Sedimentary Rocks

Deposition of sediments followed by subsequent lithification

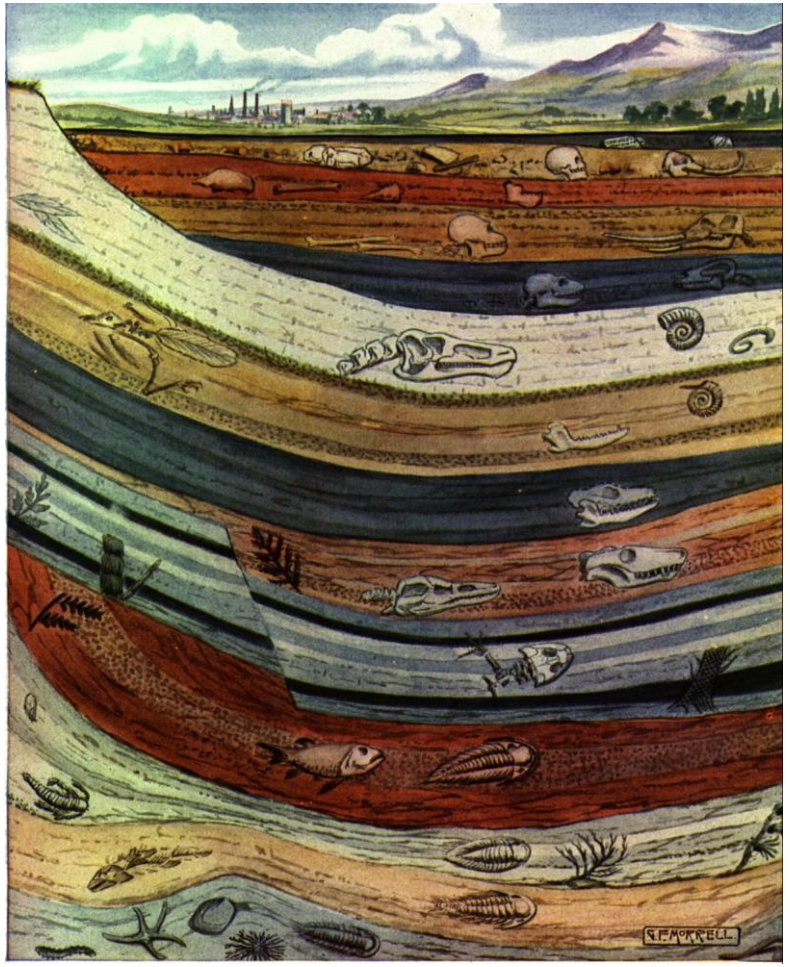
Siliciclastic	Volcaniclastic	Chemical/Biochemical	Carbonaceous

Importance- Economic products

coal

crude oil

natural gas



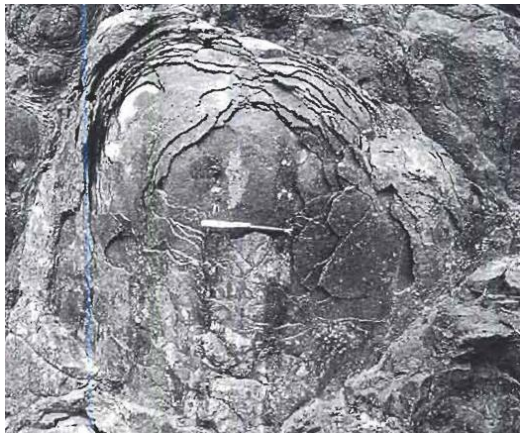
Insights into past biota and environment on Earth

The Prologue

Weathering → **Mechanical (particularly important in very cold or dry climate)**

↓

Chemical



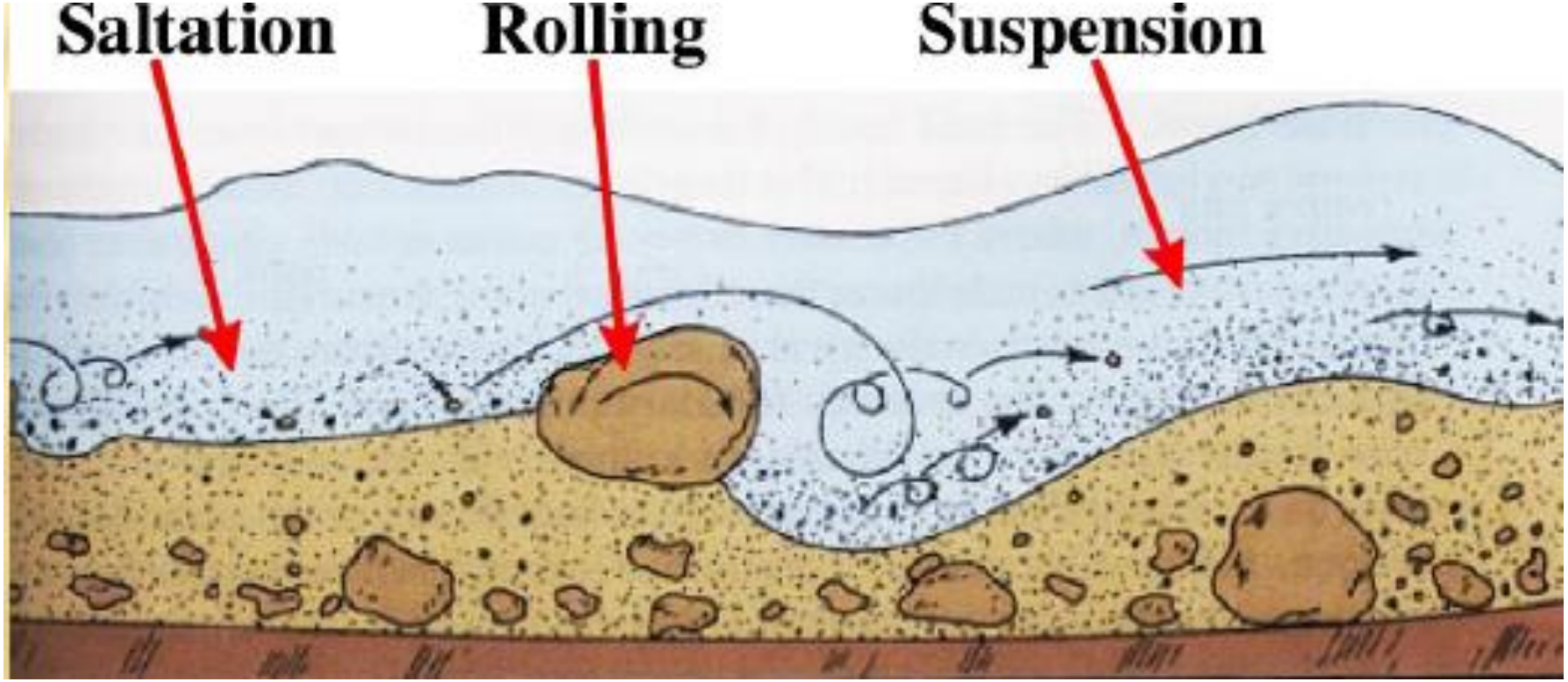
Weathering process	Type of weathering product	Example	Ultimate depositional product
Physical weathering	Particulate residues	Silicate minerals such as quartz and feldspar; all types of rock fragments	Sandstones, conglomerates, mudrocks
Chemical weathering			
Hydrolysis	Soluble constituents	Silicic acid (H_4SiO_4); K^+, Na^+, Mg^{2+}, Ca^{2+}, etc.	Cherts, limestones, etc.
	Secondary minerals	Clay minerals	Mudrocks (shales)
Simple solution	Soluble constituents	Silicic acid; K^+, Na^+, Mg^{2+}, Ca^{2+}, HCO_3^-, SO_4^{2-}, etc.	Limestones, evaporites, chert, etc.
Oxidation	Secondary minerals	Ferric oxides (Fe_2OOH); manganese oxides (MnO_2)	Minor constituent in siliciclastic rocks
	Soluble constituents	Silicic acid; SO_4^{2-}	Chert, evaporites, etc.

Submarine Weathering Processes and Products

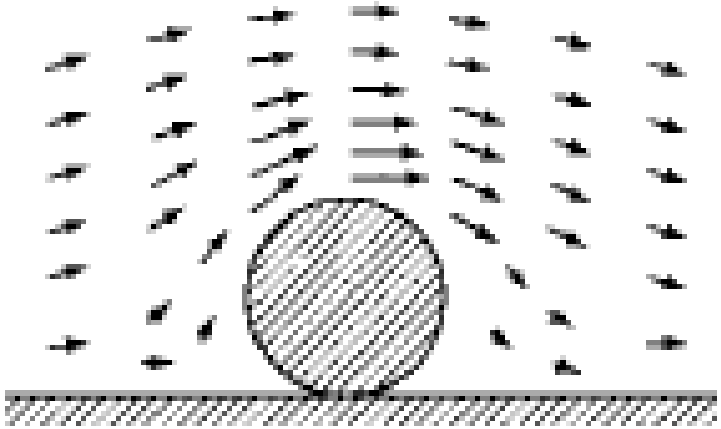
Alteration of ocean rocks occurs both at low temperature (<20°C) as well as at high temperature (~350°C)

As a result of submarine weathering, chemical elements are exchanged between rock and seawater and large mass of seawater becomes fixed in the oceanic crust in the form of altered hydrous minerals

Sediment Load and Transport Path

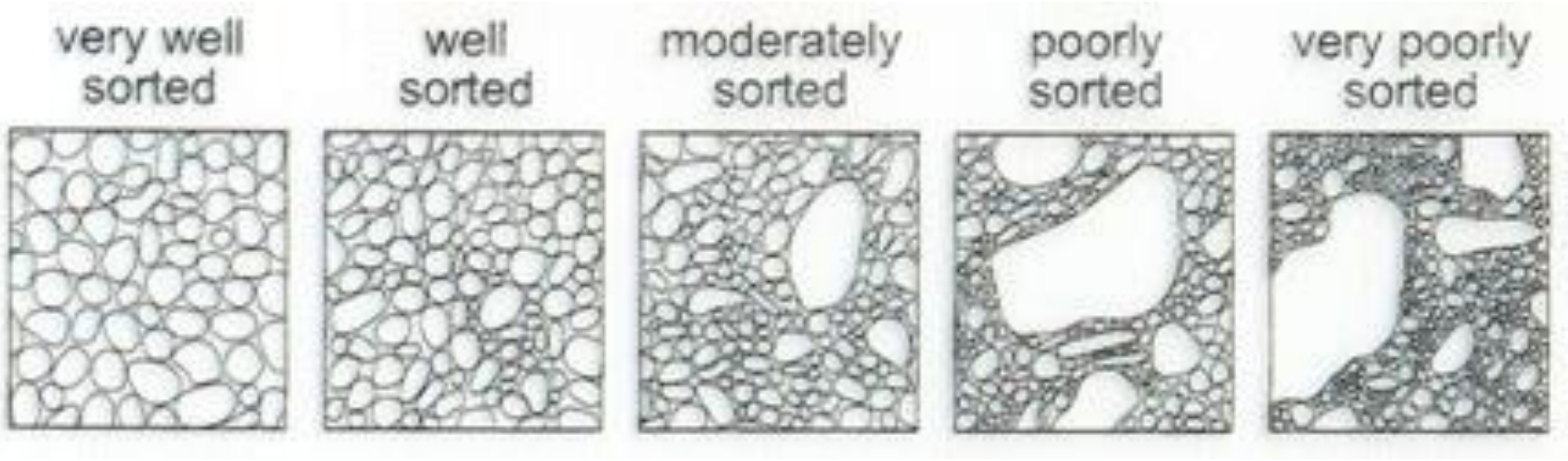


Sediments are eroded from highlands and transported to depositional basin at lower elevations



Textures- Sorting

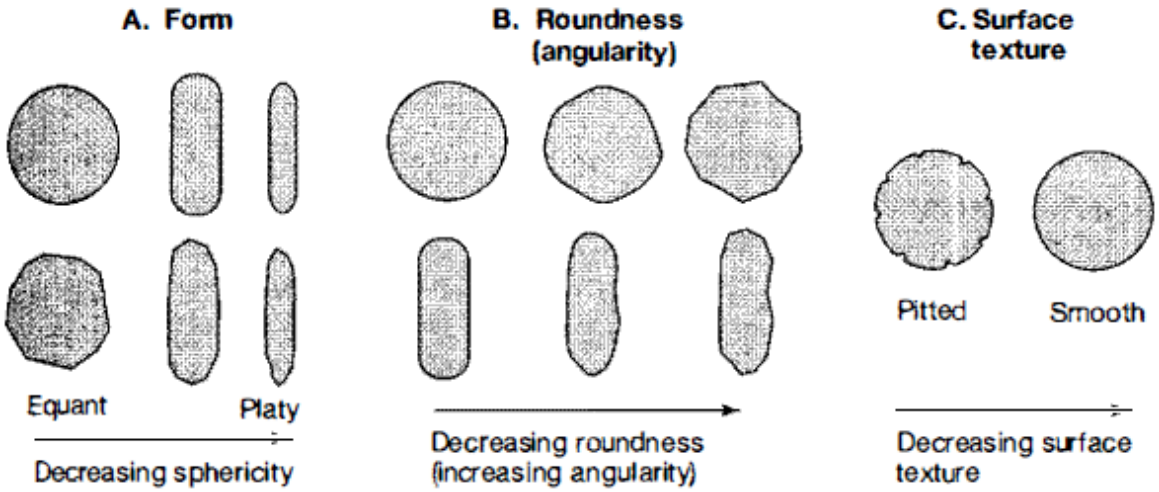
Size Range (millimeters)	Particle Name	Common Sediment Name	Detrital Rock
>256 64–256 4–64 2–4	Boulder Cobble Pebble Granule	Gravel	Conglomerate or breccia
1/16-2	Sand	Sand	Sandstone
1/256–1/16 <1/256	Silt Clay	Mud	Shale or mudstone

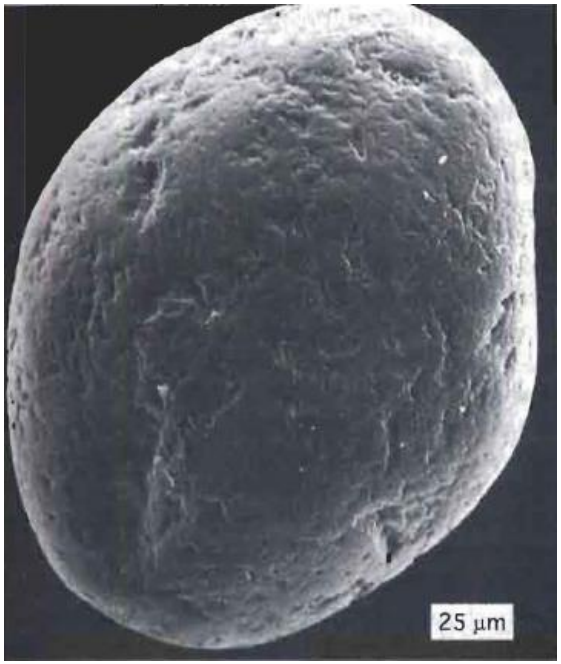


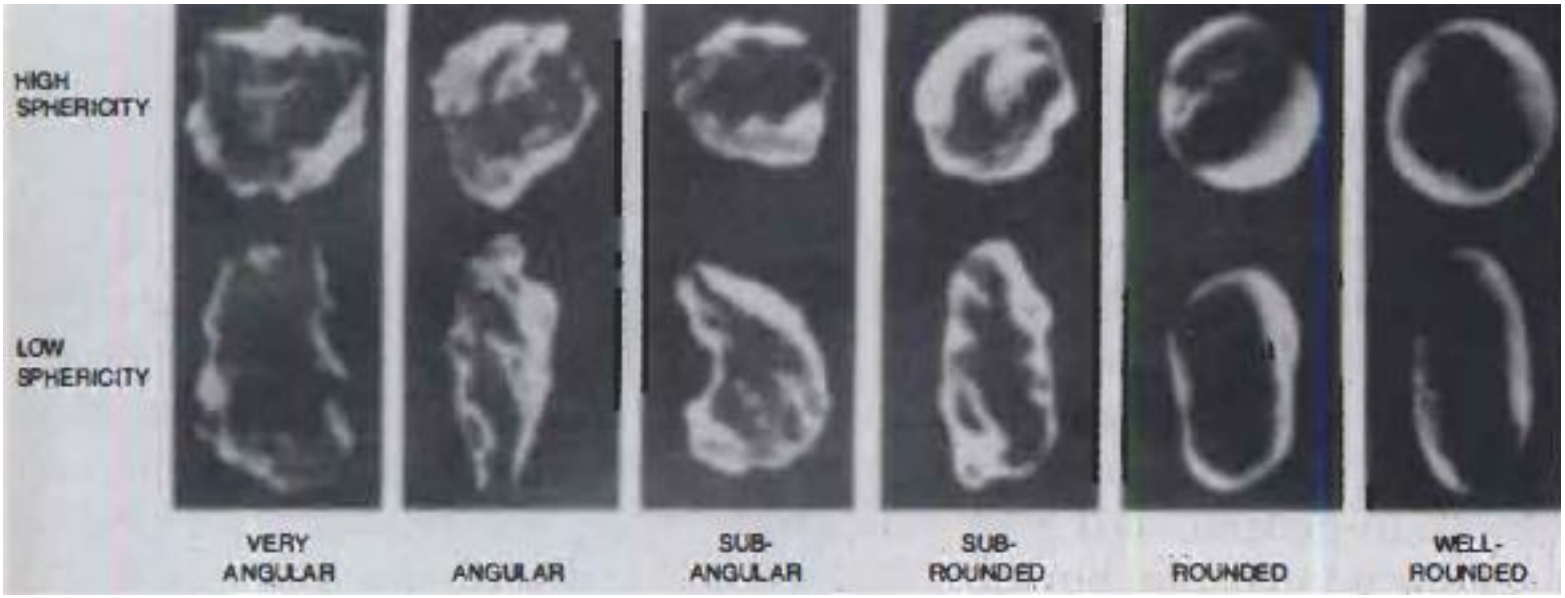
Well sorted grains

Poorly sorted grains

Textures- Roundness and Sphericity







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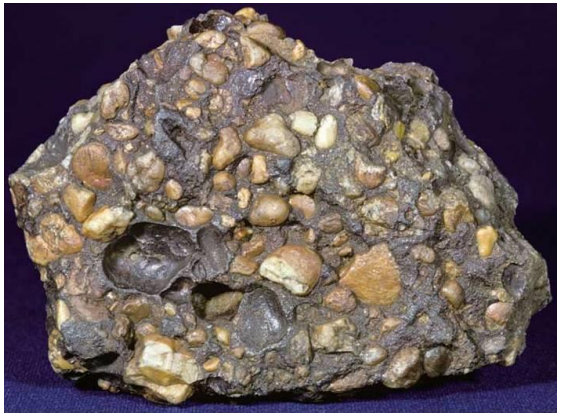
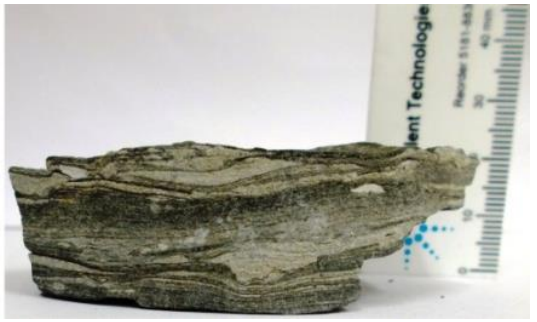
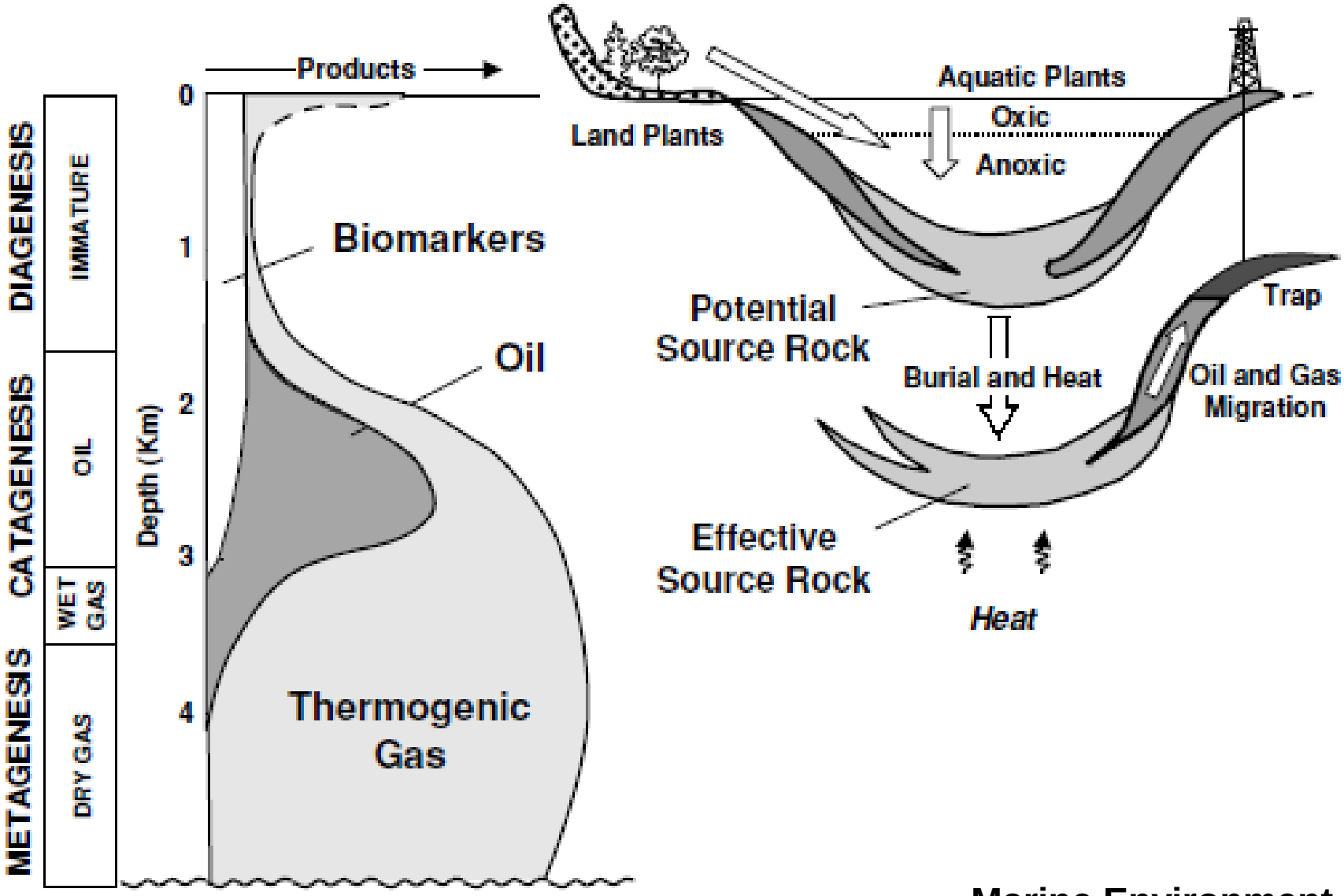


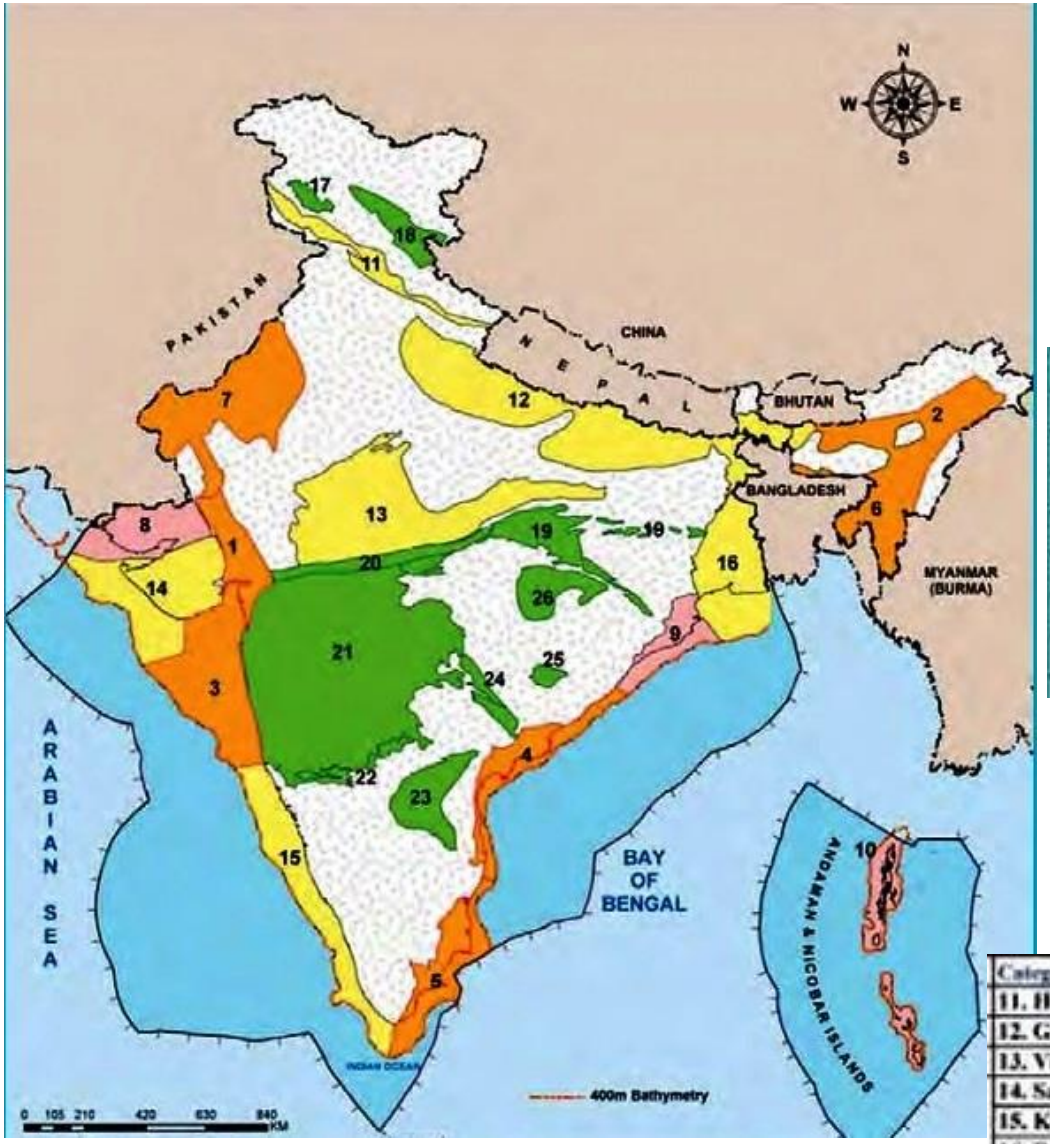


Formation of Fossil Fuel



Marine Environment

Sedimentary Basins of India



CATEGORY-I (Proven commercial productivity)

CATEGORY-II (Identified prospectivity)

CATEGORY-III (Prospective Basins)

CATEGORY-IV (Potentially Prospective)

Category I	Category II
1. Cambay Basin	8. Kutch Basin
2. Assam Shelf Basin	9. Mahanadi Basin
3. Mumbai Offshore Basin	10. Andaman-Nicobar Basin
4. Krishna -Godavari Basin	
5. Cauvery Basin	
6. Assam-Arakan Fold Belt	
7. Rajasthan Basin	

Category III	Category IV
11. Himalayan Foreland	17. Karewa Basin
12. Ganga Basin	18. Spiti -Zanskar Basin
13. Vindhyan Basin	19. Satpura-South Rewa-Damodar Basin
14. Saurashtra Basin	20. Narmada Basin
15. Kerala -Konkan -Lakshadweep Basin	21. Deccan Syneclise Basin
16. Bengal Basin	22. Bhima -Kaladgi Basin
	23. Cuddapah Basin
	24. Pranhita- Godavari Basin
	25. Bastar Basin
	26. Chhattisgarh Basin