Chapter 5: Sediments

The Memory of the Ocean

* + The Mediterranean Sea was once a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Theory based on the presence of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (CaSO4 · 2H2O) and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (sodium chloride - NaCl)
	+ Beneath sediments that suggest the Mediterranean Sea once \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Input of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ water from southern Europe, Egypt (Nile River), and Black Sea is insufficient to keep the Mediterranean Sea alive - there must be inflow through the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to keep it wet
	+ This occurred about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ million years ago
1. What Sediments Look Like
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - particles of organic or inorganic matter that accumulate in a loose, unconsolidated form.
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rate varies from a few cm per year to a few mm per 1000 years
	* Beach sand, mud, broken shell fragments, and CaCO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are all sediments
	* Two types of sediment
		+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*: composed of particles*
		+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*: Precipitated from chemicals dissolved in water*
2. Classifying Sediment By \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sediment is composed of particles of other rocks
	* Classified by particles size
		+ Boulder
		+ Cobble
		+ Pebble
		+ Granule
		+ Sand
		+ Silt
		+ Clay
	* Size distribution of sediment is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		+ A well sorted sediment will have the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		+ A poorly sorted sediment will have a wide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of particles sizes
		+ Sorting is dependent on the energy (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) of water or wind that is transporting the sediment
3. Classifying Sediment by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	* + - * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - detrital sediment
		+ Erosion of land
		+ Volcanic eruptions
		+ Blown dust
			- * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - remains of dead organisms
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - made of the mineral calcite (CaCO3)
	* + - *chalk*
			- *coral*
			- *shelly materials*
		+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *depth (CCD)*
			- roughly 4500 m deep water
			- where falling \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shells start to dissolve
			- because of increased \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of H2O + CO2 => H2CO3 (carbonic acid)
			- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has more CO2 dissolved in it thus lowers the solubility of calcite shells
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - made of the mineral quartz (SiO2)
	* + - *chert (radiolaria)*
			- *diatomaceous earth (diatoms)*
6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - coal
7. Hard parts (shells) of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - precipitation of dissolved minerals in water
	* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of chemicals from sea water, often by bacteria
		+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nodules
		+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ deposits
		+ Chert
		+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ minerals
			- *Mediterranean Sea*
			- *halite*
			- *gypsum*
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - dust and meteorite fragments from Outer Space
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ spheres
* Glassy nodules
* Some red nickel-rich clays
* Most sediment is composed of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of all the above sediments
1. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of Marine Sediments
	* Sediment is classified by its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sediment
		+ near shore (of the coast)
		+ primarily terrigenous material
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sediment
		+ deep-sea sediments
2. The Sediments of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Sediments reach continental margins by several methods
	+ - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Some sediments \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the coastal zone though wind (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) transport
		- Sediment \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and Sorting Along Continental Margins
		- Sediment in the coastal setting is sorted by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *stay close to their source areas (river or glaciers)*
			* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *move along coasts by wave action*
			* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *and* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *are suspended in the water column by wave action and carried out to the deep sea*
		- Biota may ingest fine sediments and make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which deposit quickly
		- Continental Shelves
			* Shallow platforms (~100m) surrounding land masses
			* Shelves developed by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, longshore currents, glaciers, and submarine channels
			* Terraces are ancient shelves uplifted or down warped by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or sea level changes
			* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ margin shelves broad
			* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ margin shelves narrow or nonexistent
		- Shelf Sediments
			* Dominated by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ material - sands and some silts
			* Locally important \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ components - coral reefs
			* When sediment supply is low - eroded rock platforms may be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ margin shelves may contain old shoreline feature
1. The Sediments of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_has over 1 km of sediment, Pacific only .5 km
		+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is larger, more spread out
		+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_has more rivers
		+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_has more trenches

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—deposits left over from turbidity currents

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—covers 38% of ocean floor, very tiny particle size causes far movement

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—higher in proportion further out to sea

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_oozes—made of glass (radiolarians, diatoms)
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_oozes—made of calcium carbonate (foraminiferans, pteropods, coccolithophores)—White Cliffs of Dover
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_falls faster

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Materials—usually from chemical reactions with terrigenous and biogenous sediments—manganese nodules

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—salts evaporating in shallow pools or isolated ocean arms

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Sands—precipitations from acidity or temperature changes

1. Studying Sediments—List some methods: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_