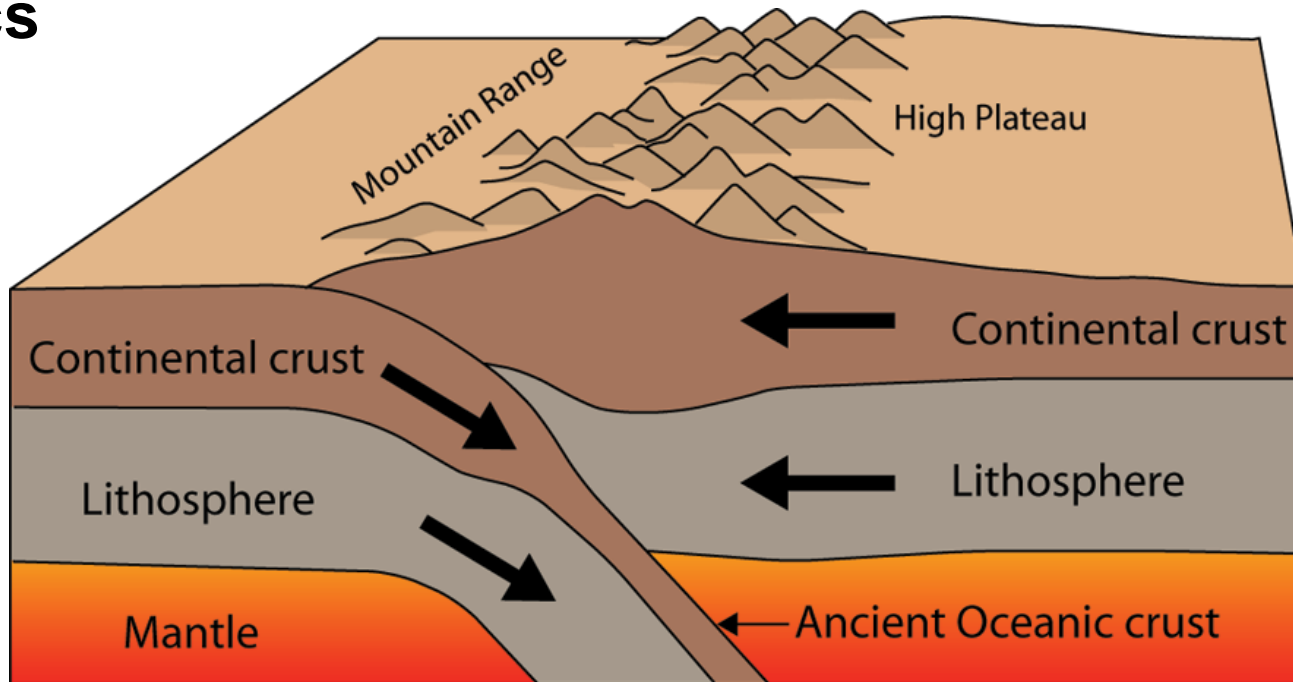


# What is Orogeny?

**Essentially mountain-building process driven by Plate Tectonics**

**Mountain-building takes place principally by Collisional Tectonics**



**An ideal example is the Himalaya**

# **Anatomy of continents**

**Continents consist of:**

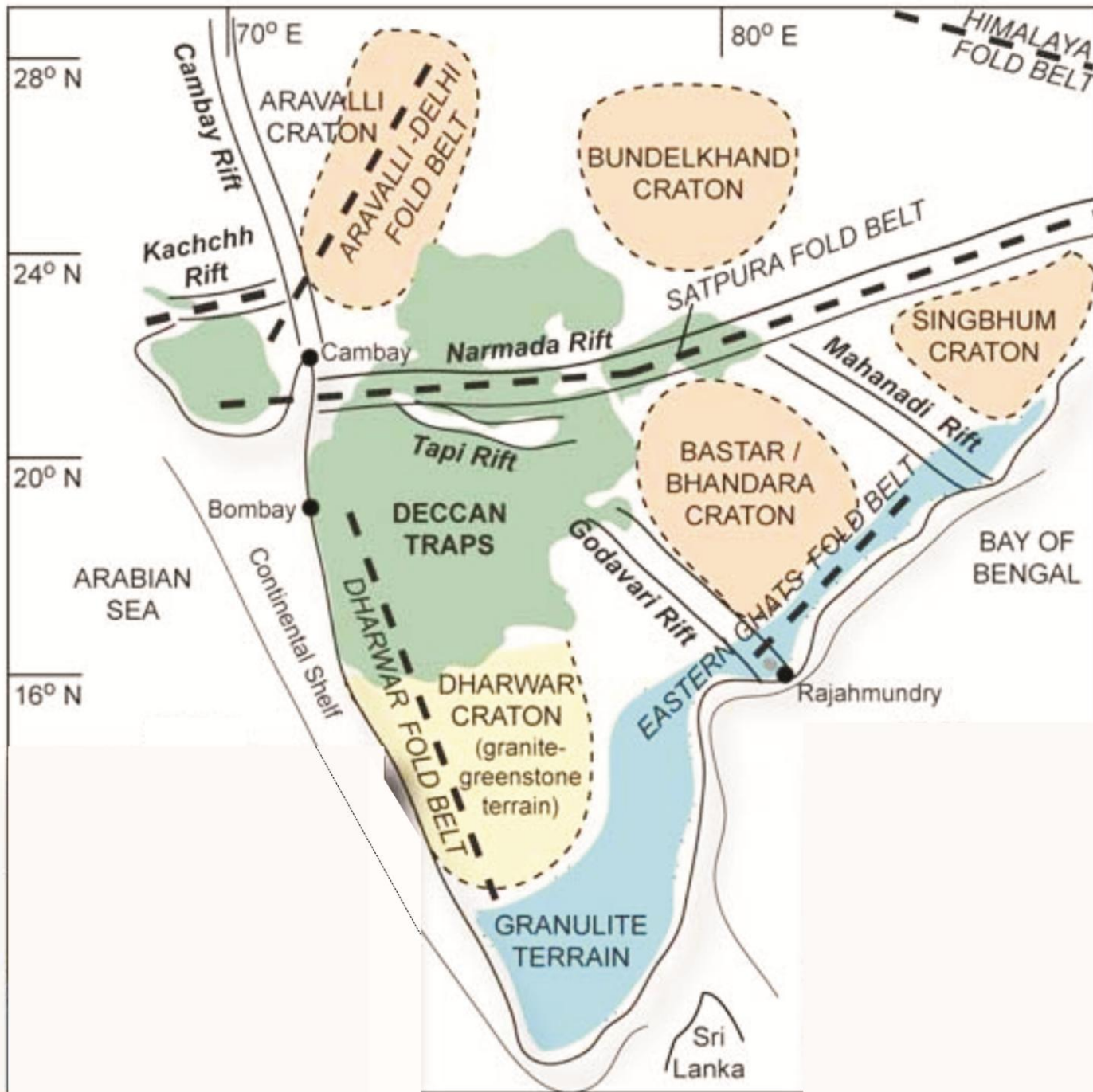
- 1. Cratons: Stable part consisting of old rocks**
- 2. Fold Belts: Both old (was tectonically active) and young (tectonically active in present day )**

**Cratons are further divided into:**

- A. Shield: Where older igneous/metamorphic rocks are exposed (>2500 Million years)**
- B. Platform: Old sedimentary rocks are exposed (usually 1000-1800 Million years old)**

**Orogeny: Mountain building process  
(Remember Convergent Plate Boundaries)**

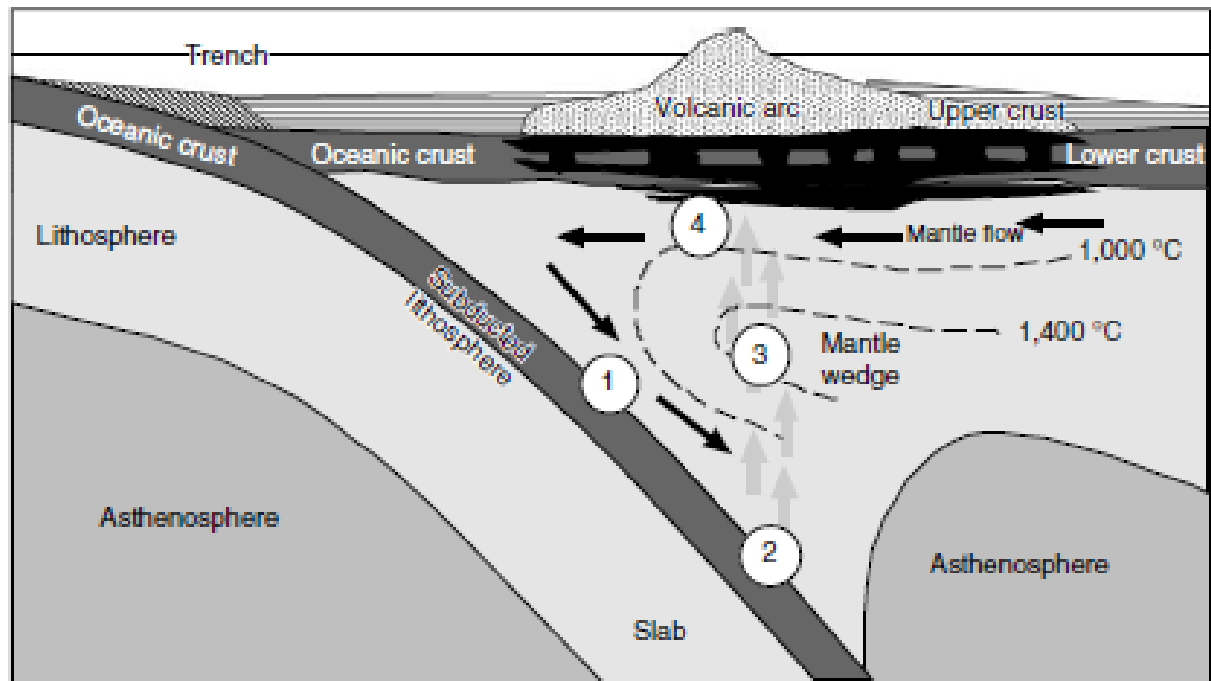
## Tectonic divisions of India



# How continents grow?

## 1. Magmatic Addition

- a. Subduction of oceanic plate beneath a continental plate- melting of the subducted plate & melting in the upper mantle wedge above the subducted plate due to transfer of water from the subducting plate- production of acidic to intermediate magmas that add to the preexisting continental plate- example Andes
- b. Subduction of oceanic plate beneath oceanic plate- formation of mafic-intermediate-acidic magmas constituting island arcs (e.g. Japan, Philippines). Island arcs can merge into thick continental crust. Island arcs can accrete to continental r



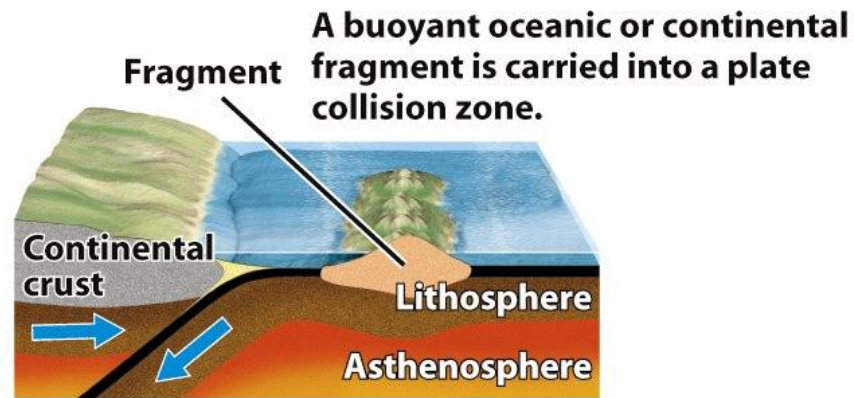
b. Crustal growth through intraplate magmatism

Examples include continental flood basalts (our Deccan Traps), which are not directly related to subduction. Because of the size, these are called **Large Igneous Province (LIP)**. The sites are called **Mantle Hotspots**- very large amount of magma. In a short period of time, lot of melting in the mantle- **plumes**?

c. Crustal growth at rifted margins- rifts in continents

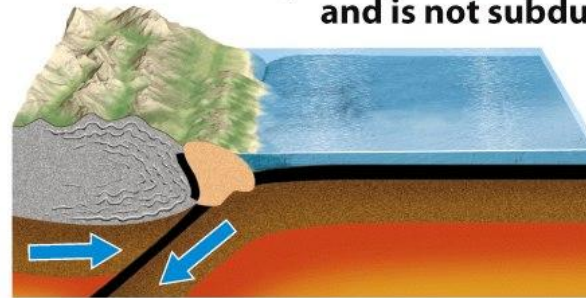
**(East African Rift)**- magmatism from the mantle to form new crust

## 1 ACCRETION OF A BUOYANT FRAGMENT TO A CONTINENT

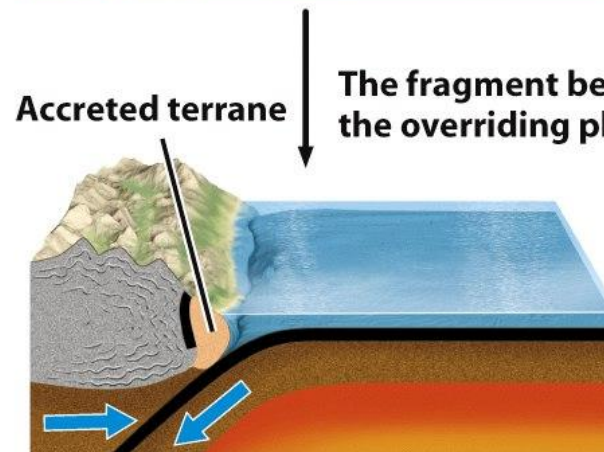


## 2. Continental accretion

The fragment is more buoyant than the subducting lithosphere and is not subducted.



The fragment becomes welded to the overriding plate.





## 2 ACCRETION OF AN ISLAND ARC TO A CONTINENT

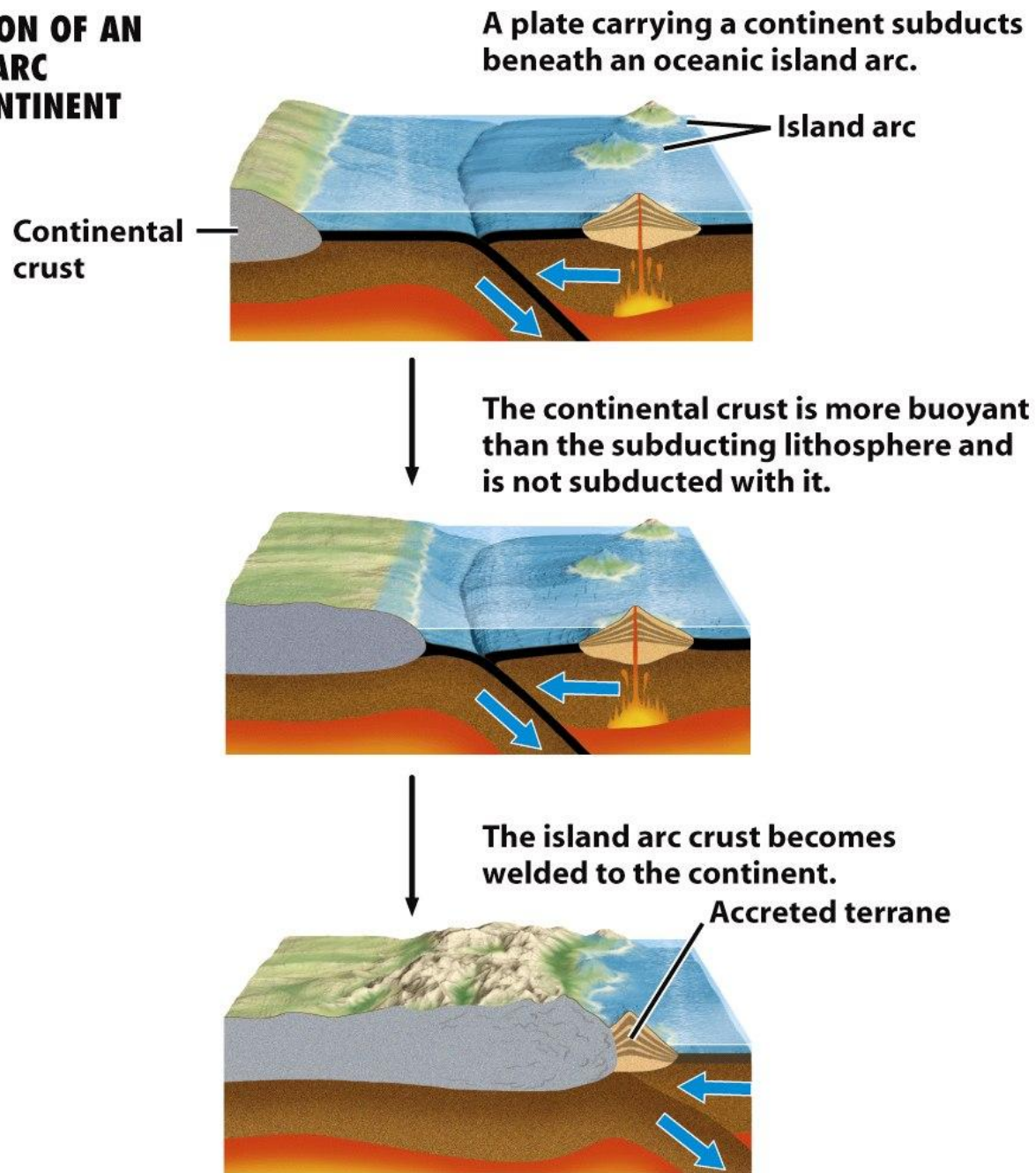


Figure 10-12 part 2  
*Understanding Earth, Fifth Edition*  
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### 3 ACCRETION ALONG A TRANSFORM FAULT

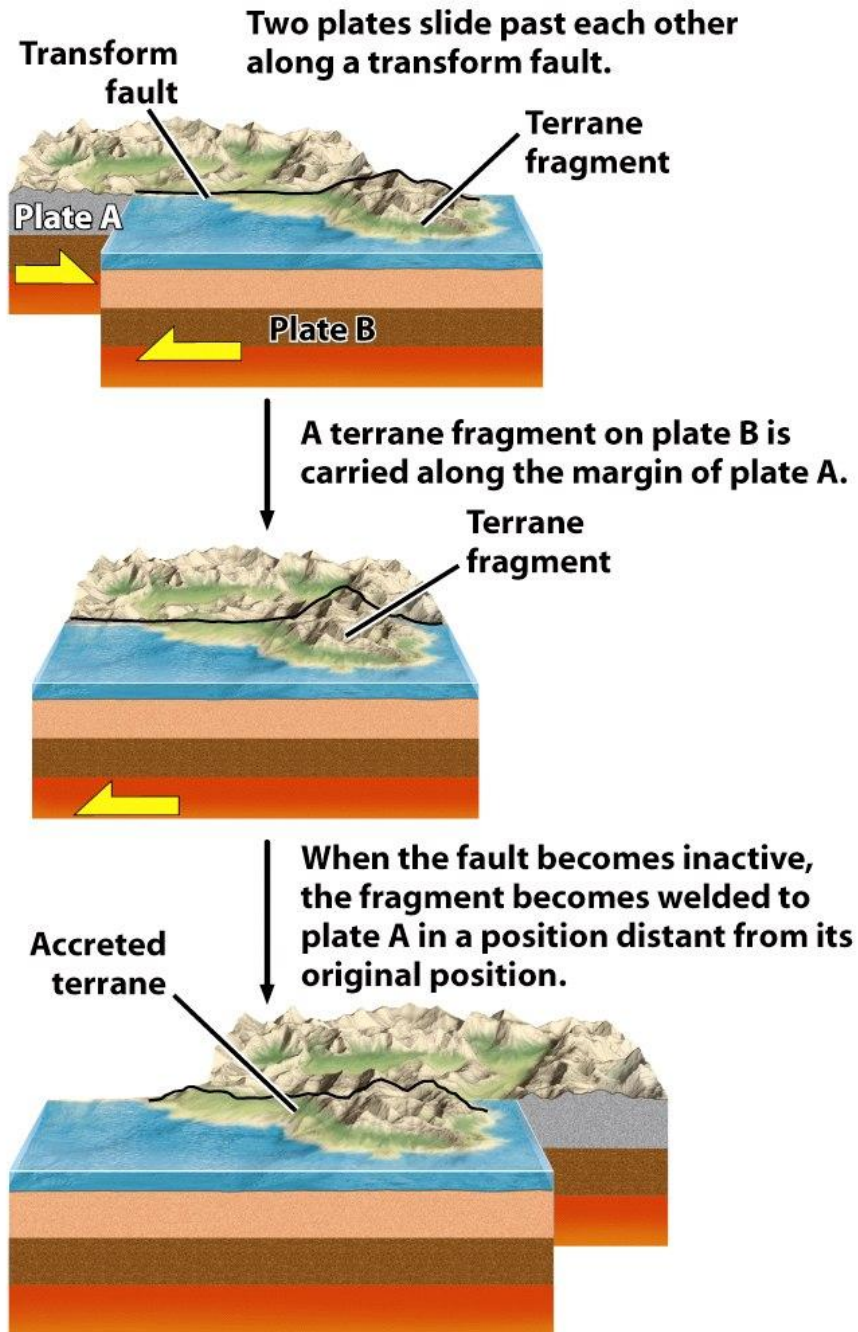
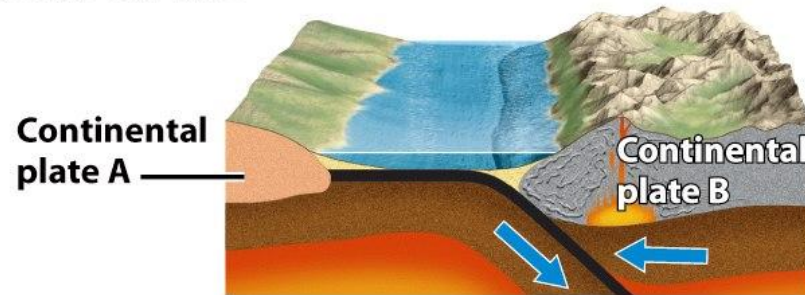


Figure 10-12 part 3  
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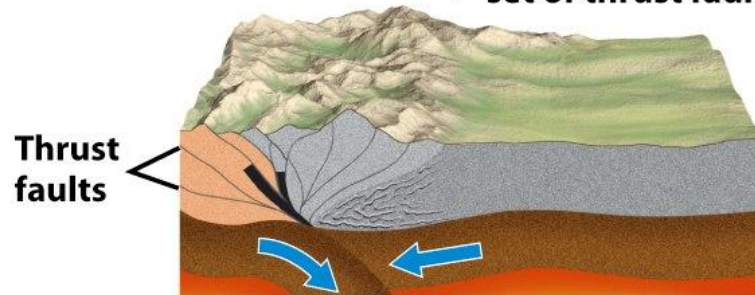


#### 4 ACCRETION BY CONTINENTAL COLLISION AND RIFTING

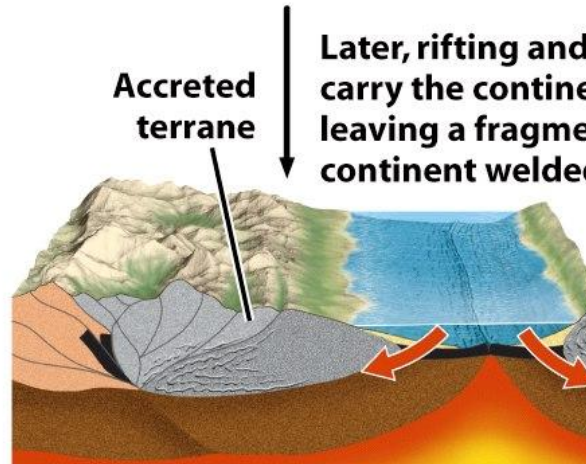
A plate carrying a continent subducts beneath another continental plate.



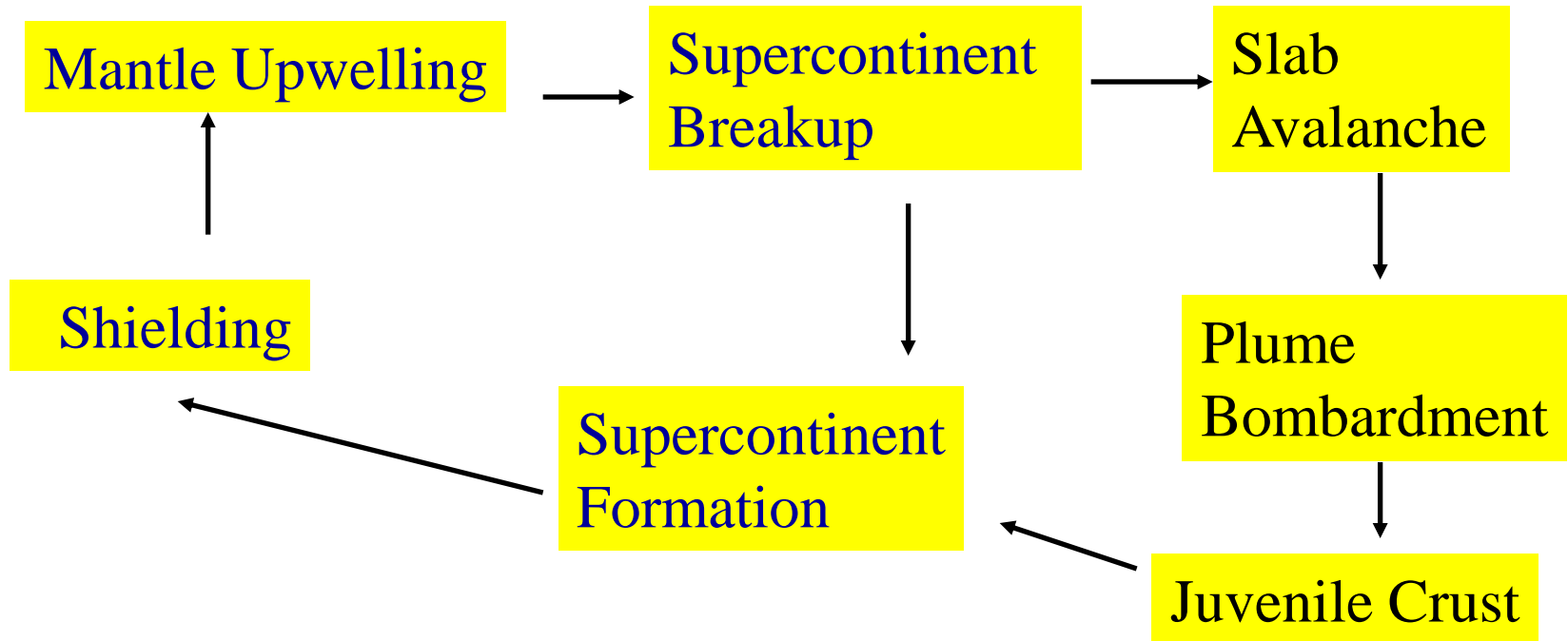
The continent is not subducted, so two continents are welded together along a set of thrust faults.



Later, rifting and seafloor spreading carry the continental plates apart, leaving a fragment of one continent welded to the other.



# Supercontinent Cycle



**Supercontinent Cycle : The Supercontinent Cycle controls all geological phenomena**

# History of the Continents in the last 3 billion years

