

Lab 4

Tectonic Settings

Eric Z. 02/08/2020

2 tectonic setting

- ❖ Cratonic (stable, from craton, Greek: κράτος kratos “strength”)
 - ❖ Small, slow uplift
 - ❖ Low subsidence
- ❖ Orogenic (active, from orogeny, oros genesis)
 - ❖ Mountain building
 - ❖ Fast uplift
 - ❖ Fast subsidence
- ❖ Both involve movements of Earth’s outer layer (lithosphere)

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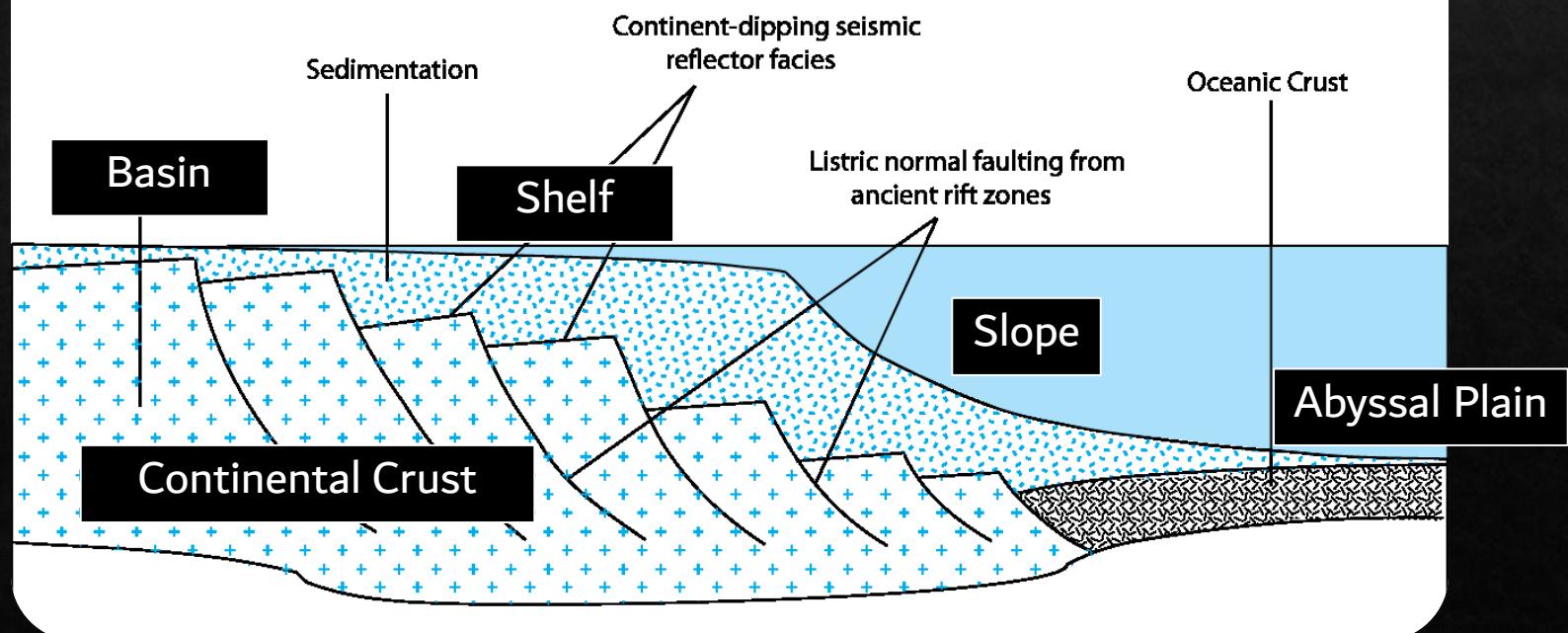
Cratonic Setting

Cratonic – refers to parts of the continents that have been stable for hundreds of millions of years

- ❖ little to no tectonic activity and uplift
- ❖ wide continental shelf with slow sedimentation rate

Passive Margin

Rifted Passive Margin



Mississippi River Delta



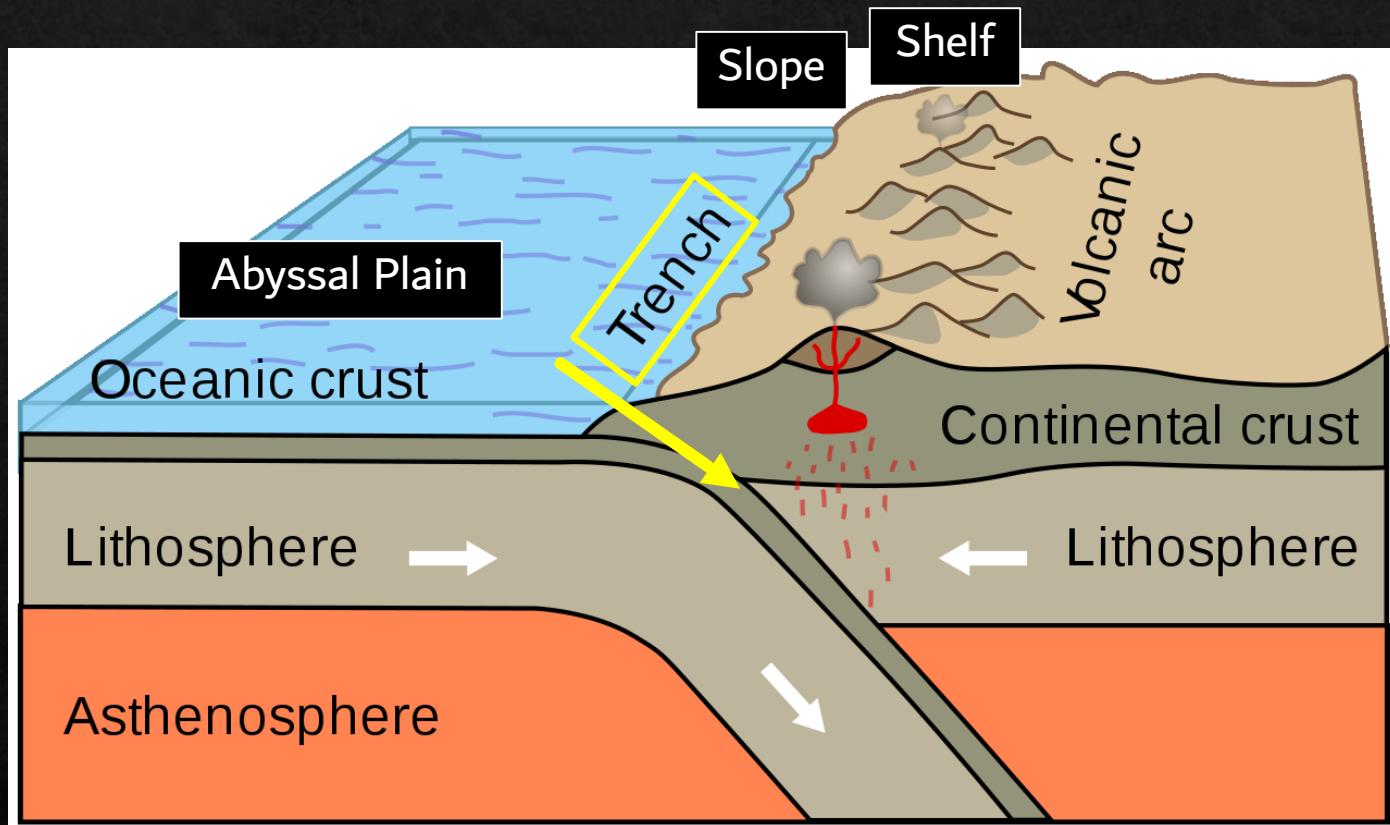
European Space Agency (ESA)

Orogenic Setting

Orogenic – refers to deformational crustal processes by which rapid uplift and mountain systems are formed

- ❖ Oceanic plate being subducted beneath a continental plate
- ❖ Rapid sedimentation with texturally immature sediment
- ❖ Susceptible to earthquakes and volcanic activity

Active Margin



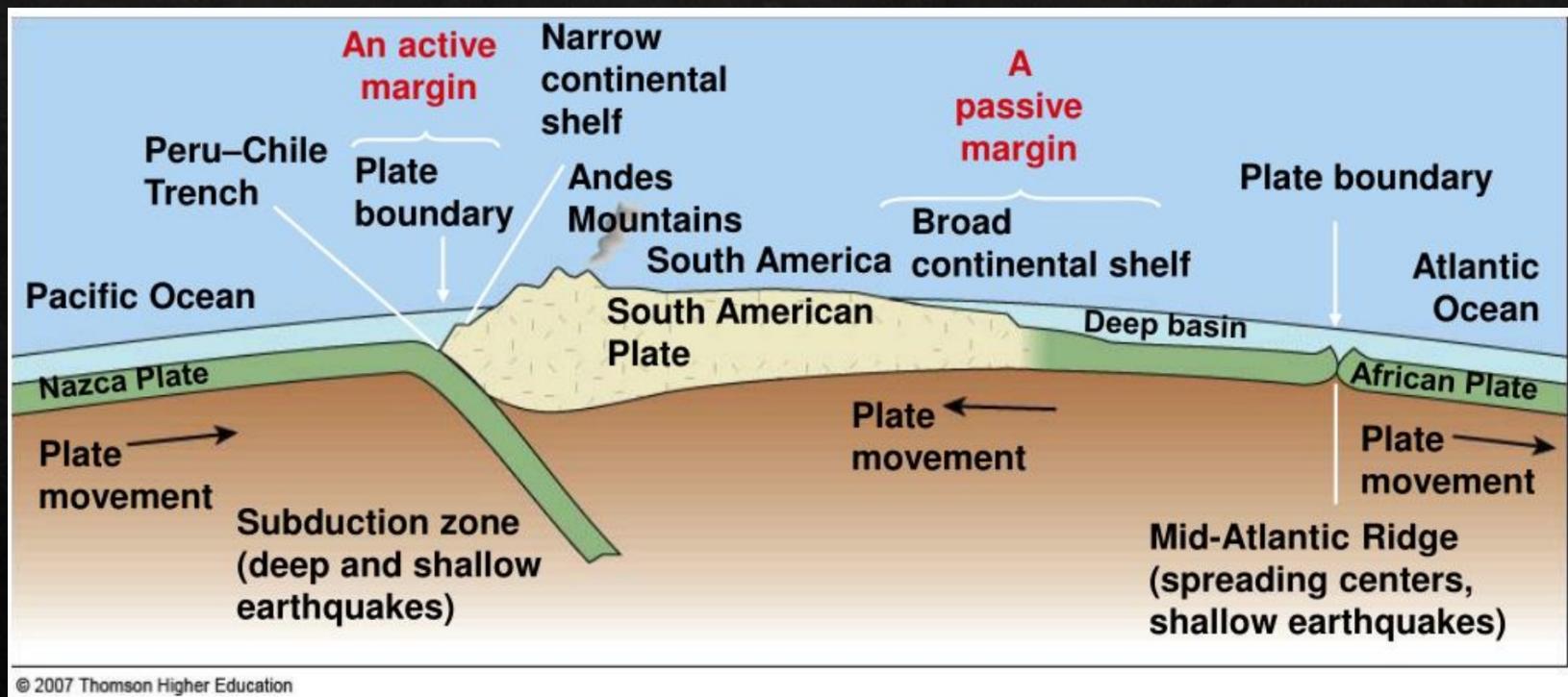
Mount St. Helens Eruption 1980



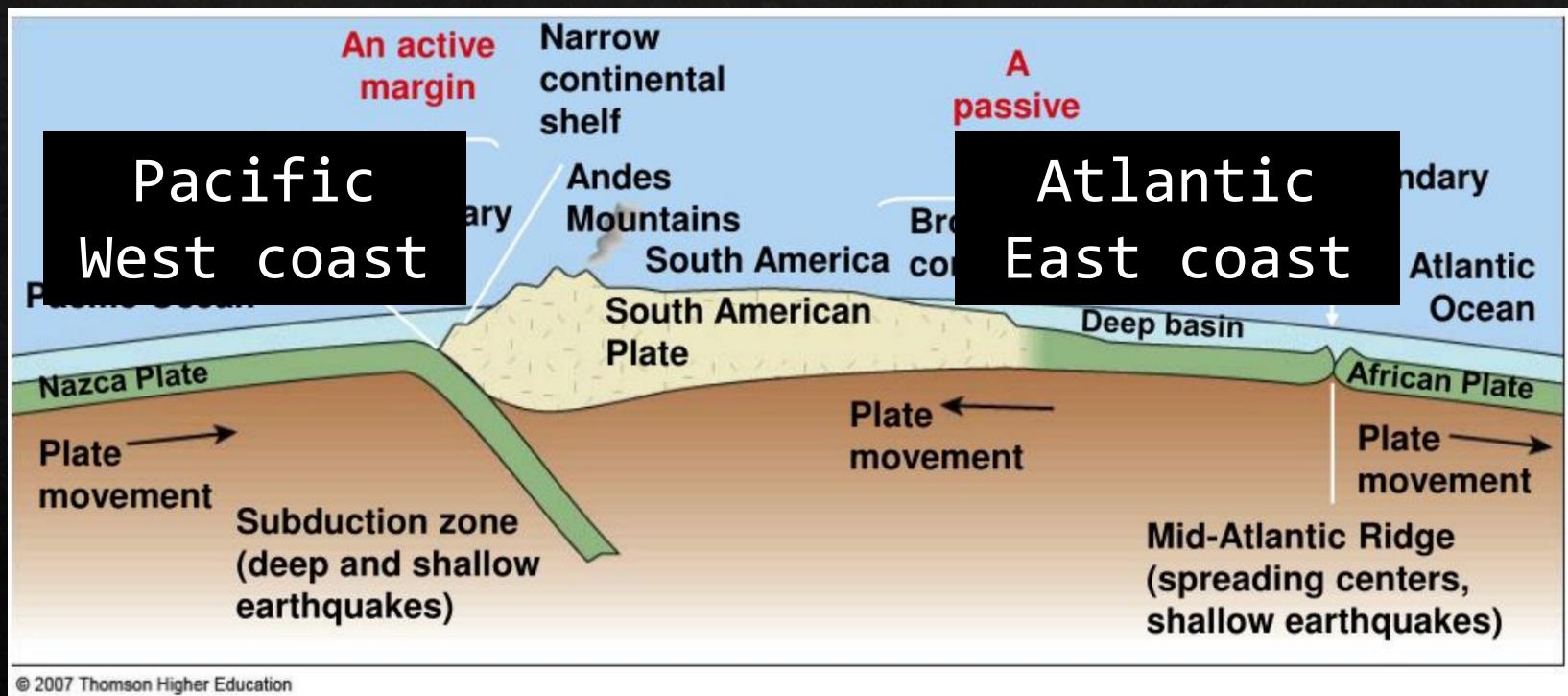
USGS

Skamania County, Washington. May 18, 1980.

Active Margin vs Passive Margin



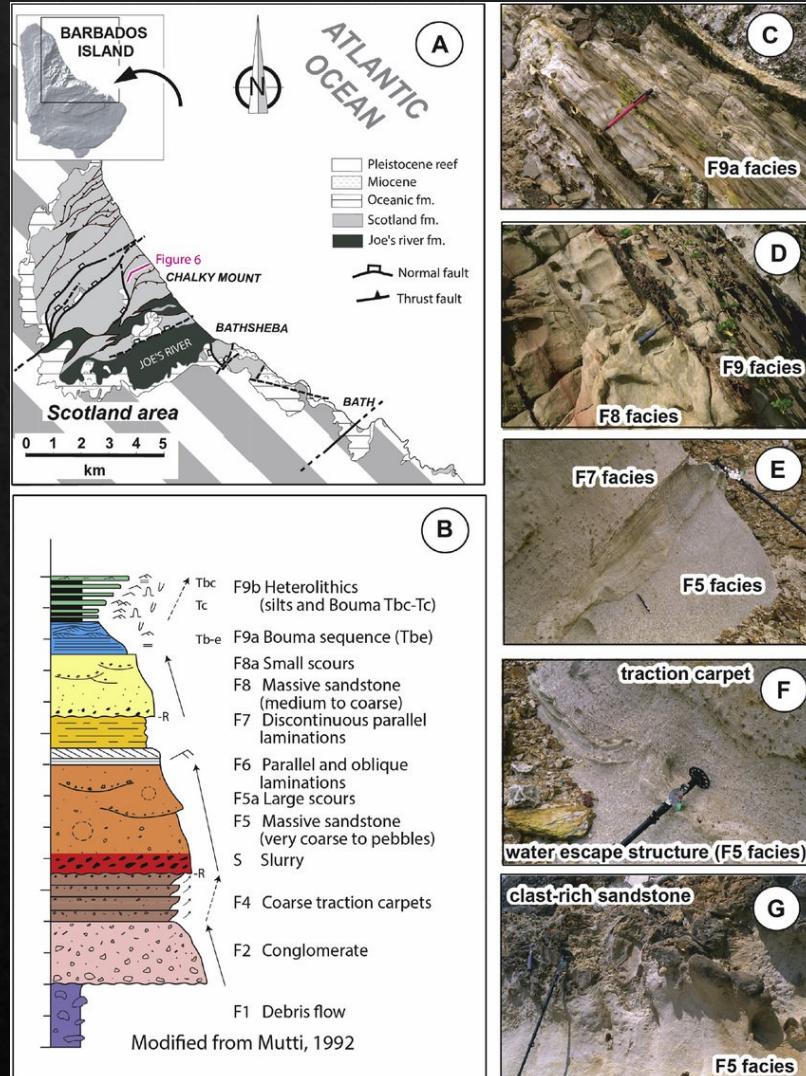
Active Margin vs Passive Margin



Tectonically bipartisan

Facies Associations of Beds

- ❖ Facies : a general aspect of a rock type (lithology, fossil content, environment)
- ❖ Within a particular tectonic setting, beds of different rock types are likely to be deposited in association

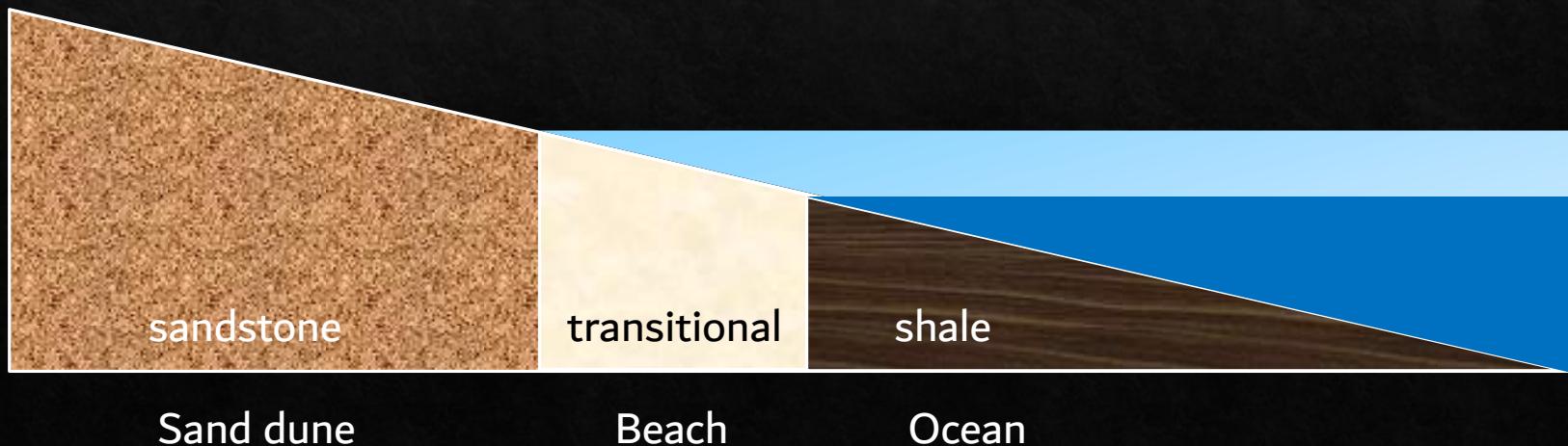


Walther's Law

- ❖ Facies occur in **conformably** vertical succession also occur in laterally adjacent depositional environments
- ❖ Exceptions: erosion (unconformity)
- ❖ e.g. marine transgression and regression

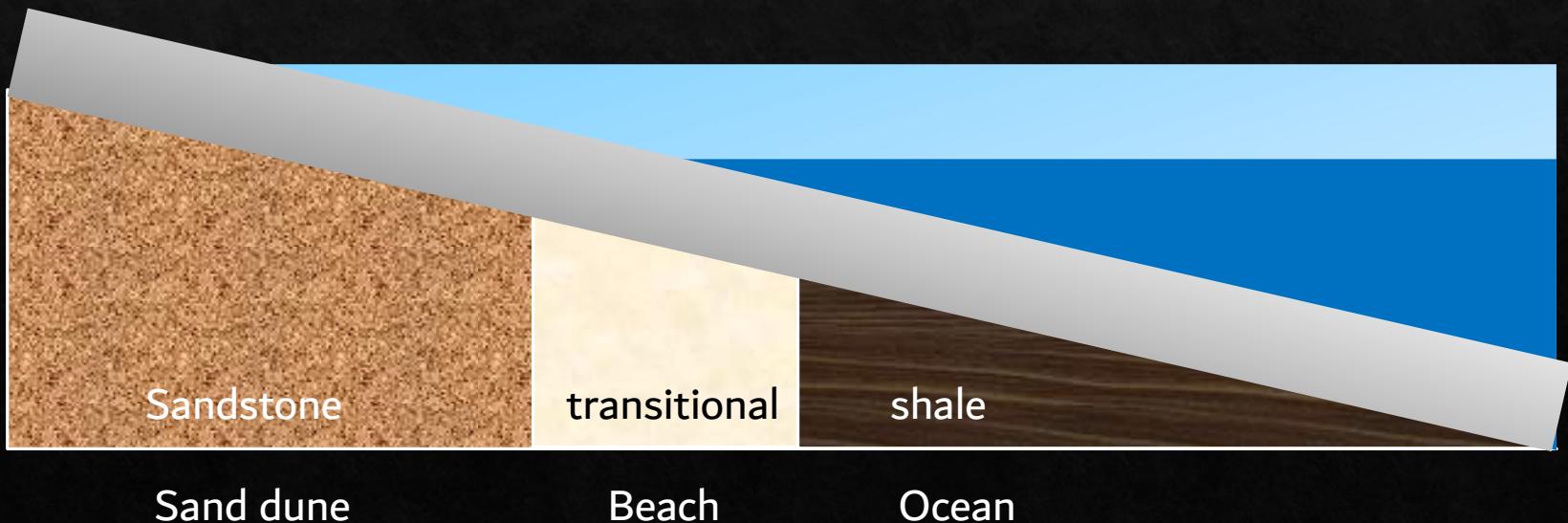
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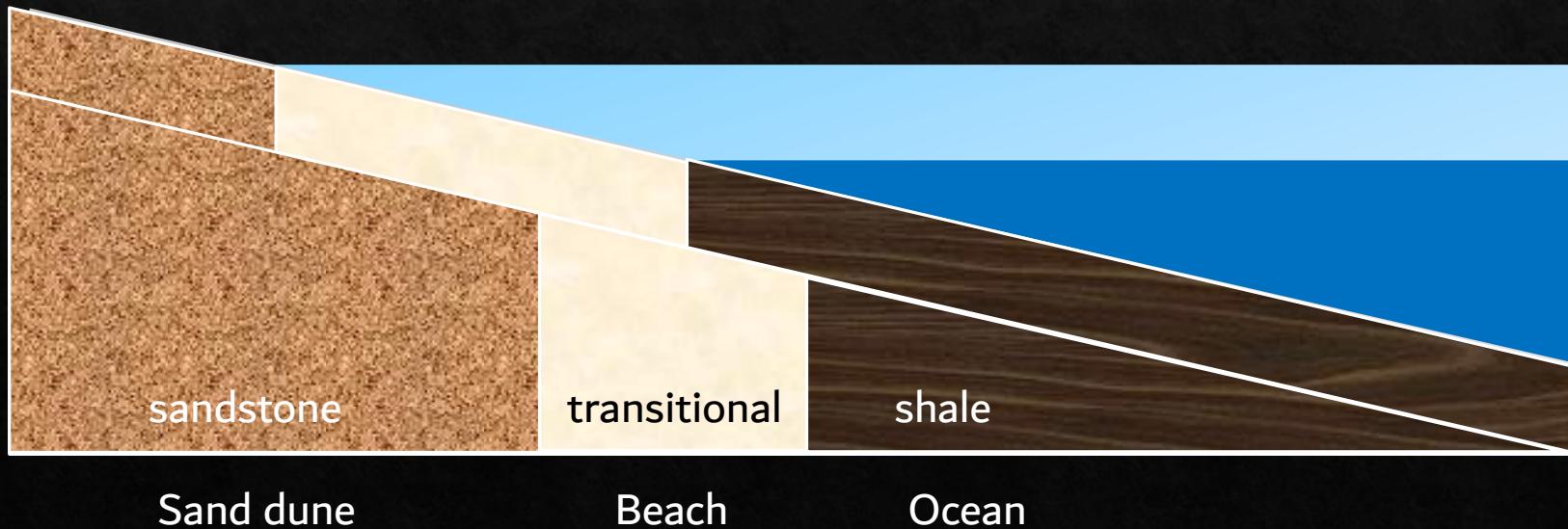
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- ❖ Marine transgression (sea level rising 1)
- ❖ ?????



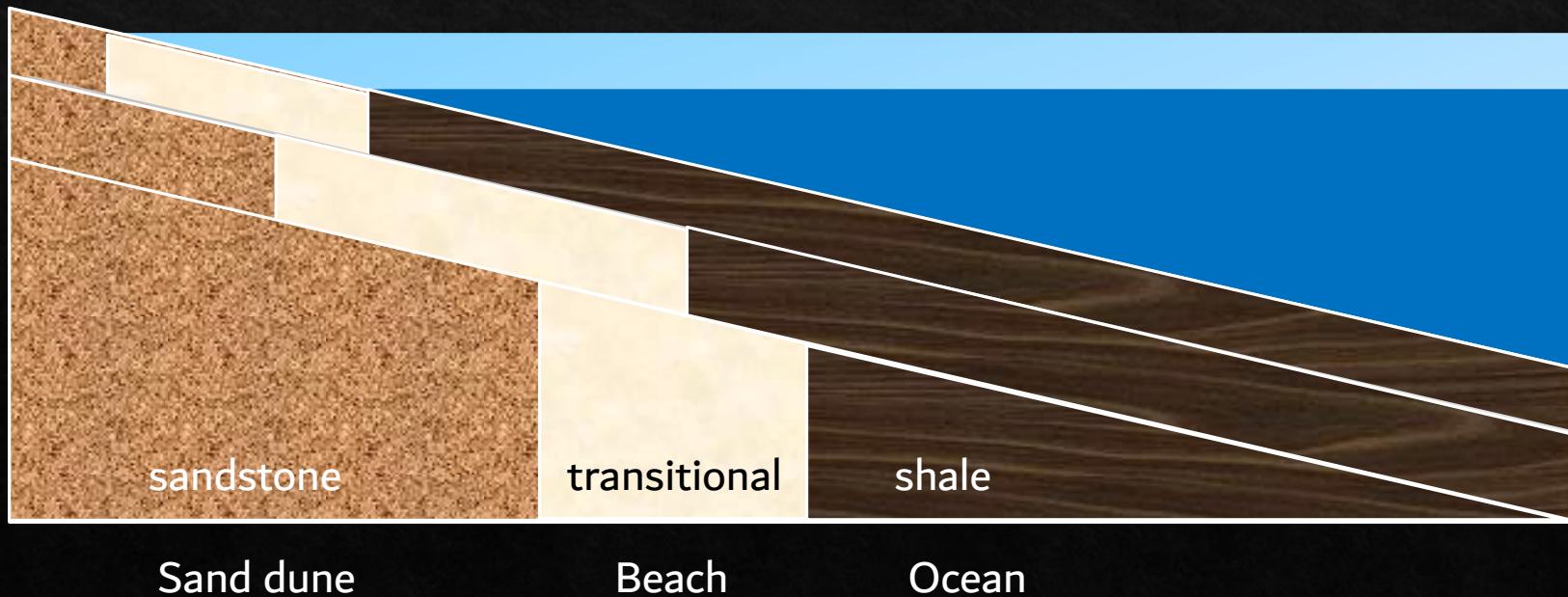
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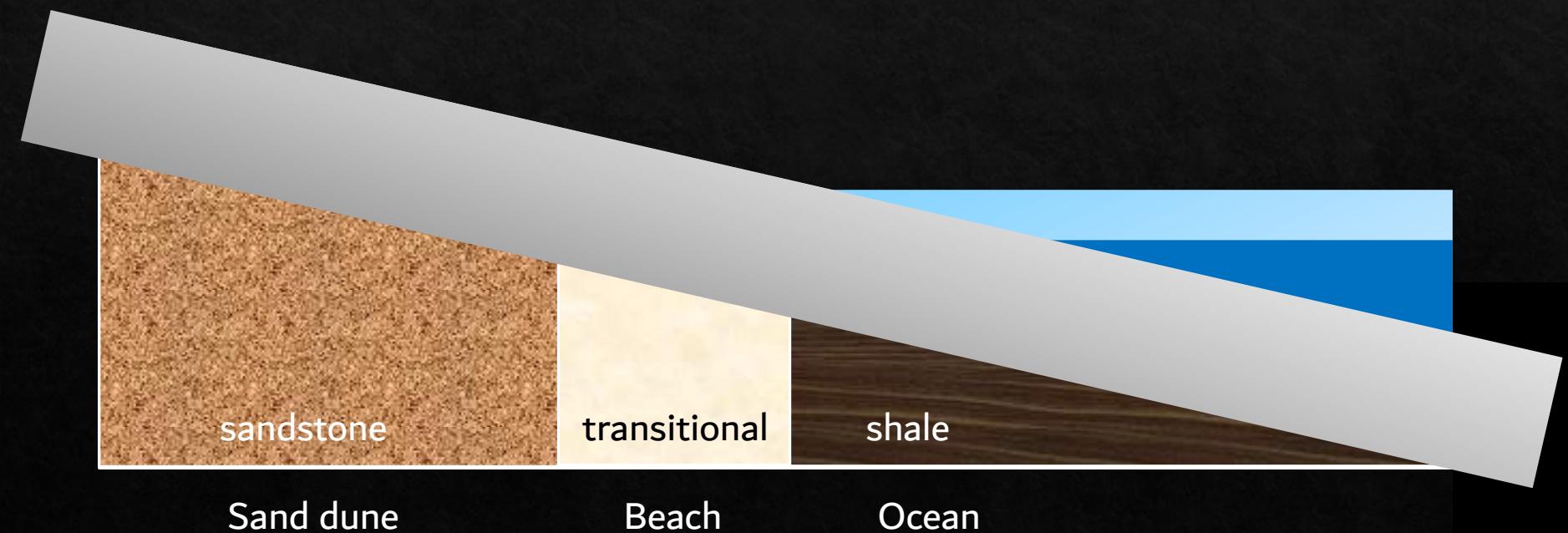
Walther's Law

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- ❖ Marine transgression (sea level rising 2)



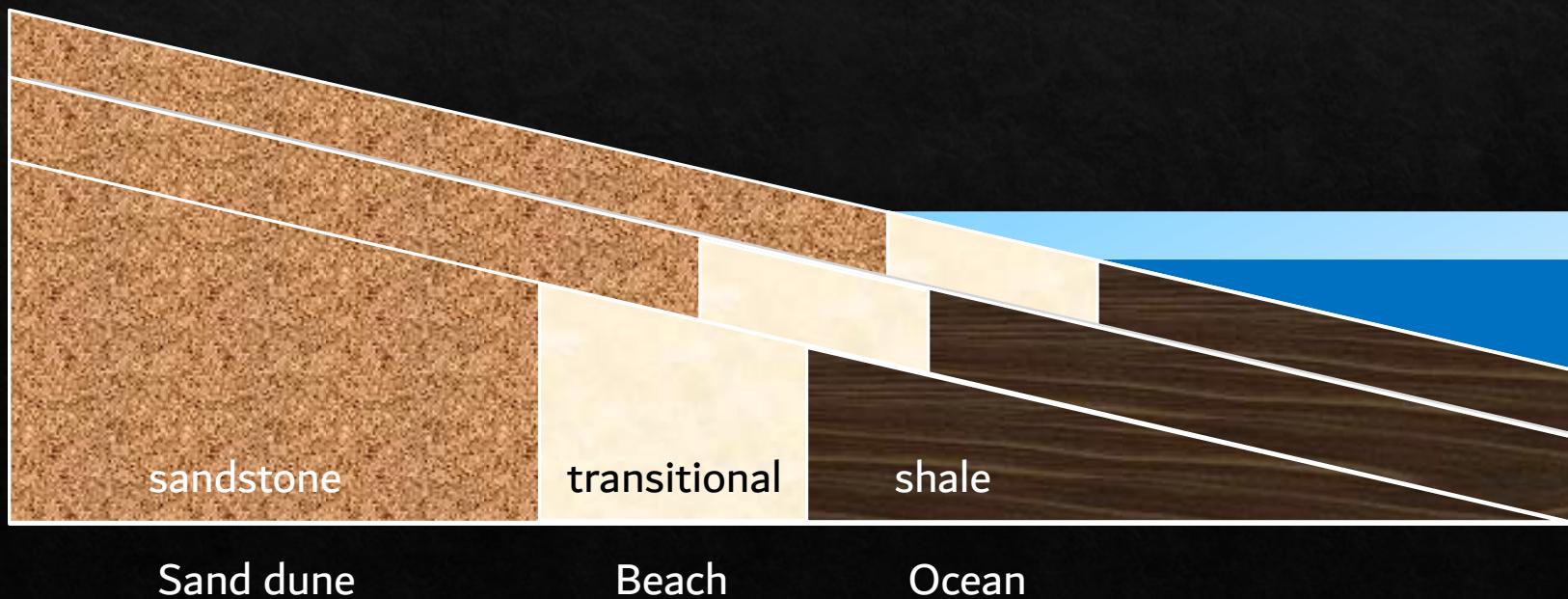
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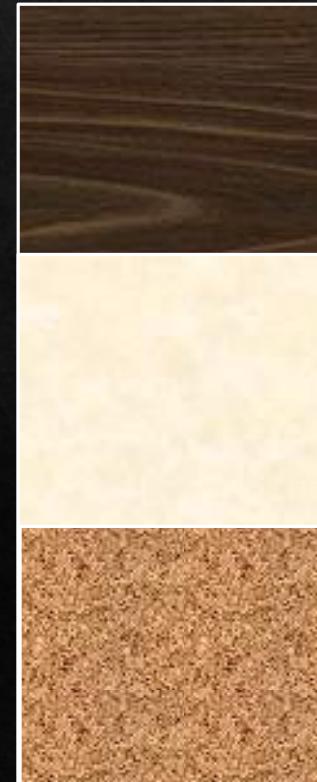
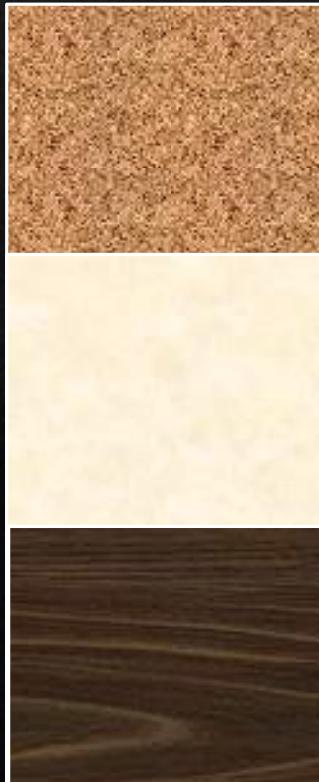
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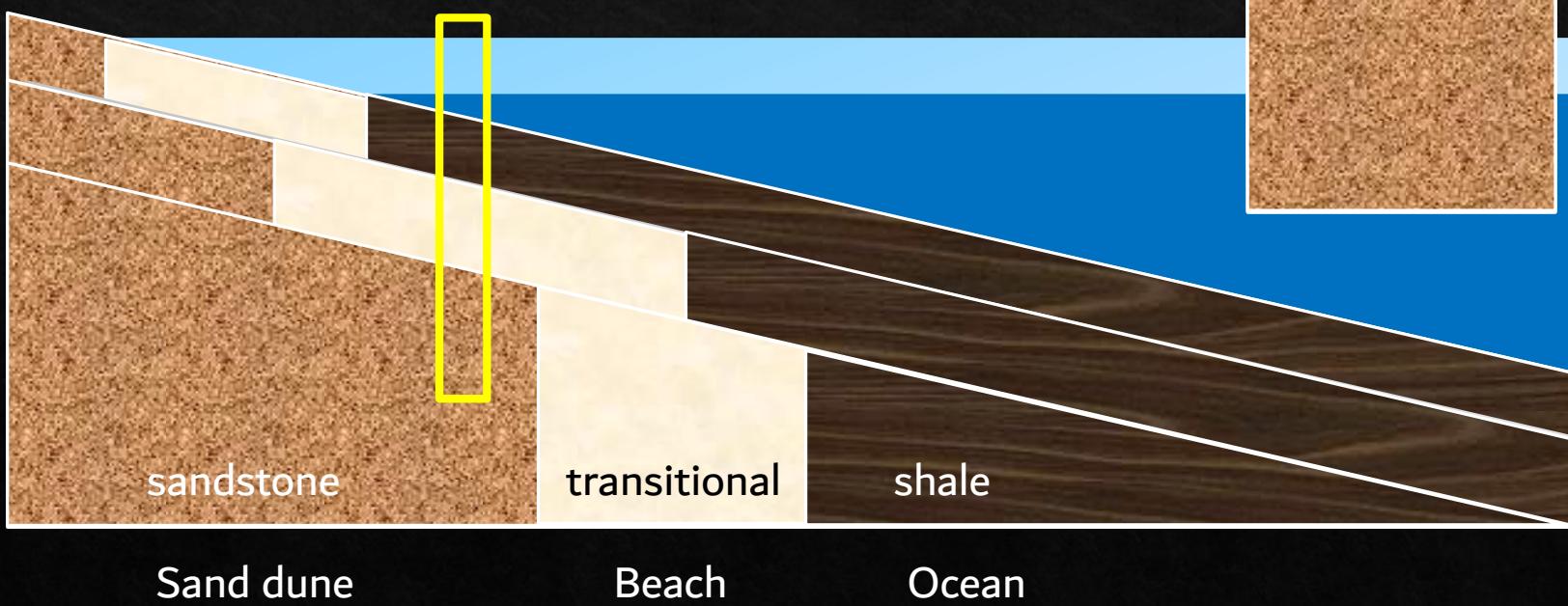


Sequence

❖ Transgression or Regression, which is which?



Transgression



Regression

