Discuss the evidence for tectonic plate movement

The basic theory of plate tectonics is that along seafloor spreading zones, the continents are separating from one another. As they spread apart, magma comes to the surface and becomes new continental crust. As the tectonic plates move away from spreading zones, they collide with one another. In some cases, the edges of two different plates will grind against each other in a horizontal fashion. These areas, called transform boundaries, experience many earthquakes. A well-known transform boundary is the San Andreas fault in California. In other cases, the plates directly collide, forcing one plate upward while the other plate is forced back into the mantle. These collision areas, called convergent boundaries, create mountain ranges. An active convergent boundary is under the Himalayan Mountains, which are being created by the subduction of the Indian crust sliding under the Tibetan crust.

Stripes of magnetic material in the seafloor provide strong evidence for tectonic theory. The stripes alternate between those with magnetic material orientated toward magnetic north, and those oriented in the opposite direction. Seafloor spreading is the mechanism behind this phenomenon. As new magma forces its way up to the surface, magnetised minerals in the liquid rock orient along the Earth’s magnetic field and then harden as the lava cools. As spreading continues, the material moves away from the spreading zone as if on a conveyor belt. The Earth’s magnetic field flips every few hundred thousand years, and the stripes on the ocean floor show a record of those changes. By estimating when the flips occurred and pairing that with the distance the strips have moved from the spreading zone, scientists can estimate how fast the continents are moving.

The continents have moved a great deal in the history of the planet, but they carry records of where they’ve been. Some of this evidence is the fossils of animals and plants. Tropical species found in the Antarctic and similar fossils found in western Africa and eastern South America tell a story of where those land masses used to be. Paleomagnetic evidence is an even stronger piece of evidence. Magnetic strips within the fossil record show how the land masses were oriented at different times during Earth’s history. By constructing detailed records of changes in land mass orientation, scientists can reconstruct paths of tectonic movement much further back in history than they can from the magnetic striping on the sea floor.