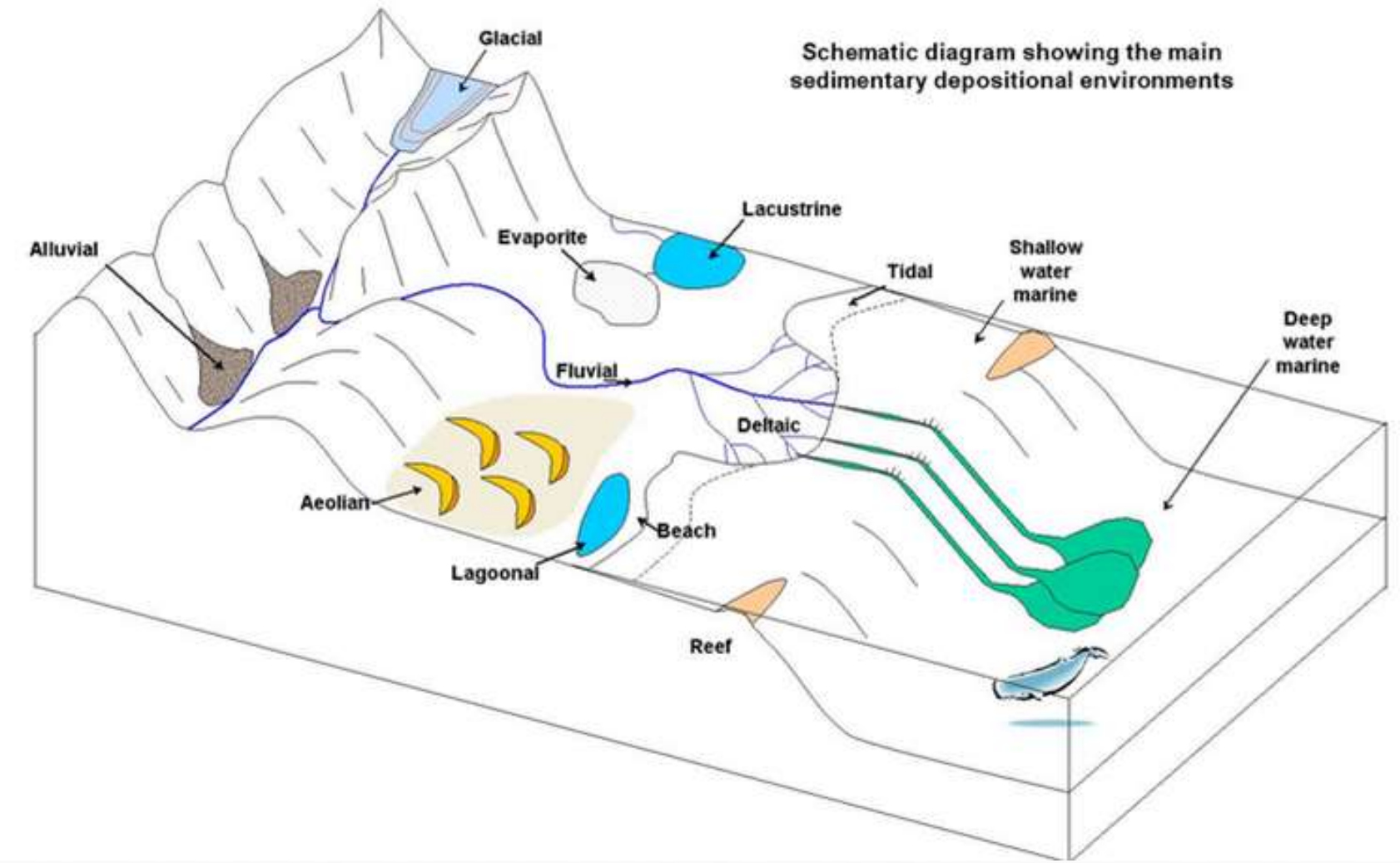
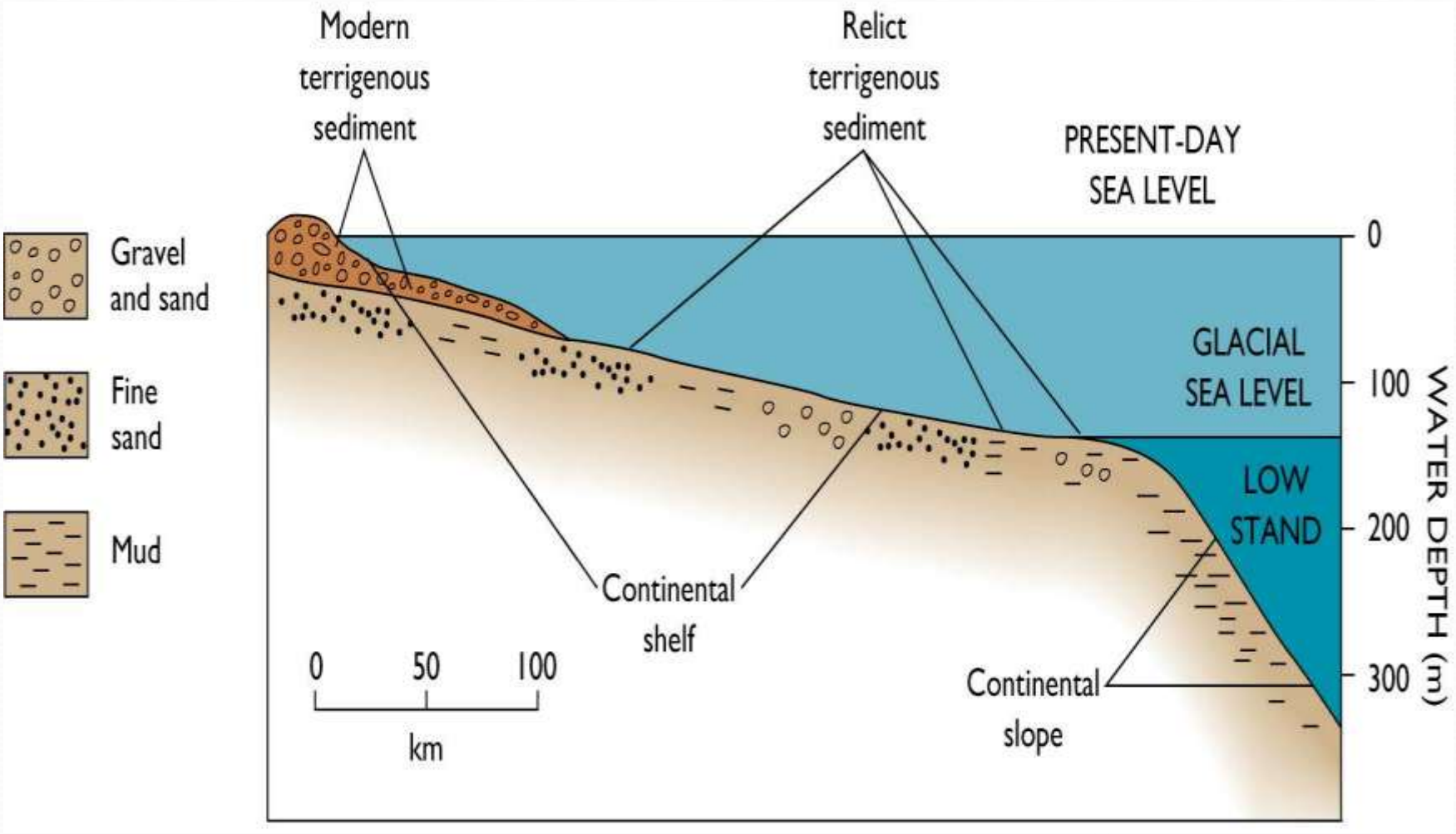
GGY 4031
LECTURE NOTES 7e
Marine

MARINE ENVIRONMENT



MARINE ENVIRONMENT



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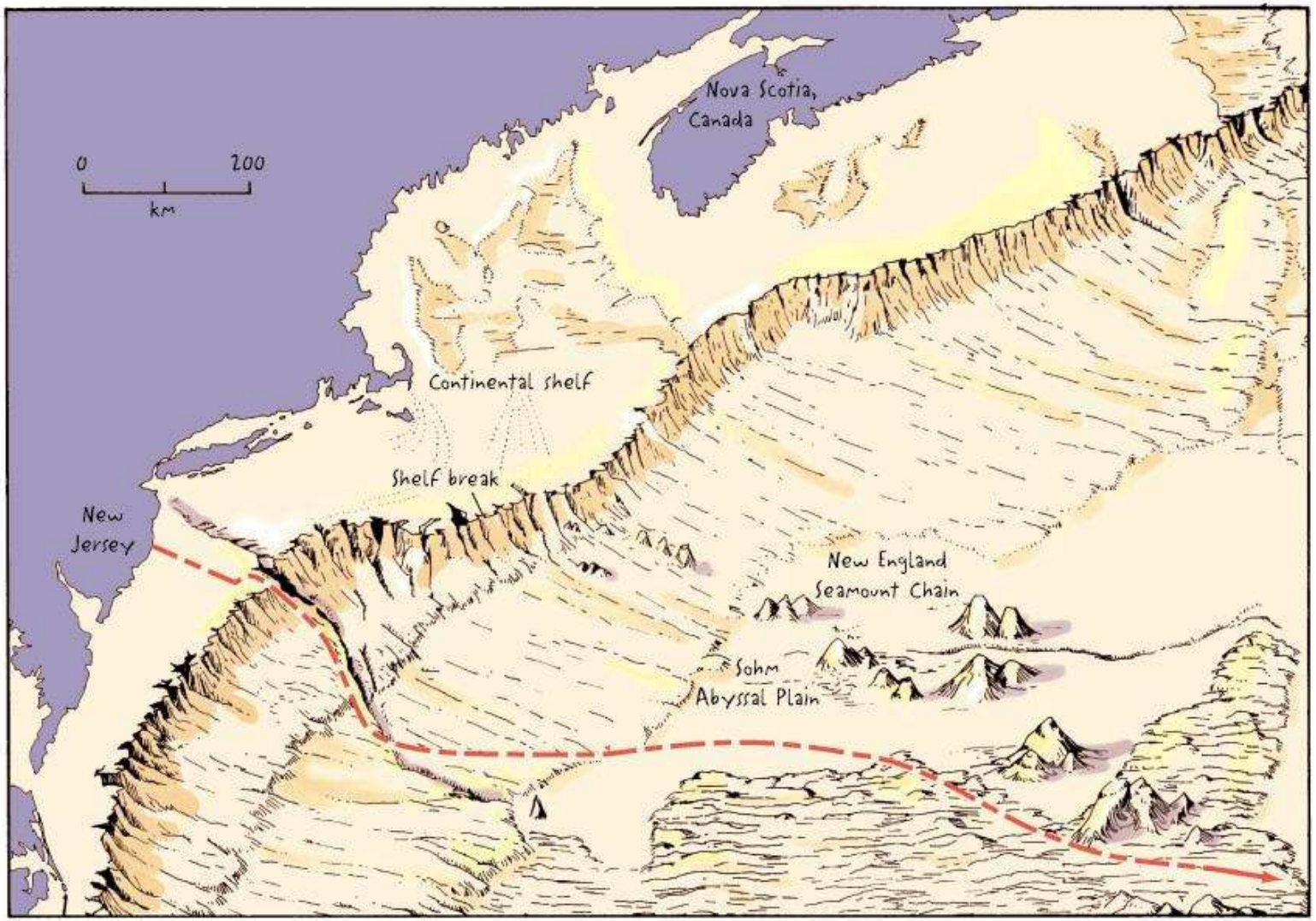

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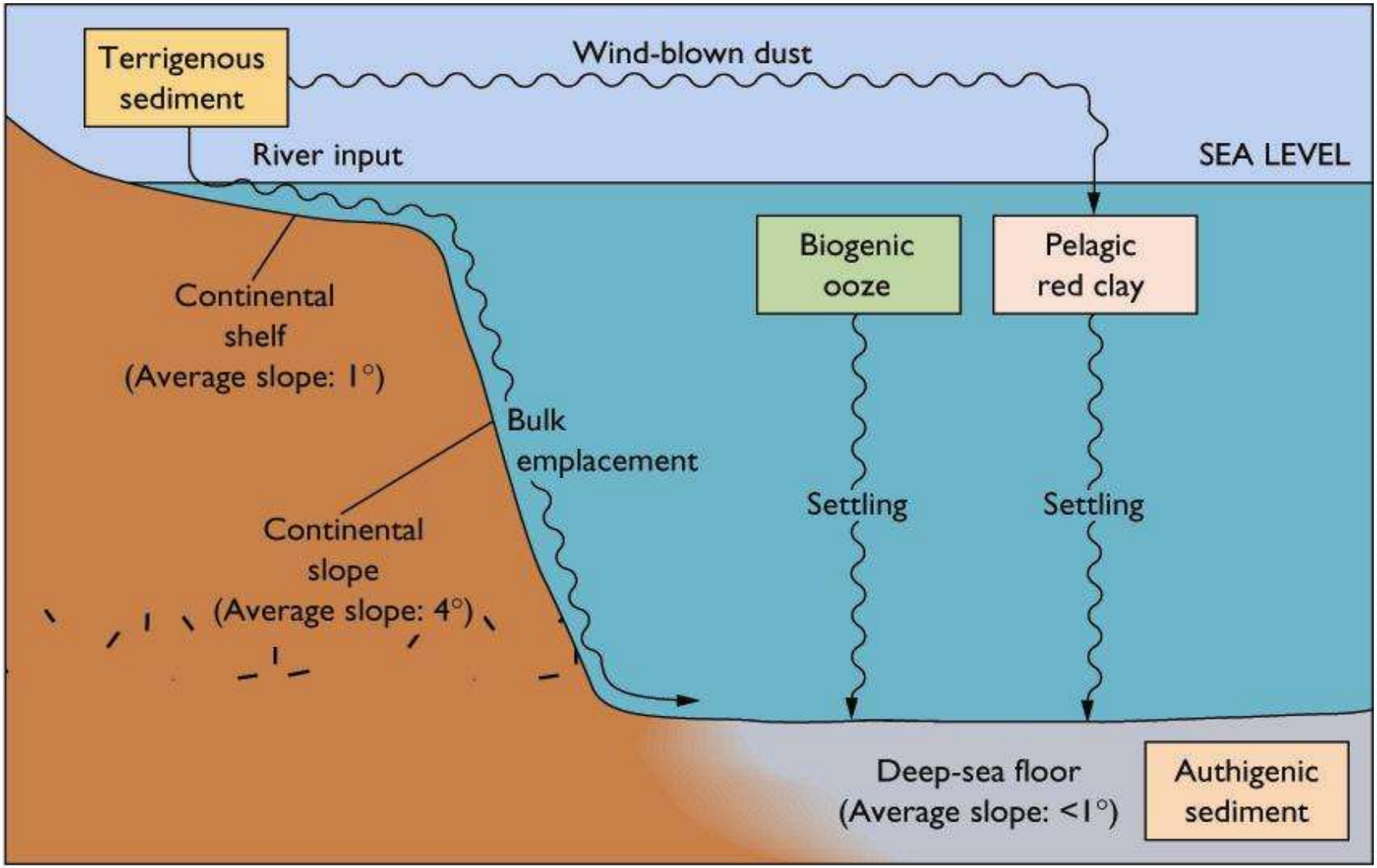
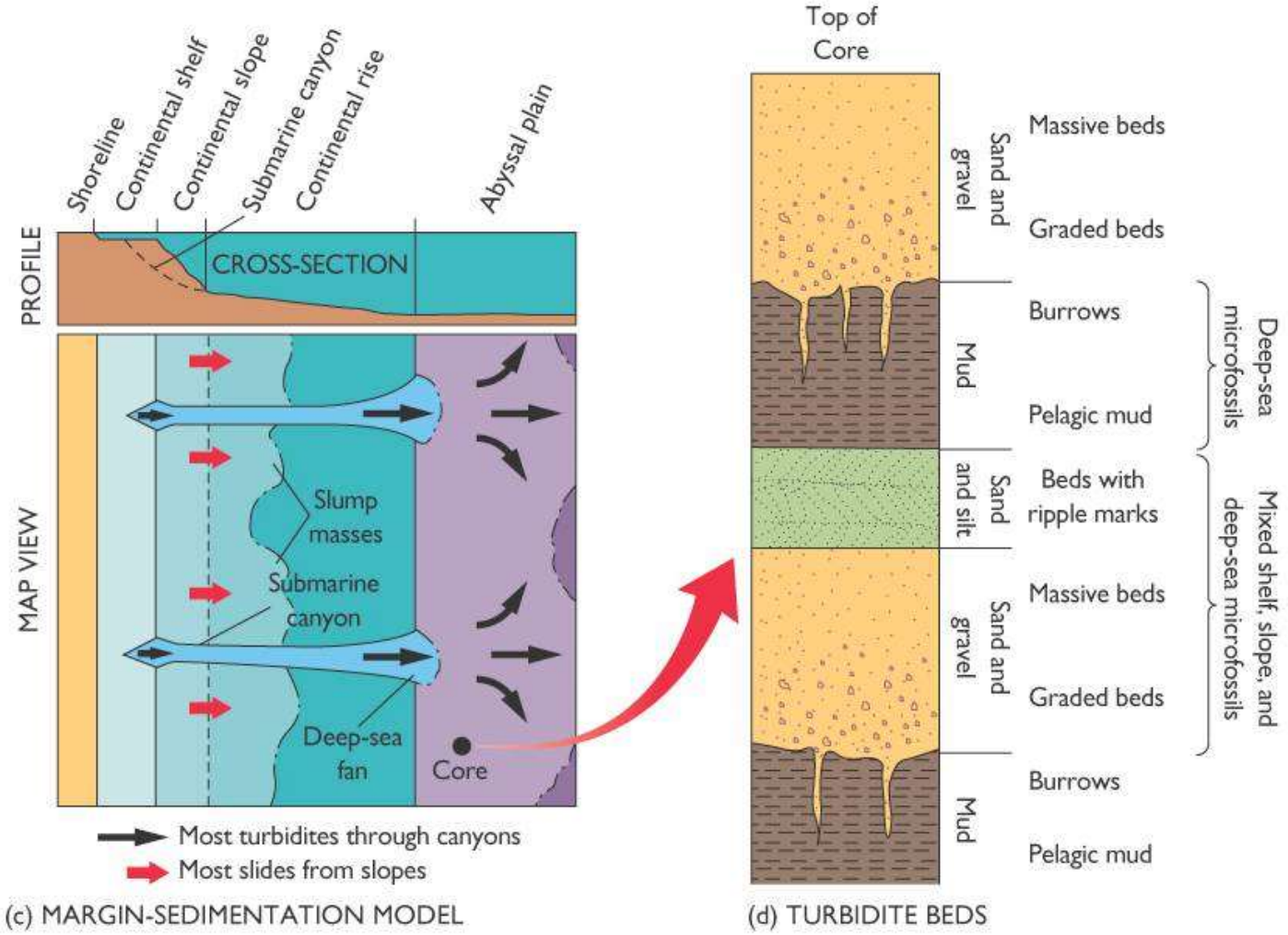


MARINE ENVIRONMENT

(c) Turbidity currents can carry coarse sand and gravel. (d) Turbidity currents flow onto the deep-ocean floor.



MARINE ENVIRONMENT

Continental Shoreline and shelf deposits

• Depth 0-900m (average), to edge of the continental shelf (neritic zone)

•Decline in light penetration with increasing depth and turbidity: approximately the top 90m is euphotic; remainder aphotic.

•Wide variation in degree of circulation, from open marine to restricted

•Generally abundant and diverse marine life

•Wide variety of energy regimes: waves, tide generated currents, mass flow processes

•Account for as much as 80% of the sedimentary record

MARINE ENVIRONMENT

Ancient shelf sequences

Features that collectively are thought to typify ancient shelf sequences

- Sequences—commonly either fining-upwards overall (retrogradational—related to marine transgression) or coarsening-upwards overall (progradational---related to marine regression).
- Compositional maturity
- Stratification—usually well developed
- Bedding (large scale) forming units that are widely extensive laterally
- Lamination (smaller scale) in silts and clays

MARINE ENVIRONMENT

Continental Slopes and Rises

- Depth from about 125m down to 400m
- Essentially aphotic
- Continuous temperature decline with depth (thermocline)
- Abundance of marine organisms reduced with depth
- Gravity settling of suspended fines (pelagic and hemipelagic)

MARINE ENVIRONMENT

Continental Slopes & Rise

- **Processes**
- *Surface currents and pelagic settling of fines*

✓Silt and clay size material is transported widely by surface currents and accumulates in different proportions across the ocean basin (e.g. detrital fines introduced by wind and water currents flocculates and settle (land-derived hemipelagic rain).

MARINE ENVIRONMENT

- *Normal bottom currents*
  - ➢Currents generated by waves and tides—continuation of shelf processes result in transport of shelf sediment into steeper slopes of the ocean basin margin
  - ➢Deep surface currents—results from deep entrainment of waters by storm-generated surface currents
- *Resedimentation*
- Partly consolidated and unconsolidated sediments can be generated by creep, slump and debris flow

MARINE ENVIRONMENT

Deposits:

•Turbidity currents are the major agents of transport and deposition of carbonate and siliciclastic on continental slopes and rises

•Currents decelerates where gradients decrease on the continental rise, deposit sediments as submarine fans

•Characteristics fan sequence show proximal-to distal and bottom-to top changes in texture and structures