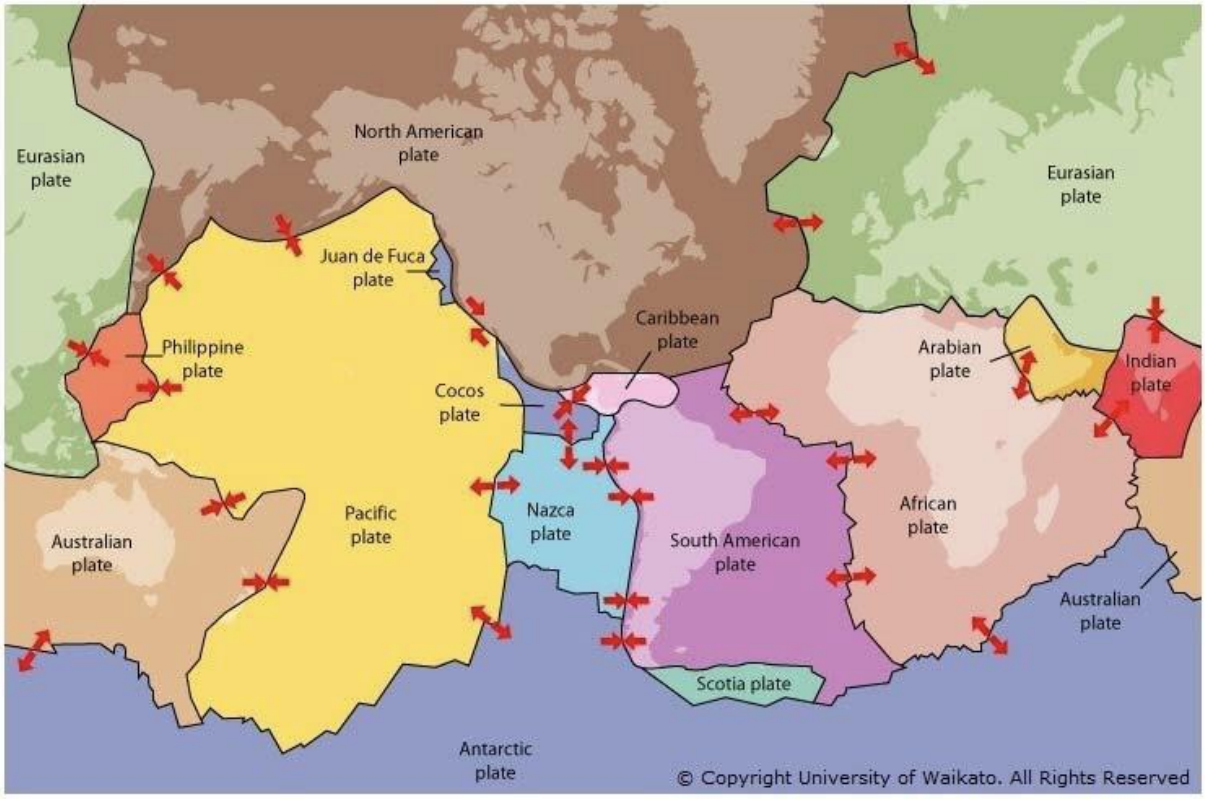
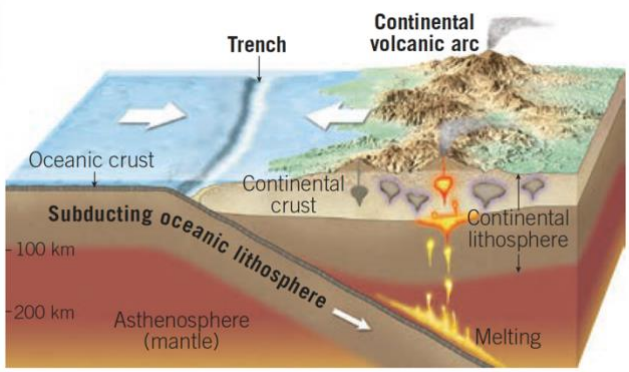
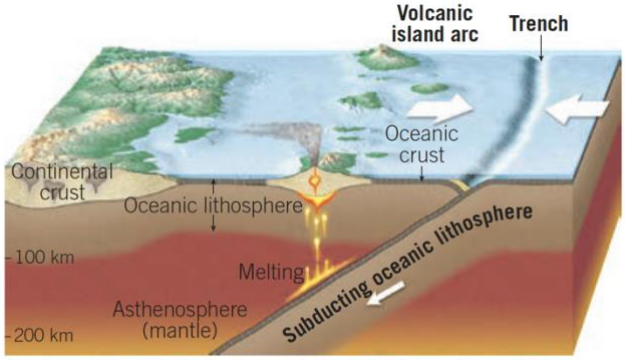
Earth’s tectonic plates



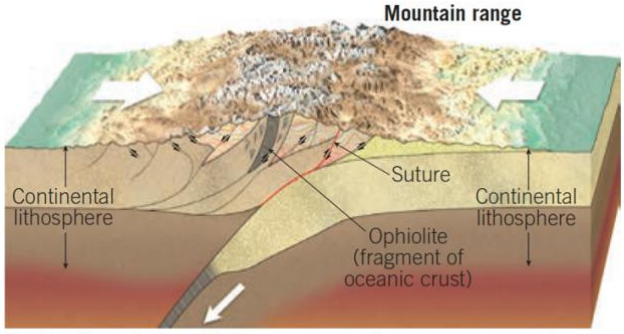
Convergent plate boundaries



A. Convergent plate boundary where oceanic lithosphere is subducting beneath continental lithosphere.

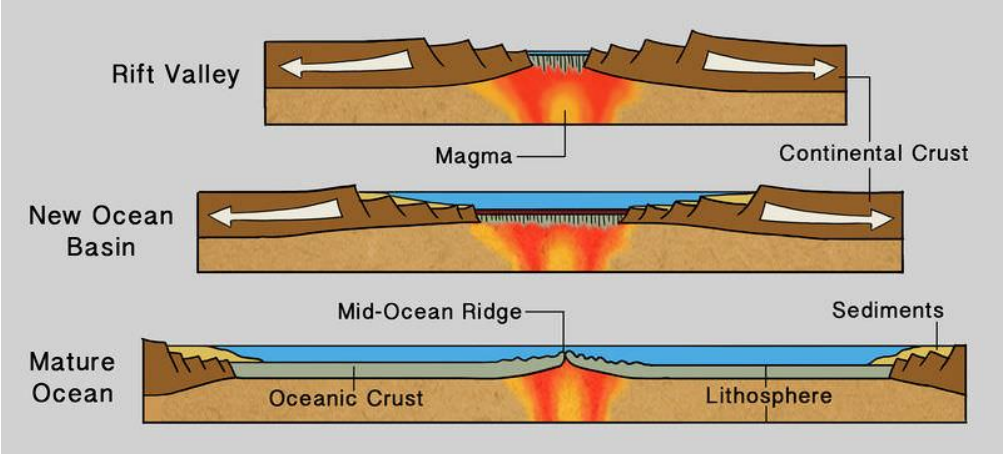


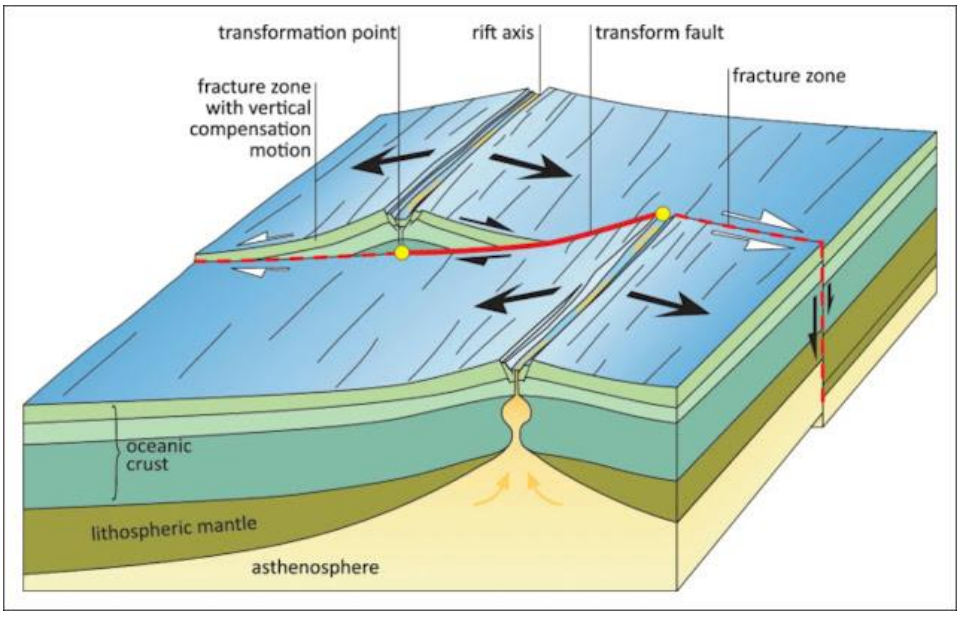
B. Convergent plate boundary involving two slabs of oceanic lithosphere.



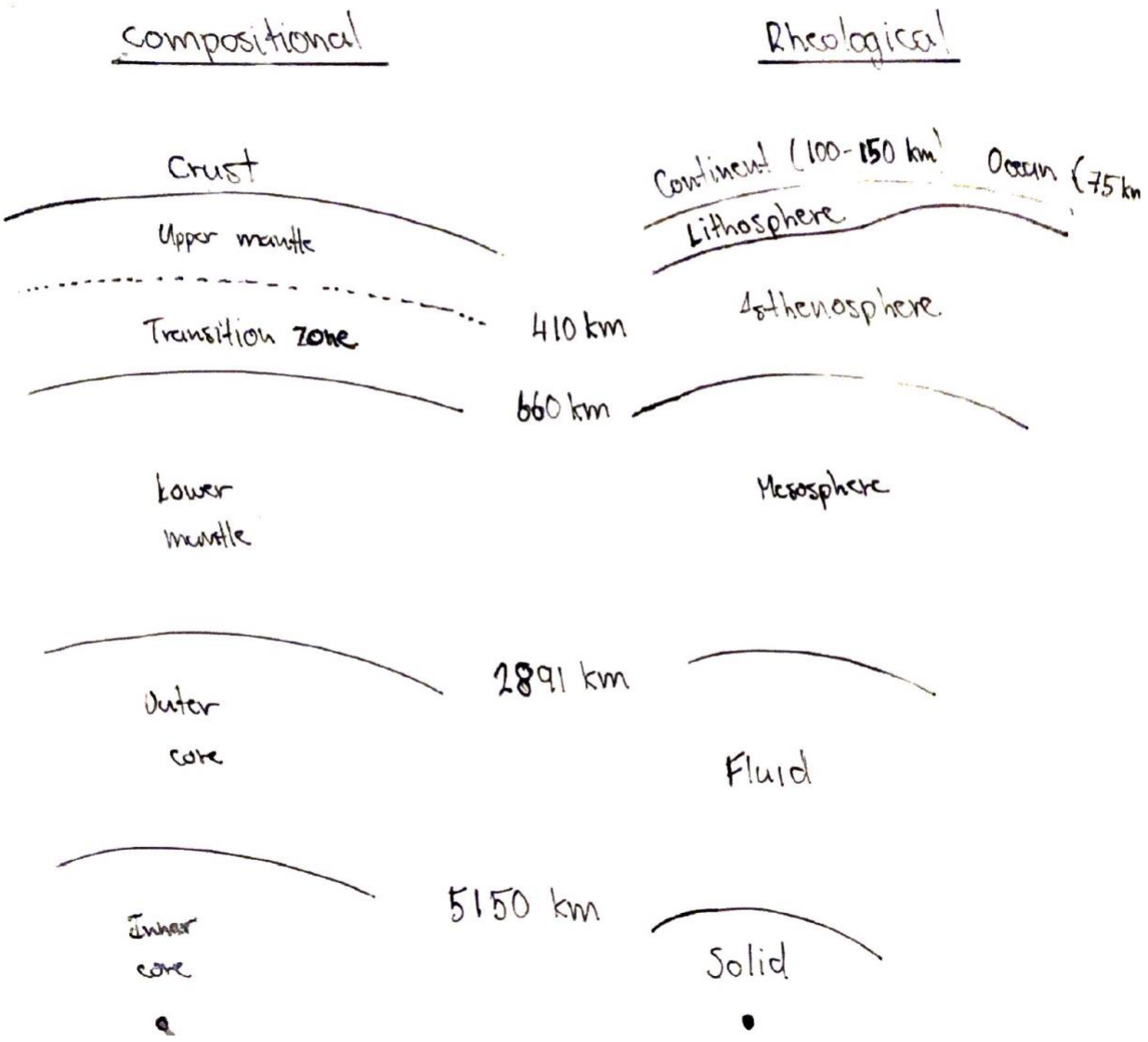
C. Continental collisions occur along convergent plate boundaries when both plates are capped with continental crust.

Divergent and transform plate boundaries





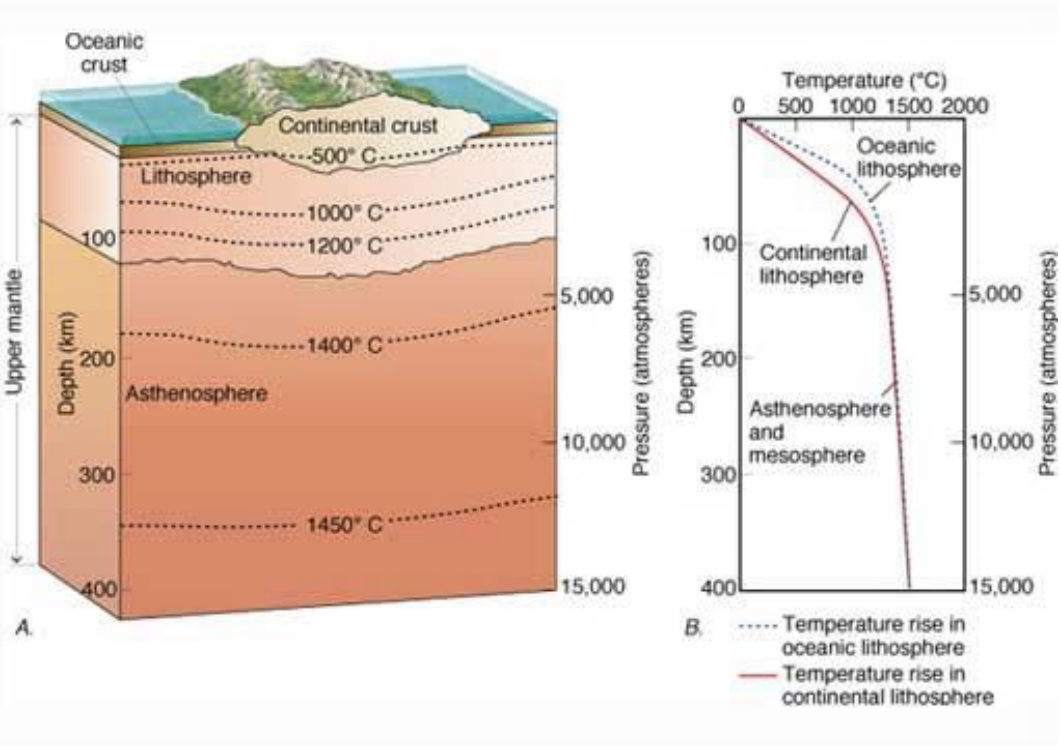
Earth's interior



Crust comparison

Oceanic	Continental
• 5 - 6 km	• 20 - 40 km
• high density	• low density
• mafic to ultramafic	• felsic
• basalt, gabbro, peridotite	• granitic, gneiss

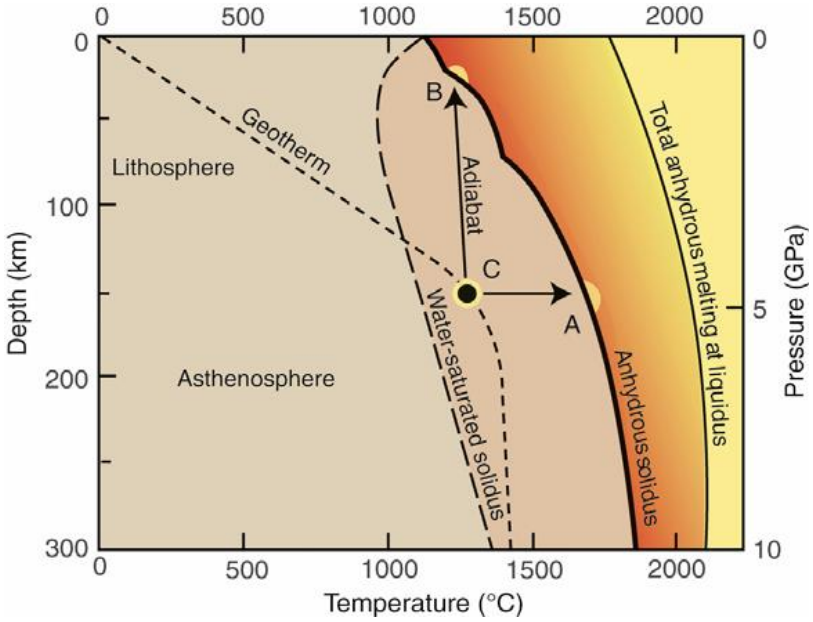
Pressure and temperature gradient



Geothermal gradient (the rate of increasing temperature as depth increases within the Earth) indicated by the red line on Figure B.

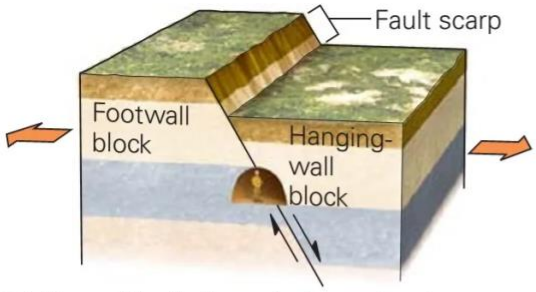
How does the upper mantle melt?

The mantle is mainly peridotite and solid (inferred by secondary seismic waves – which cannot pass through liquids – passing through it). The anhydrous solidus indicates the pressure and temperature conditions at which the mantle can start melting.

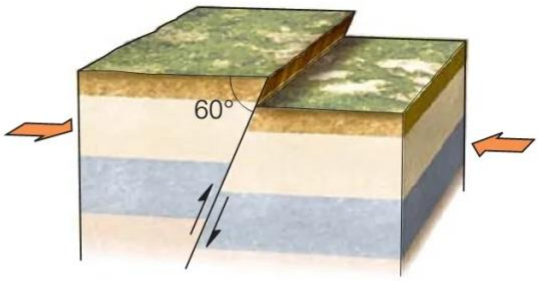


A. Raising the temperature – above a mantle plume which brings up heat from the outer core - mantle boundary and intersects the solidus.
B. Decompression melting at divergent plate boundaries where plates thin – mantle flows upward and the pressure reduces faster than the mantle can cool by conduction and eventually intersects the solidus.
C. Presence of H_2O – excess water (from hydrous minerals in the oceanic crust at subduction zones) reduces the melting point of peridotite and it melts as the geotherm crosses the water-saturated solidus.

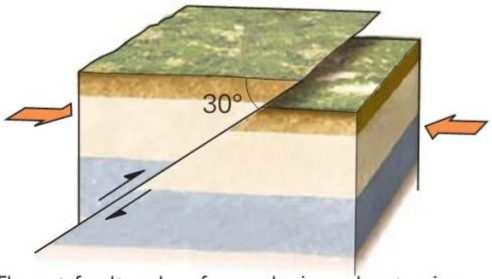
Types of faults



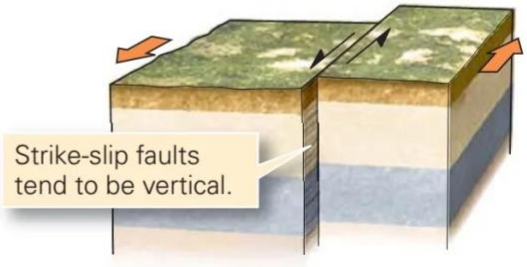
(a) Normal faults form during extension of the crust. The hanging wall moves down.



(b) Reverse faults form during shortening of the crust. The hanging wall moves up and the fault is steep.

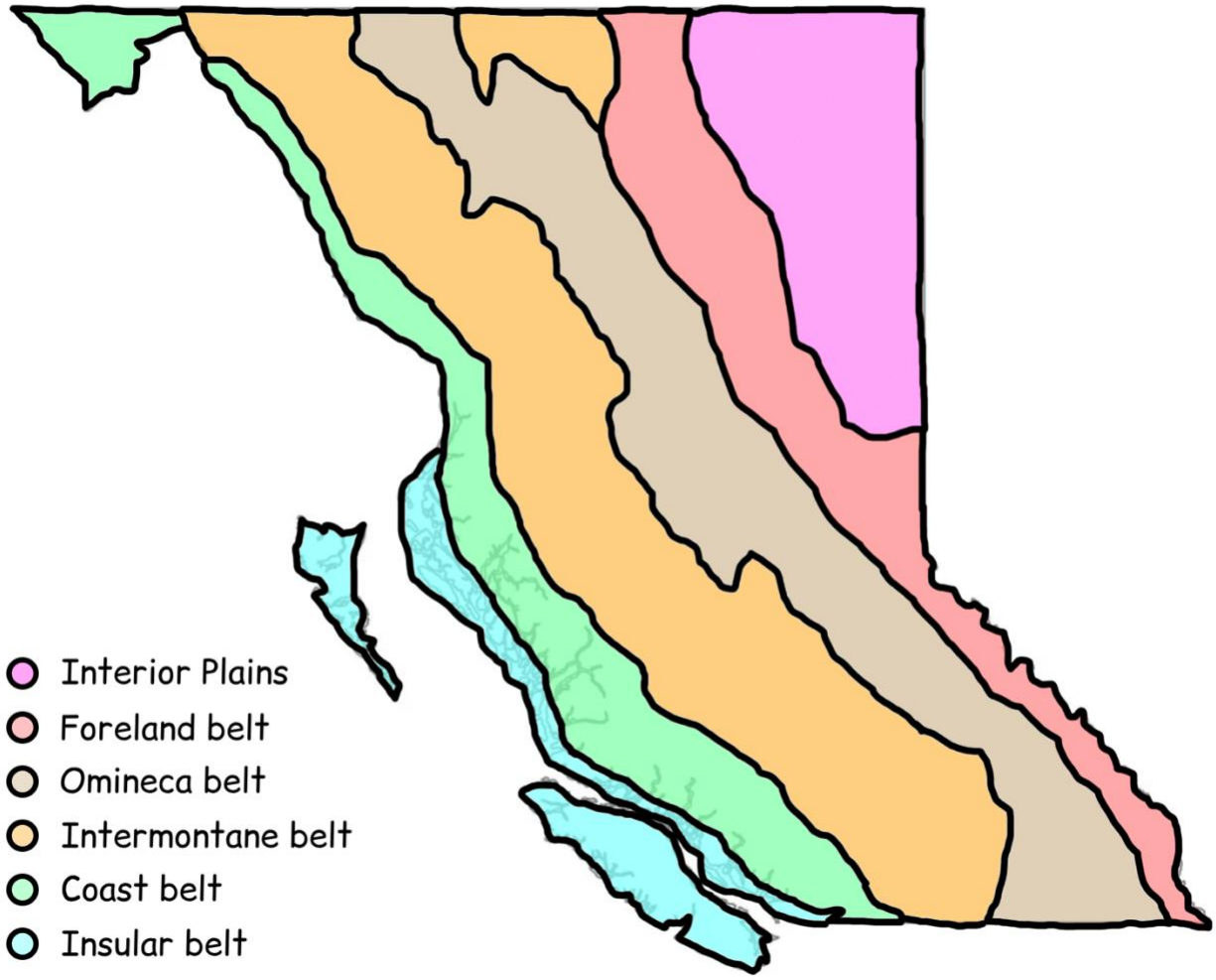


(c) Thrust faults also form during shortening. The fault's slope is gentle (less than 30°).

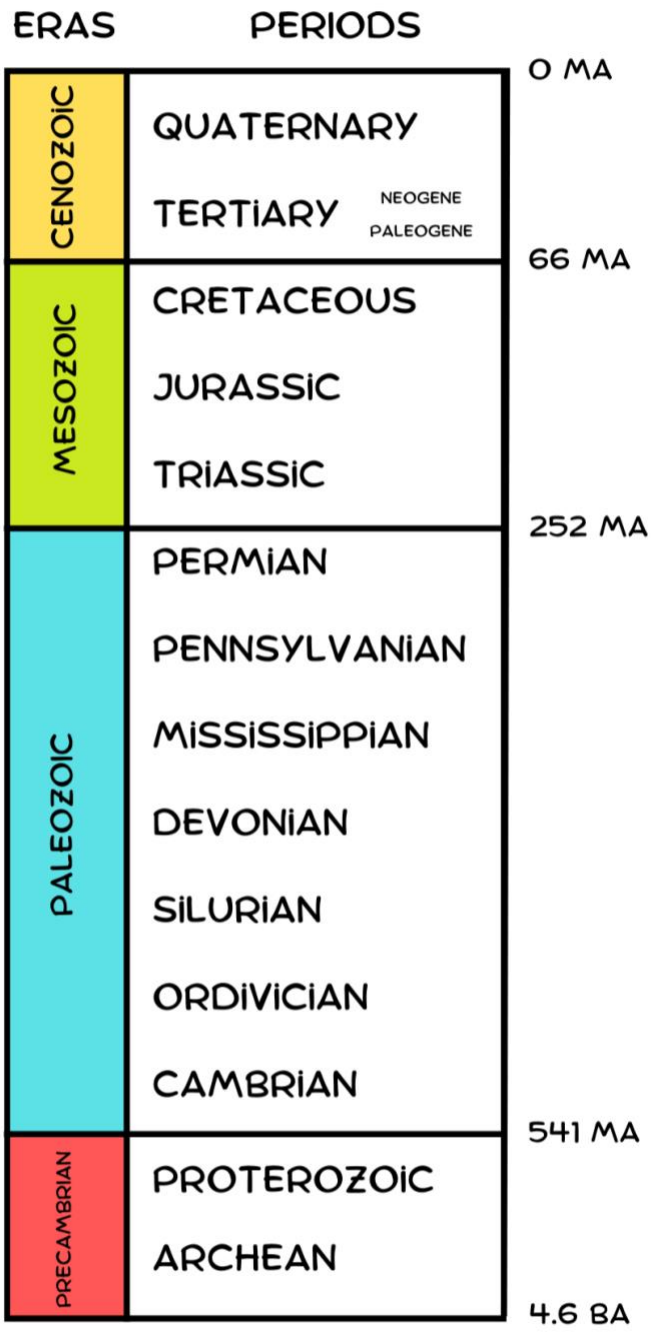


(d) On a strike-slip fault, one block slides laterally past another, so no vertical displacement takes place.

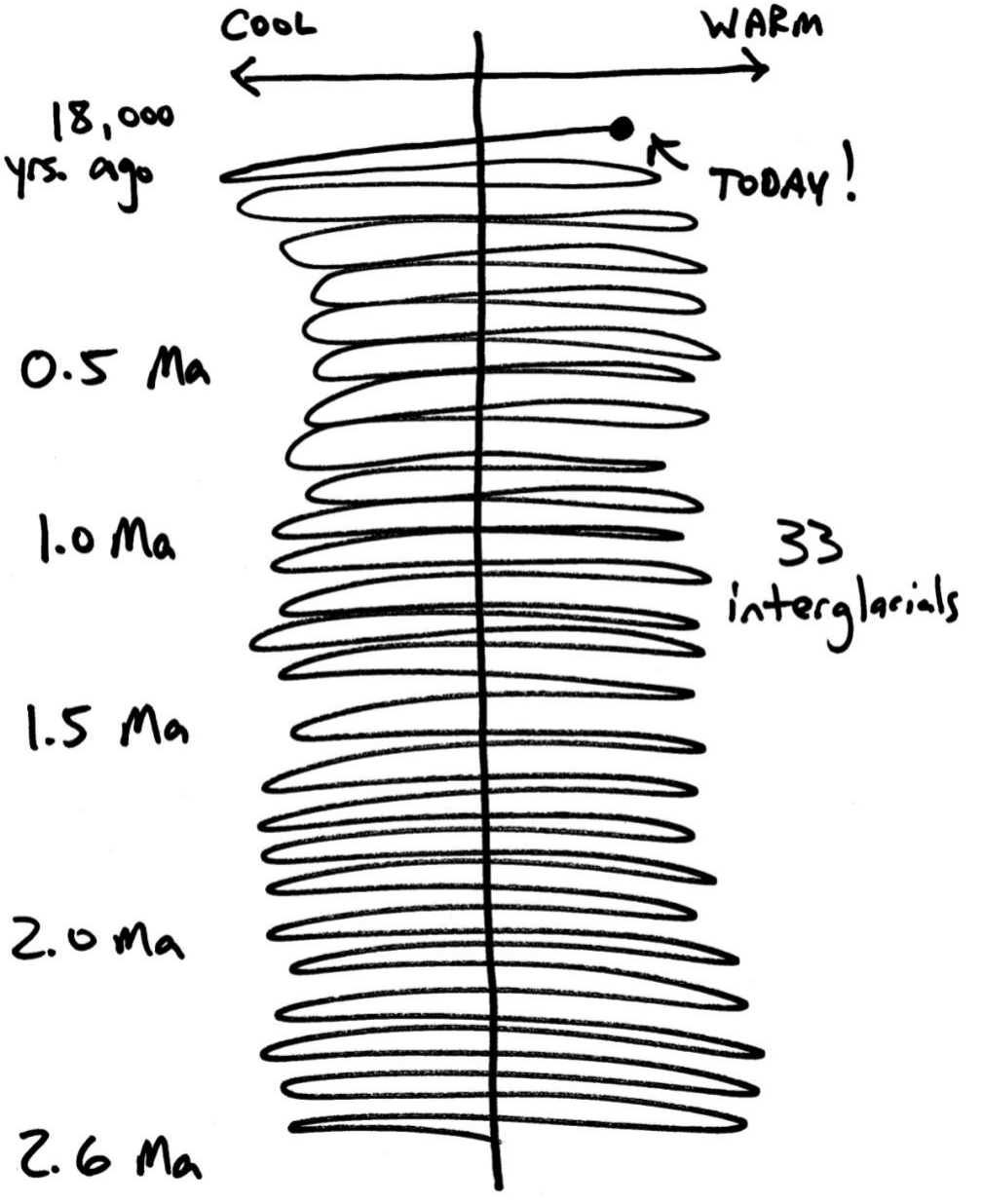
BC Geology


Interior Plains
Foreland belt
Omineca belt
Intermontane belt
Coast belt
Insular belt

Timescale


ERAS
PERIODS
0 MA
CENOZOIC
QUATERNARY
TERTIARY
NEOGENE
PALEOGENE
66 MA
MESOZOIC
CRETACEOUS
JURASSIC
TRIASSIC
252 MA
PALEOZOIC
PERMIAN
PENNSYLVANIAN
MISSISSIPPIAN
DEVONIAN
SILURIAN
ORDIVICIAN
CAMBRIAN
541 MA
PRECAMBRIAN
PROTEROZOIC
ARCHEAN
4.6 BA

Pleistocene and Holocene climate



Alpine landscape features