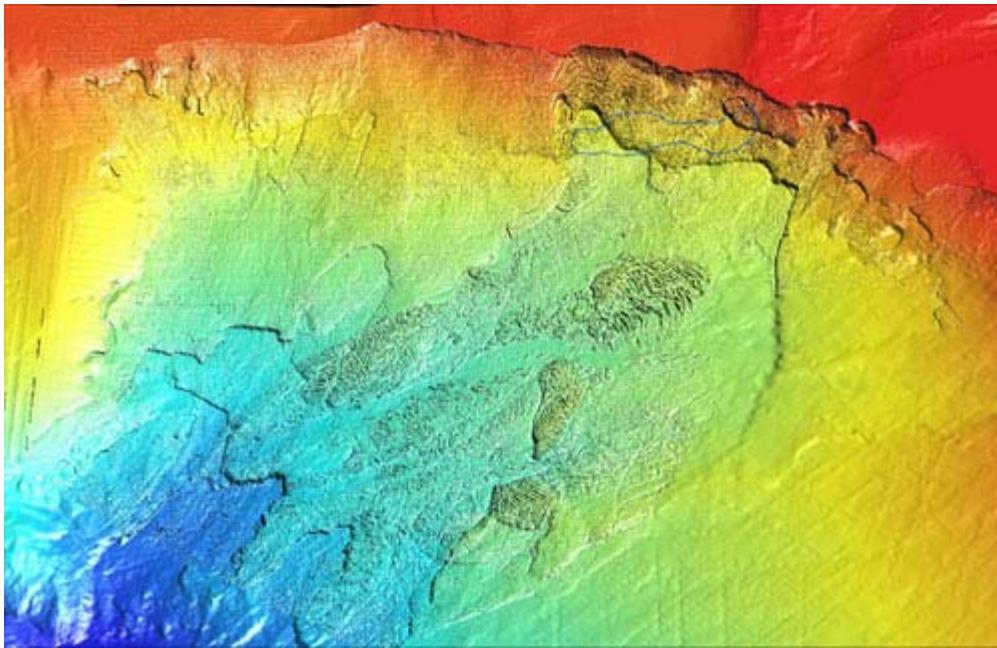


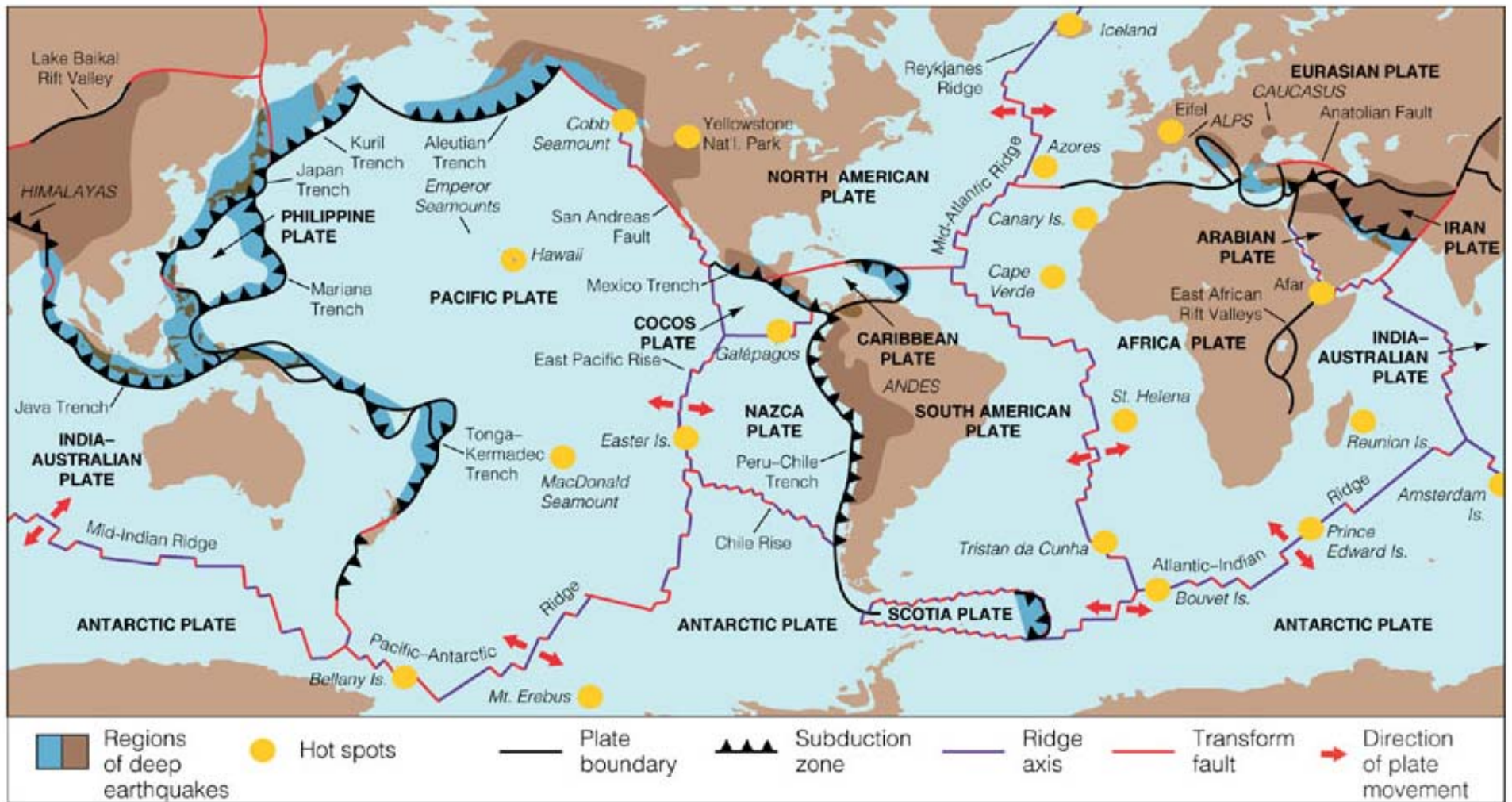
# *Ocean Margins*



Storegga Slide

***Geol 4060/5060***

Chris Jenkins 2013



# *Passive / active continental margins*

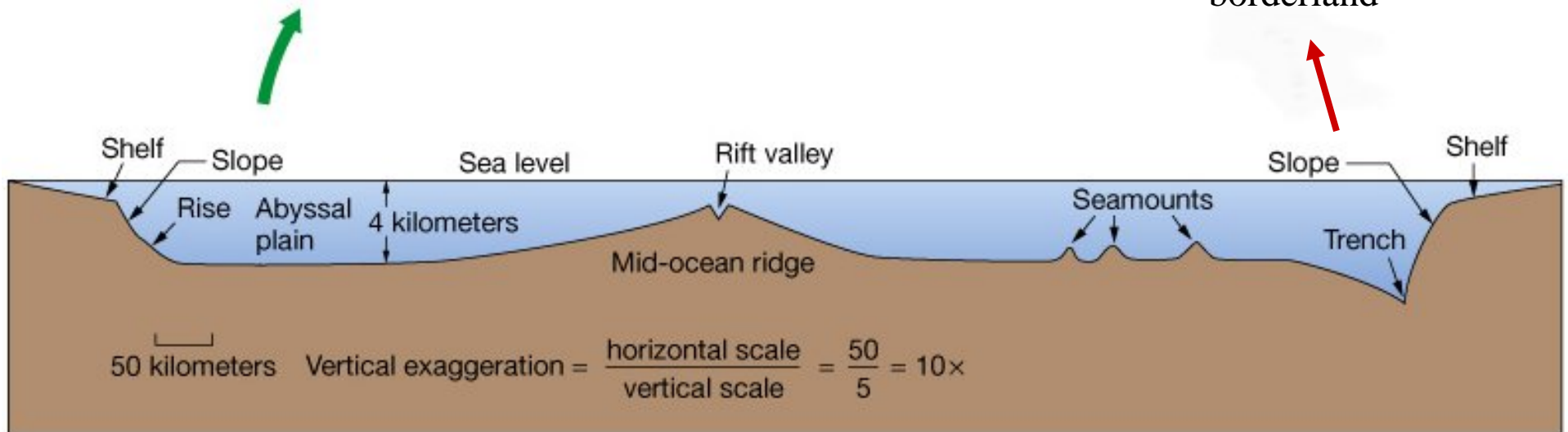
## Passive margin

- ❑ No plate boundary
  - ◆ Shelf
  - ◆ Slope
  - ◆ Rise

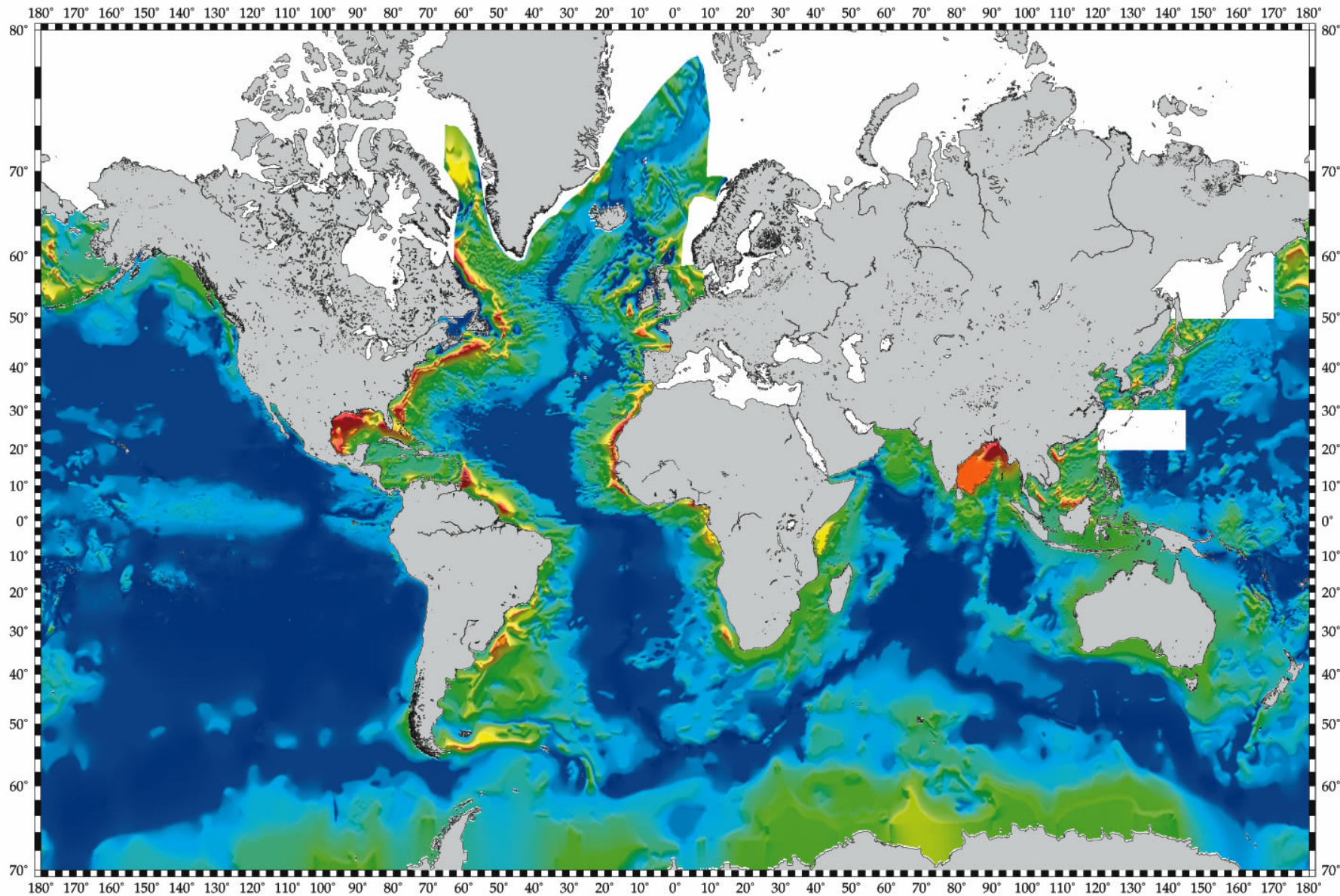
## Active margin

### Plate boundary

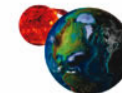
- ◆ Convergent
  - Shelf
  - Slope (steep)
  - Trench
- ◆ Transform
  - Continental borderland



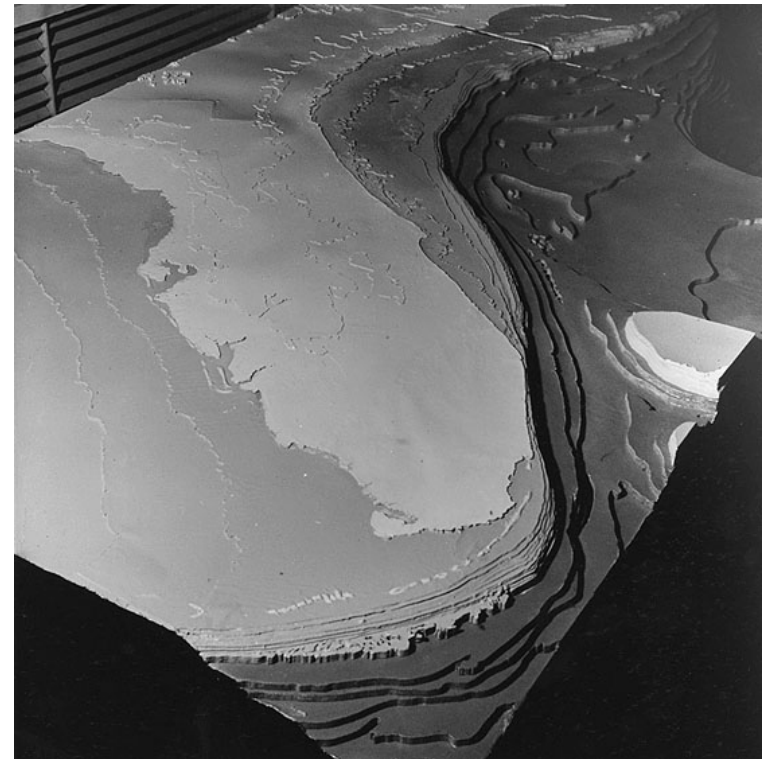
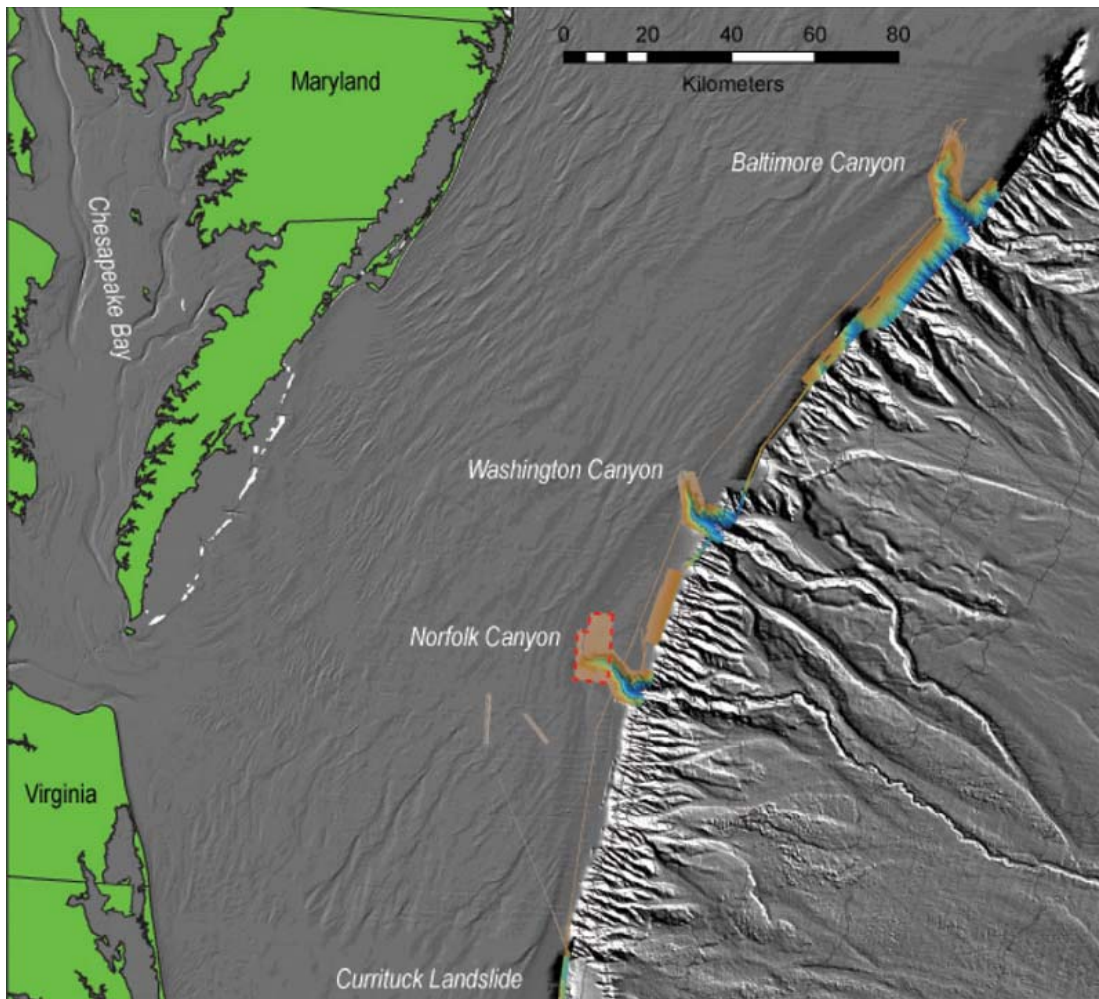
# Total Sediment Thickness of the World's Oceans & Marginal Seas



Thickness in Meters



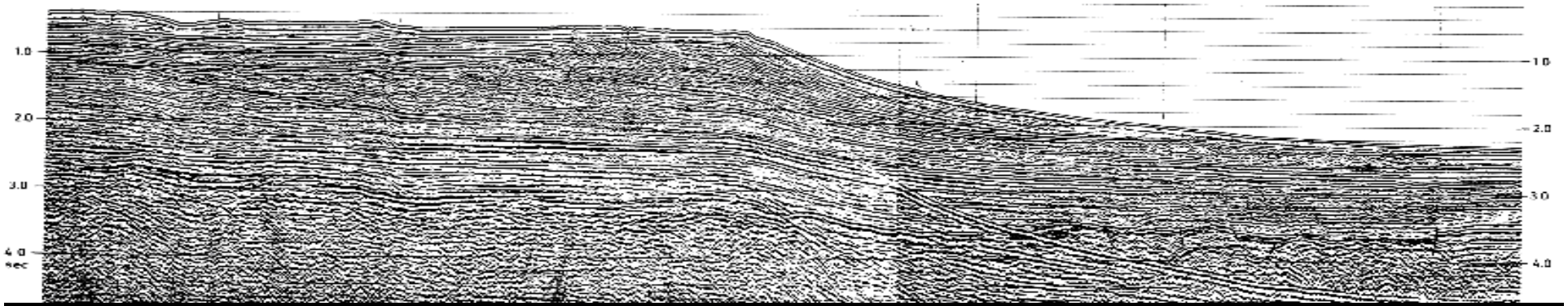
# *Continental Shelves and Slopes*



# Continental Rises, Abyssal plains

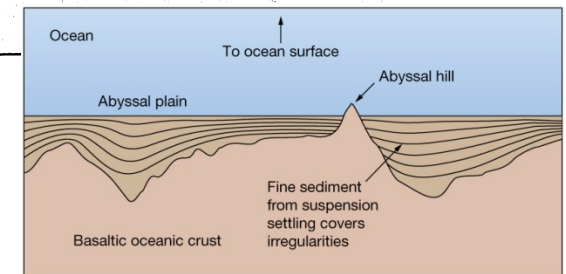
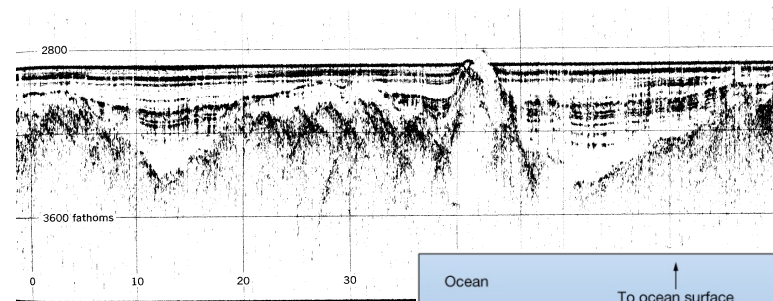
## Continental Rise

- sediments on ocean crust
- slope  $\sim 0.5^\circ$

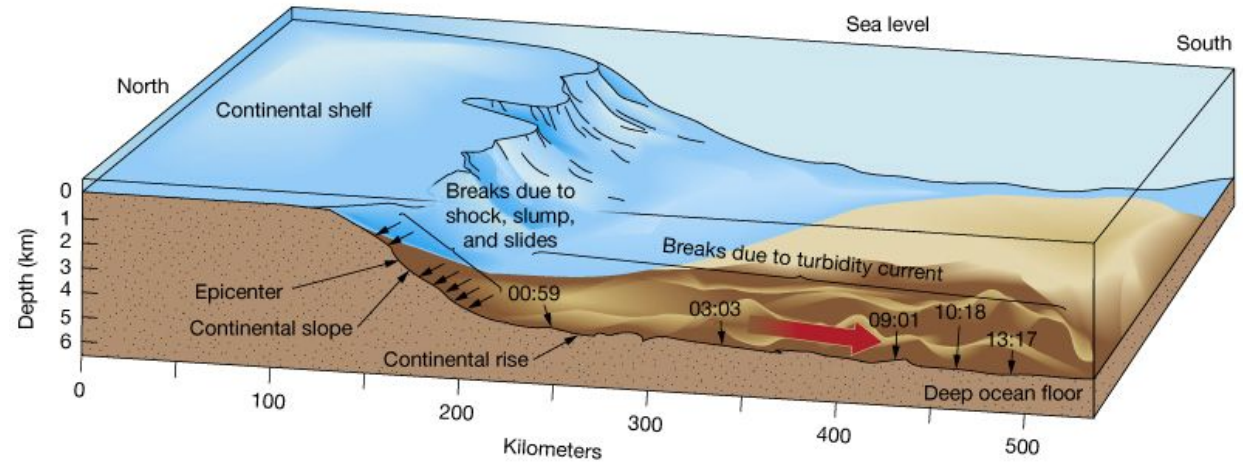


## Abyssal Plain

- Deep flat areas formed by suspension settling
- Volcanic peaks poke through the sediment
  - ❑ Abyssal hills (seaknolls)
  - ❑ Seamounts
  - ❑ Tablemounts (guyots)

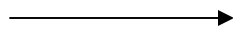


## *Diver in the La Jolla Submarine Canyon*



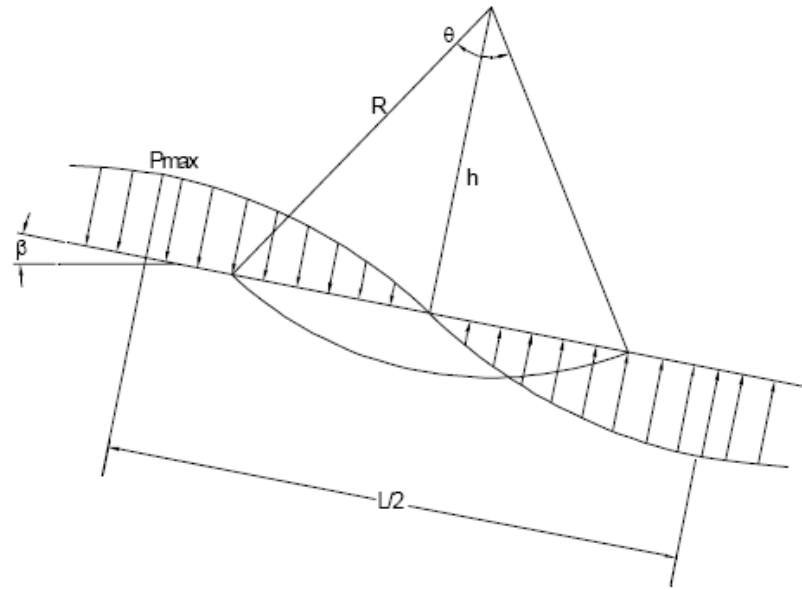
# Triggering the slides

Hurricane Waves



Earthquakes

Creep Failure



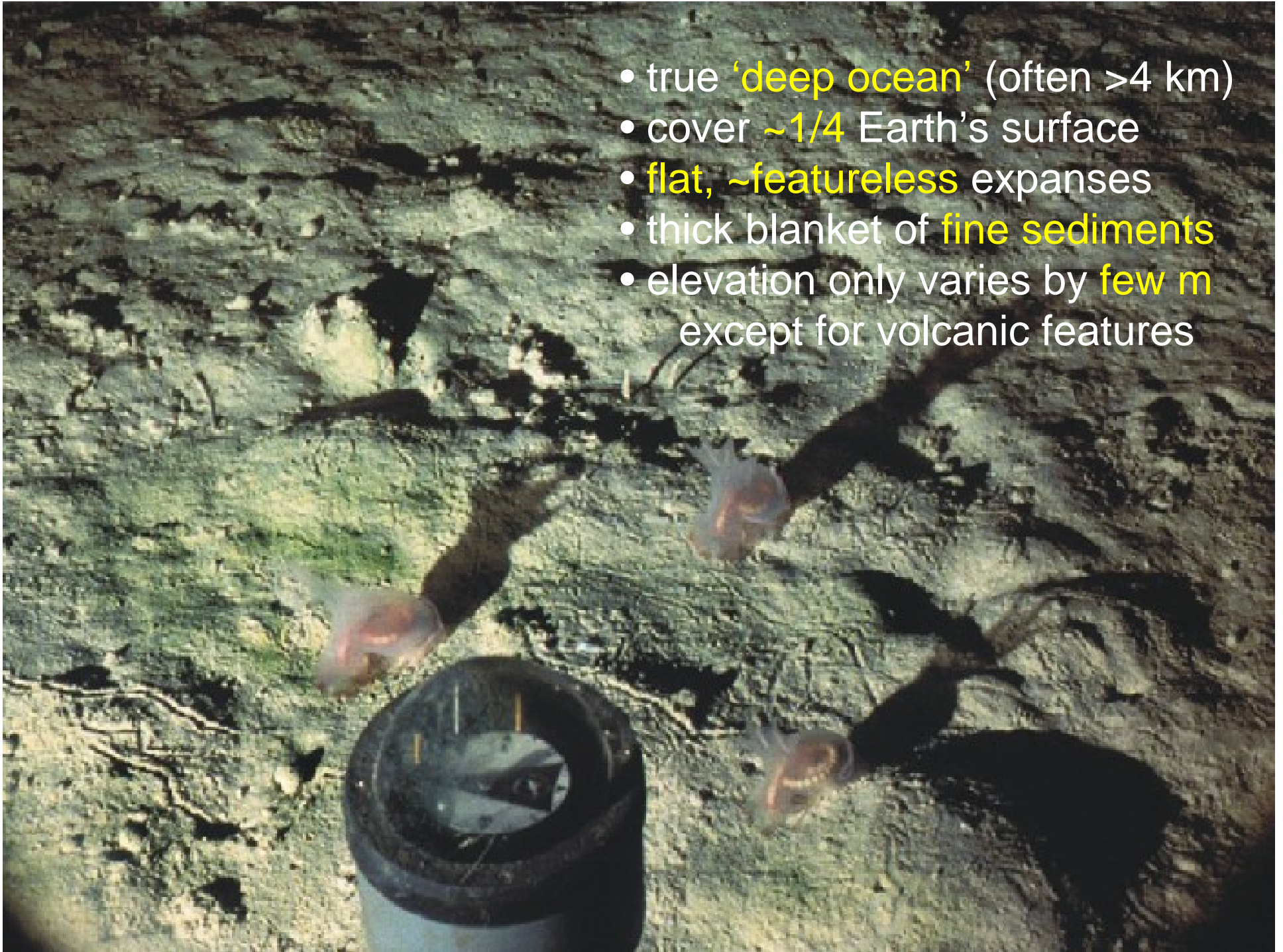
<http://www.bgs.ac.uk/discoveringGeology/hazards/landslides/sea.html>



# *Turbidity Currents*

- <http://www.youtube.com/watch?v=6obqCwLoJYA>
- <http://www.youtube.com/watch?NR=1&v=ZhDQnnONWl4&feature=fvwp>
- <http://www.youtube.com/watch?v=gN2jqkSzGxE&NR=1&feature=endscreen>
- <http://www.youtube.com/watch?v=UR5NoaqpCok>

- true 'deep ocean' (often >4 km)
- cover ~1/4 Earth's surface
- flat, ~featureless expanses
- thick blanket of fine sediments
- elevation only varies by few m except for volcanic features



## Ocean Trenches

- ❑ Deepest parts of the ocean
- ❑ Formed by plate convergence
- ❑ Most trenches are in the Pacific Ocean
- ❑ Associated with volcanic arcs
  - ◆ Island arc
  - ◆ Continental arc



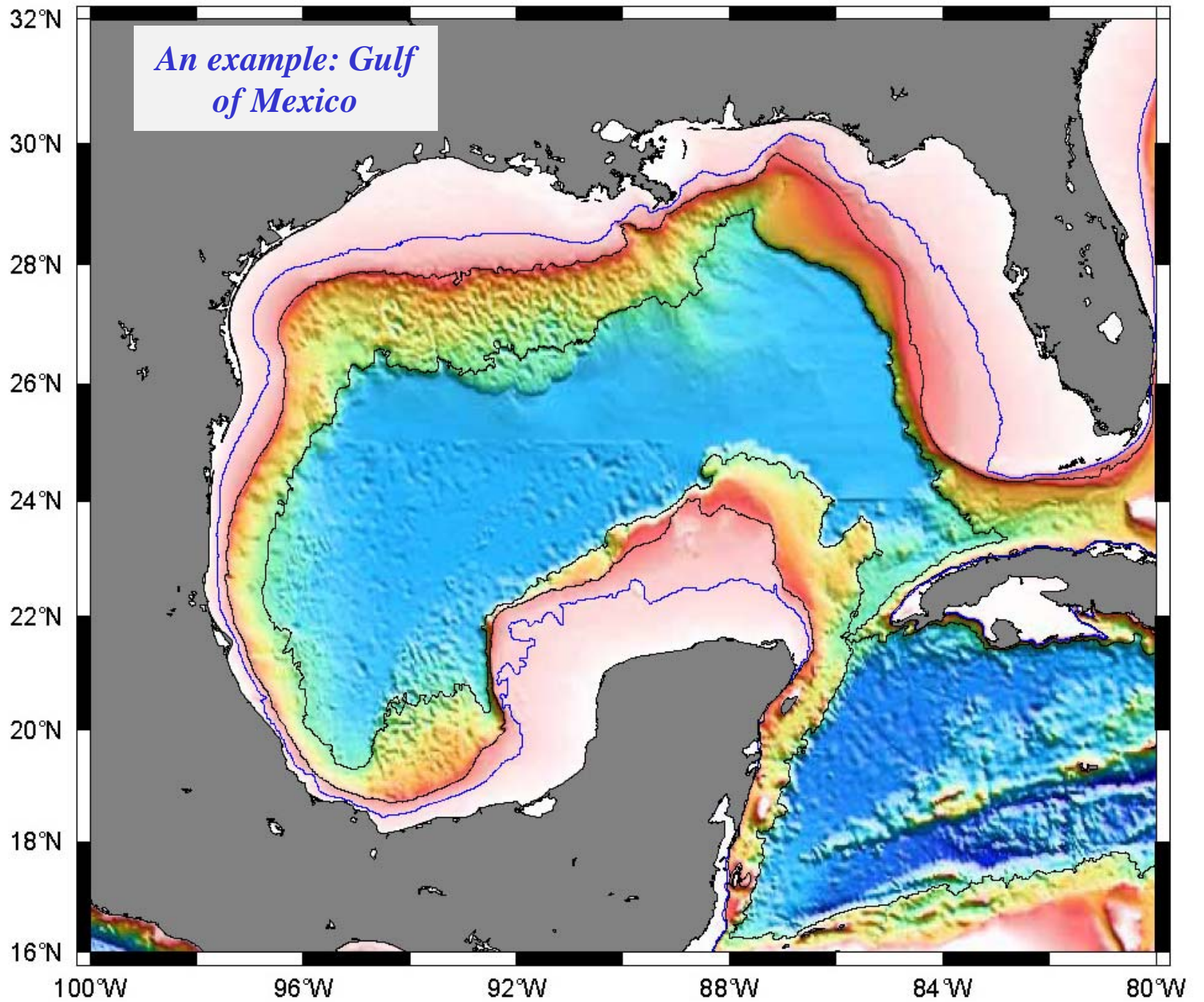
<http://www.youtube.com/watch?v=0mKotQs93Dc>

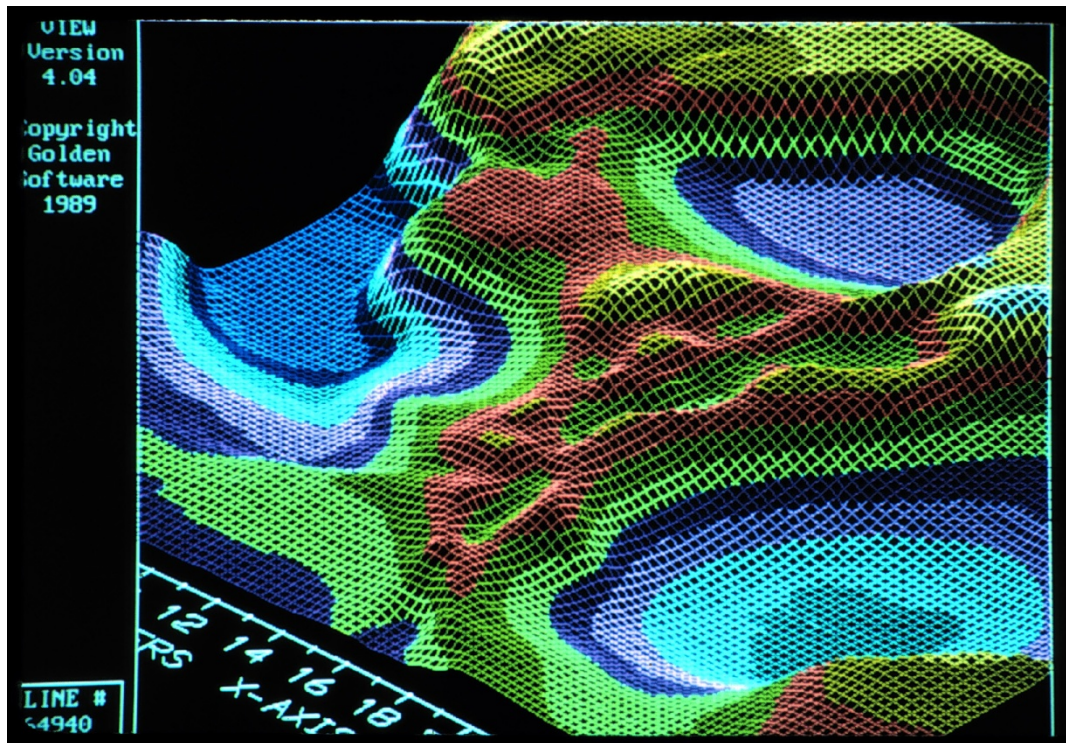
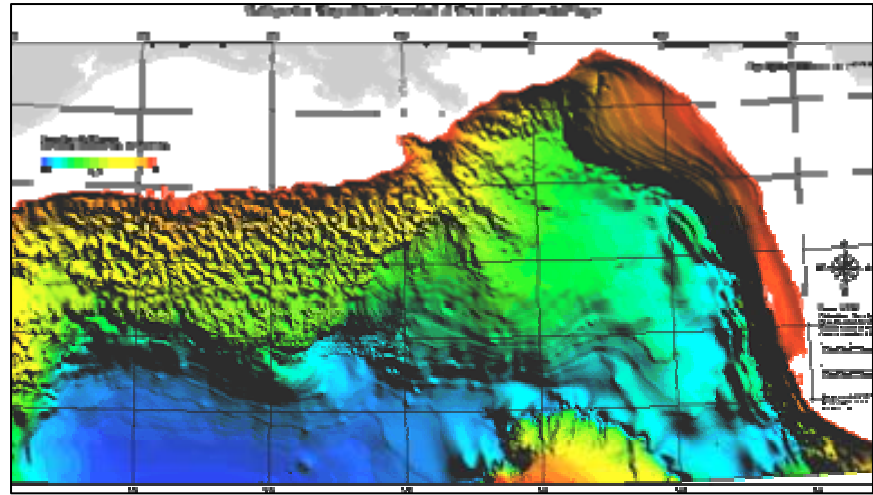
<https://www.youtube.com/watch?v=LmvtweE5abc>



## *Homework: Hydrothermal Vents*

- <http://oceantoday.noaa.gov/underwatervolcanoes/welcome.html>
- <http://www.youtube.com/watch?v=BXGF3XS-yAI>
- <http://www.youtube.com/watch?v=ltQWKm-ma48>

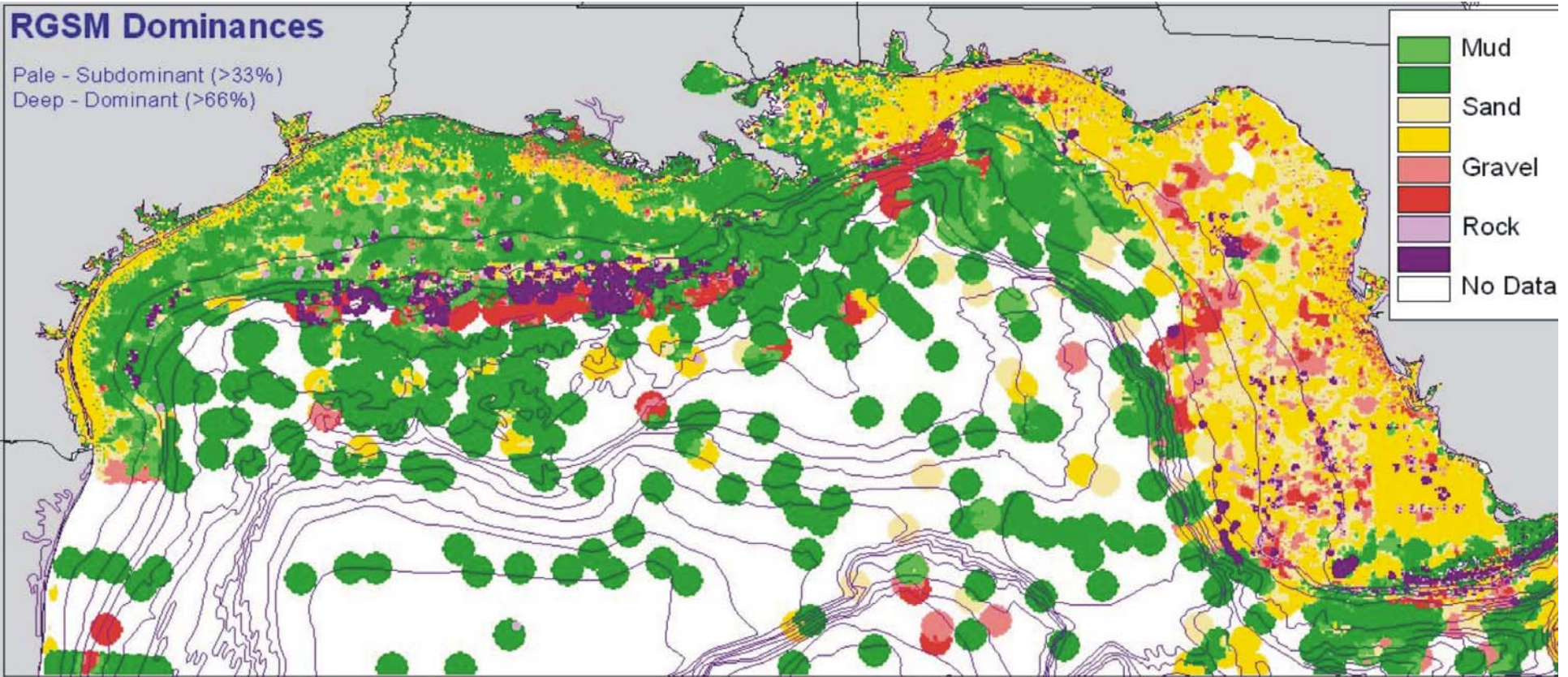




Ponded  
basins at  
diapir  
structures,  
NW GoMex

# RGSM Dominances

Pale - Subdominant (>33%)  
Deep - Dominant (>66%)





*See also 'Slope Failures' PPT*