Marine Sedimentation

- Calcareous oozes
- Red clay
- Siliceous oozes
- Terrigenous sediments
- Glacial-marine sediments
- Continental-shelf deposits
Marine Sedimentation

Classification based on ORIGIN
see map below

Classification based on SIZE
grain size (e.g. gravel, sand, silt and clay)
Marine Sedimentation

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Marine Sedimentation

? Biogenic

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Biogenic Deposits

Silica

$SiO_2$

Common microfossils in biogenic oozes.  (f) Diatoms

Carbonate

$CaCO_3$

Common microfossils in biogenic oozes.  (b) Foraminifera
Biogenic Deposits

- Calcite-secreting warm water organisms live near surface.
- Biogenous and fine lithogenous particles settle toward ocean floor.
- Upwelling, cool water.
- High productivity of silica-secreting organisms.

Calcite compensation depth.

Sea floor spreading.

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Marine Sedimentation

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Marine Sedimentation

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Glacial Deposits & Ice Rafting

(a) Glaciers extend into the ocean and disintegrate into icebergs.
(b) Ice rafting has created a glacial-marine sediment band around Antarctica.

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Marine Sedimentation

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Marine Sedimentation

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Schematic of processes shaping the structure of marine sediments

- Terrigenous sediment
- Wind-blown dust
- River input
- Continental shelf
  - (Average slope: 1°)
- Bulk emplacement
- Biogenic ooze
- Pelagic red clay
- Settling
- Deep-sea floor
  - (Average slope: <1°)
- Authigenic sediment
Marine Sedimentation

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Deep-sea stratigraphy

Distance below sea level

0 km

2 km

4 km

6 km

WATER DEPTH

SEA LEVEL

Axial rift valley (no sediment)

Biogenic foraminifera ooze

Thin sediment

Pelagic red clay

CCD

Basalt crust spreading

Increasing age of crust

Calcareous oozes

Red clay

Siliceous oozes

Glacial-marine sediments

Terrigenous sediments

Continental-shelf deposits

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Marine Sedimentation
Marine Sedimentation

(a) DEEP-SEA SEDIMENT DISTRIBUTION
Marine Sedimentation

- Terrigenous & Shelf Deposits
- Biogenic
- Red Clays
- Glacial

(a) DEEP-SEA SEDIMENT DISTRIBUTION