

Why are plate margins hazardous?

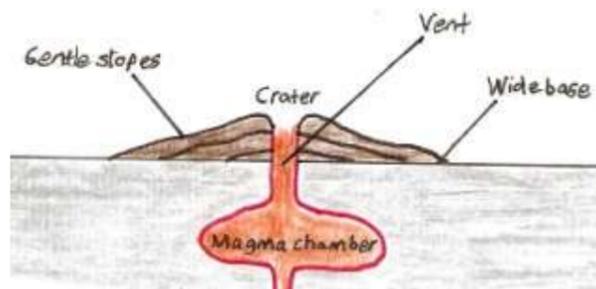
What are plate margins and how does plate movement generate a variety of landforms?

Heat is generated in the centre of the earth where high pressure causes the liquid outer core to 'freeze' - which releases latent heat. This heat flows to the surface in giant **convection currents** in the solid mantle. The solid mantle rocks are warm enough that they can flow like soft toffee left in the sun. The surface rocks (crust & upper mantle - called the lithosphere) are the coldest so are the most solid these break into large pieces called **tectonic plates** - these move about on the currents in the soft mantle rocks.



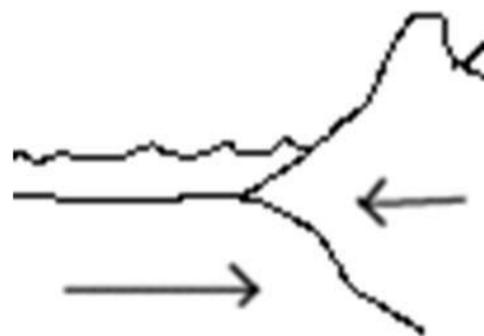
Constructive plate margins are where plates move away from each other. Rising convection currents push overlying rocks upward to form a **ridge**. The currents then pull plates apart - as

the pressure drops around 10% of the mantle rocks melt creating basaltic (like a **basalt**) magma - this creates volcanoes which help create new oceanic crust. This is happening to form the **mid-Atlantic Ridge**. If it happens in a continent then **rift valleys** form - this is happening in East Africa and causes the volcanoes in Uganda such as **Mount Elgon** next to Mbale.

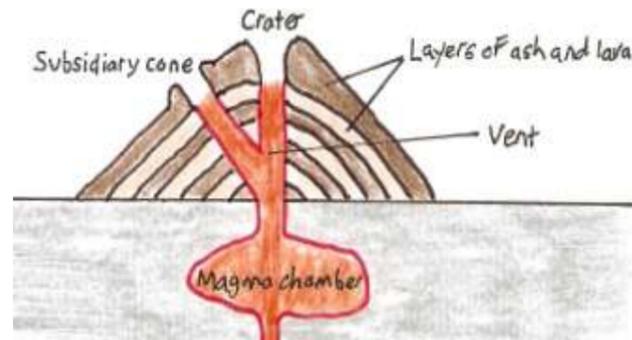


Basaltic magma is very runny so forms **shield volcanoes**; Mount Elgon is the largest shield volcano in Africa.

Destructive plate margins are formed where plates collide. Oceanic crust is dense so when it collides with another plate it sinks into the hot mantle beneath - this is called **subduction**. It carries sea water with it which lowers its melting point allowing some of it to melt.



This causes granitic (like a **granite**) magma to form which makes new continental crust. If one of the plates is made of continental crust then fold mountains such as the Andes in South America will form.



Granitic magma is viscous (thick) so forms explosive **composite cone** volcanoes. This is also where big earthquakes happen such as the one that caused the 2004 Boxing Day tsunami and the 2011 Japanese tsunami.

Where plates slide/grind past each other such as in California then many earthquakes happen at what is called a **passive** or **conservative** plate margin. Where two continental plates collide a **compression** or **collision** plate margin results in massive fold mountain chains this is happening where India is colliding with Asia creating the Himalaya mountains.

What are the primary and secondary hazards associated with volcanoes and earthquake zones?

Volcanoes	
Primary	Secondary
Blast	Lahars
Pyroclastic flows	Landslides
Lava flows	Collapsed buildings
Volcanic Bombs	Tsunami (Krakatoa)
Ash Falls	Disease

Earthquakes	
Primary	Secondary
Ground shaking	After shocks
Liquefaction	Fires
Collapsing buildings	Tsunamis
	Landslides
	Economic/infrastructure
	Disease

Why do people continue to live in hazard zones?

There are a number of reasons:

- Volcanic soils are very **fertile** - Mount Elgon Coffee
- Volcanic landscapes attract **tourists** - Mount Elgon
- Volcanic processes create valuable **mineral** resources

- Deep water trenches of subduction zone provide rich **fishing** grounds.

How can the risks associated with volcanic and earthquake zones be reduced?

How are volcanoes monitored and what does this tell us about their state?

- **Seismographs** - detect earthquakes and tremors - rapid tremors called **harmonic tremors** tell us an eruption is about to happen.
- **Tiltmeters** - tell us the ground underneath is being pushed up by magma.
- **Gas emissions & ground water monitoring** - chemical changes can tell us what might happen next.

How might the effects of volcanic eruptions and earthquakes be reduced in MEDCs and LEDCs?

- **Prediction**; volcanoes can be predicted as shown above. Earthquakes cannot accurately be predicted but tsunamis can.
- **Preparation**; practicing drills for action when the alarms sound, building shelters from tsunamis, evacuation, stockpiles of emergency supplies will all minimise the impacts of tectonic events.
- **Short term responses**; rescuing trapped people, providing medical care, providing clean water, food and shelter.
- **Long term responses**; rebuilding damaged homes, businesses and infrastructure. It is important to get people off aid and working again so after the Boxing Day Tsunami a priority was to get the fishing boats replaced. Other businesses such as tourism also had to be promoted to get the local economy functioning again.

MEDC's	LEDC's
Earthquake proof buildings	Life-safe buildings
Practicing Drills	Practicing Drills
Tsunami warning systems	International aid - to provide, water, food, shelter and medical supplies
Automatic Earthquake systems	MEDC rescue teams help in response
Training emergency services	International loans to help rebuild infrastructure and economy - fishing boats, tourist hotels.
Stockpiling supplies	
Insurance	