

# Depositional Environments and Facies

## Ideal Clastic Dominated Long System

Typical Sediment Size and Texture	TERRESTRIAL ENVIRONMENTS				TRANSITION ENVIRONMENTS					MARINE ENVIRONMENTS			
	Alluvial Fan	Braided River	Meandering River Alluvial (flood) Plain Channel/Point Bar		Delta Complex <small>Channels, levees, crevasse splays, bays, channel mouth bars, etc.</small>	Lagoon or Delta Bay	Beach/Barrier Island	Desert Dunes (Beach Dunes)	Tidal Flat	Shelf <small>Storm Domin. Tide Domin.</small>	Submarine Fan	Deep Shelf or Basin Floor	
Breccia	Very coarse; Immature												
Conglomerate	Crs- Med; Immature	Vry Crs to medium immature		Mud pebbles at base of channel			SHORT SYST: grain support/ imbricated, clean gravel.			Thin lag gravels at snd bottom	Thin lag gravels	Wacke Congl. in T <sub>A</sub> unit	
Arenite (sand)	Vry Crs; Immature	Vry Crs to medium immature		Med to fine; channel sands	Interbedded in a thickening, coarsening upward sequence	Channel mouth bars	Storm wash in	Med - Crs; Very clean qtz sand	Fn-Med; Very well sorted	Random thin to medium intimately interbedded	Typical		
Wacke sandstone				Typical in channel sands		Levee/ crevasse splay	Flood sands				Medium typical	Coarse in T <sub>A</sub> & T <sub>AB</sub> units	
Siltstone			Random Interbeds	Point bar on top of channel sequ			Typic; CM beds			Hummocky FUS	Fn - Med	Fn-Crs in T <sub>ABC</sub> units	
Shale			Usually silty			In bay	Typic.			Typical		Typical in T <sub>E</sub>	Dominant

## Ideal Carbonate Dominated System

Typical Sediment Size and Texture	TRANS ENVIRON		MARINE ENVIRON		
	Tidal Flat (Super- and Inter-tidal)	Lagoon or Sub-tidal	Reef	Shelf	Deep Shelf or Basin Floor
Reef Rock "Boundstone"		Small patch reefs	Typical, but see below		
Micrites	Pure; + oo-pel- & intra micrudite	Bio (all kinds), Pel-Oo-	Compact mound of fossils	Fossil- bio-/ pel-micrites	Dominant; Sparse bio-micrite
Sparites		Sparmic- and Micspar			
Dolomites	Typical	In evaporate basins			
Chert	Nodular cherts	Nodular cherts		Nodular cherts	Bedded cherts
Salt/Gypsum (evaporites)	Typical in arid climates	Typical in arid climates			Shallow basins

### Typical Rock Sequences Found in Environments

Typical Color	L-Bar/T-Bar Sequences				POINT BAR Sequences					HUMMOCKY Sequences		BOUMA Sequences	
	Red, pink, brown	Red, pink brown, gray-white	Red, tan brown typical	Red, tan brown typical	Gray to black; Mouth bar sand tan/white	Gray to black	White to tan	White, tan, reddish	Gray to black (red poss.)	Greenish to tan	Greenish to tan	Gray to dark gray	Dark gray to black
Sequence, or Most typical Deposit		Proximal C/S Sand Gr T-Bar Distal	Laminated silts with thin crevasse splay and levee sands; beds often dipping	C/S Sand Gr Flood plain Pt Bar Channel FUS DM to M		BAY Multiple thin FUS in overall CUS	SWASH ZONE parallel laminations gently dipping seaward	Very lag scale X-beds; 10s - 100s meters thick	NO ONE IDEAL SEQUENCE Wavy, flaser, lenticular bedding. Abundant small ripples, cross beds. Oscillation ripples. Herringbone cross bedding	Proximal C/S Sand X H amalgamated Typical M X F H DM to DM Centimeter scale Distal	Vry lrg scale planar X-beds	Proximal C/S Sand E A A D & E C B A DM to DM Distal D & E C	Thinly laminated shales CUS to thin silts at top
Other Typical Structures/ Conditions	PROXIMAL Massive matrix supported thick CUS & FUS debris flow gravels MEDIAL Poorly sorted sandy gravels/ crs sands; weakly layered/ X-bedded	L-Bar = Grain supported gravel; Imbricated sometimes T-Bar = crs sand in large planar crossbeds	Climbing ripples typical in fine wacke sands Sand often dipping at angle to major bedding	Many variants; HVL's and/or small cross beds may dominate. Thickness highly variable	Diagnostic: rippled, x-bedded channel mouth bar (clean sands) cut by river scour; sometimes coal capped	LAGOON Storm wash in from barrier; laminations or planar cross beds	SHORT SYST GRVL BEACH Grain support/ imbricated C/S Sand Gr	Grains Vry rounded & sorted. Cross bed foresets strongly curved; large scale		May be confused with dune or braided river sand bodies	Matrix supported T <sub>A</sub> gravel. Fluid escape stru. Flutes, tool marks typical	Extreme low energy; low oxygen	
Typical Fossils	Rare trees or vertebrates	Rare trees or vertebrates	Plant fragments	Tree frags.; rare vertebrates	Plant fragments; many kinds of sparse invert. types	Coquina; brackish animals; plant frag	Tree trunks; coquinas	Rare vertebrates		Diverse abundant marine inverts	Sparce marine fossils	Rare floaters/ swimmers	Rare floaters/ swimmers
Trace Fossil Community		Scoyenia; root traces	Scoyenia; root traces	Scoyenia; root traces		Cruziana	Skolithos	Vertebrate tracks	Glossi-fungities	Cruziana	Cruziana	Nerites	Zoo-phycus
Other					Slumps, loads, fluid escape common	Thin coals H <sub>2</sub> S smell		Evaporates common	Evaporates in arid climates	Phosphate; glauconite	Phosphate		Phosphate; pyrite

### Typical Rock Sequences Found in Environments

Typical Color	HUMMOCKY Sequences				
	Light Gray	Dark and Light Gray	Light Gray	Lt to Med gray, green brown	Dark gray to black
Sequence or Most Typical Deposit	SUPERTIDAL Mudcracks, Algal lamin., Pure massive micrite, dolo, gypsum	Lrg variety interbedded rock types	Massive mounds of bound fossils without bedding	Typical M X F H	Very even millimeter scale lamination or massive micrites
Other Typical Structures/ Conditions	Broken abraded fossil-sand bars, OR lens shaped tidal channel scour fills	Often interbed with clastics	Slumps, debris flows and turbidites of fossil debris down front slope	Distal H M	TIDAL C/S Sand CM - DM through X-bed bio- and oospar sands
Typical Fossils	Stromatolites Algal laminates Snails, Ostracods	Snails, arthropods, clams, sponges	Corals, Bryo, Echinoderm Stromatop. Red algae	Echinoderm, Cephalopods, Corals, Brach., Arthro., etc.	Rare swimming/ floating types
Trace Fossil Community	Glossifungites	Cruziana prominent	Trypanites	Cruziana vry borrowed	Zoo-phycus
Other	"Birdseye" (small gray calcite crystals in micrite; sometimes abndt)			Glauconite Phosphate	Pyrite