**Plate boundaries**

All of the Earth's tectonic plates are moving at different speeds and in different directions.

This means that where two plates meet – at a **plate boundary** – the plates can interact in different ways. The way plates interact with each other often cause earthquakes and volcanoes. They can also produce major landforms such as mountain ranges and new rock on Earth. For all of these reasons, the plate boundaries are closely studied by scientists.

There are three basic types of plate boundary. These are defined by whether the two plates are pushing together (colliding), pulling apart (separating), or sliding (slipping) past each other. The way the plates move has a huge impact on what happens at the plate boundary.

In addition to the three ways in which plates can interact, there are also the two very different types of plates - Continental plates and Oceanic plates. **Oceanic plates** are usually about 5–10 km thick and is made of dense rock types. **Continental plates are** usually about 20–70 km thick and is made of less dense rock types. So the type of plates which inteact with each other also has a huge impact on what happens at the plate boundaries.

**Convergent (colliding) boundaries**

Two neighbouring plates that are moving towards each other form a convergentboundary. The type of plates involved determines what will happen when the two plates collide.

* *Oceanic–oceanic plates colliding:* As shown in the interactive, when two plates with oceanic crust converge, one plate sinks beneath the other plate into the mantle. This is called **subduction** and it produces a deep trench on the seafloor. Magma is generated above the subducting plate, forming a chain of volcanoes.

* *Oceanic–continental plates colliding:* Subduction also occurs in this case – the much denser oceanic crust always sinks beneath the continental crust. This produces a trench along the subduction zone and volcanoes on the continental crust.

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* *Continental–continental plates colliding:* Continental crust is too light to sink into the mantle. So when two continents collide at a convergent boundary, the continental crust is pushed up to form high mountain ranges.

**Divergent boundaries**

**Two neighbouring plates that are moving apart from one another form a divergent boundary.

* *Oceanic–oceanic plates separating (in the ocean):* This is when two plates with oceanic crust pull apart, causing a **mid-ocean ridge** forms. Cracks in the thin crust allow magma to rise up from the mantle and erupt from deep sea volcanoes. This process produces new oceanic crust and causes **seafloor spreading**.
* *Continental–continental plates separating (on land):* A divergent plate boundary in continental crust creates a long depression known as a **rift valley**. Rising magma pushes up the thinner crust and creates volcanoes along the rift valley. A good example of this is the East African rift valley, where the African continent is slowly splitting apart. Over millions of years, volcanic activity in a rift valley can create new oceanic crust between two continents. The divergent boundary changes from a rift valley to a mid-ocean ridge, and a new ocean basin is created. Potentially this space can grow into an inland lake, then an inland sea, and eventually, over millions of years, an ocean.

**Transform boundaries**

When two plates slide past each other, they form a **transform boundary**. This can involve any combination of oceanic and continental plates but the results are similar.

The two plates slide past each other along a large crack in the crust. This is known as a **fault**. Faults are not perfectly straight or even. This means plates can “snag” at times so movement stops and pressure builds. When the pressure becomes too great, the “snag” is overcome, and a sudden movement occurs, which triggers an earthquake. These faults do not usually allow magma to rise up through the crust, so volcanic activity is unlikely. Therefore, this type of boundary is only associated with earthquakes, rather than volcanoes.

**Complete** the table by identifying (naming) each type of plate boundary and whether each one typically produces earthquakes and volcanoes.

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of movement** | **Name of plate boundary** | **Earthquakes** | **Volcanoes** |
| Plates moving towards one another |  | yes |  |
| Plates moving away from one another |  |  | yes |
| Plates sliding past one another  |  |  |  |

**Hotspots**

You should be aware that whilst most volcanoes / earthquakes occur along plate boundaries, there are exceptions. For example the volcanic Hawaiian Islands which can be found in the middle of the Pacific Plate are formed due to a Hotspot. Hotspots are plumes of molten rock which rise underneath a thin or weak area in a plate causing localised melting and creation of magma resulting in volcanic activity.