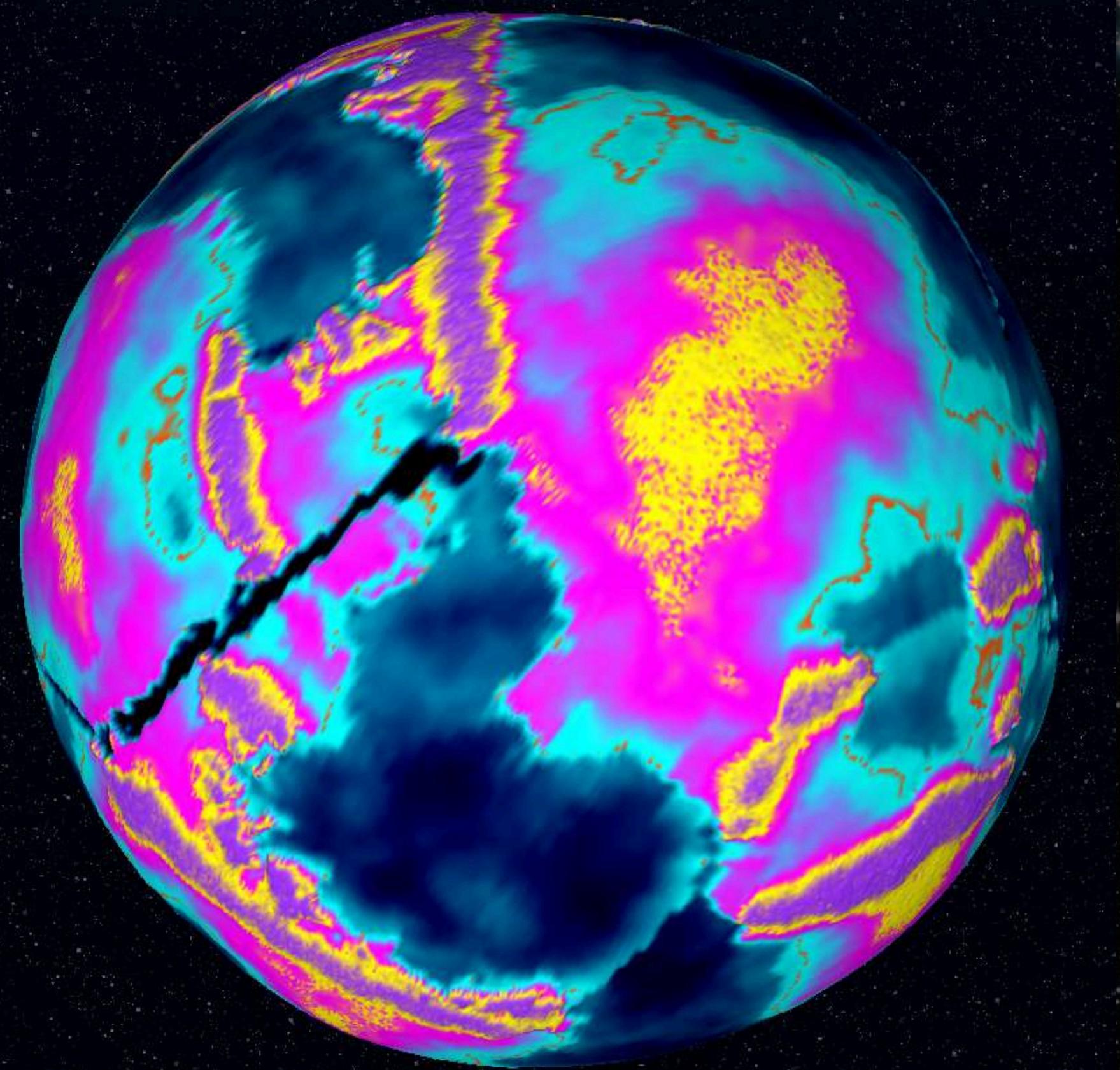
A rod nap

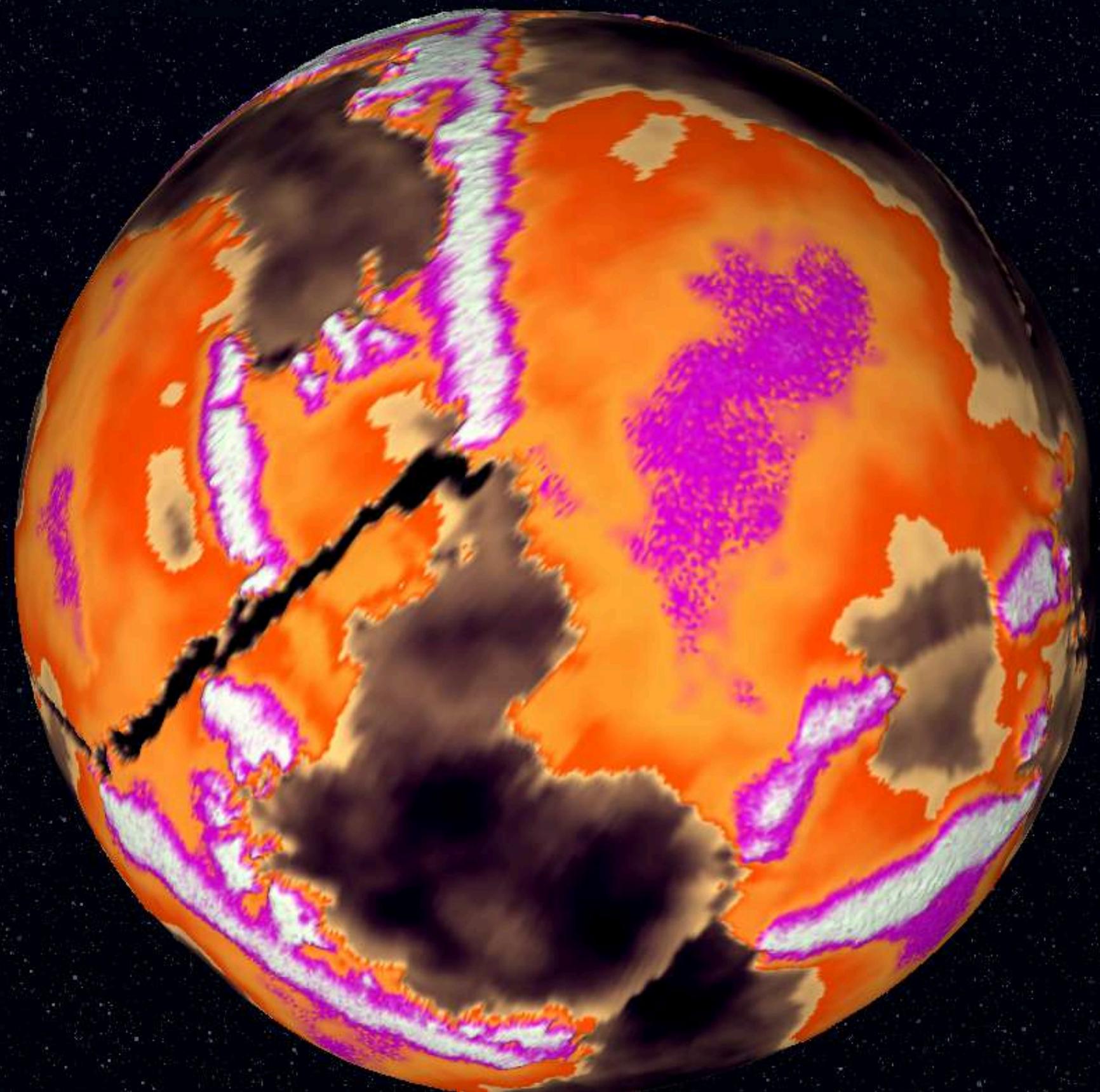




zib
Zoob

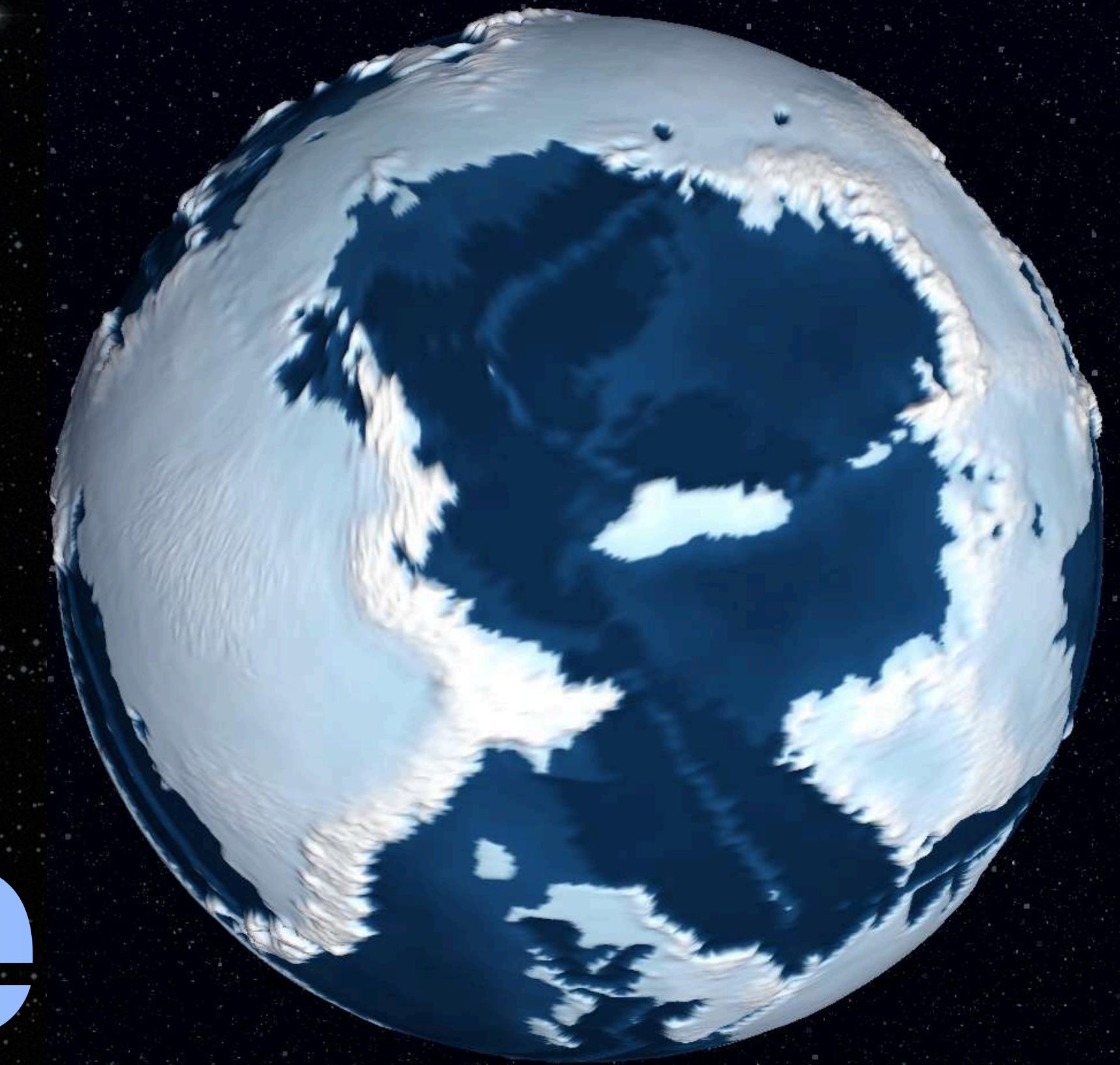
**Zoob
Zib**



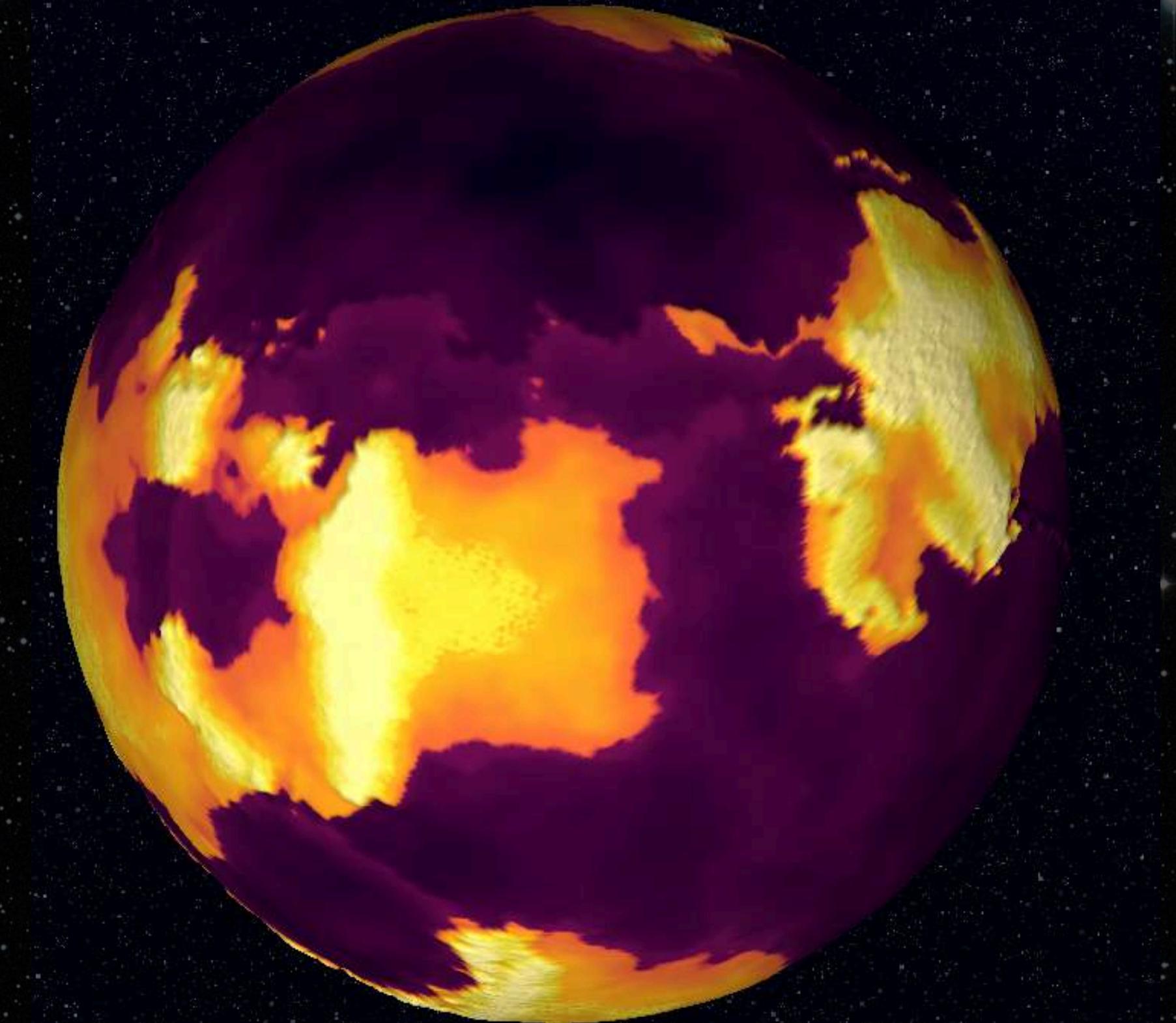


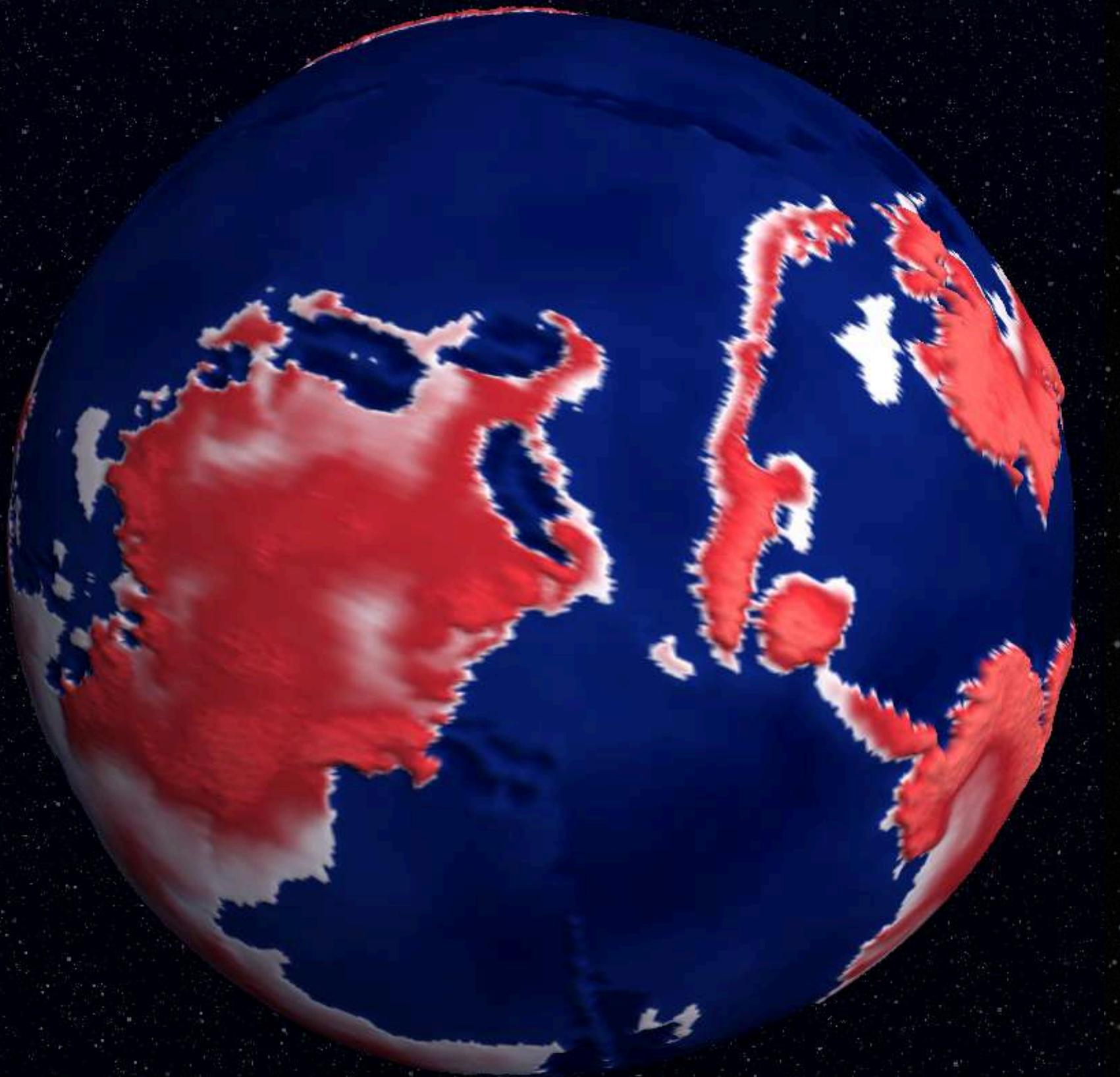
Bing
Bang

Ice Age



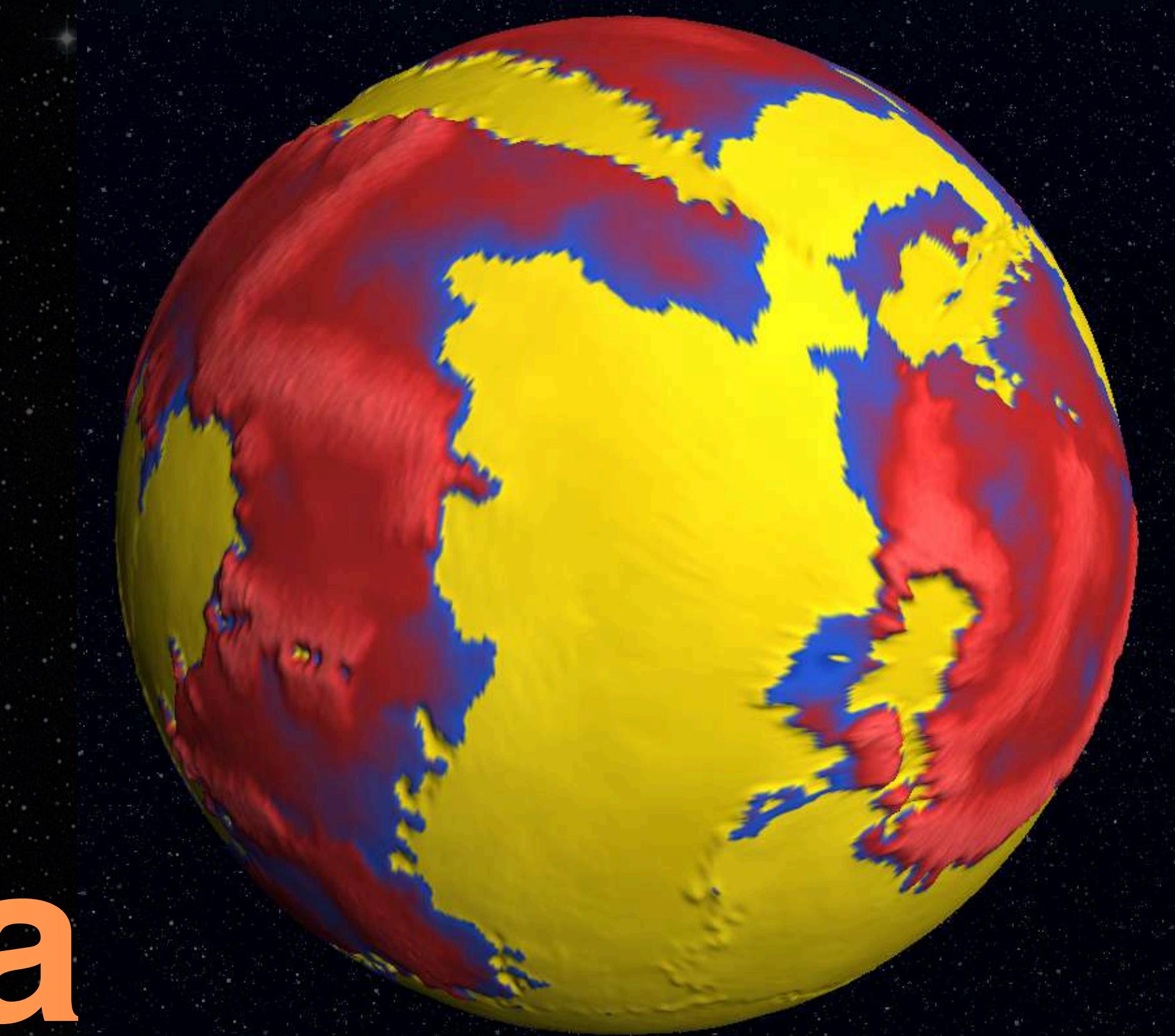
Mozilla





France

Colombia





Retrospective

Possible improvements

Amplification on Geometry Shader

User interface

Still some bugs

"Example based" Amplification

Have more control on the simulation

Optimization for large number of points

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