PARALIC SYSTEMS

Paralic system

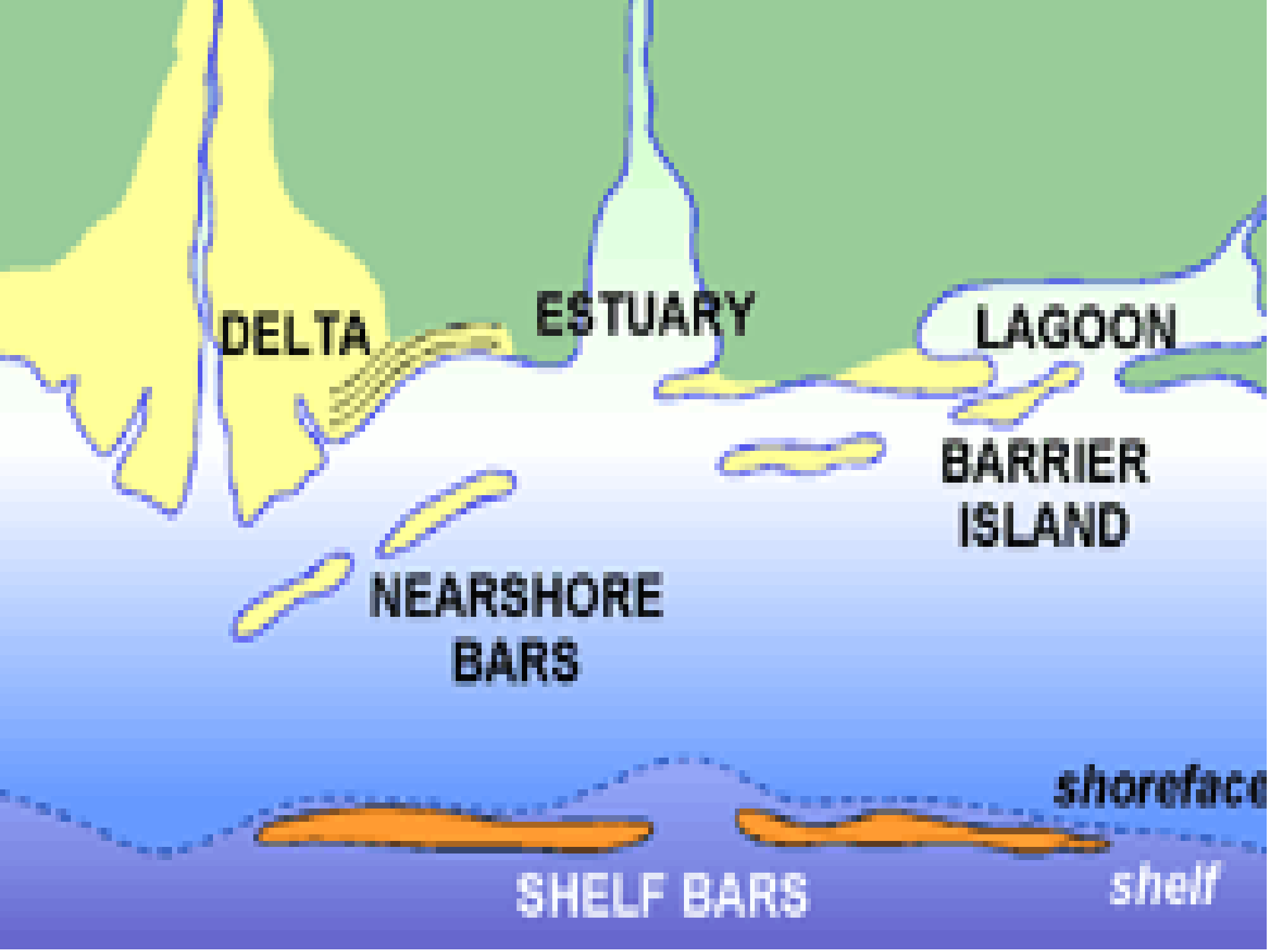
- Paralic succession include variety of envoirnments

➢ Deltas

➢ Coastal Plains

➢ Shoreline-shelf system

➢ Esturies


DELTA
ESTUARY
LAGOON
BARRIER
ISLAND
NEARSHORE
BARS
shoreface
SHELF BARS
shelf

DELTA SYSTEM

- A **river delta** is a landform that is formed at the mouth of a river, where the river flows into an ocean, sea, estuary, lake, or reservoir

Deltas are categorized by sediment size and influence of tidal power and/or wave power

TYPES

- **River dominated Deltas These type of deltas form when the tidal currents are stronger than river outflow**

- **Tide dominated Deltas Bidirectional currents can redistribute river mouth sediments, producing sand-filled, funnel-shaped distributaries**

- **Wave dominated Deltas Strong waves cause rapid diffusion and deceleration of river outflow and produce constricted or deflected river mouths**

- **Distributaries-mouth deposits are reworked by waves and by longshore currents to form beaches, barrier bars, and spits**

- **Fan Deltas: coastal prism of sediments delivered by and alluvial-fan system and deposited, mainly or entirely subaquaeously, at the interface between the active fan and a standing body of water.**
- **Shelf Edge Delta**
- **Shelf Delta**

Shelf Edge Delta

- Located at shelf slope break
- System pass directly into slope and deep water sedimentaion system
- 2-5 degree angle
- Show growth faults, slides and mud daipers due to gravity processes

Shelf Delta

- Shallow water depth 30-70m landward of shelf slope break
- Coarse grained steep delta front
- Fringing muddy low angle prodelta (0.5degree)
- Lack large slope and deep water system
- Devoid of soft sediments deformation features

Gilbert Delta

- Coarse grained fan delta
- Characterize by steep delta fore sets
- Dominated by sediments gravity flow processing
- Common in rift and strike slip setting
- Shallow water progradation occur and steep fore sets may not developed
- Deep water form sub marine deposits

LAGOON

- A **lagoon** is a shallow body of water separated from a larger body of water by barrier islands or reef
- Lagoons are shallow, often elongated bodies of water separated from a larger body of water by a shallow or exposed shoal, coral reef, or similar feature

TYPES

- Atoll lagoons
- Coastal lagoons

ESTUARY

- An **estuary** is a partly enclosed coastal body of brackish water with one or more rivers or streams flowing into it, and with a free connection to the open sea
- Estuaries form a transition zone between river environments and ocean environments and are subject to both marine influences, such as tides, waves, and the influx of saline water; and riverine influences, such as flows of fresh water and sediment

SHORELINE-SHELF MARGIN

- **A shoreline or shelf margin trajectory is the path taken by the shoreline or shallow shelf margin facies as they change position when a sedimentary basin fills**
- **These trajectories are controlled by rates of change in base level (as expressed by rates of change in accommodation, or the sum of eustatic change and tectonic movement of the substrate), varying rates of sediment accumulation, and the slope and shape of the basin margin and floor and their depths**

COASTAL PLAINS

- A **coastal plain** is an area of flat, low-lying land adjacent to a seacoast and separated from the interior by other features

Sequence Stratigraphy

- Sequence stratigraphy of paralic systems include

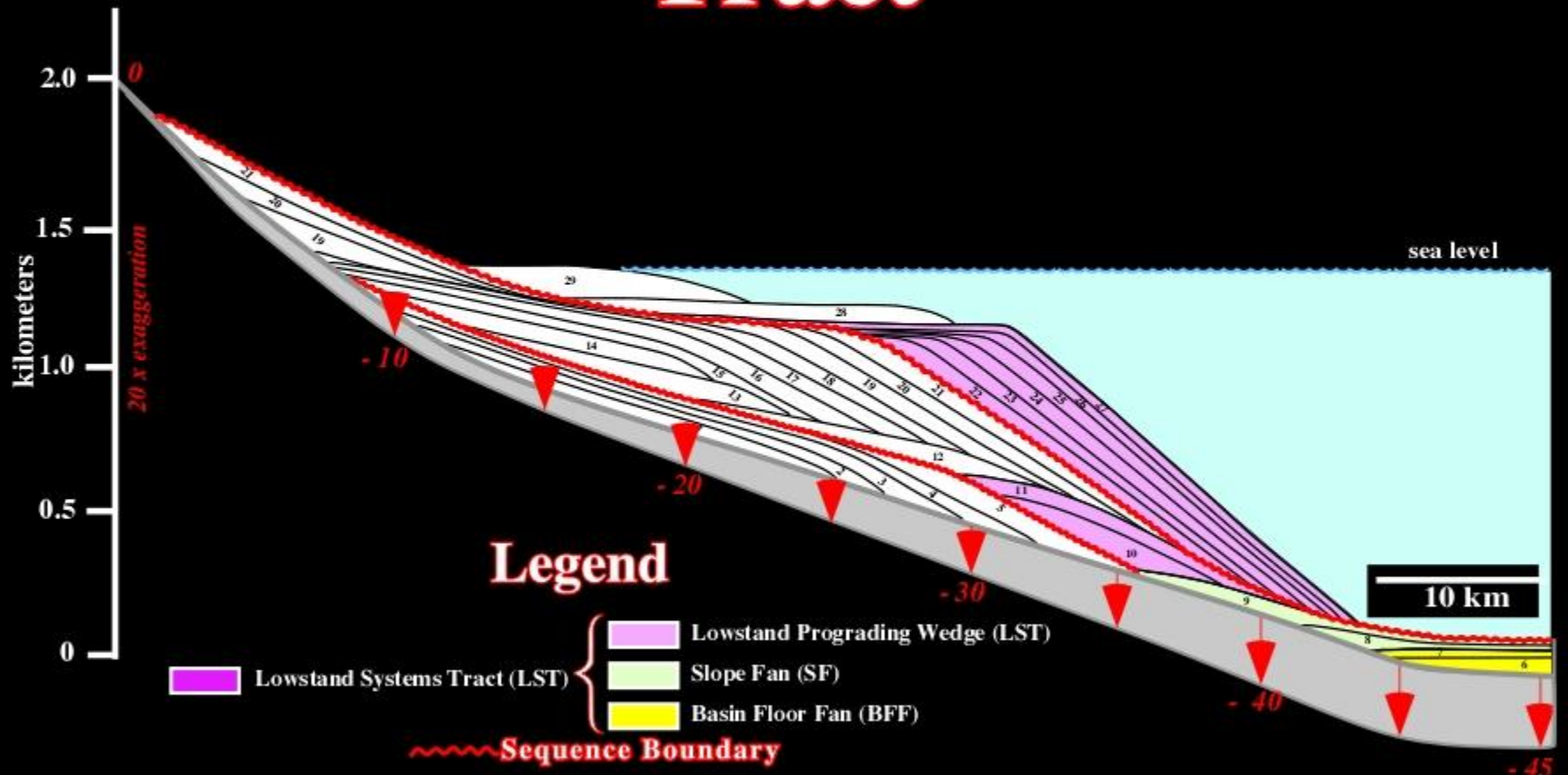
1. Sequence Boundary identification
2. System Tracts identification
3. Parasequences identification

Systems tract identification

- LST

- Regressive system tract
- Estuary zone fluvialy dominated
- Progradation which result fluvially and shelf dominated delta
- Late stage shelf wedge is produced tidally dominated estuary system bay head delta system is formed
- Laterite bed and basinal conglomerate formed that mark sequence boundary
- Late part gradual increse in sea level

Lowstand Systems Tract

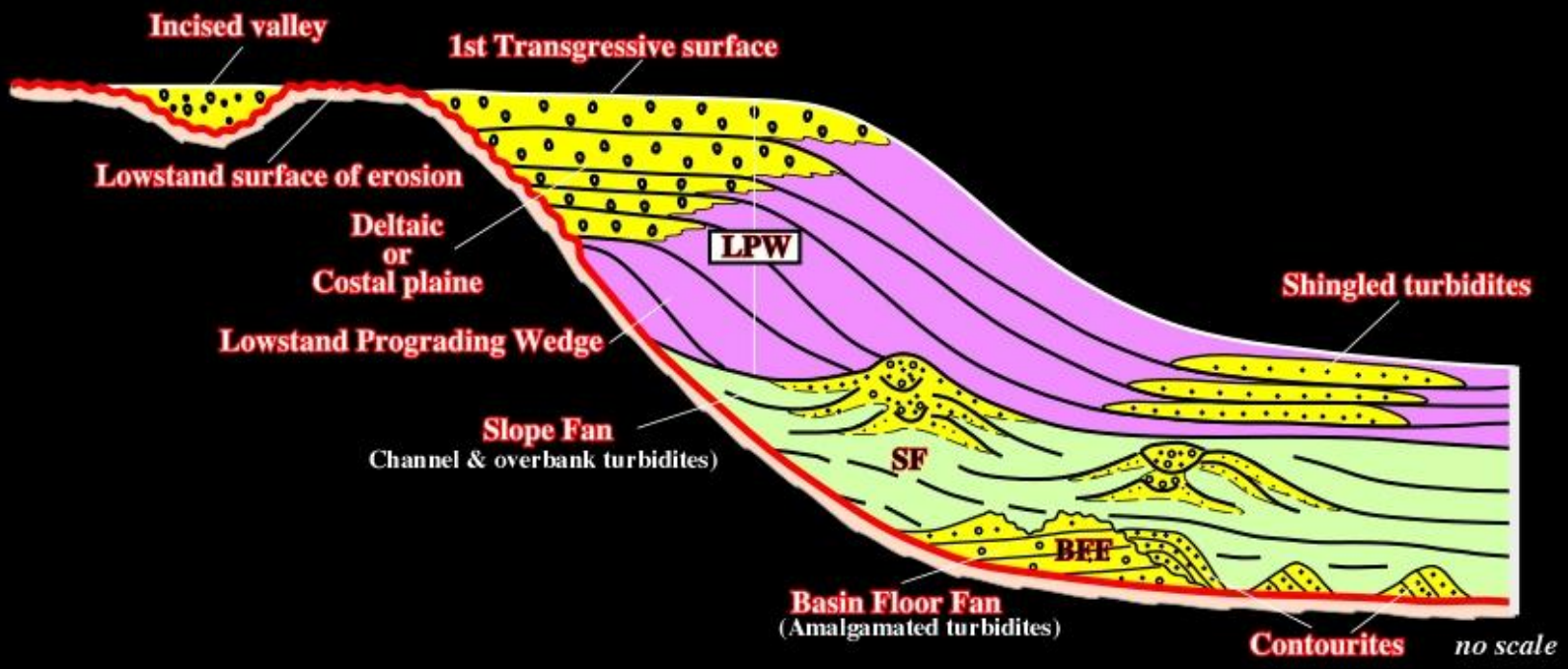


Lowstand Systems Tract

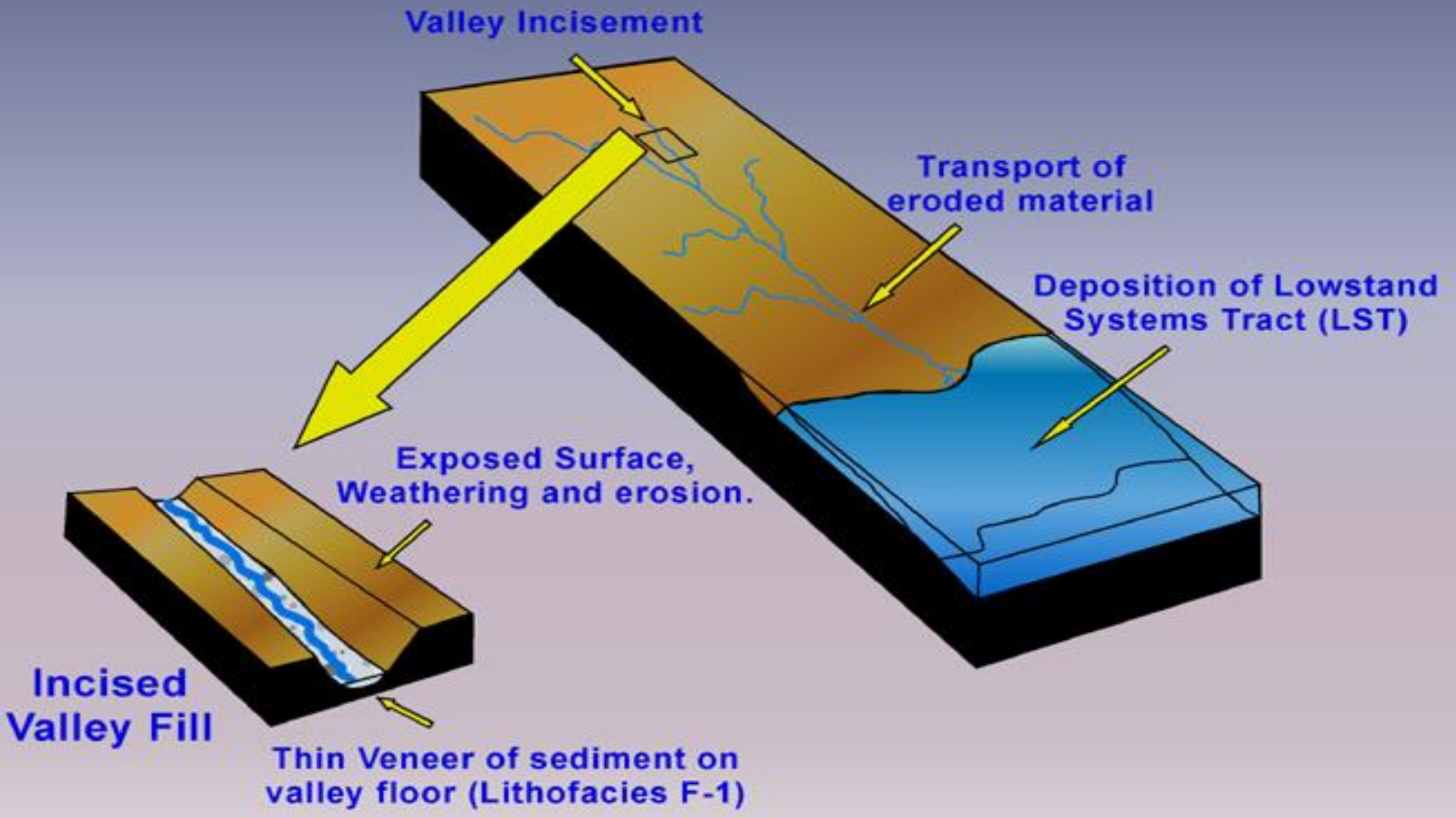
1) Deepwater Setting

Lowstand Systems Tract

- Upper Member: Lowstand Prograding Wedge (LPW)
- Middle Member: Slope Fan (SF)
- Lower Member: Basin Floor Fan (BFF)



LOWSTAND SYSTEMS TRACT
Formation of sequence boundaries



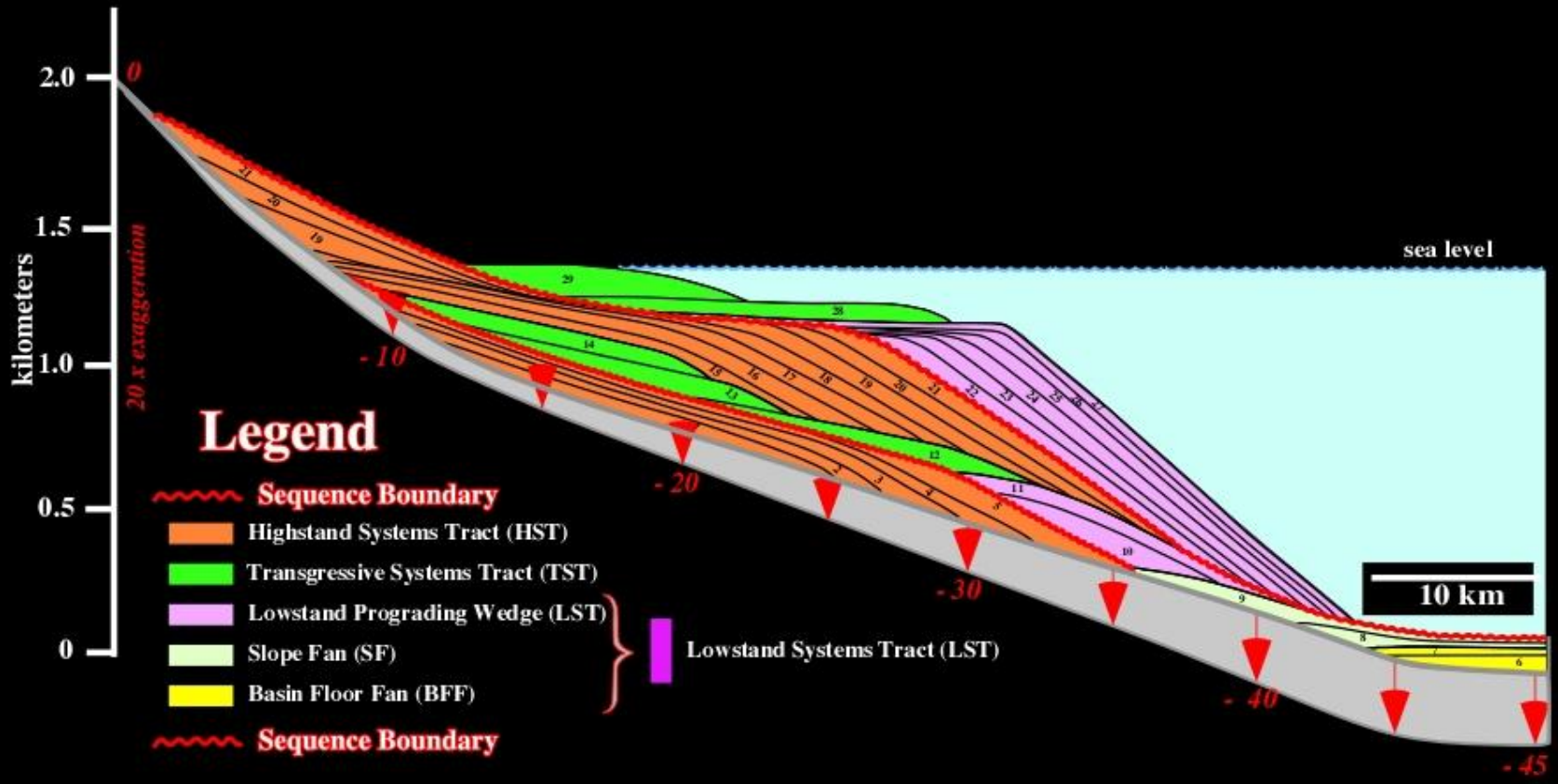
TST

- Tide dominated eastuary system developed.
- Lagoonal system formed
- Retrogradational geometry
- Deepening upward sequence
- Shelf delta system
- Coal overbank deposits and lagoonal deposits
- Pronounce tidal influence
- Passes distally intro a condense section
- Max sea level rise may occur
- Ends when accomodation volume just match sediment supply

- Top sets have low sand percentage so act as sealing horizon

- Most of present day deositional systems form TST

Systems Tracts

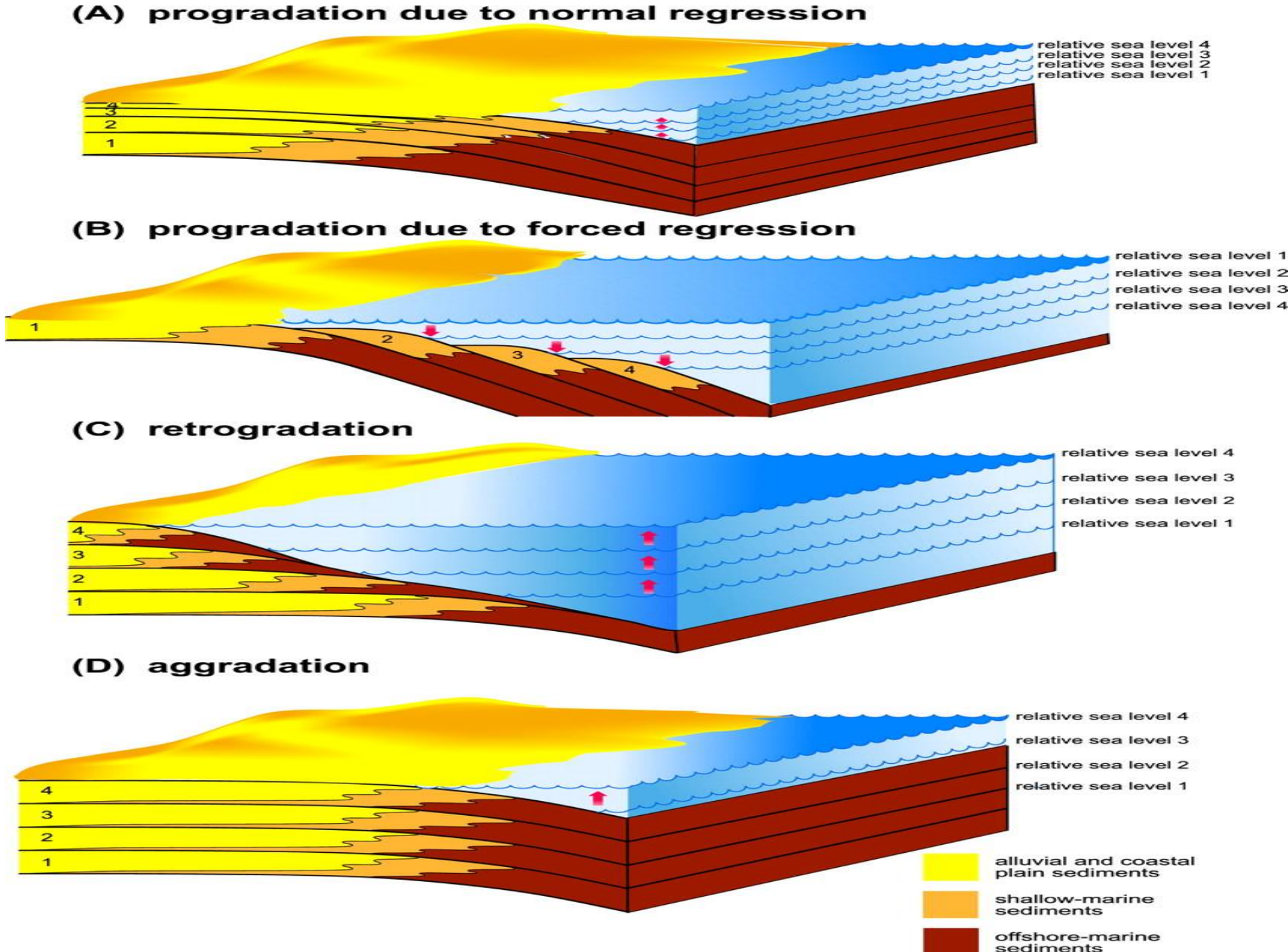


HST

- Youngest system tract
- Represented by top set clinoform system
- Deposited after maximum regression
- When rate of creation of accmodation space is less than sediment supply
- Characterize by initial agradational and later progradational architecture

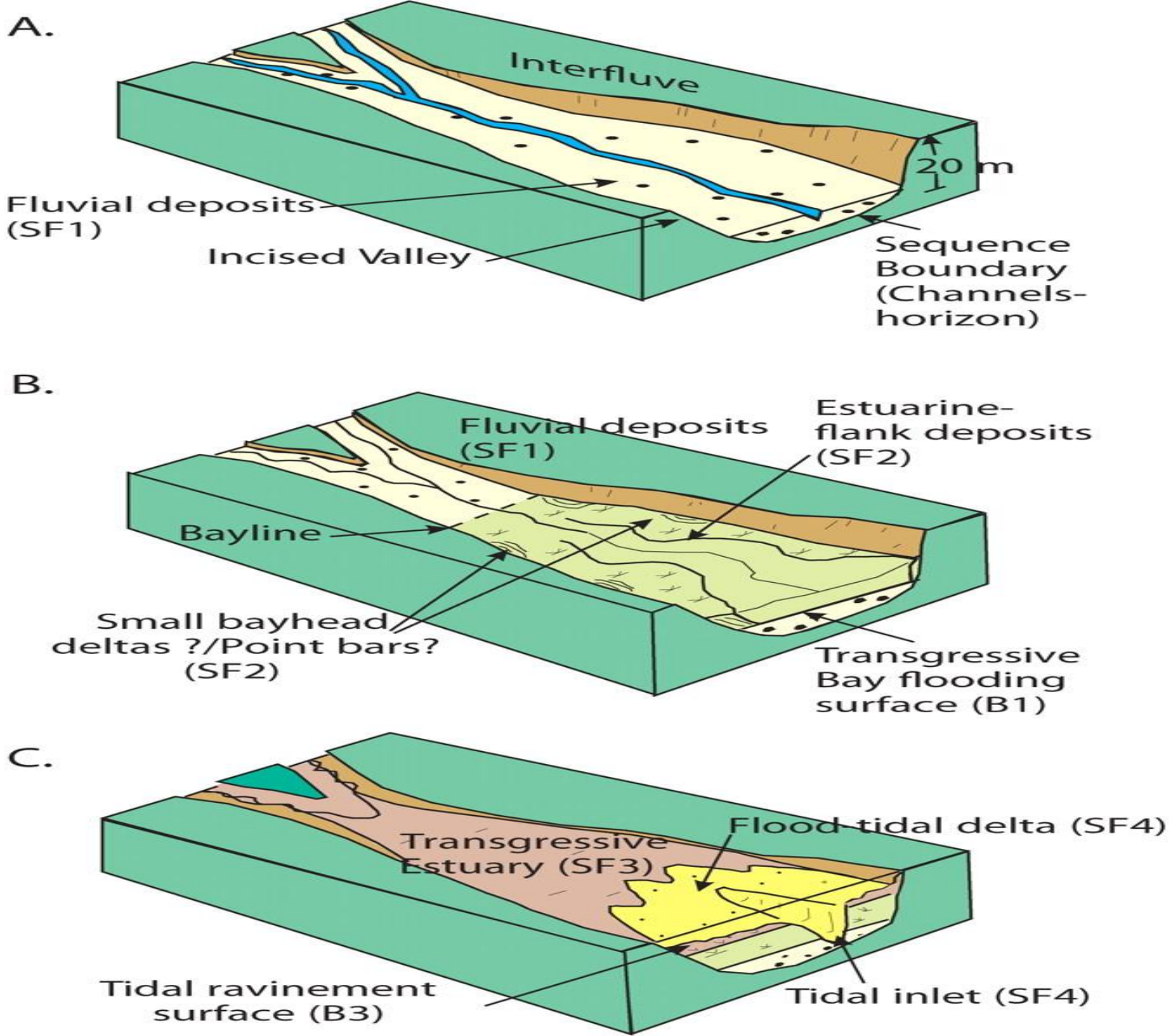
Differnce b/w HST & TST

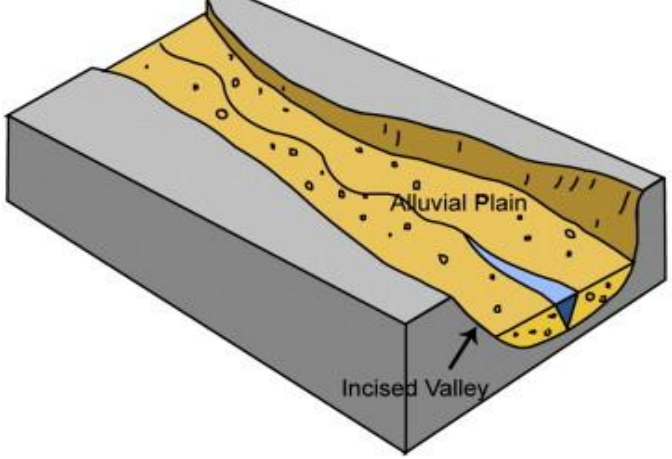
- Deccelarating rate of sea level rise resulting initial agradation and later prograding
- Shelf area infill by progradtion architecture and decrease in tidal influence
- Decrease in amount of coal and of overbank lagoonal and lacustrine shales
- Channel sand body become more common and more connected
- Basinward movement of bay line


(A) progradation due to normal regression
relative sea level 4
relative sea level 3
relative sea level 2
relative sea level 1
4
3
2
1
(B) progradation due to forced regression
relative sea level 1
relative sea level 2
relative sea level 3
relative sea level 4
1
2
3
4
(C) retrogradation
relative sea level 4
relative sea level 3
relative sea level 2
relative sea level 1
4
3
2
1
(D) aggradation
relative sea level 4
relative sea level 3
relative sea level 2
relative sea level 1
4
3
2
1
alluvial and coastal plain sediments
shallow-marine sediments
offshore-marine sediments

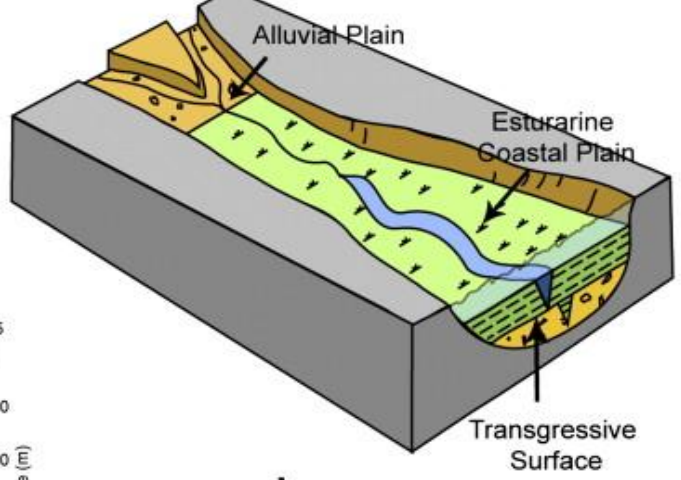
Sequence Boundary

- Recorded by basinward movement of facies
  - VALLEY INCISION
- Deep valley cut by sea level fall
- Evidence of sequence boundary
- Reworking or Rewinenement surface

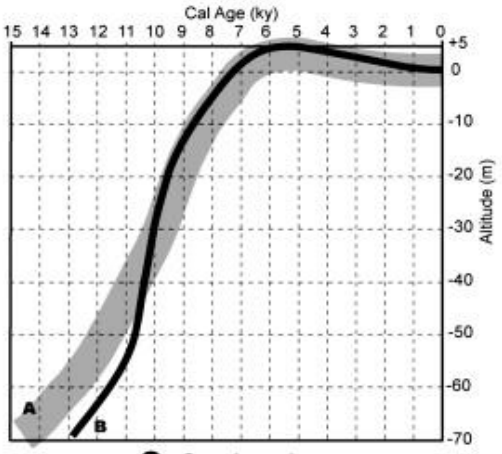

A.
Interfluve
20 m
Fluvial deposits
(SF1)
Incised Valley
Sequence
Boundary
(Channels-
horizon)
B.
Fluvial deposits
(SF1)
Estuarine-
flank deposits
(SF2)
Bayline
Small bayhead
deltas ?/Point bars?
(SF2)
Transgressive
Bay flooding
surface (B1)
C.
Flood tidal delta (SF4)
Transgressive
Estuary (SF3)
Tidal ravinement
surface (B3)
Tidal inlet (SF4)



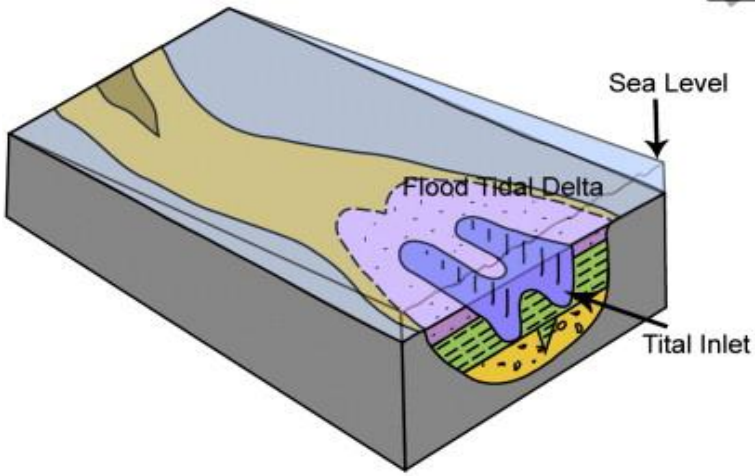
a. Low sea-level stand
(prior to LGM)



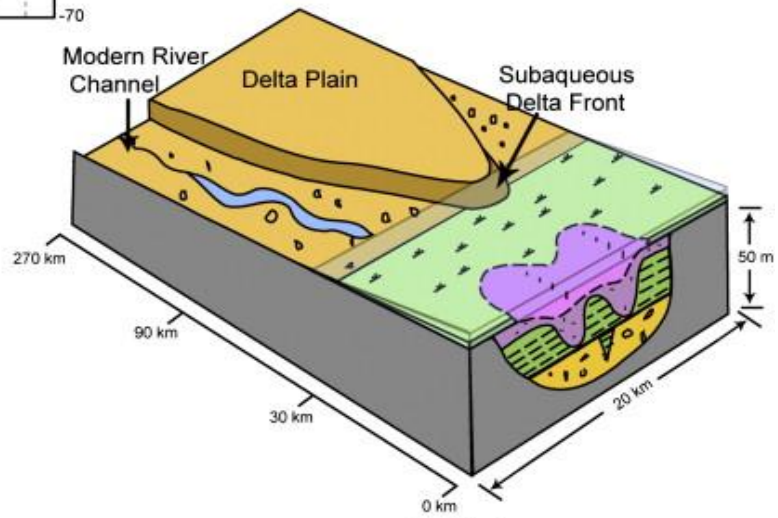
b. Transgression
(after 19,000 ~ 20,000 cal yr BP)



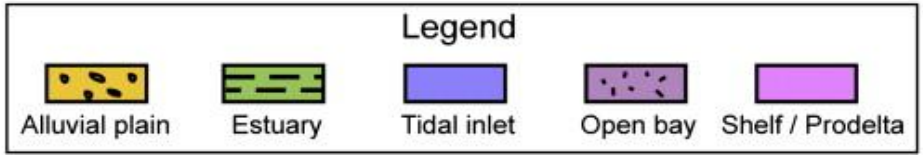
e. Sea Level



c. High sea-level stand
(~ 5,500 cal yr BP)



d. Modern



Distinction b/w Incision & Channels

- Wider and thicker than channels
- Terraces
- Basinawrd shift of facies
- Maximum 100m deep (Haq)

Type-1 & Type-2 Sequence Boundaries

- Falling sea level fluves exposed
- Erosion and pedogenesis
- Sea level rise form Rewinenment surface
- Type-1 sequence boundary form
- B/w upper surface of LST and lower surface of TST
- Type-2 is same as Type-1 , the difference is in associated facies

Transgressive Surface

- First signifence flooding surface
- Top of LST and Base of HST
- Caps valley fill deposits

Forced Regression

- Basin ward movement of shore line due to relative sea level fall
- Independent of sediments supply characterize by basin ward movement of facies
- Shore line sand stone overlie shelf mud stone

Maximum Flooding Surface

- Most land ward position of shore line
- Underlain by Retrogradational parasequence set
- Overlain by Progradation
- No discrete line instead of MFS
- In Delta represented by tidally influenced distributary channels
- Pronounced channel crevessing
- Wetter paleosoil
- In lagoon foresteping and back steping bay head delta parasequence

Parasequences

- Any deepening effect in sequence
- Bioturbation and monotonous bedding show deepening
- Marked by facies and fossils
- Precise and grade resolution needed