JJ Kim
EARS001
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Option 1: Divergent boundaries

Divergent boundaries occur when tectonic plates move away from each other, and is evidenced by seafloor spreading and mid ocean ridges. Seafloor spreading is a phenomenon where as plates move away from each other, molten magma from the liquid asthenosphere rises up to the lithosphere and cools to form oceanic crust (basalt). As seafloor spreading continues, it cools and expands away from the point where it rose up from the mantle. The point where magma originally rises up forms a mid-ocean ridge, which appears as a thin jagged line of elevated seafloor on a bathymetry (seafloor depth) map. Mid ocean ridges are lines of underwater volcanoes, and the presence of mid ocean ridges between continents creates geological phenomena such as earthquakes and volcanoes. Earthquakes and volcanoes occur more around plate boundaries where plate movement causes the crust to form fault lines. Spreading creates underwater volcanoes because as the plates move apart magma rises up and forms many volcanoes in a line. Because of this separation and constant magma flow, the crust is thinner around divergent boundaries. Earthquakes around divergent boundaries are frequent but shallow (0–33 km) on a seismology map because crust is thinner at mid ocean ridges (because of magma forming volcanoes) and does not rub against other plates like it would at a convergent boundary, where plates move together. Volcanoes occur along mid ocean ridges but are mostly underwater in deep ocean, so there are fewer in the middle of the Atlantic, Pacific, and Indian Ocean than expected. Some evidence that mid ocean ridges are composed of volcanoes lies in Iceland, which has a concentration of volcanoes and lies along a divergent boundary between the North American and Eurasian plates. Iceland has many volcanoes because it is situated along the plate boundary but has a higher elevation on a topographic map, so its volcanoes are above water. Further evidence on a geochronology map shows that the youngest seafloor occurs along mid ocean ridges and grows older as it radiates out from where it welled up. Seafloor can be dated in this way because as it moves away from a mid ocean ridge, it cools and grows denser so scientists can measure it to find out its age.

Seafloor spreading at divergent boundaries is evidence of active plate movement because it indicates that tectonic plates are moving apart, and magma wells up in the separation to create new crust and mid ocean ridges. Geological evidence in the form of earthquakes and volcanoes supports this because earthquakes tend to occur along the jagged fault lines of divergent boundaries where plates move, and mid ocean ridges are essentially lines of underwater volcanoes that can be seen on higher elevations along divergent boundaries, such as Iceland.