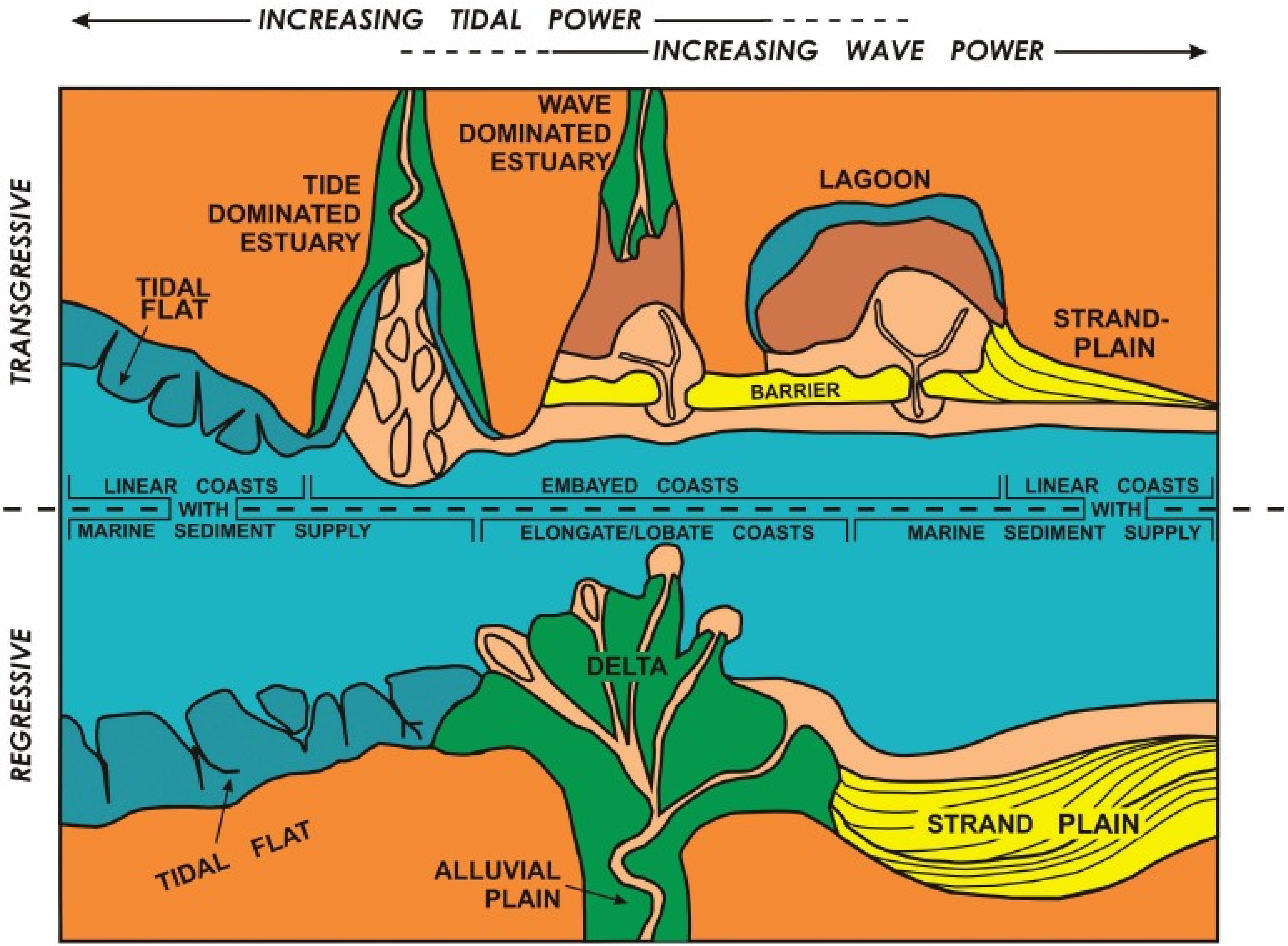
Depósitos Costeiros



Boyd et al. (2006)

Sedimentação Marinha – Sistemas Deposicionais

Costeiros

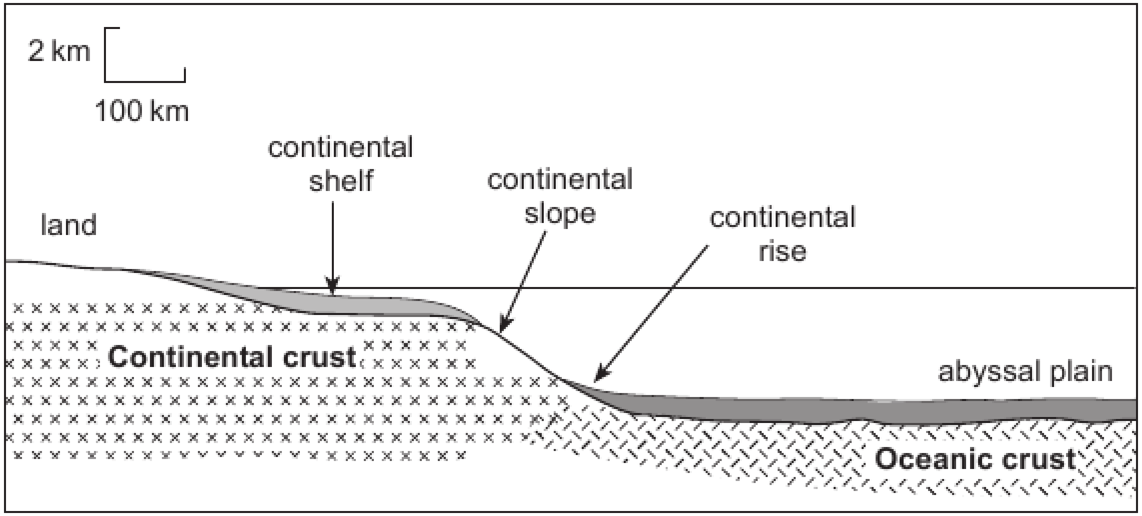


Fig. 11.1 A cross-section from the continental shelf through the continental slope and rise down to the abyssal plain.

Nichols 2009

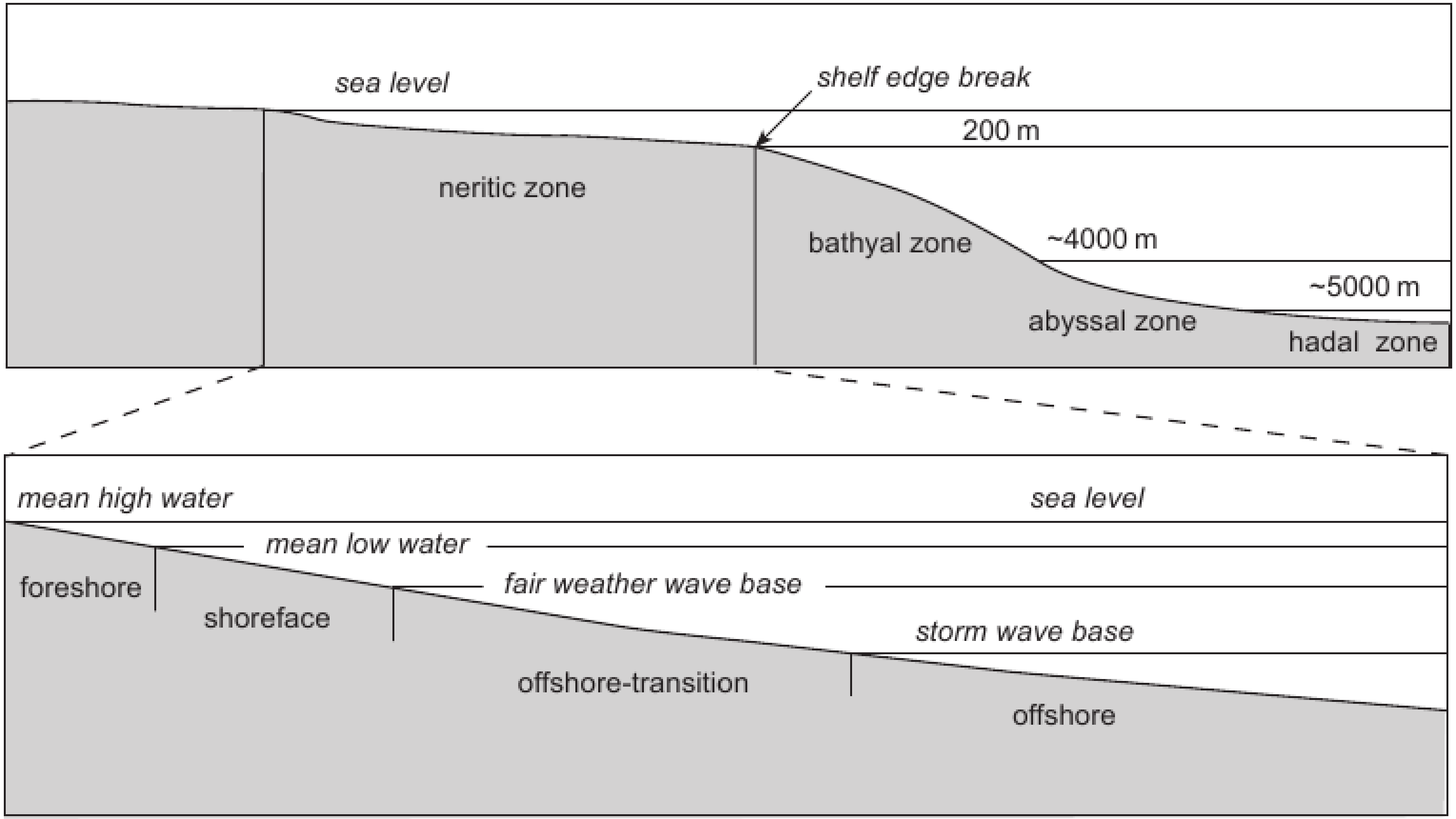


Fig. 11.2 Depth-related divisions of the marine realm: (a) broad divisions are defined by water depth; (b) the shelf is described in terms of the depth to which different processes interact with the sea floor, and the actual depths vary according to the characteristics of the shelf.

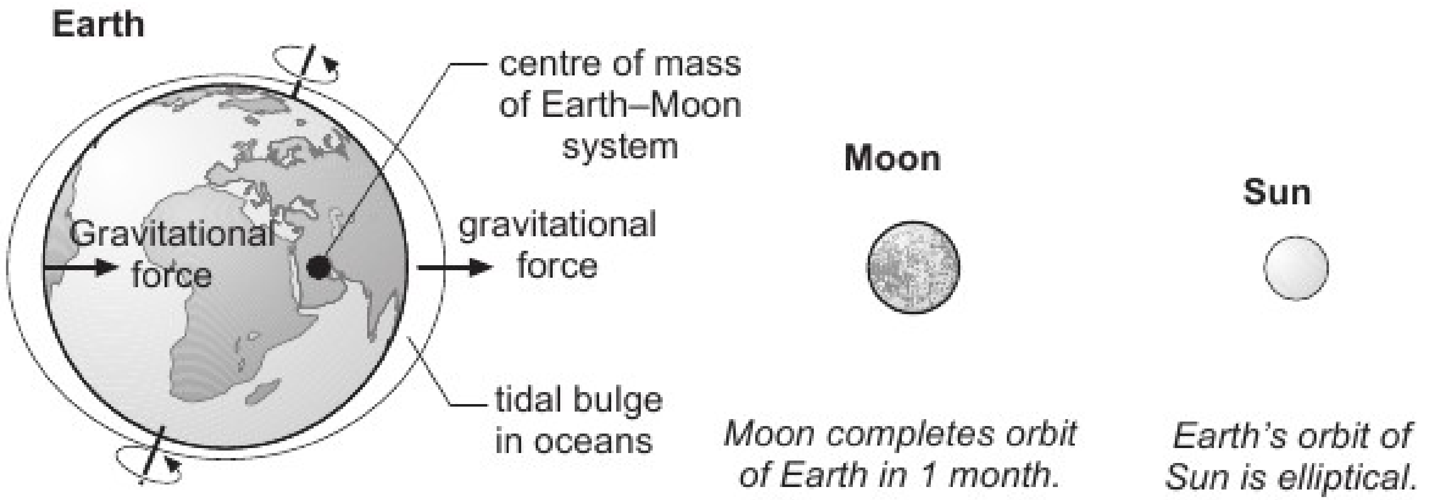
Marés:

- Ação gravitacional da Lua e do Sol

- Ciclicidade

- Marés diurnas e bidiurnas

- Fatores que controlam a amplitude de marés



Earth rotates under each tidal bulge once each day — results in two tides each day

Moon completes orbit of Earth in 1 month. When aligned with Sun (twice a month), spring tides occur. When perpendicular, neap tides occur

Earth's orbit of Sun is elliptical. When the Earth is closest (spring and autumn equinoxes), tides are highest

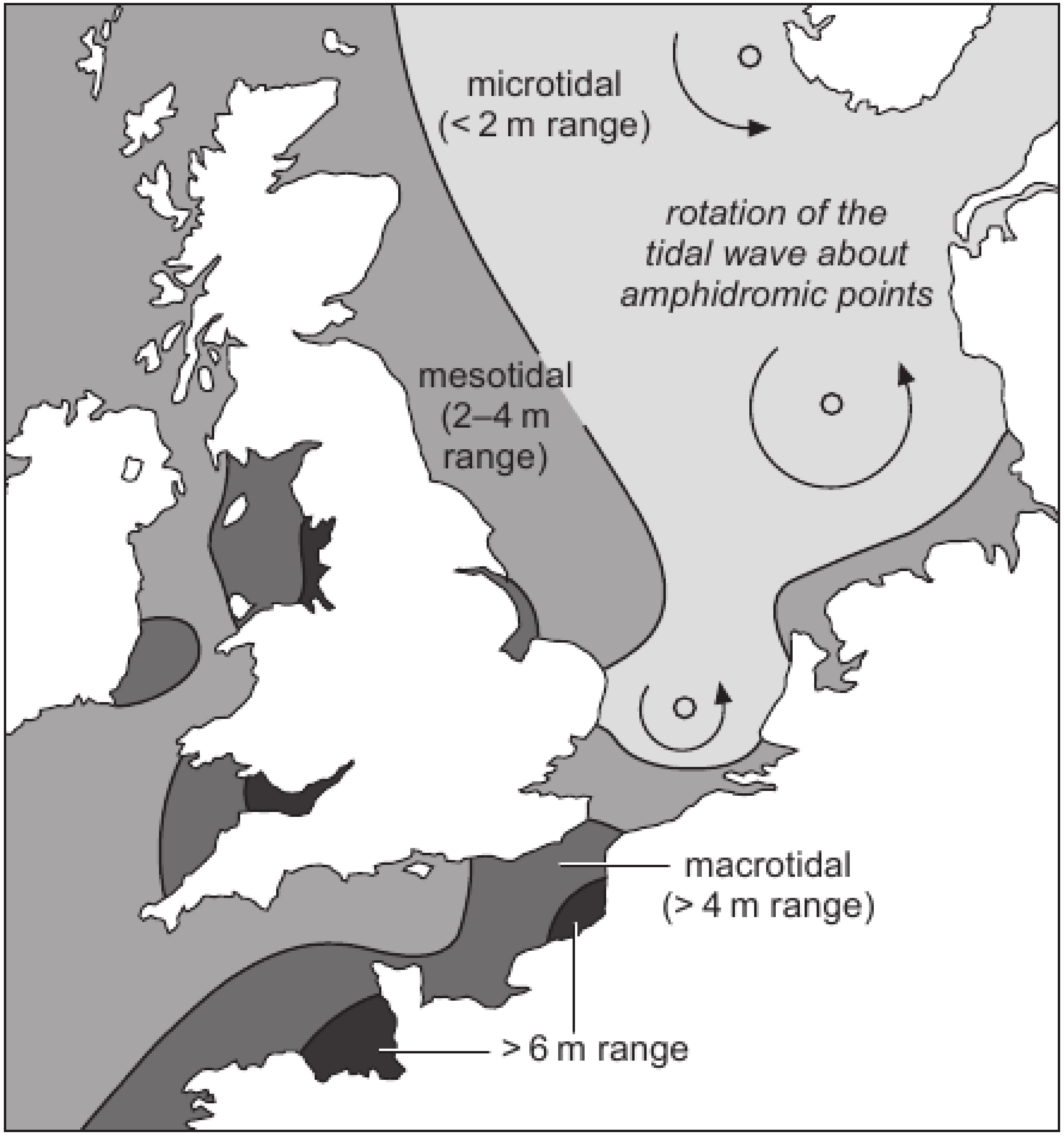
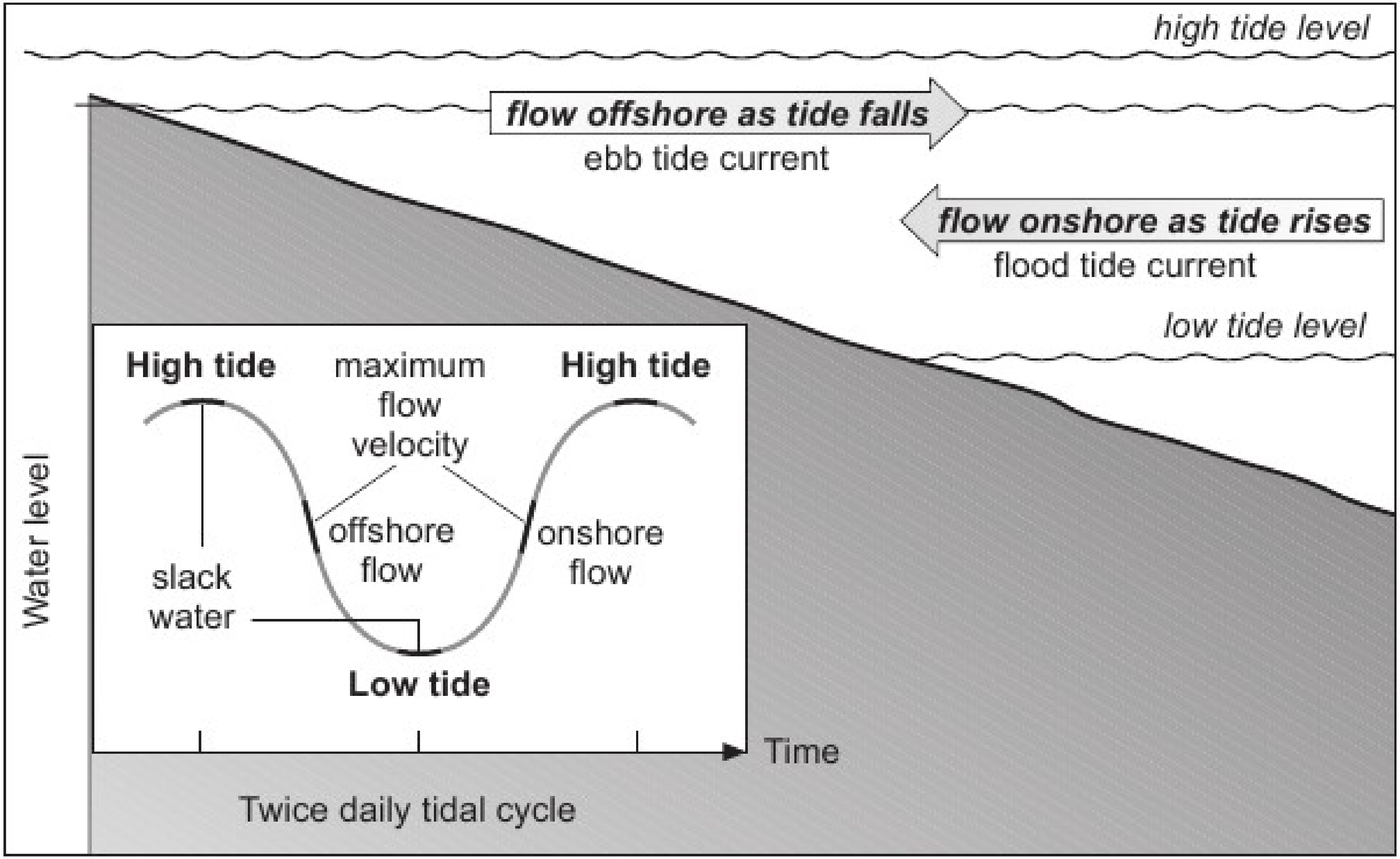


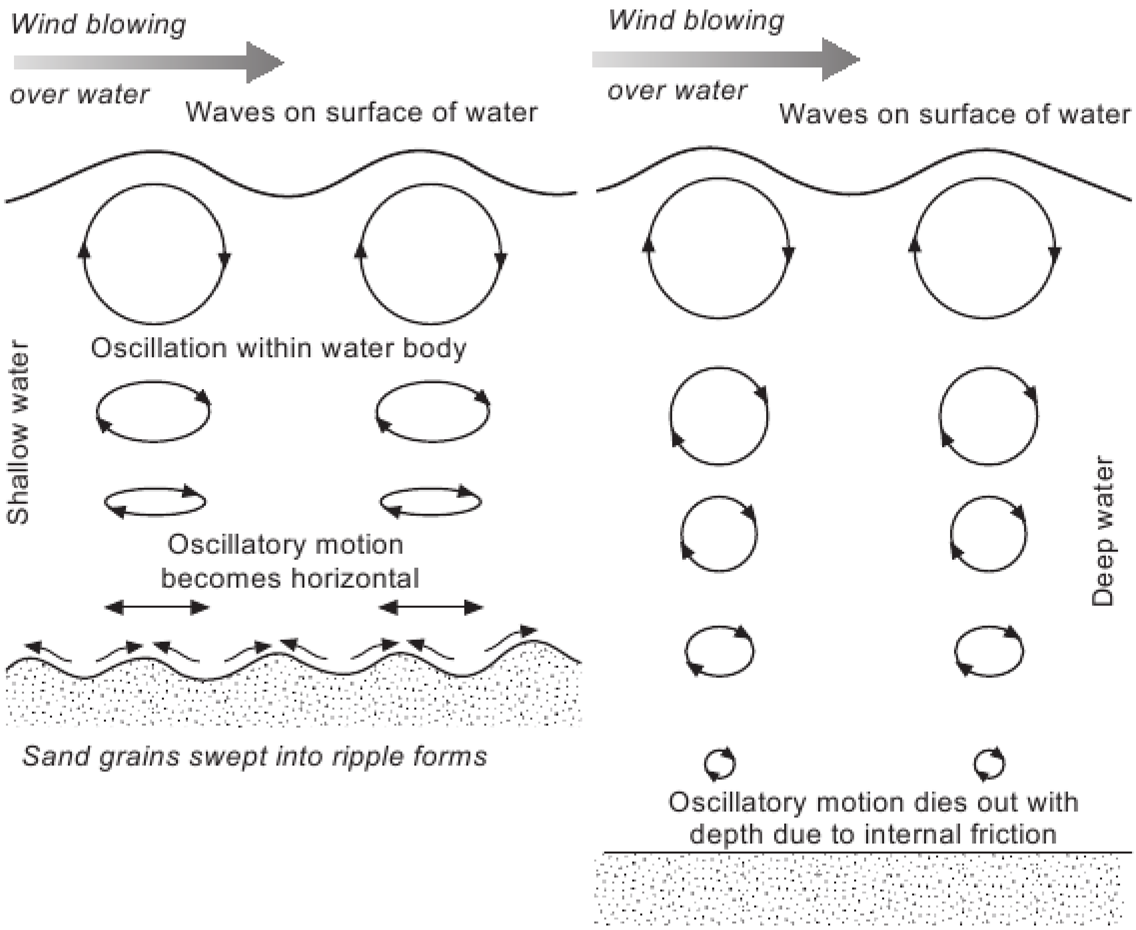
Fig. 11.4 The North Sea of northwest Europe has a variable tidal range along different parts of the bordering coasts. Amphidromic points mark the centres of cells of rotary tides that affect the shallow sea.


high tide level
flow offshore as tide falls
ebb tide current
flow onshore as tide rises
flood tide current
low tide level
Water level
High tide
maximum flow velocity
High tide
offshore flow
onshore flow
slack water
Low tide
Time
Twice daily tidal cycle

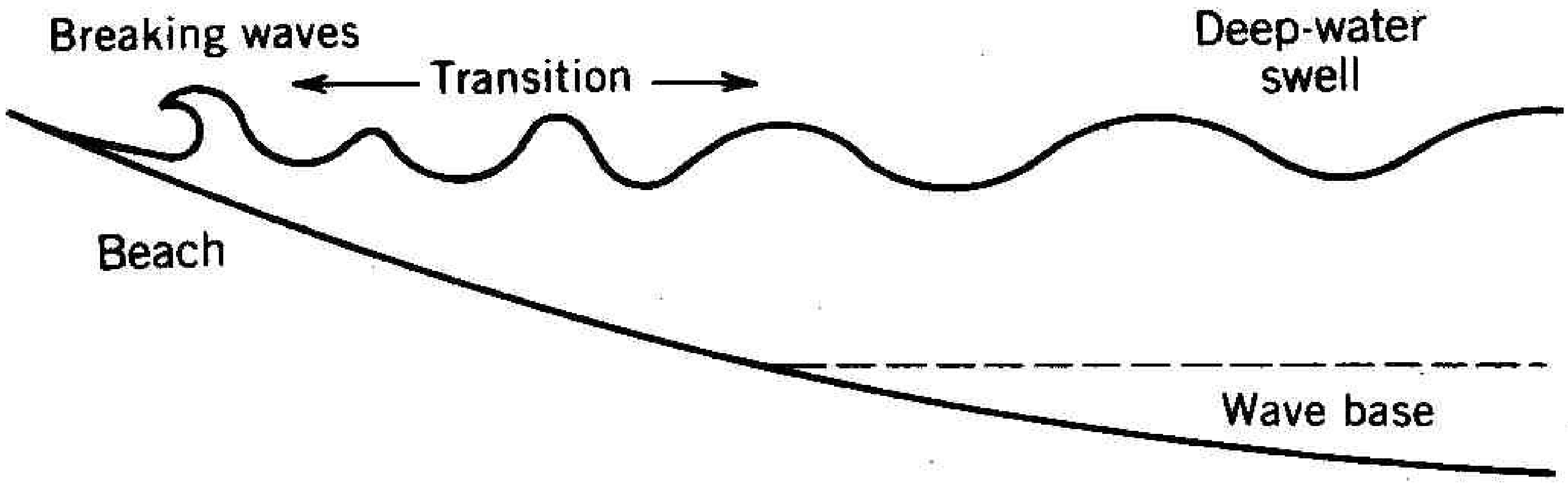
Elementos do sistema deposicional:

- Planícies de Maré
  - Inframaré
  - Intermaré
  - Supramaré
- Canais de maré

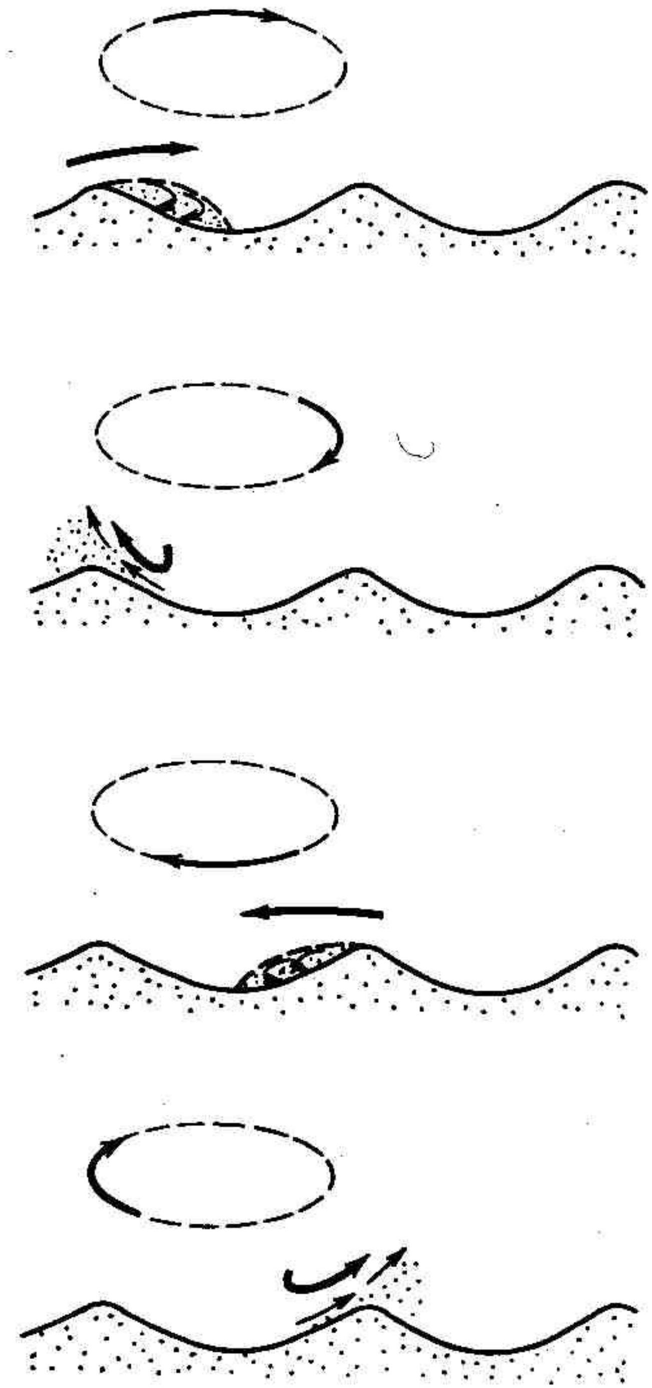
Fig. 4.21 The formation of wave ripples in sediment is produced by oscillatory motion in the water column due to wave ripples on the surface of the water. Note that there is no overall lateral movement of the water, or of the sediment. In deep water the internal friction reduces the oscillation and wave ripples do not form in the sediment.



Transporte sedimentar por ondas



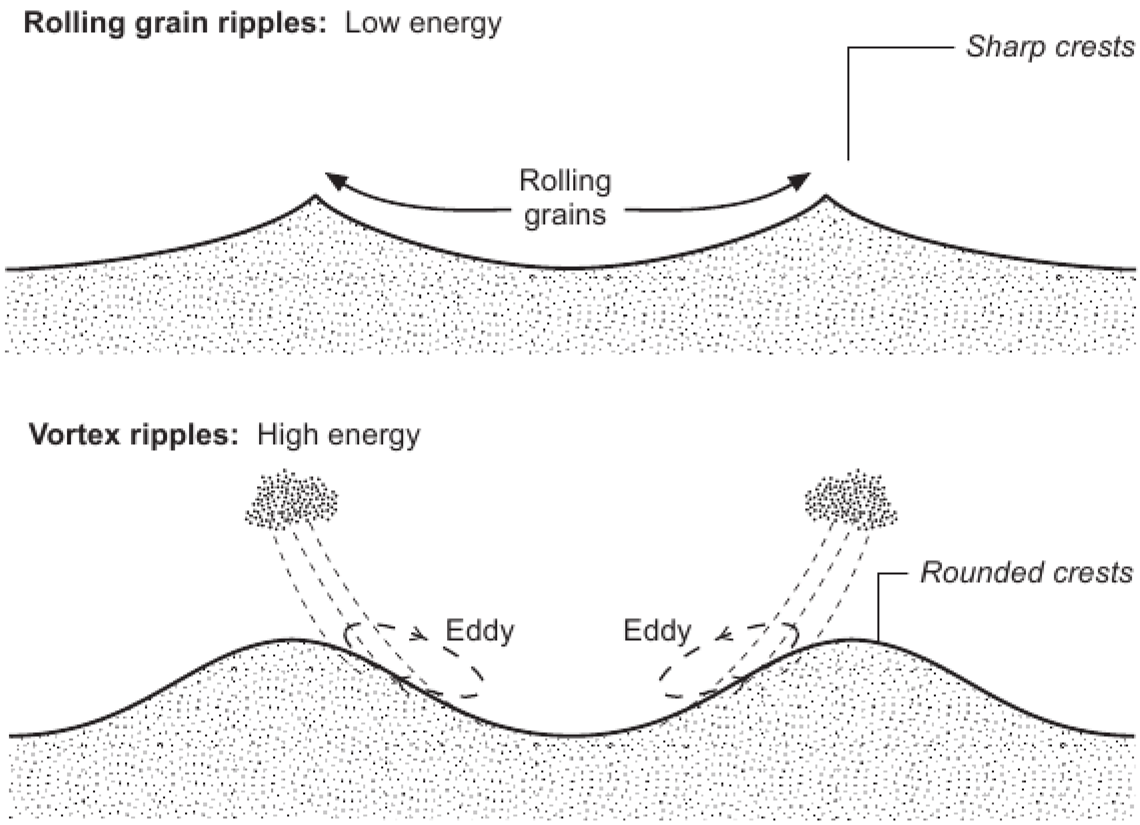
*Característica principal: oscilações de curto período e indução de correntes secundárias



Eddy forms behind ripple crest during maximum orbital velocity; sediment accumulates in eddy.

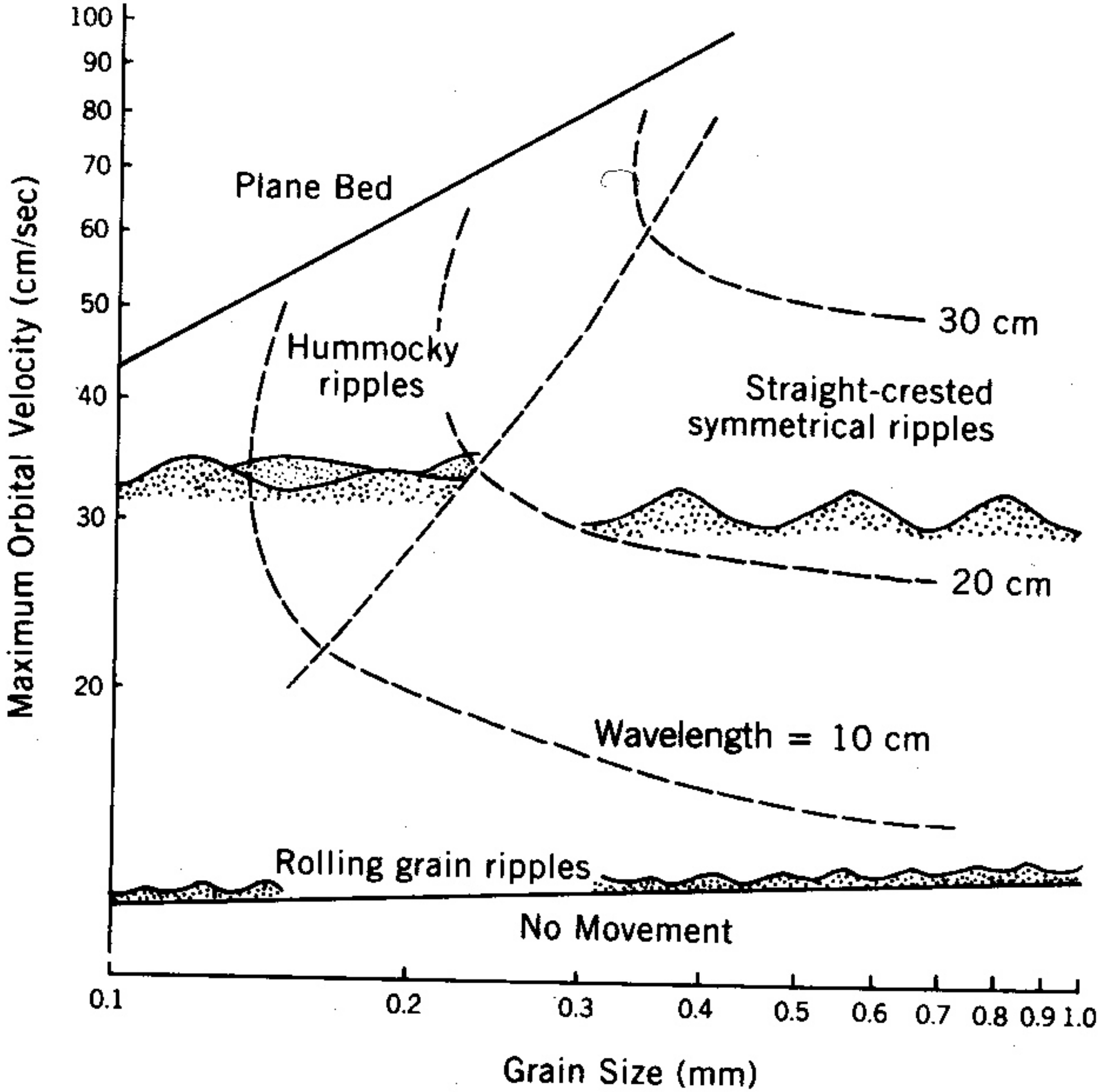
Eddy is destroyed by reversing current; vortice forms, suspending sediment momentarily.

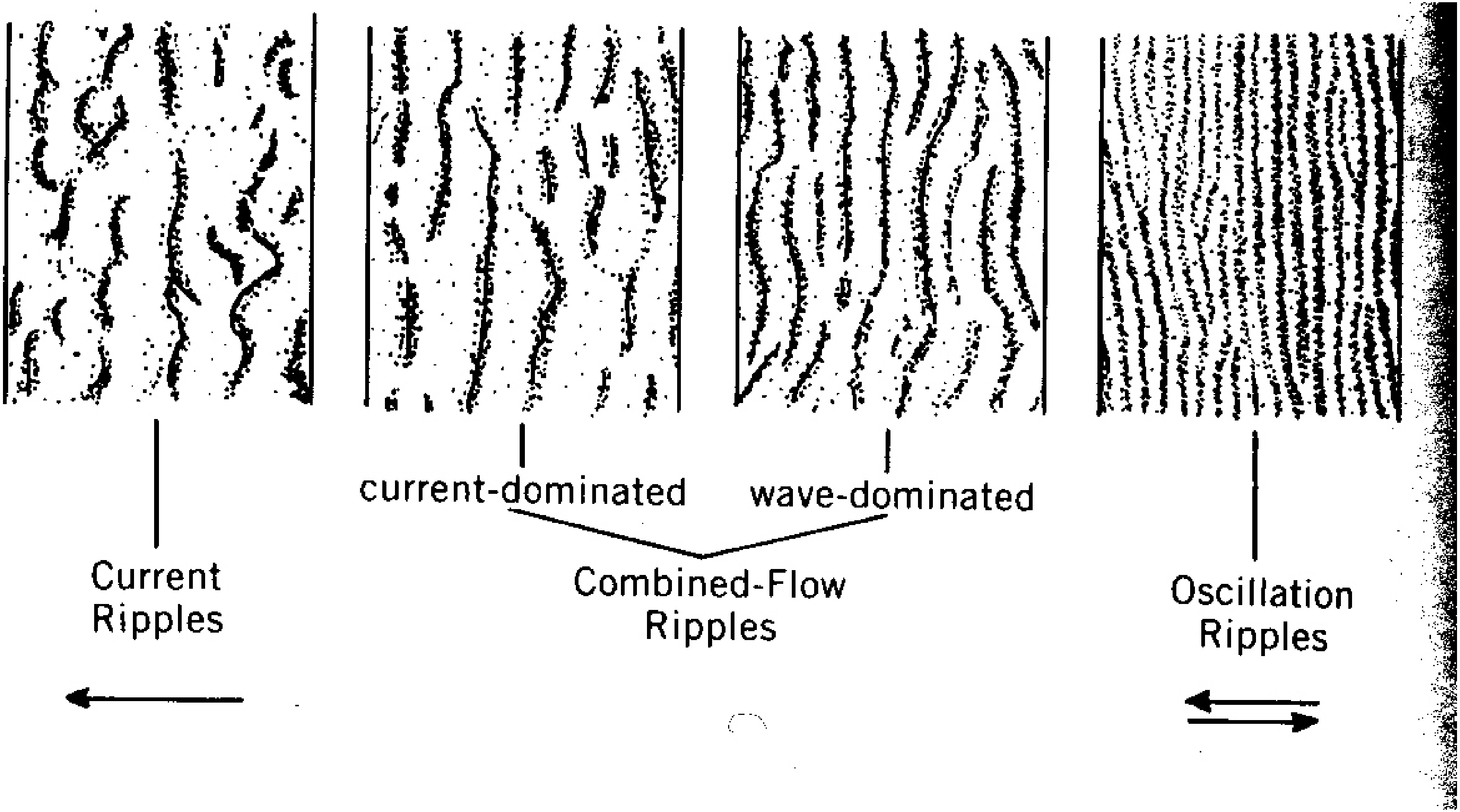
Process is repeating as current continues the reversal.

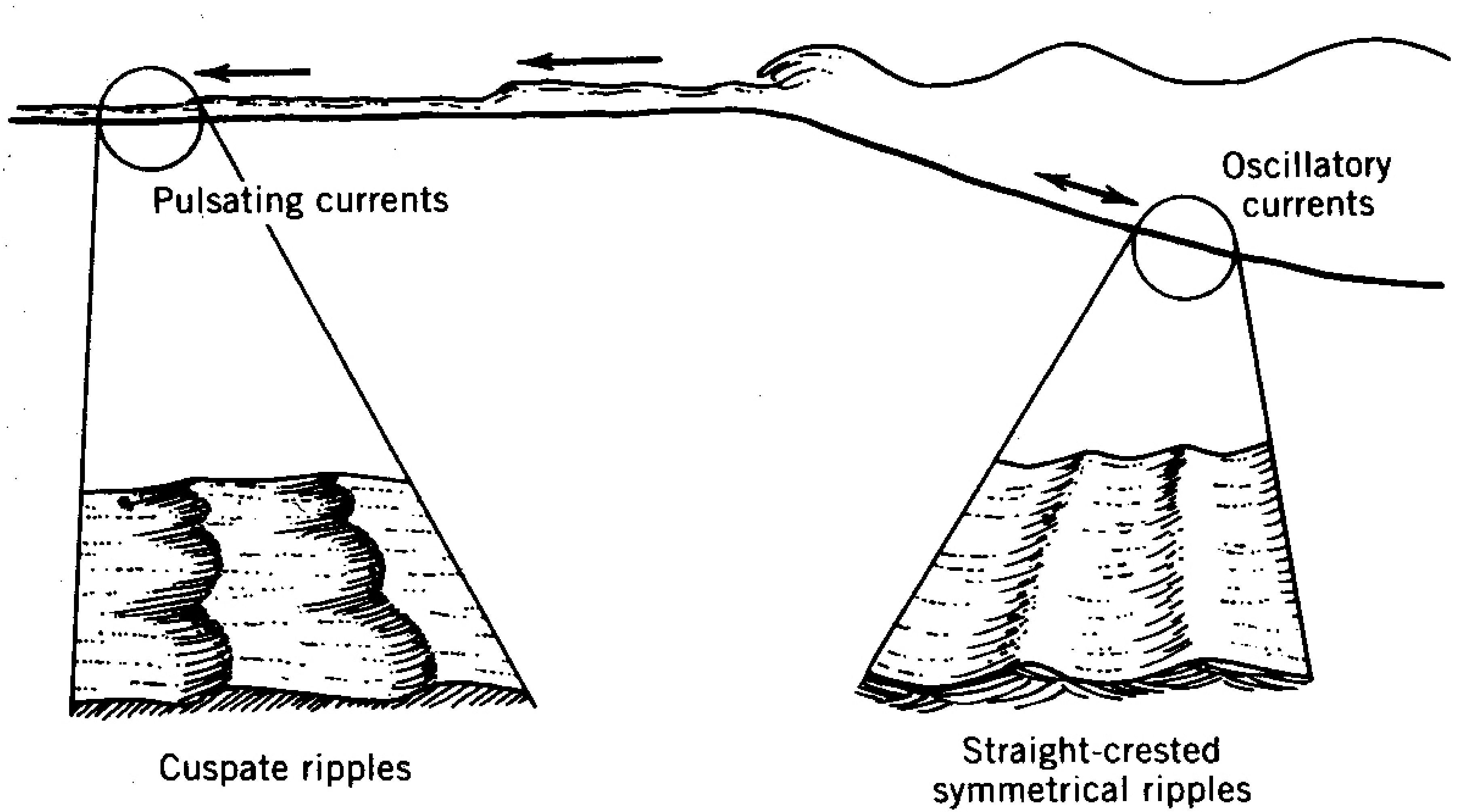


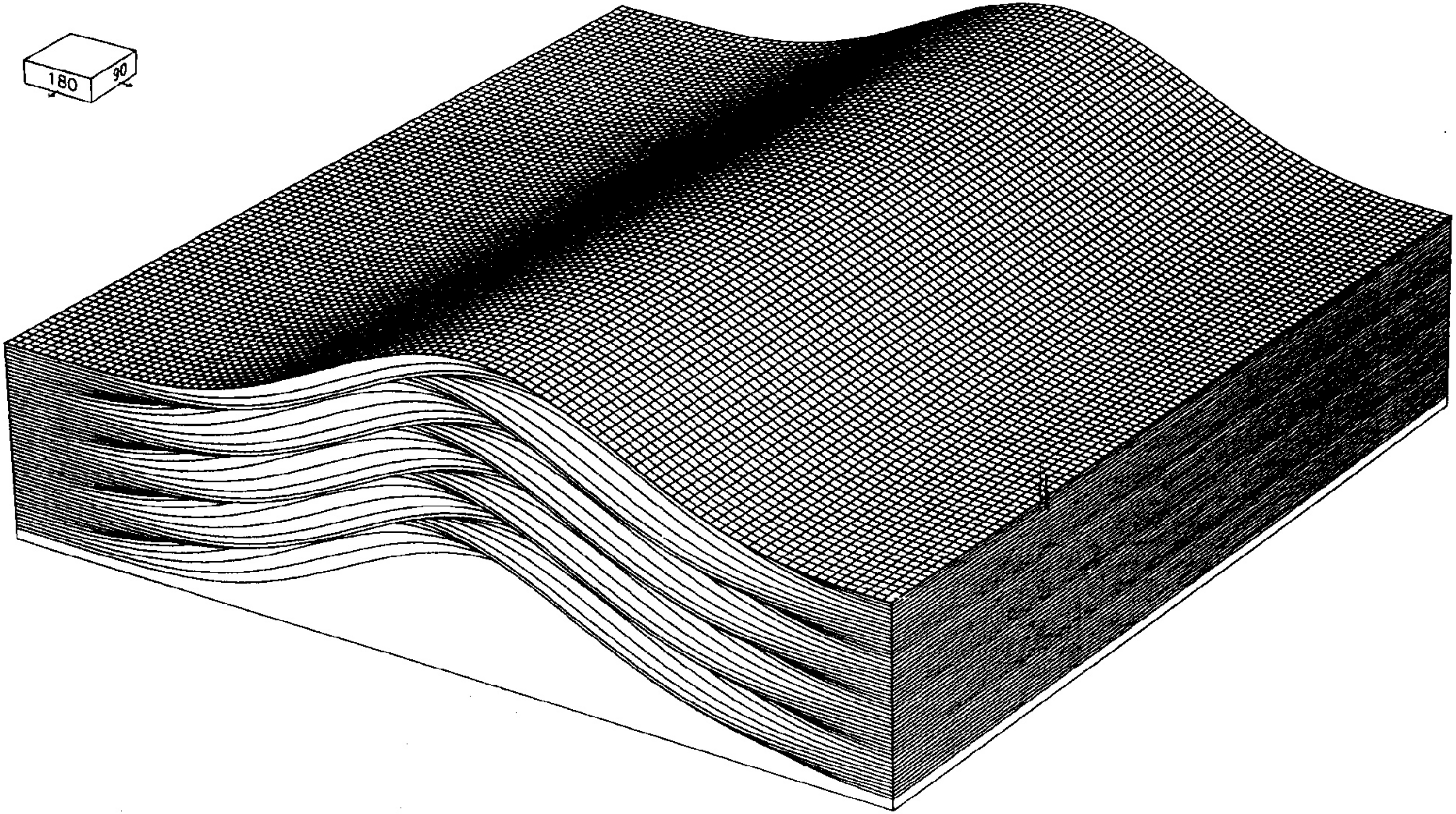
Nichols (2009)

Fig. 4.22 Forms of wave ripple: rolling grain ripples produced when the oscillatory motion is capable only of moving the grains on the bed surface and vortex ripples are formed by higher energy waves relative to the grain size of the sediment.


100
90
80
70
60
50
40
30
20
Maximum Orbital Velocity (cm/sec)
Plane Bed
Hummocky ripples
30 cm
Straight-crested symmetrical ripples
20 cm
Wavelength = 10 cm
Rolling grain ripples
No Movement
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Grain Size (mm)


current-dominated
wave-dominated
Current Ripples
Combined-Flow Ripples
Oscillation Ripples


Pulsating currents
Oscillatory currents
Cuspate ripples
Straight-crested symmetrical ripples


180
90

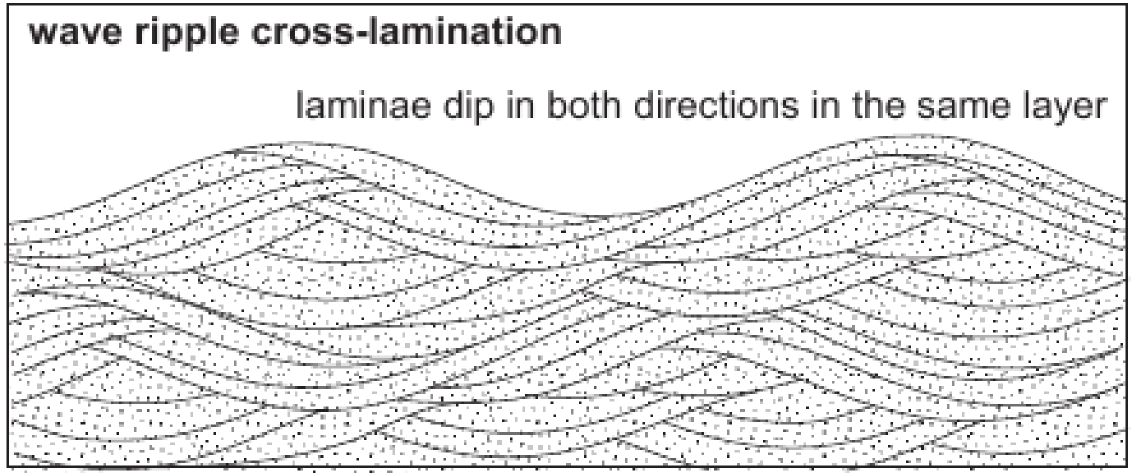
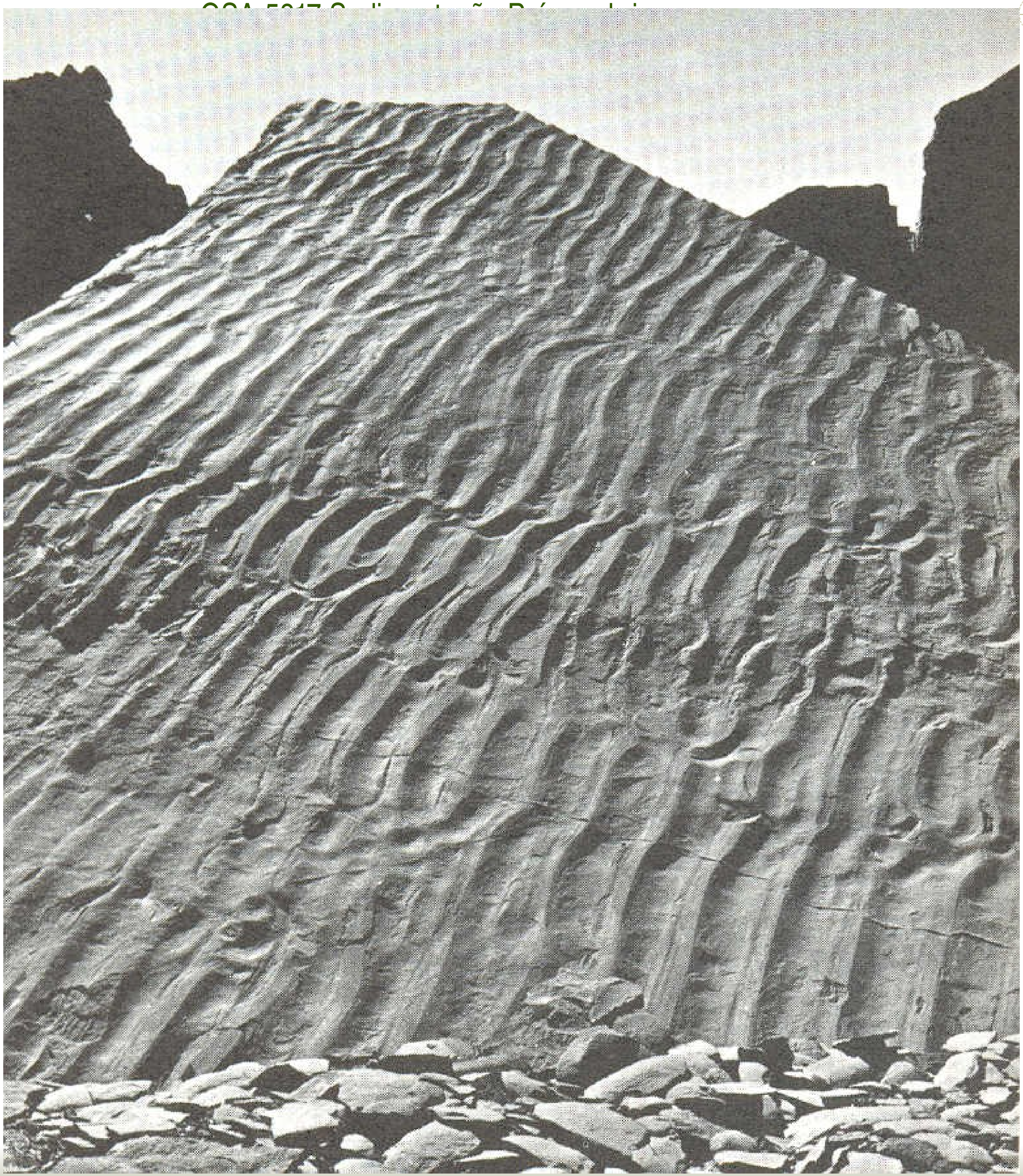
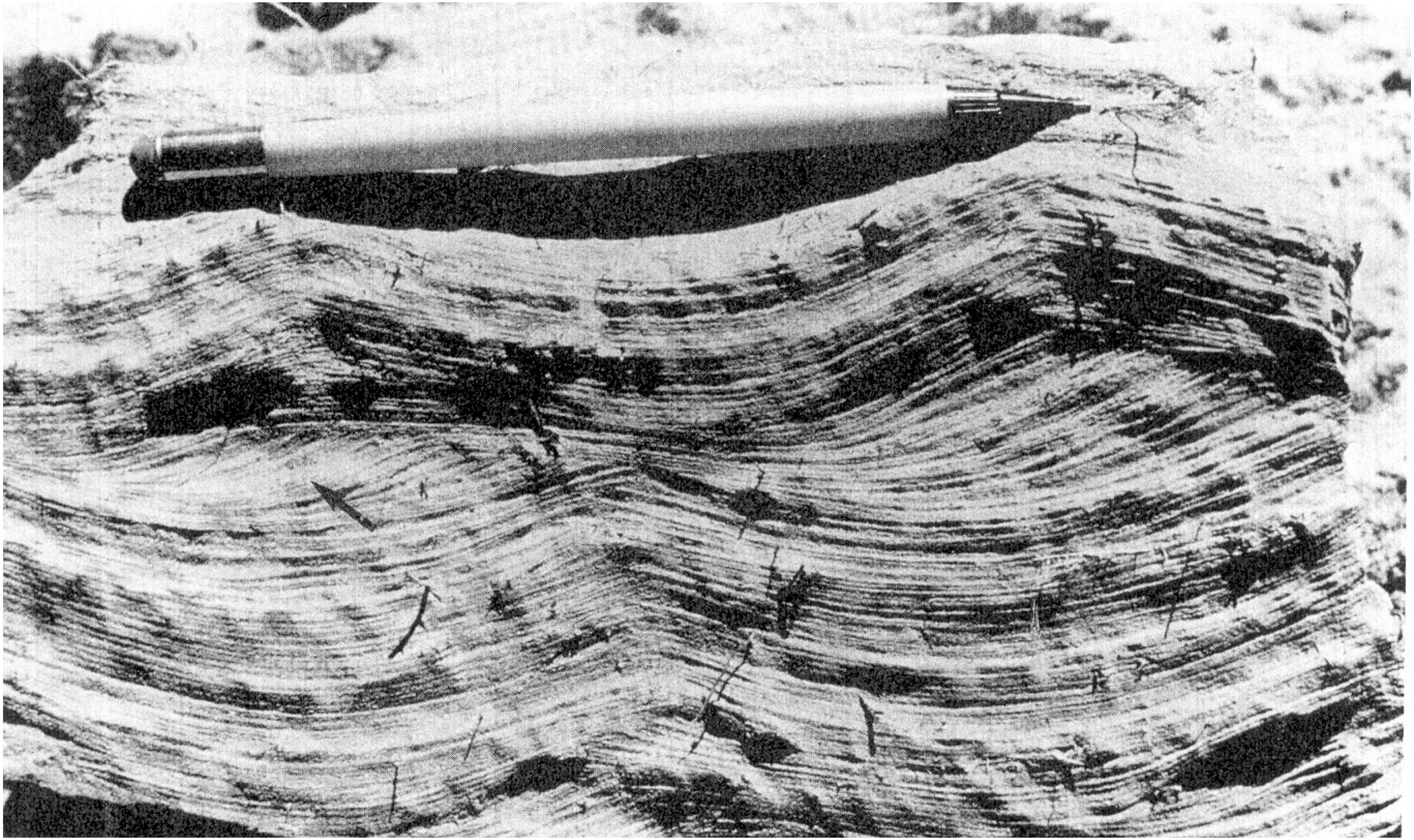
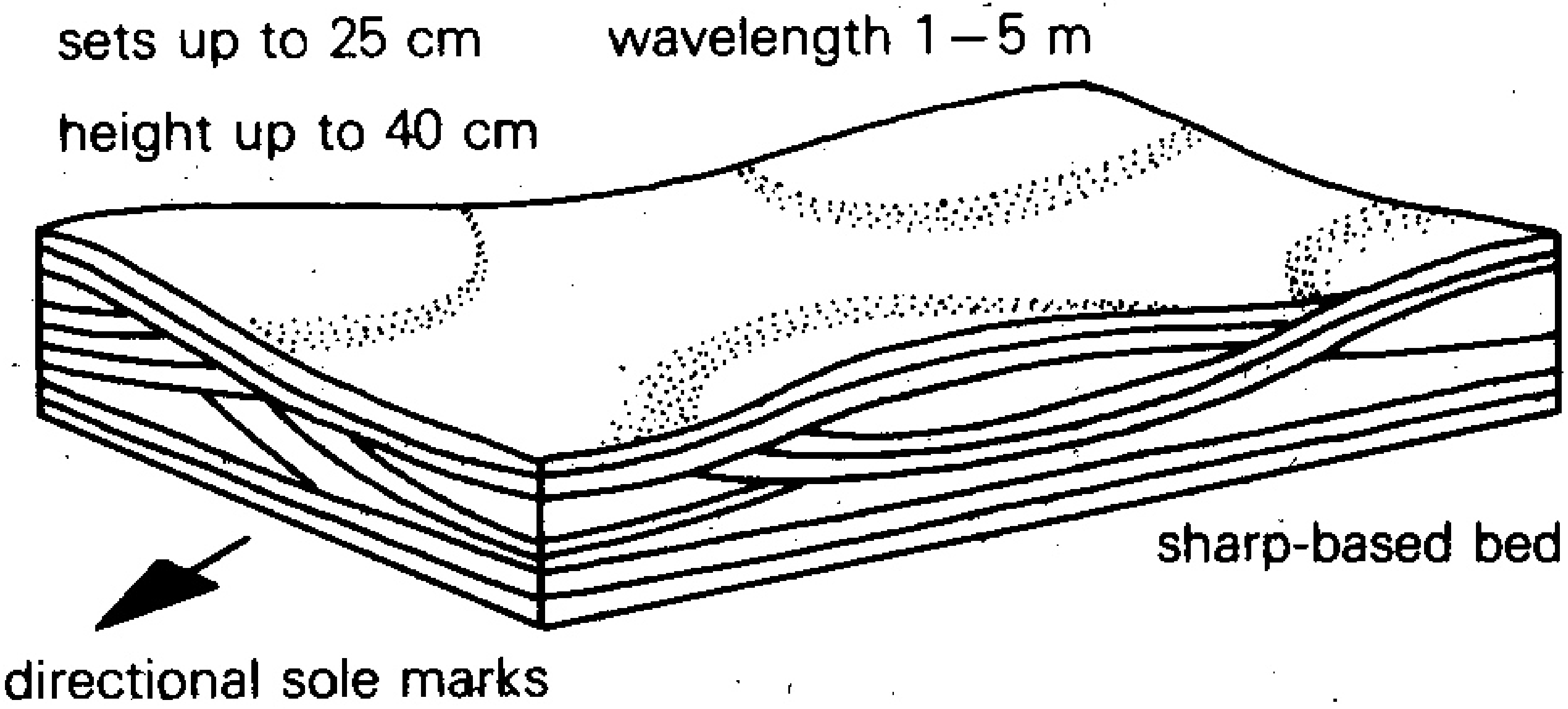


Fig. 4.24 Internal stratification in wave ripples showing cross-lamination in opposite directions within the same layer. The wavelength may vary from a few centimetres to tens of centimetres.





Hummocky


sets up to 25 cm
wavelength 1 – 5 m
height up to 40 cm
sharp-based bed
directional sole marks

Bridge & Demicco (2008)

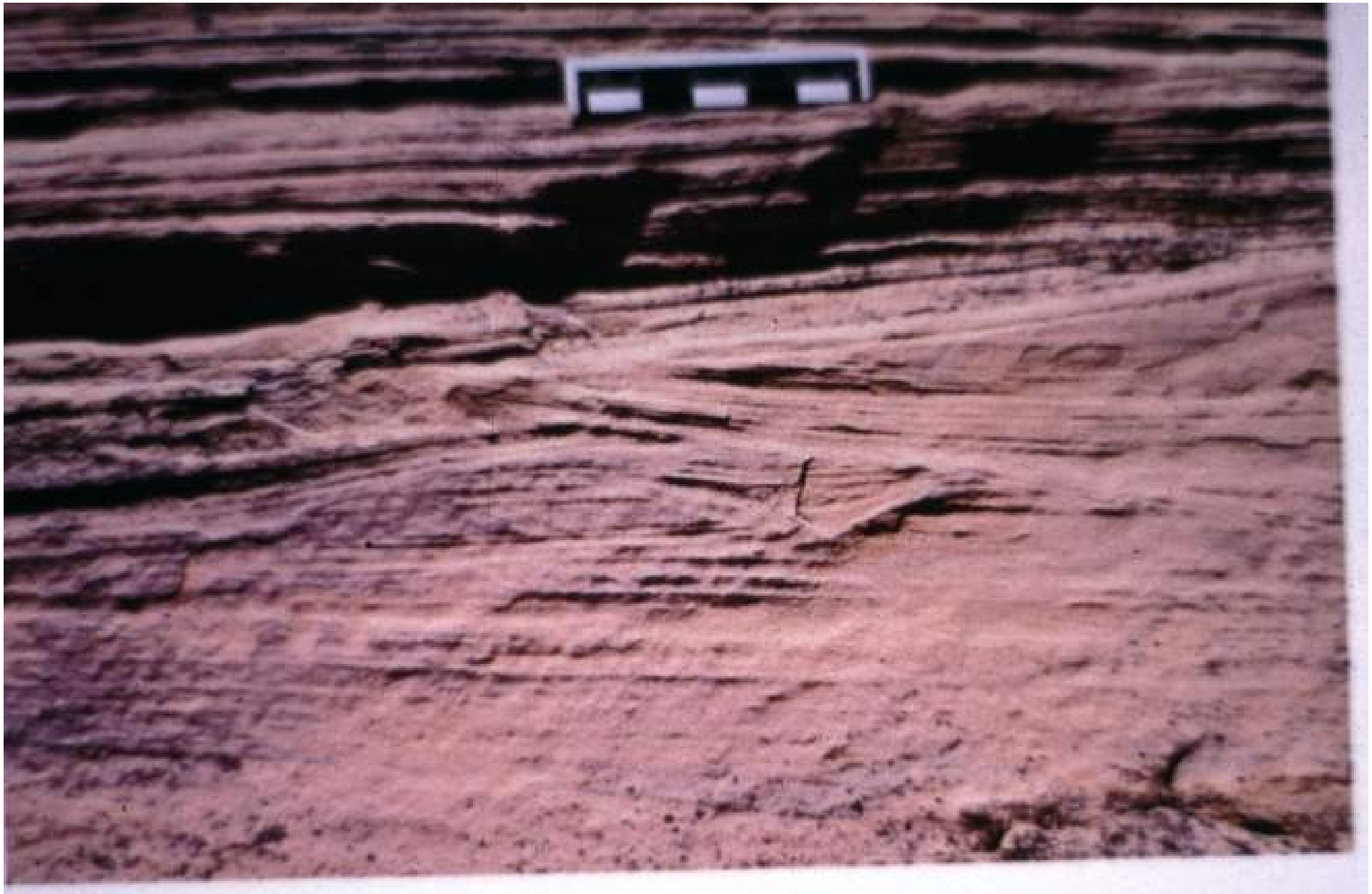


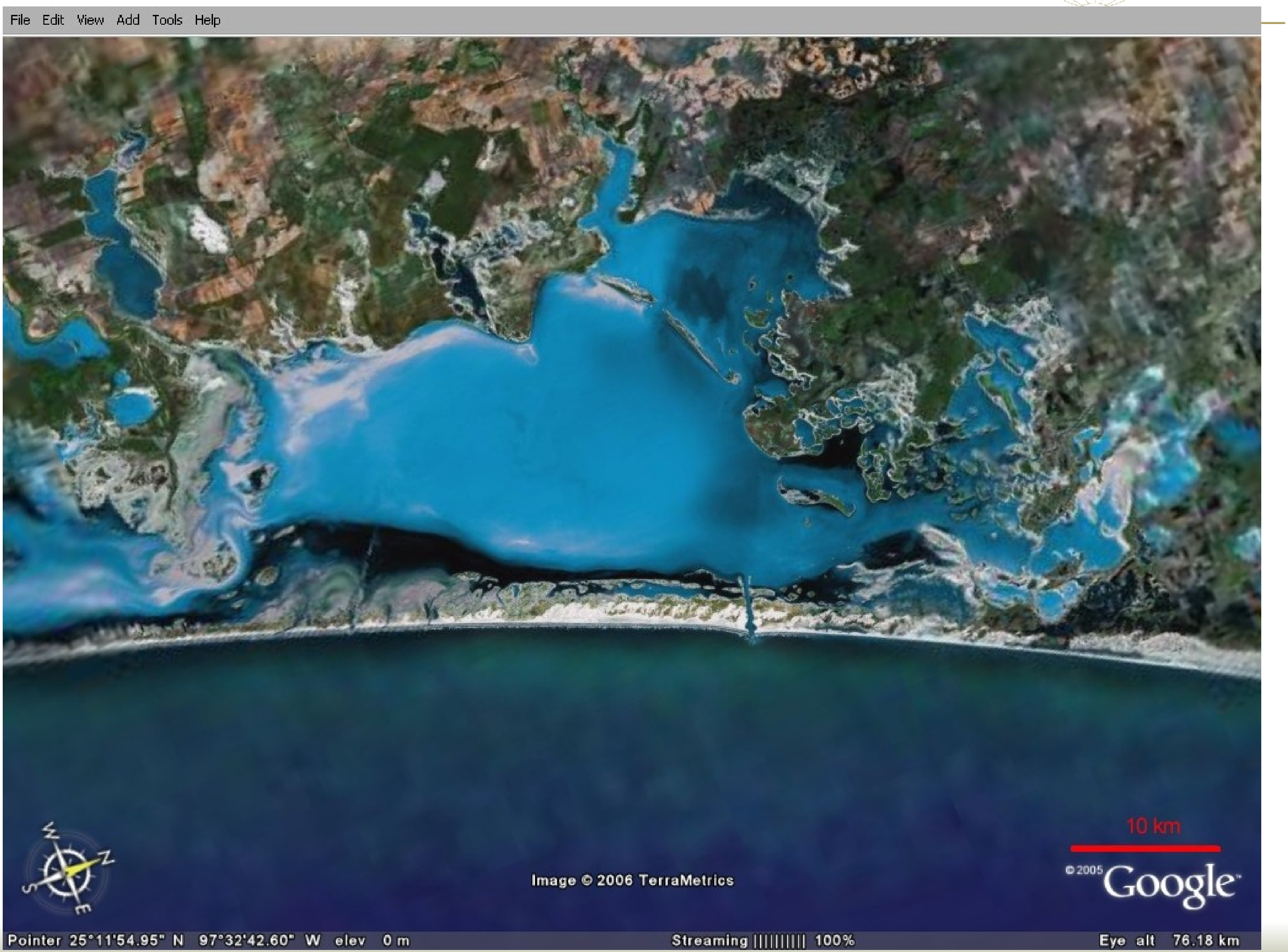
Fig. 29—Fine-grained sandstone bed with low-angle, hummocky cross stratification from basal part of the Gallup Sandstone sequence. The characteristics of this bed and its position near the base of a progradational beach-to-offshore sequence suggests deposition by unusually large storm waves.

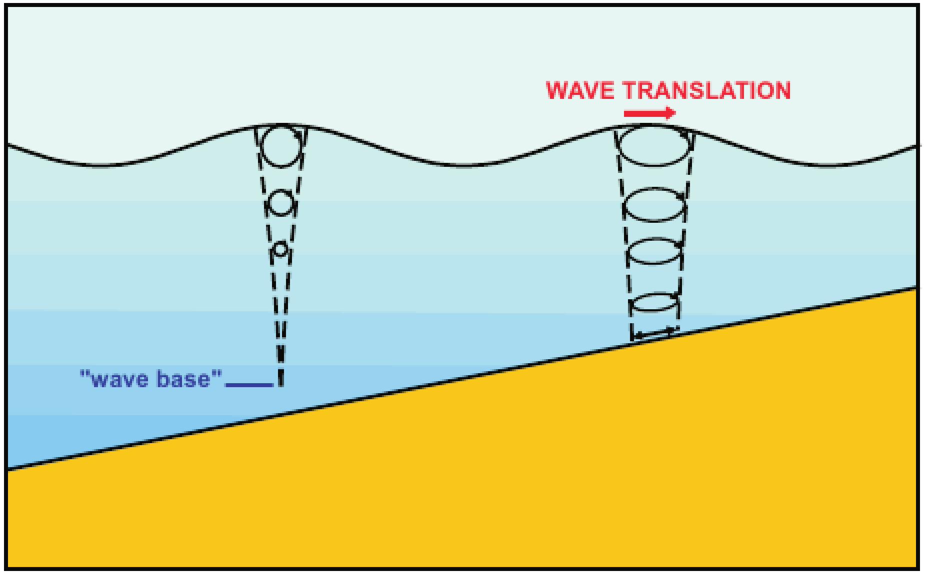
Leito de onda

por ondas

Leito de mares

por mares


File Edit View Add Tools Help
10 km
Image © 2006 TerraMetrics
© 2005 Google
N
S
E
W
Pointer 25°11'54.95" N 97°32'42.60" W elev 0 m
Streaming ||||||||| 100%
Eye alt 76.18 km



Ondas são afetadas pelo fundo a λ/2 ou menos

Mas o fundo é afetado pelas ondas?

Depende da granulação e da amplitude da onda (não do λ)

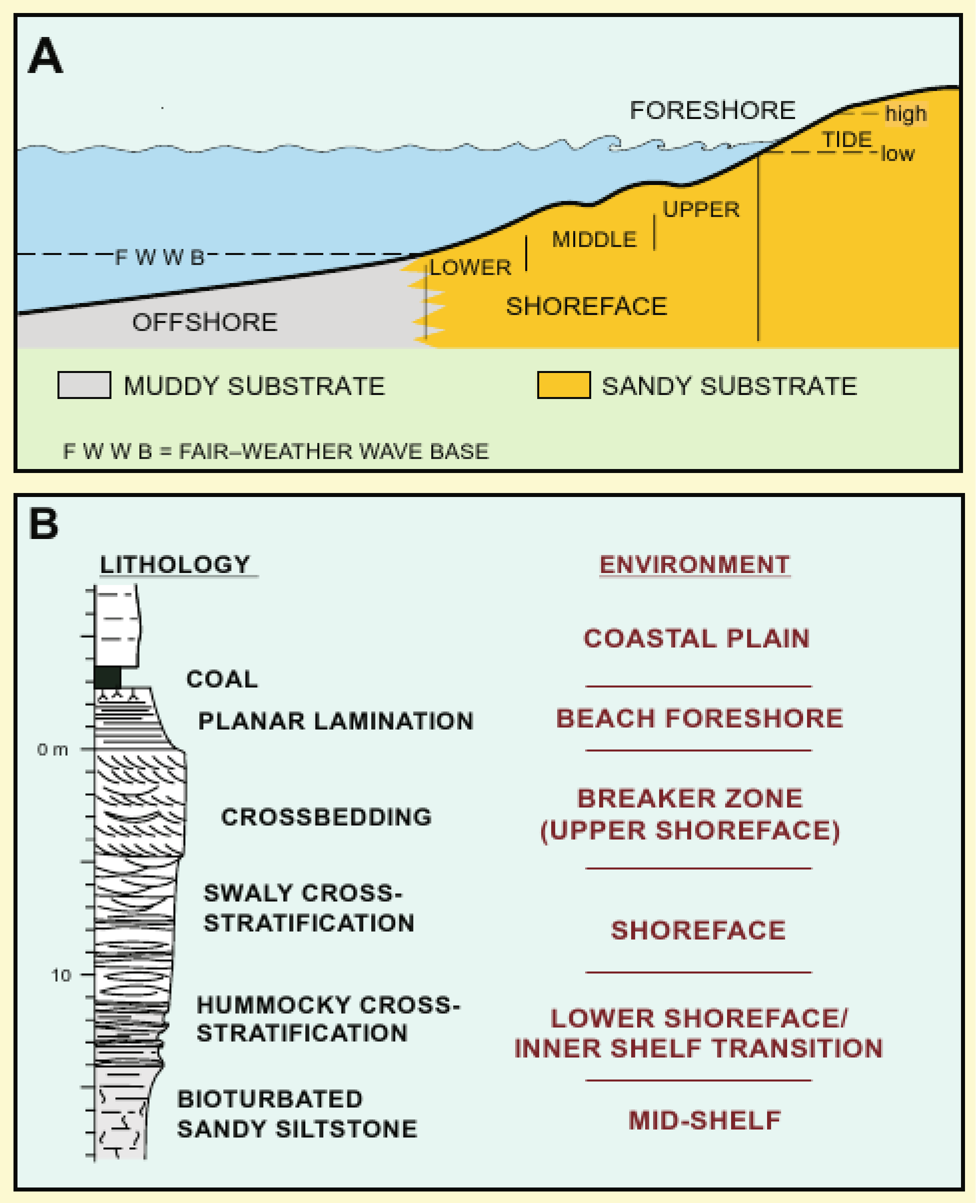
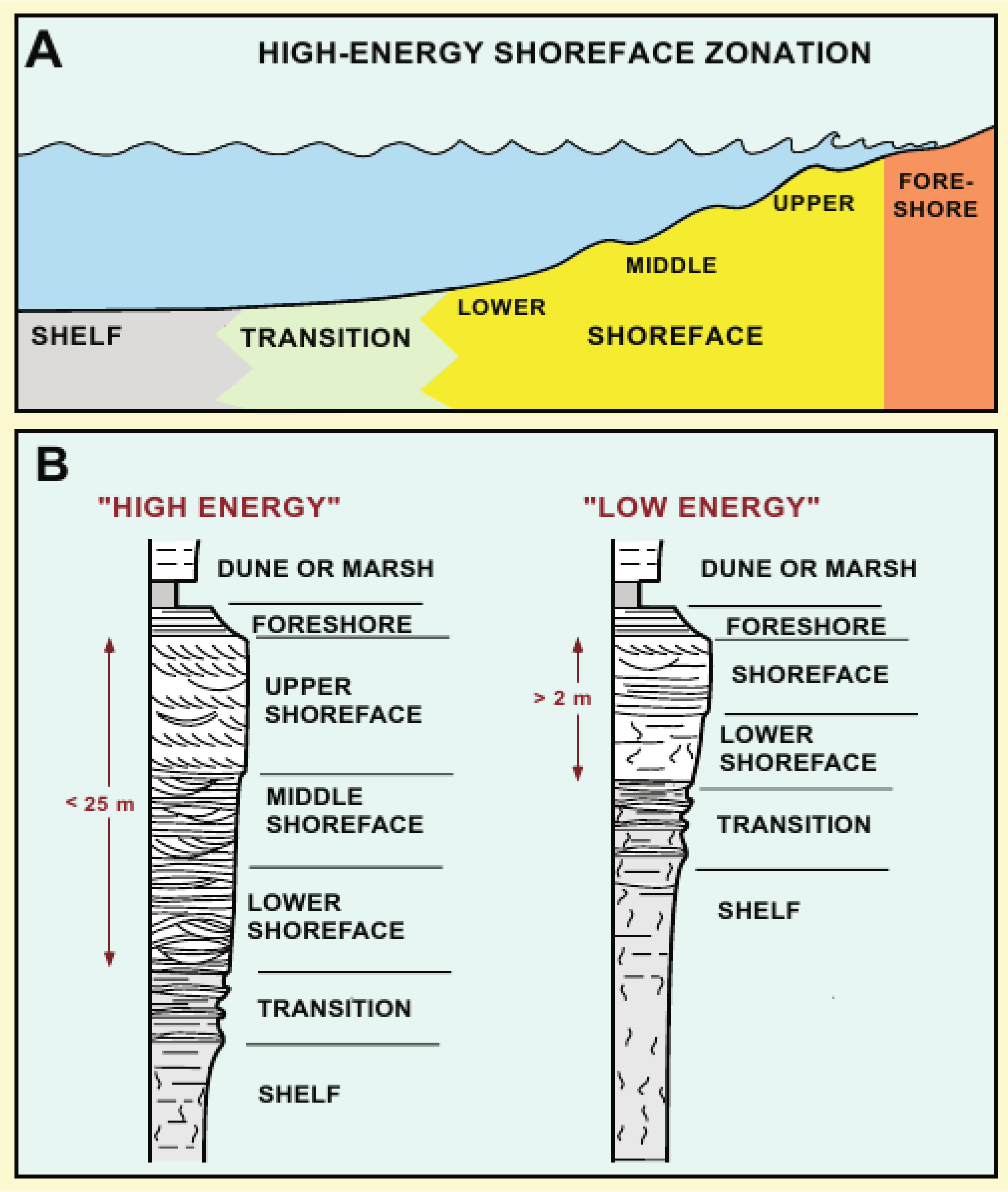


FIG. 2.—A) Beach-to-offshore profile in facies model of Walker and Plint (1992). Fair-weather wave base at base of shoreface. B) Shallowing-up facies succession in facies model of Walker and Plint (1992).



A) Beach-to-offshore profile (high-energy) in facies model of Galloway and Hobday (1996). Features a “transition zone” between shoreface and shelf. B) Shallowing-up facies succession in facies model of Galloway and Hobday (1996). Features a “transition zone” between shoreface and shelf in both high- and low-energy sequences.

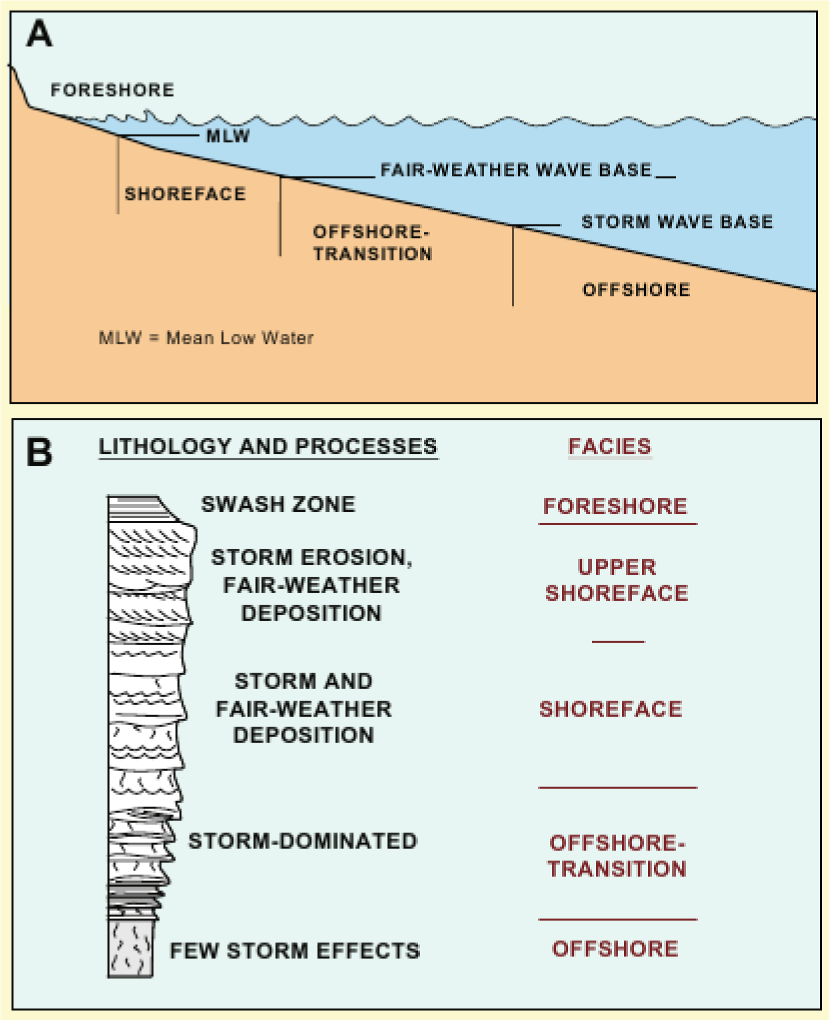
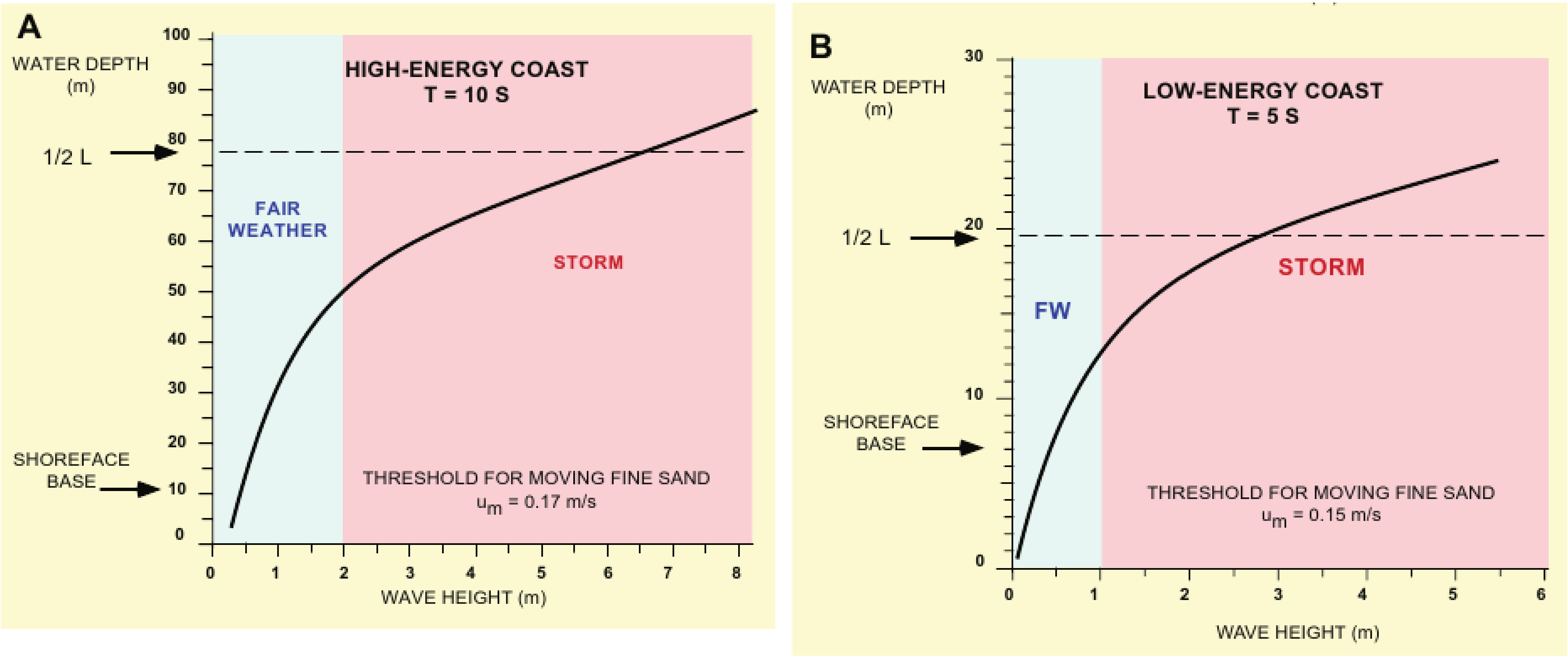
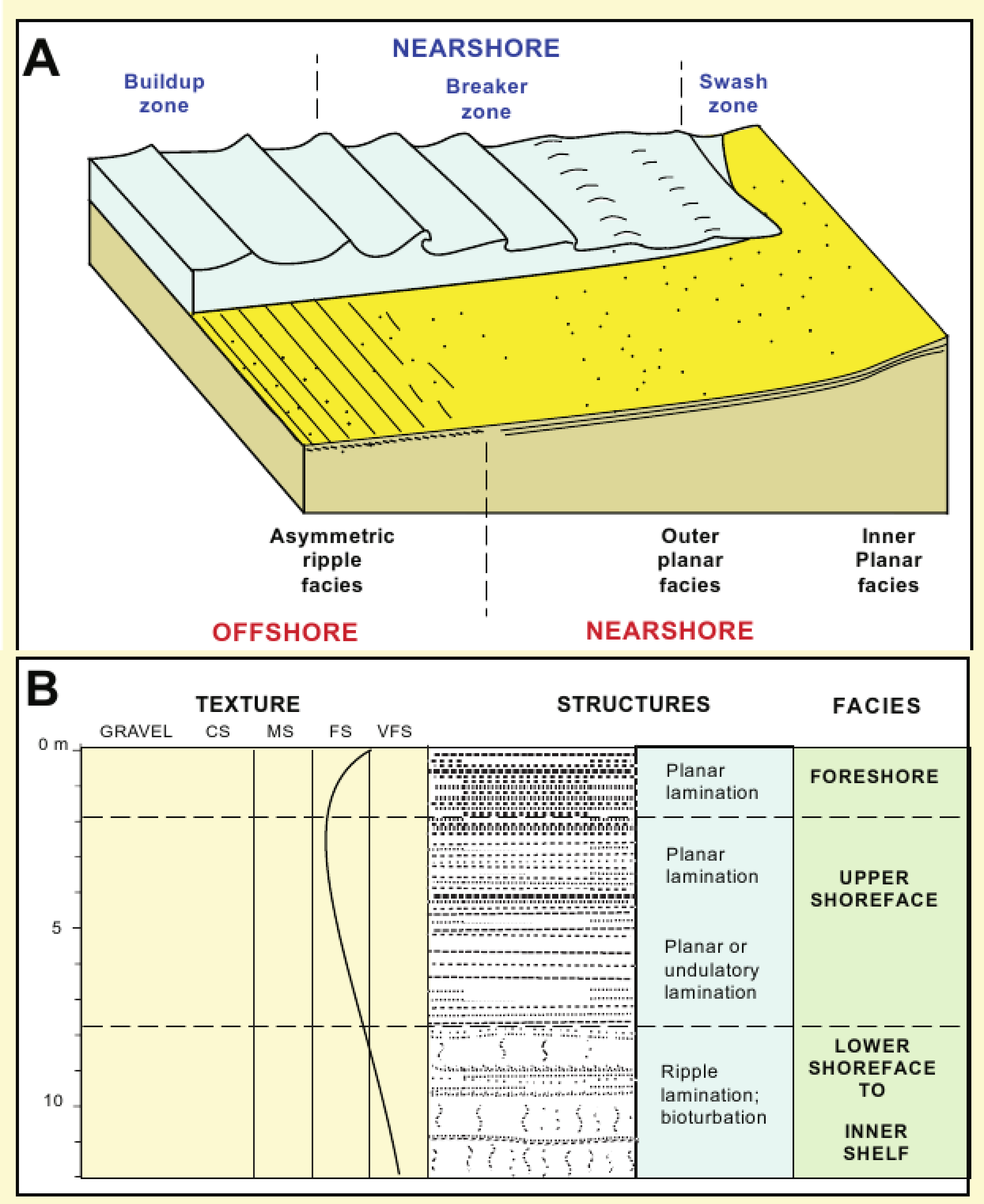


FIG. 4.—A) Beach-to-offshore profile in facies model of Reading and Collinson (1996). Fair-weather wave base defines base of shoreface. B) Shallowing-up facies succession in facies model of Reading and Collinson (1996).

Clifton (2006)

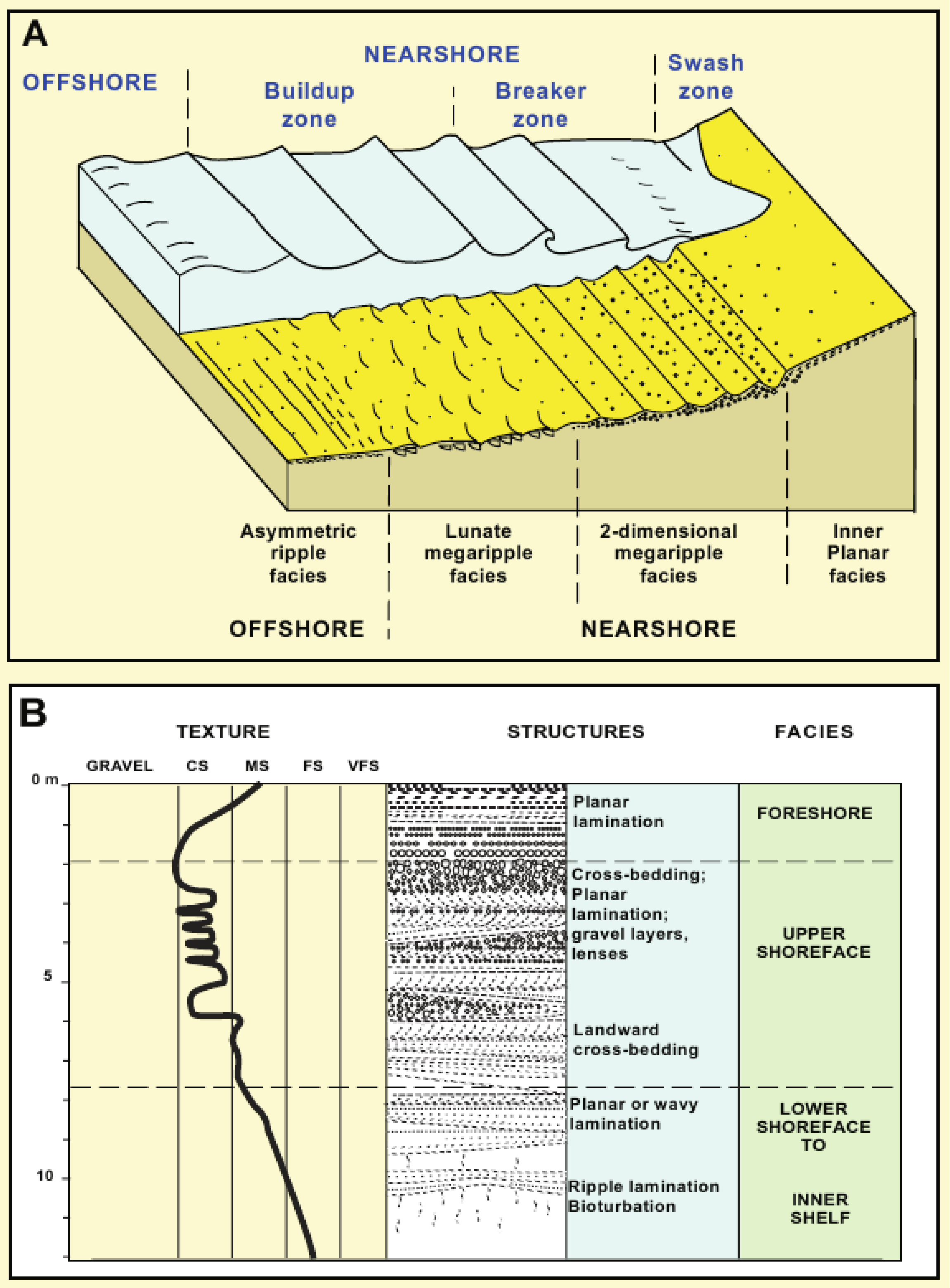


Combination of wave heights and water depths in which fine sand (D = 0.125 mm) will be moved by passing waves. A) 10-second waves. Combination of wave heights and water depths in which fine sand (D = 0.125 mm) will be moved by passing waves. B) 5-second waves. In both cases movement occurs in water depths well seaward of the base of the shoreface on a prograding coast. Water depths equal to one-half the deep water wave length are deeper still.



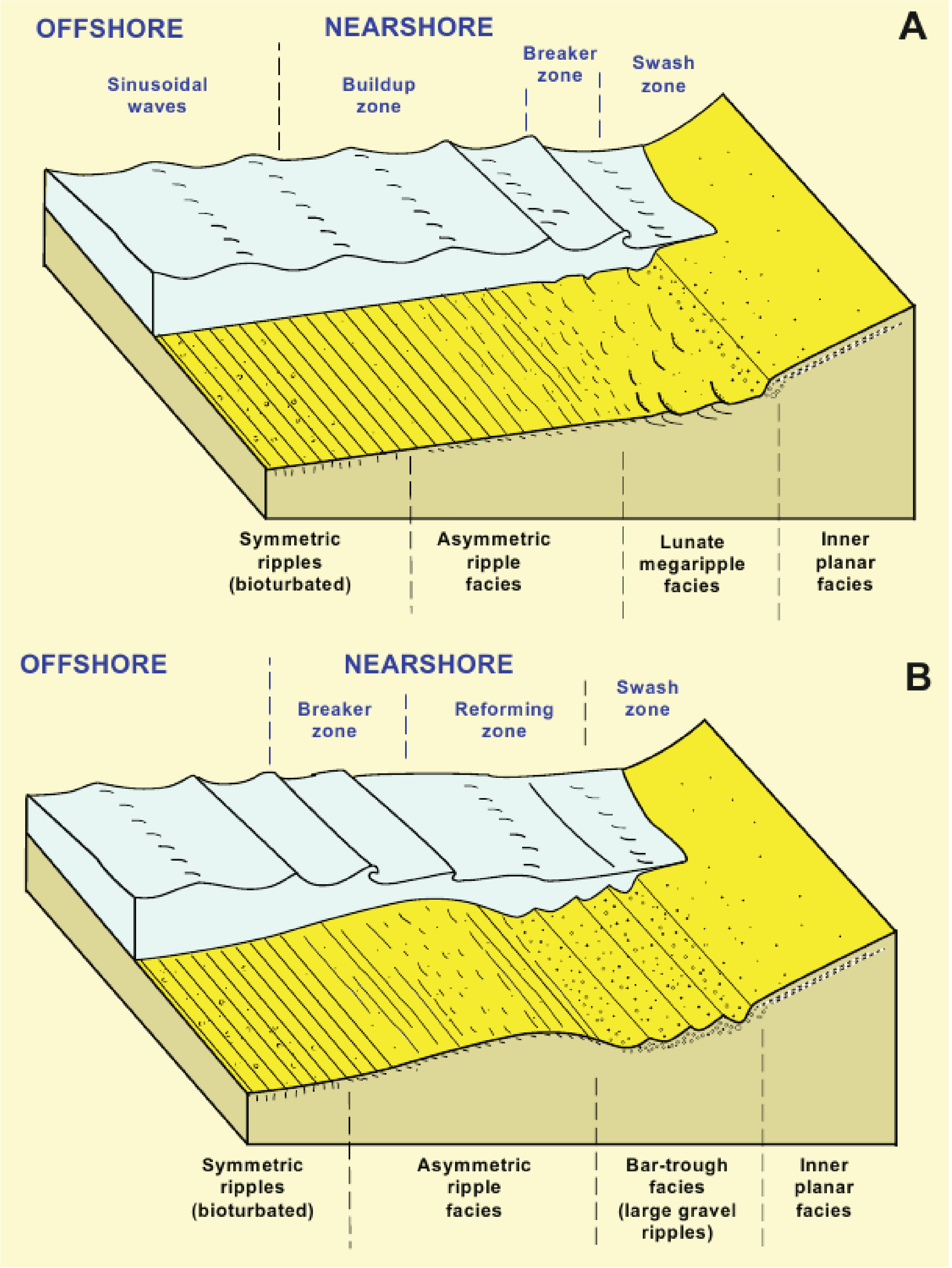
A) Sedimentary structural facies in the non-barred nearshore (upper shoreface) in fine sandy sediment on a high-energy coast under fair-weather conditions. Flatter beach–nearshore profile expands the surf zone relative to coarser shorelines. No medium- to large-scale bedforms. Surf and swash zones are underlain by planar parallel lamination. B) Vertical succession produced by progradation of such a system. Section lacks cross-bedding that typifies the upper shoreface of coarser shorelines.

Clifton (2006)



A) Sedimentary structural facies in the non-barred nearshore (upper shoreface) in coarse gravelly sand on a high-energy coast under fair-weather conditions. Large two-dimensional, straight-crested ripples occur in the gravel. These ripples tend to face landward near the beach and be symmetrical in deeper water. B) Stratigraphic succession produced by progradation of such a system.

Clifton (2006)



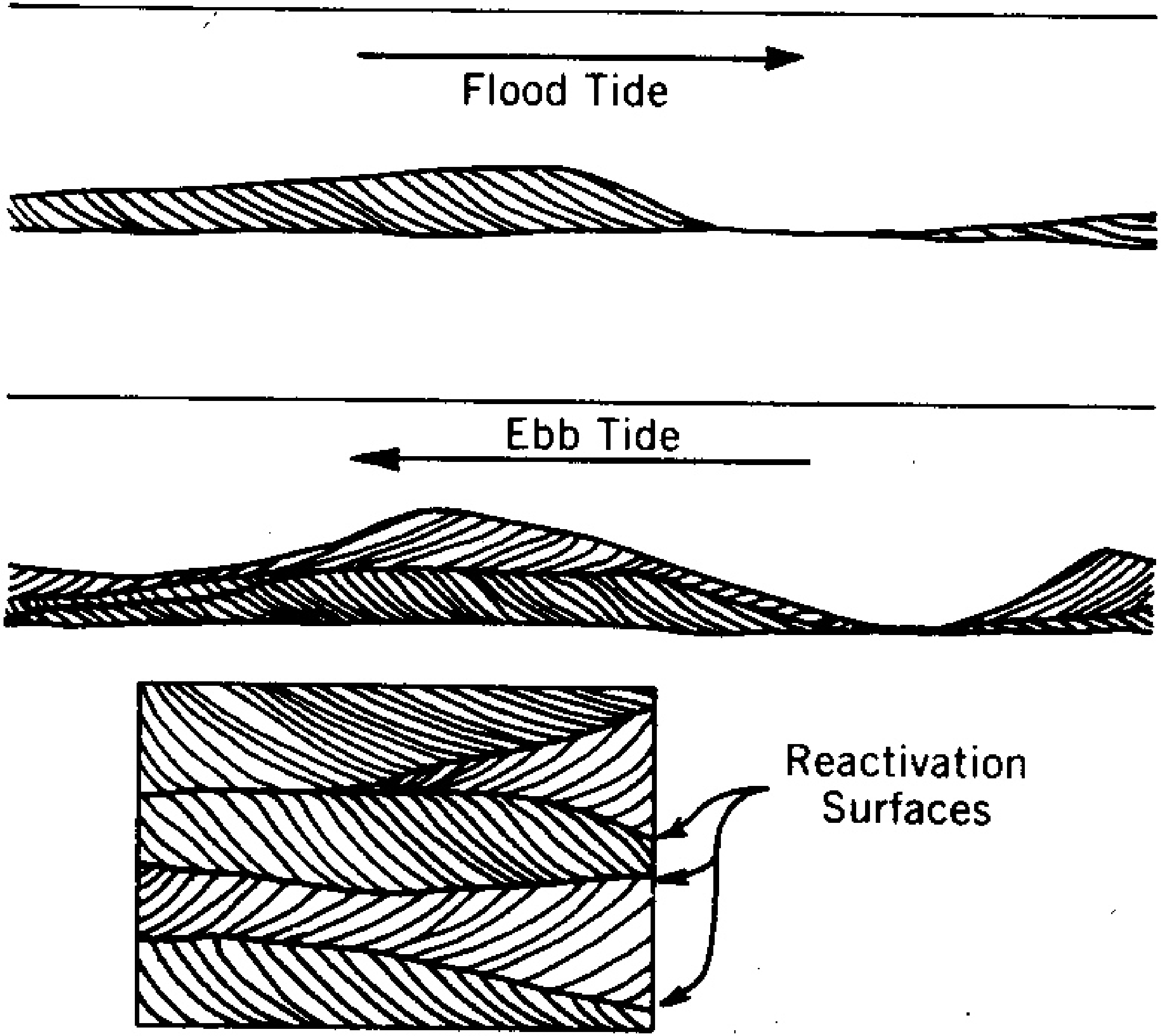
Coastal facies on an non-barred and barred nearshores on the southeastern coast of Spain. A) Upper-shoreface profile on a non-barred nearshore. Small (0.5 m) waves break directly on the edge of the foreshore. Lunate megaripples occur just seaward of the beach foreshore. B) Upper-shoreface profile on a barred nearshore, southeastern coast of Spain. Large 2-D megaripples occur in gravel at base of beach. Bar is composed of fine- to medium-grained sand.

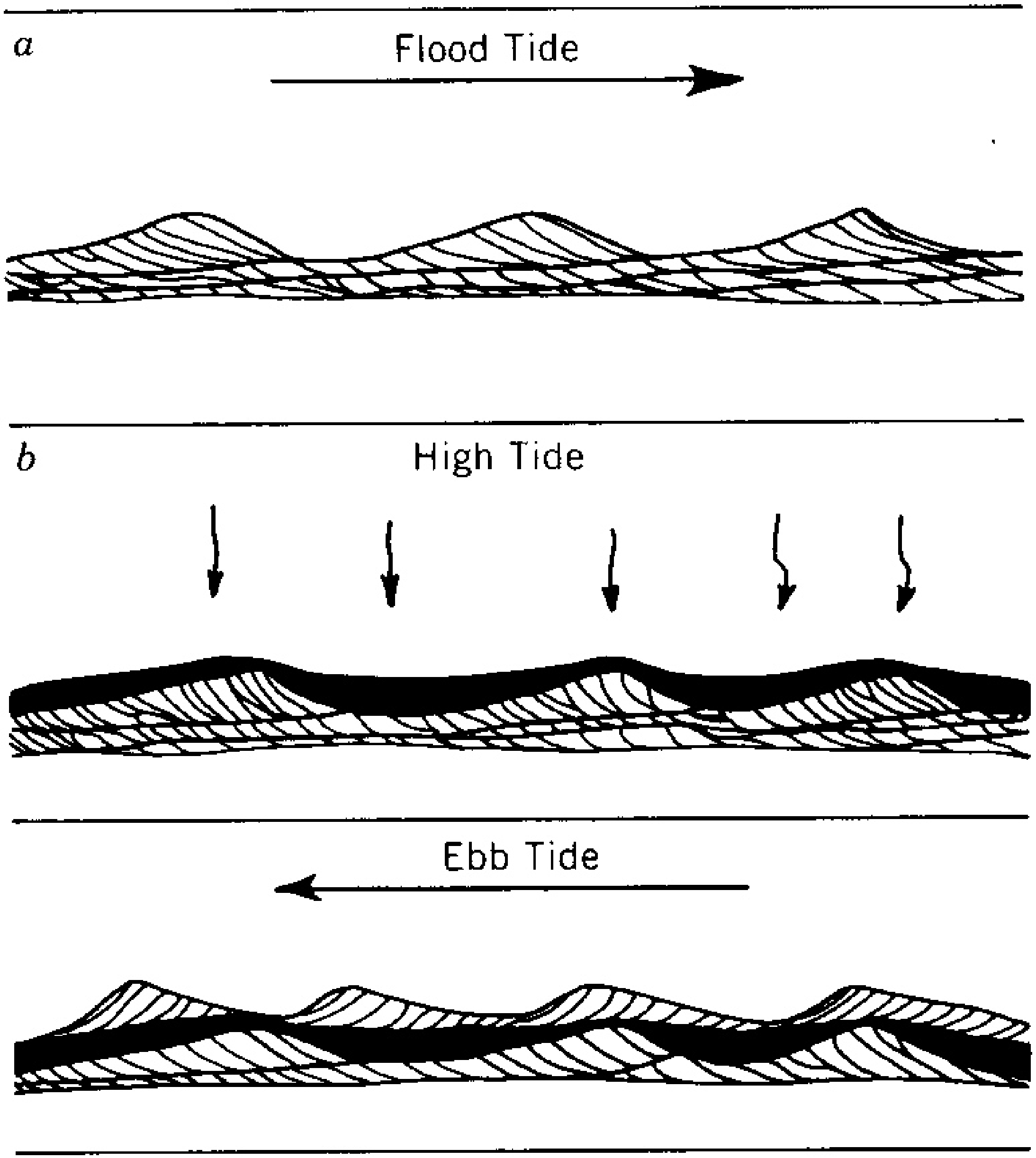
Clifton (2006)

“Layers of mud can accumulate in shallow water from the rapid settling of large volumes of silt and/or clay resuspended by storm waves or introduced by floods. Their presence is unrelated to fair-weather conditions. The extension of generalizations regarding wave base, drawn from studies of modern low-energy coasts, is largely unwarranted.”

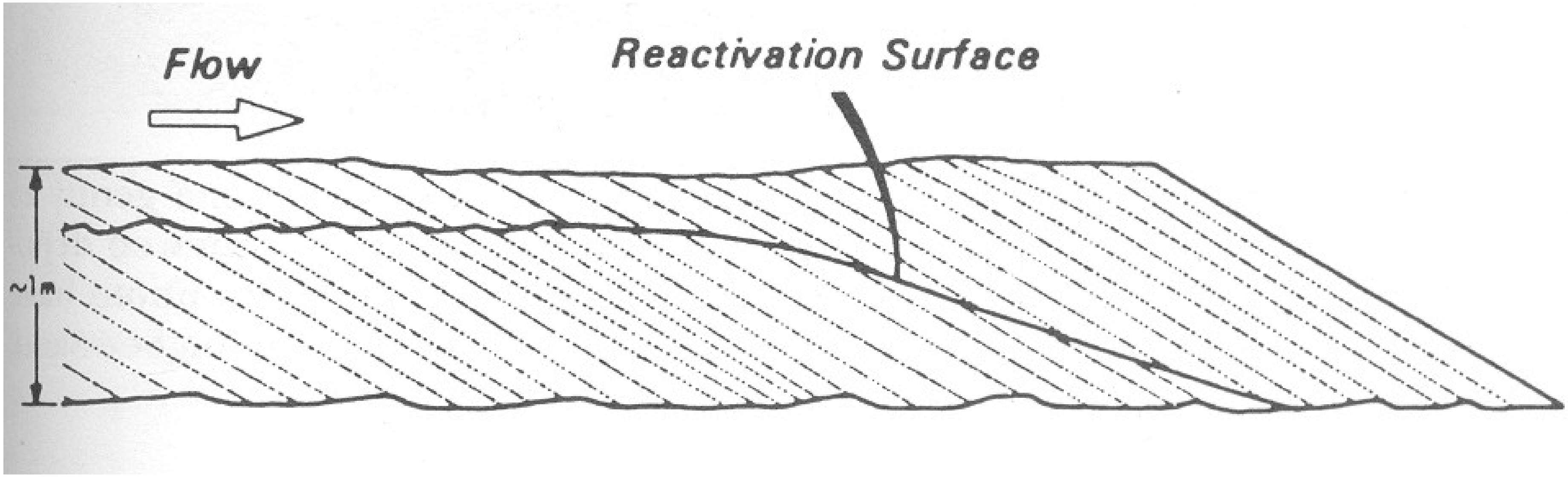
Clifton (2006)

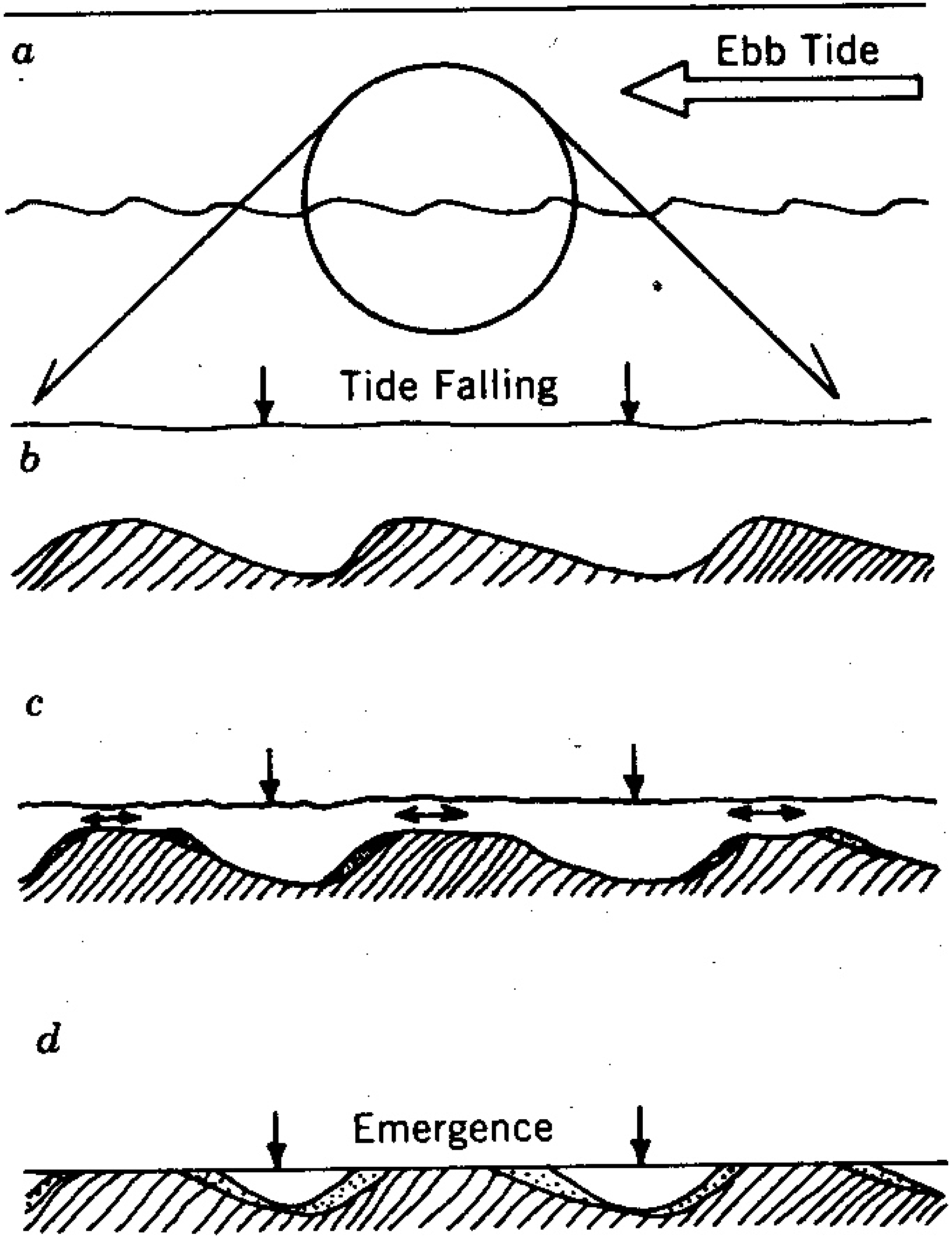
Formas de leito e estratificações geradas por correntes de maré


Flood Tide
Ebb Tide
Reactivation Surfaces



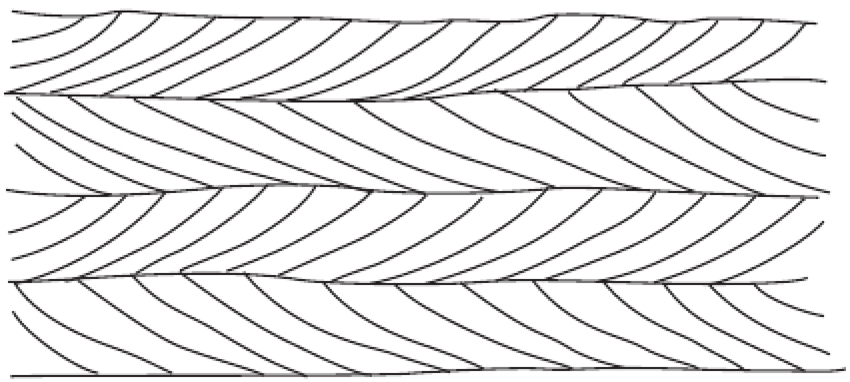
Por que o nível de sedimentos pelíticos não é erodido?


Flow
Reactivation Surface
~1m


a
Ebb Tide
Tide Falling
b
c
d
Emergence

Barras de Inframaré

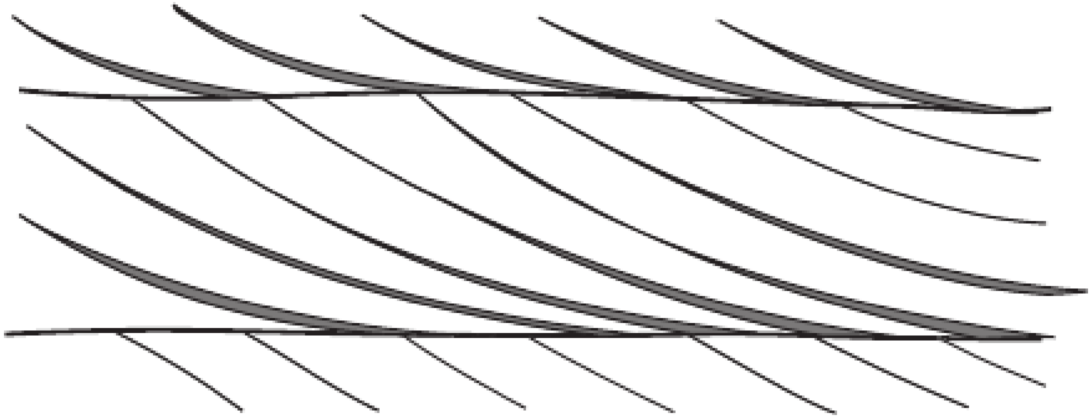
Herringbone cross-stratification



Raro e fácil de confundir com cruzadas acanaladas

Fig. 11.7 Herringbone cross-stratification in sandstone beds (width of view 1.5 m).

Mud drapes on cross-beds



Reactivation surface
(erosion surface within a set of cross-beds)

Fig. 11.8 Cross-bedded sandstone in sets 35 cm thick with the surfaces of individual cross-beds picked out by thin layers of mud. Mud drapes on cross-beds are interpreted as forming during slack water stages in the tidal cycle.

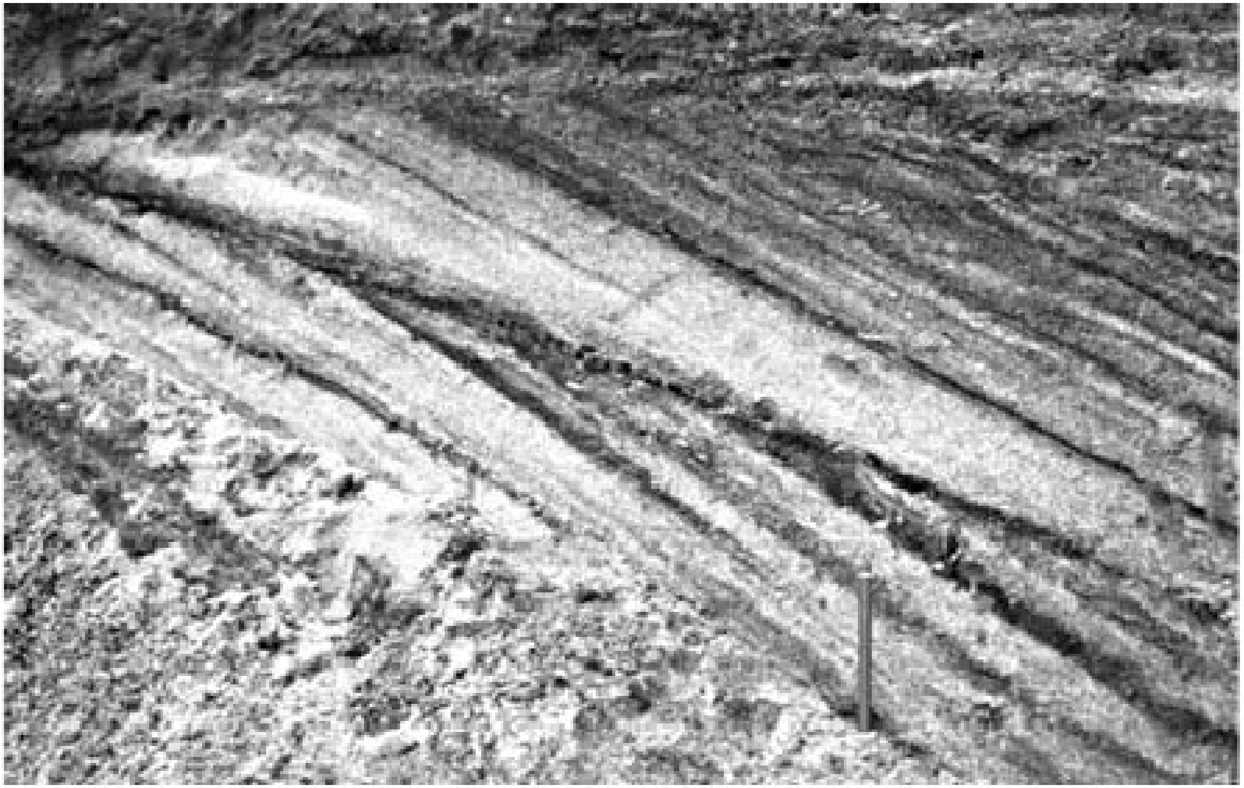
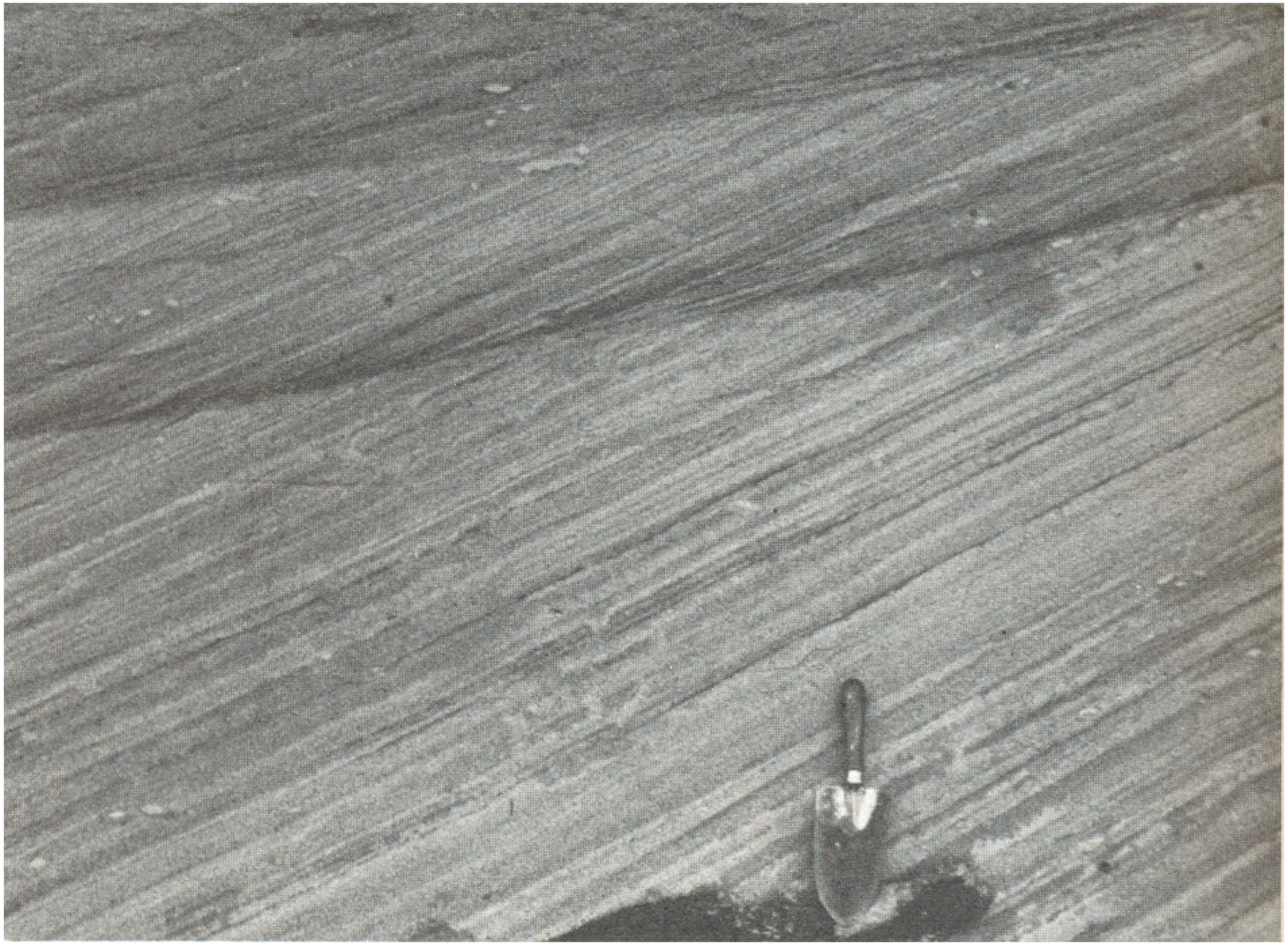


Fig. 11.9 A reactivation surface within cross-bedded sands is a minor erosion surface truncating some of the cross-beds.

Fig. 14.8 Large-scale cross-stratification formed by the migration of sandwaves in a tidally influenced shelf environment.

Barras de Inframaré



Fácies de Intermaré

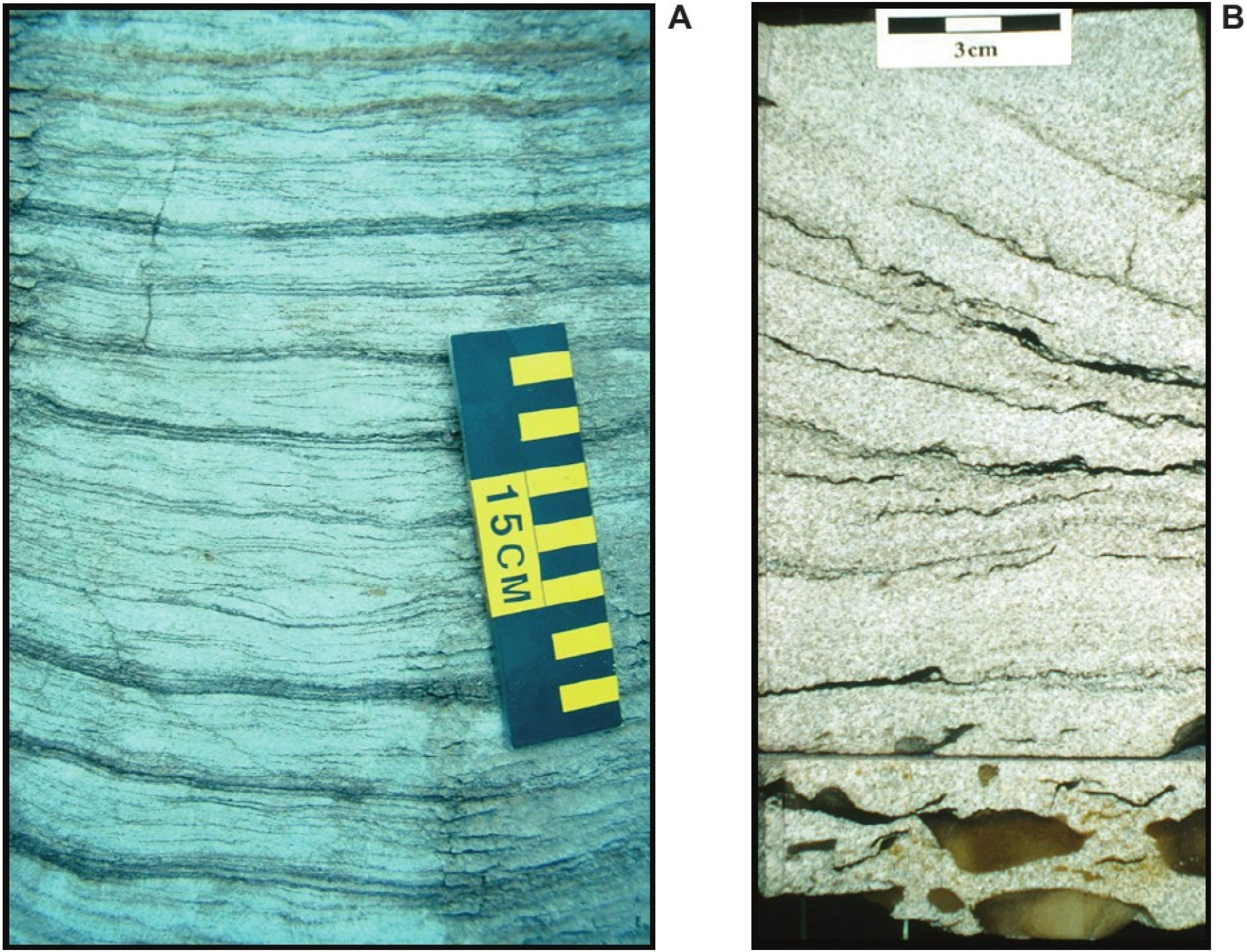
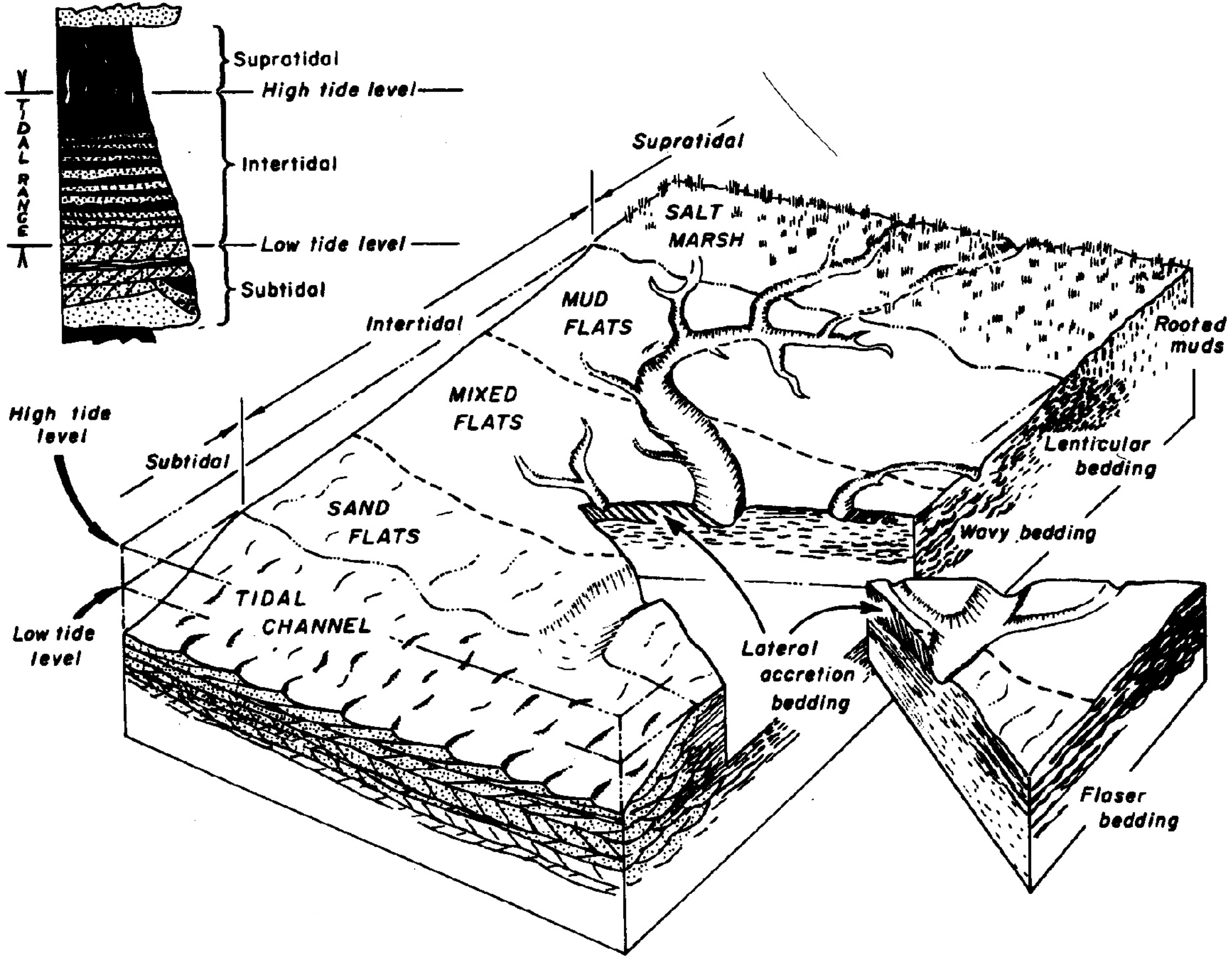


Fig. 25.—Examples of diagnostic tidal sedimentary structures; **A)** tidal rhythmites, **B)** tidal mud drapes in a cross bed that separates the cross bed into tidal bundles (from MacEachern and Pemberton, 1994).

Fácies de Supramaré

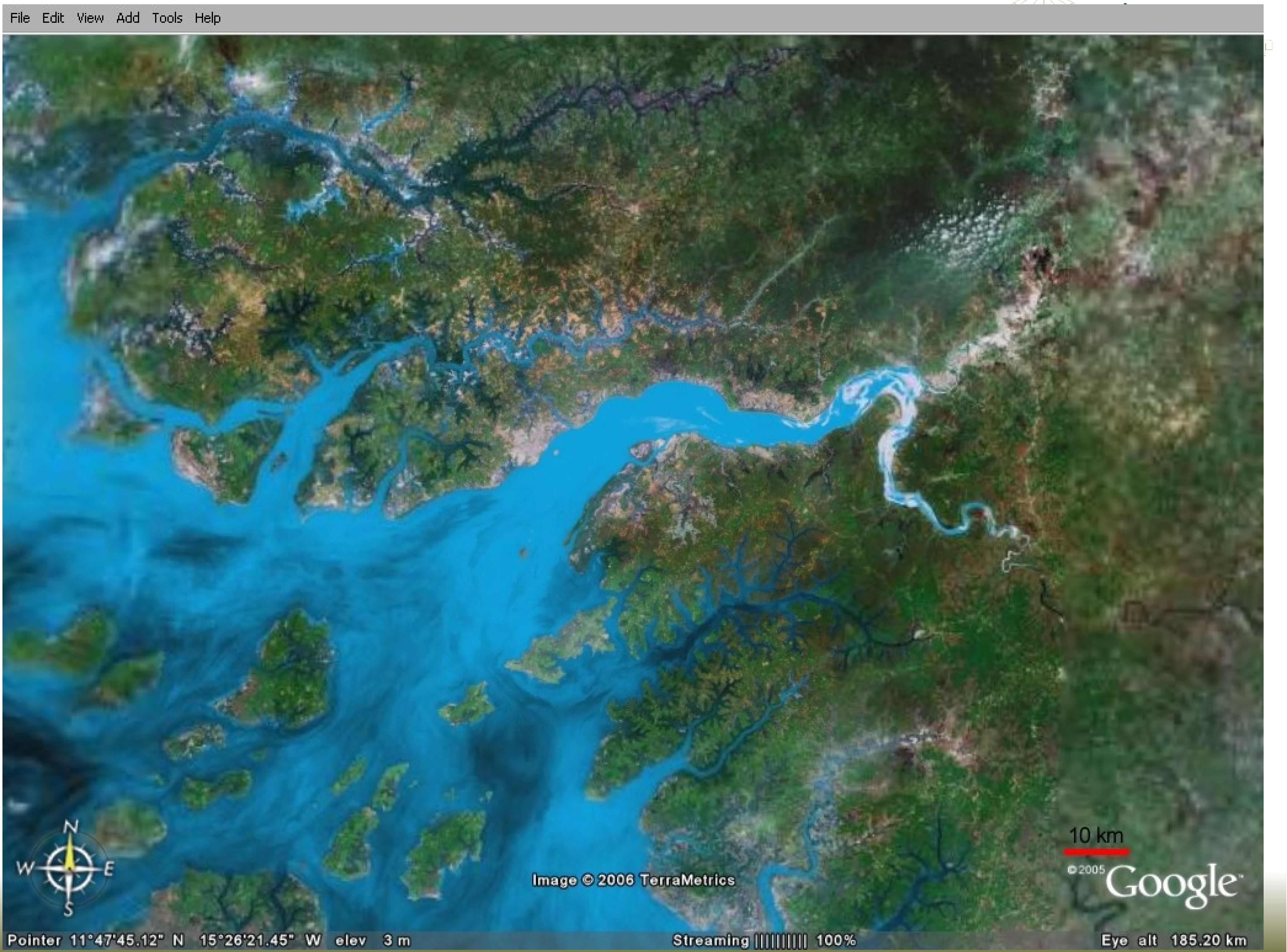
Costas dominadas por maré

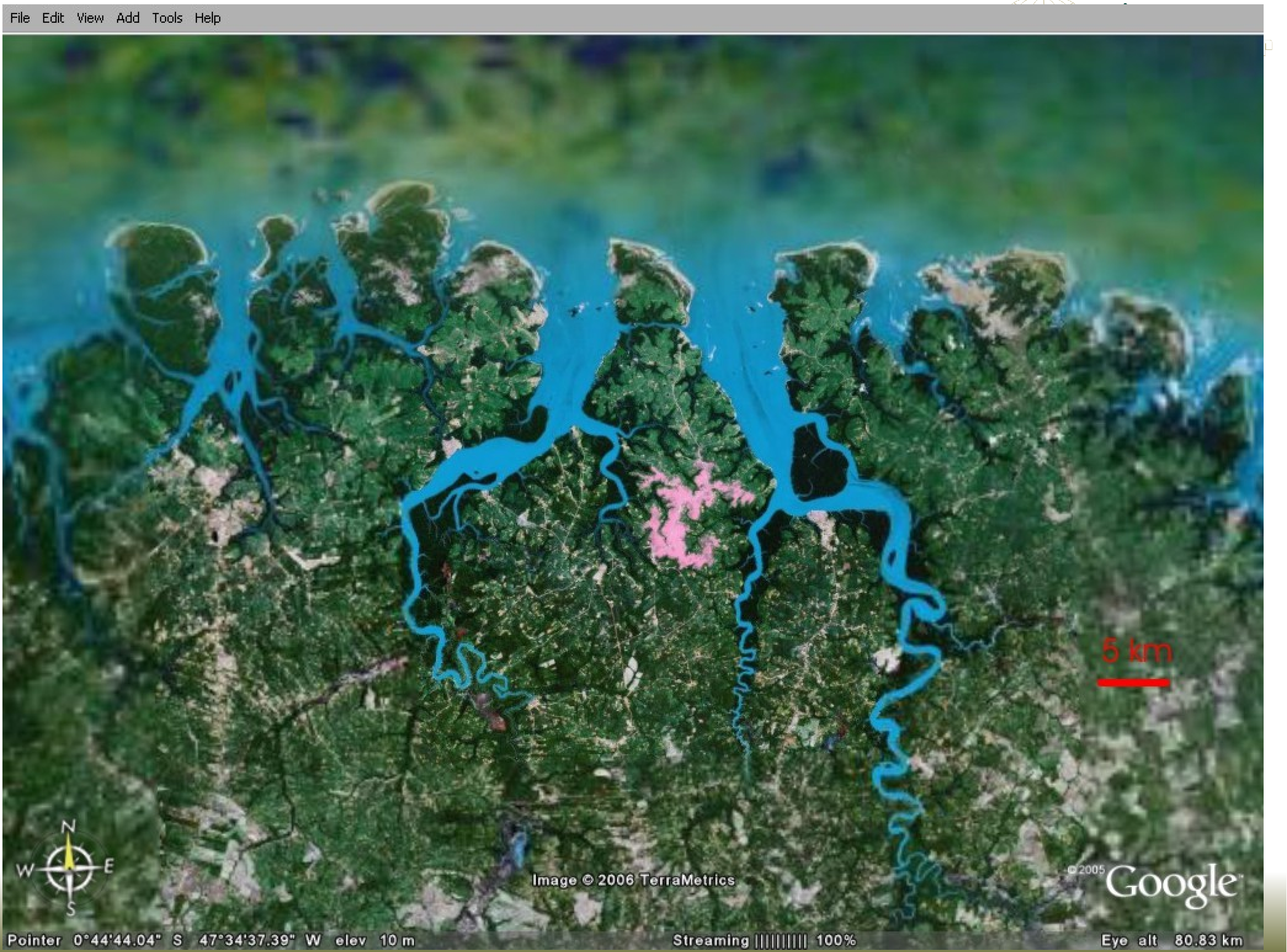

Supratidal
High tide level
TIDAL RANGE
Intertidal
Low tide level
Subtidal
Supratidal
SALT MARSH
MUD FLATS
Rooted muds
Intertidal
MIXED FLATS
Lenticular bedding
High tide level
Subtidal
SAND FLATS
Wavy bedding
TIDAL CHANNEL
Low tide level
Lateral accretion bedding
Flaser bedding

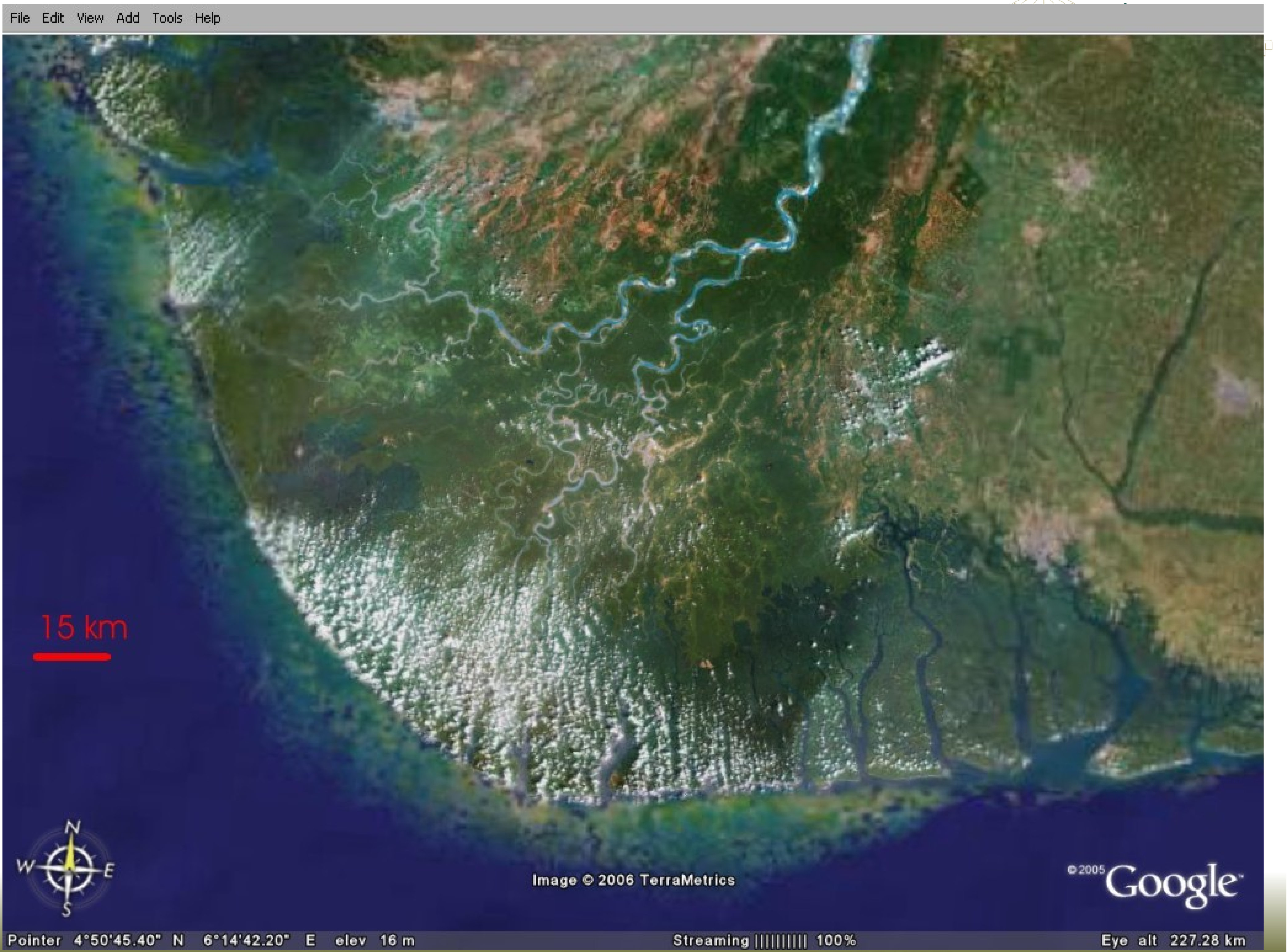
Costas dominadas por marés:

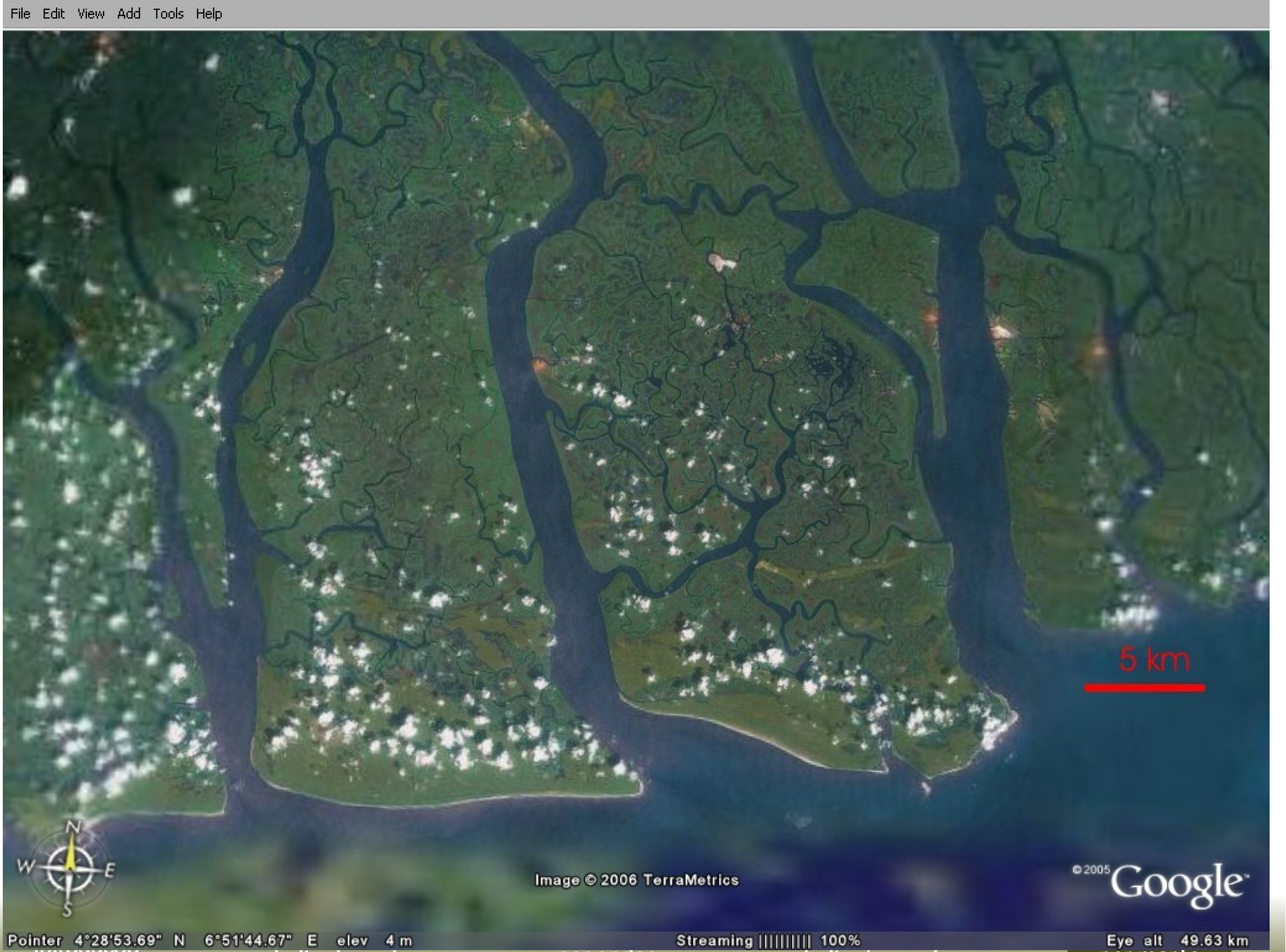
- Estuários

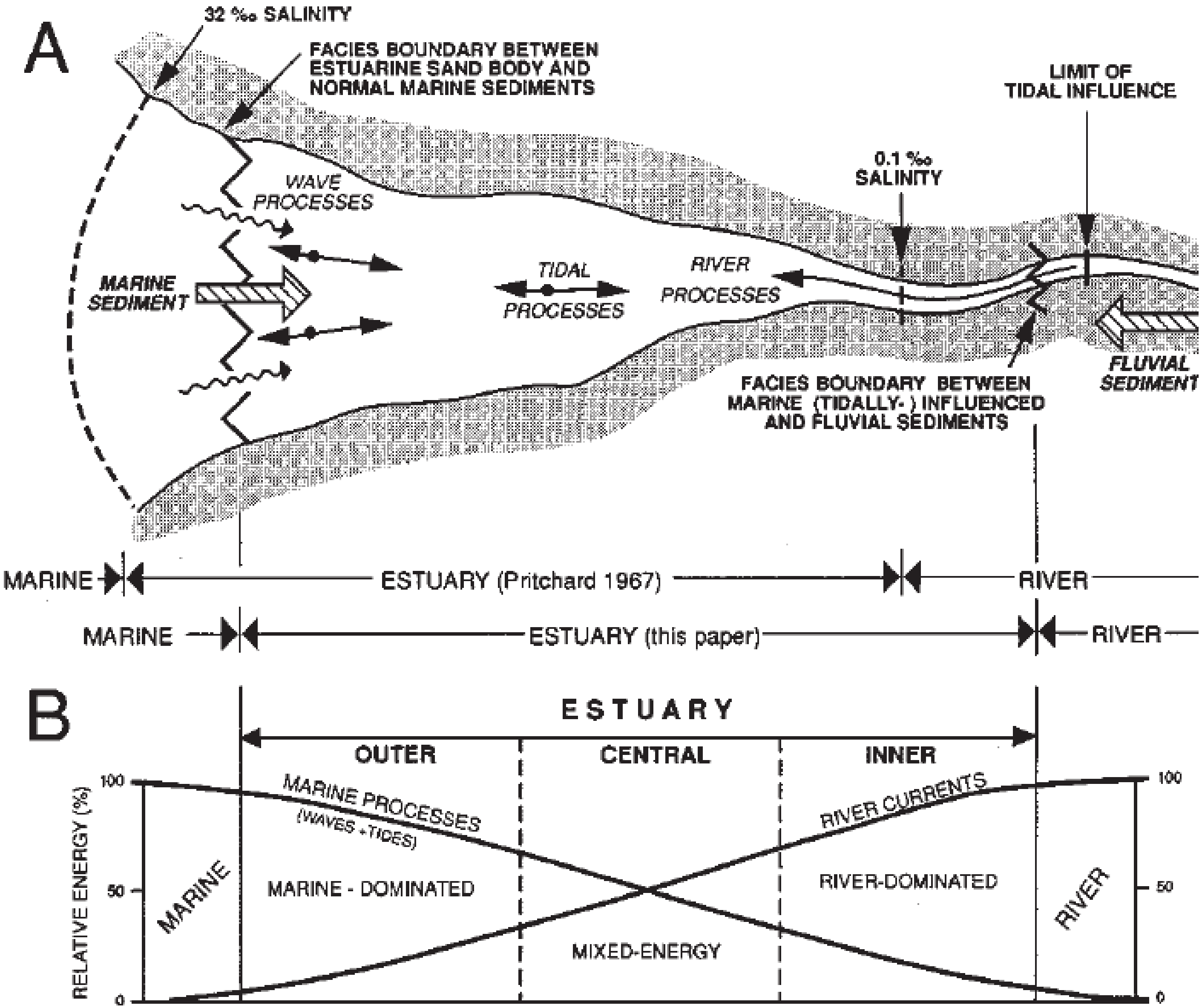
- Deltas com influência de marés


File
Edit
View
Add
Tools
Help
N
W
E
S
Image © 2006 TerraMetrics
10 km
© 2005 Google
Pointer 11°47'45.12" N 15°26'21.45" W elev 3 m
Streaming ||||||||| 100%
Eye alt 185.20 km


File Edit View Add Tools Help
5 km
N
W
E
S
Image © 2006 TerraMetrics
©2005 Google
Pointer 0°44'44.04" S 47°34'37.39" W elev 10 m
Streaming |||||||||| 100%
Eye alt 80.83 km


File Edit View Add Tools Help
15 km
N
W
E
S
Image © 2006 TerraMetrics
©2005 Google
Pointer 4°50'45.40" N 6°14'42.20" E elev 16 m
Streaming ||||||||| 100%
Eye alt 227.28 km


File Edit View Add Tools Help
5 km
N
W
E
S
Image © 2006 TerraMetrics
© 2005 Google
Pointer 4°28'53.69" N 6°51'44.67" E elev 4 m
Streaming ||||||||| 100%
Eye alt 49.63 km


A
32 ‰ SALINITY
FACIES BOUNDARY BETWEEN ESTUARINE SAND BODY AND NORMAL MARINE SEDIMENTS
LIMIT OF TIDAL INFLUENCE
0.1 ‰ SALINITY
WAVE PROCESSES
MARINE SEDIMENT
TIDAL PROCESSES
RIVER PROCESSES
FACIES BOUNDARY BETWEEN MARINE (TIDALLY-) INFLUENCED AND FLUVIAL SEDIMENTS
FLUVIAL SEDIMENT
MARINE
ESTUARY (Pritchard 1967)
RIVER
MARINE
ESTUARY (this paper)
RIVER
B
ESTUARY
OUTER
CENTRAL
INNER
RELATIVE ENERGY (%)
100
50
0
MARINE PROCESSES (WAVES +TIDES)
RIVER CURRENTS
MARINE
MARINE - DOMINATED
MIXED-ENERGY
RIVER-DOMINATED
RIVER
100
50
0

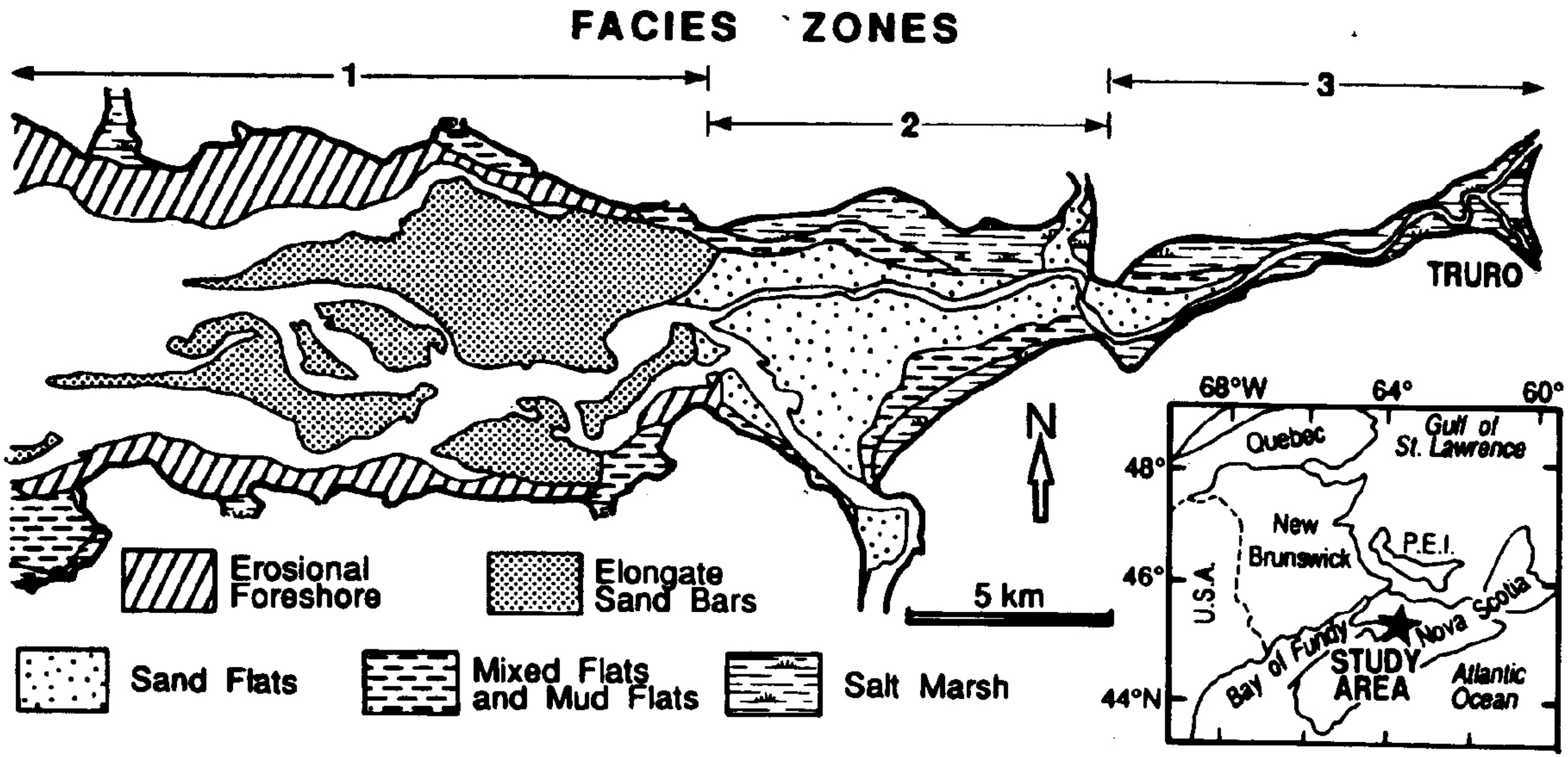
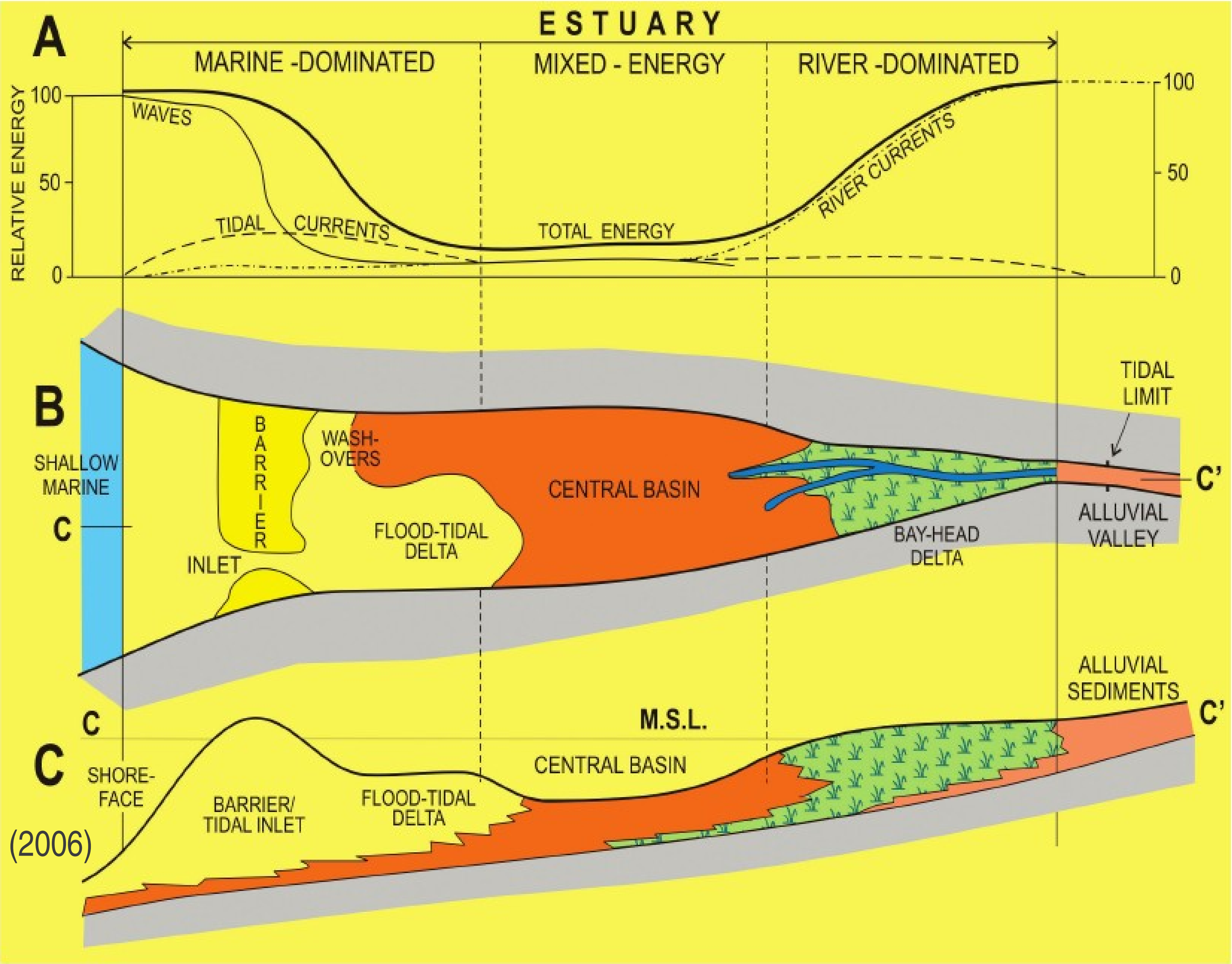
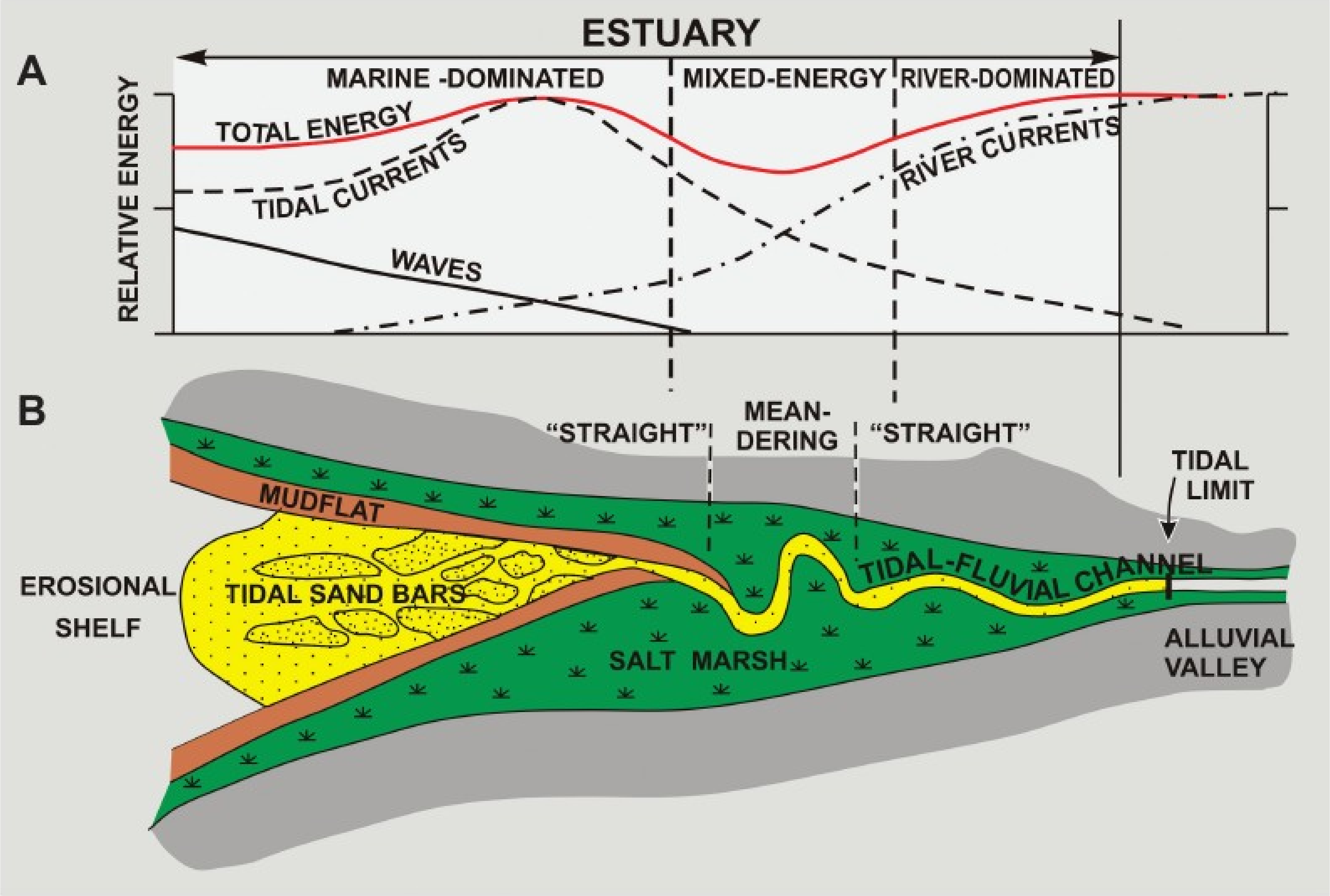


Figure 22 Facies distribution in the Cobequid Bay – Salmon River macrotidal estuary, Bay of Fundy. Facies zone 1, elongate sand bars (medium to coarse sand); zone 2, upper-flow-regime sand flats (fine sand); and zone 3, tidal-fluvial transition. The erosional foreshores bordering zone 1 are unique to Cobequid Bay. Sand bars in estuaries such as the Severn River are bordered by mud flats and salt marshes. After Dalrymple *et al.* (1990).



Boyd et al. (2006)



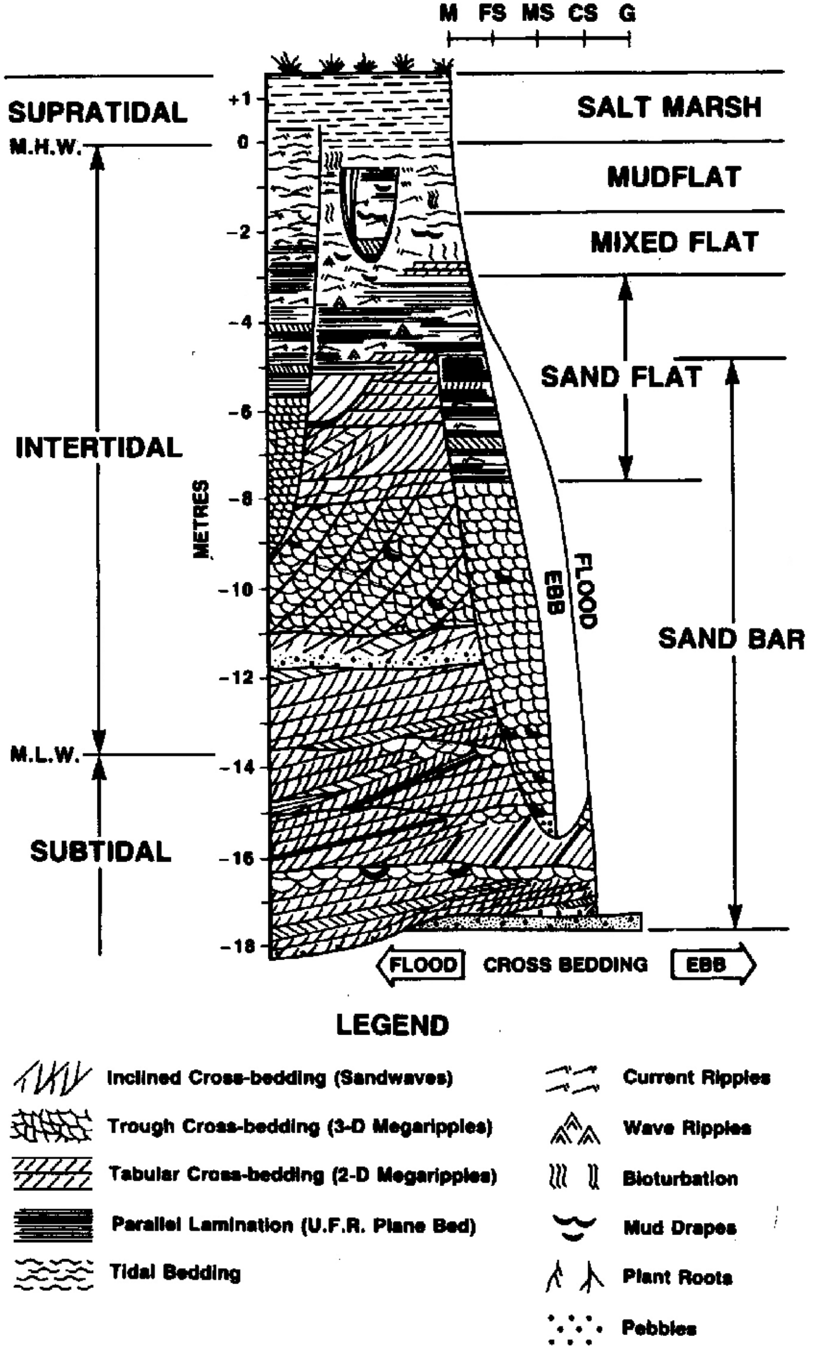
Boyd et al. (2006)

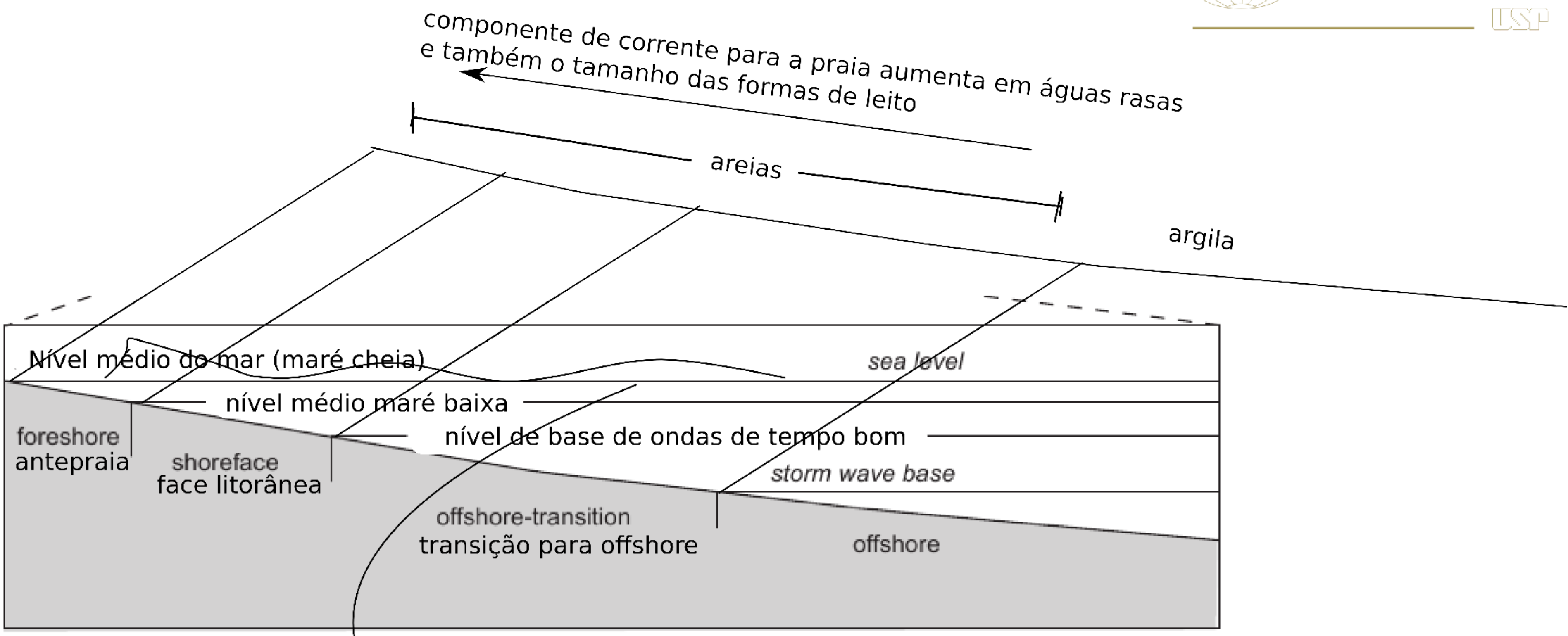

File
Edit
View
Add
Tools
Help
1 km
N
E
S
W
Image © 2006 TerraMetrics
©2005 Google
Pointer 45°45'28.60" N 64°15'20.34" W elev 4 m
Streaming |||||||||| 100%
Eye alt 13.99 km

FIG. 14.—**A)** Overview of elongate sand bars developed in the outer (marine dominated) part of the Cobequid Bay–Salmon River Estuary, Bay of Fundy, Canada. **B)** Close up of one elongate sand bar from Part A showing the scale of the bar (approximately 500 m across) and the superimposed dunes on the bar at several different length scales (Both photos by R. Dalrymple).

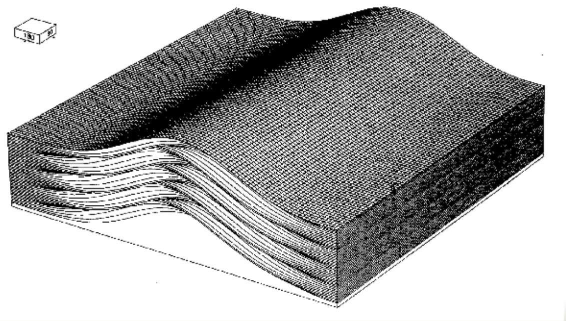
Boyd et al. (2006)

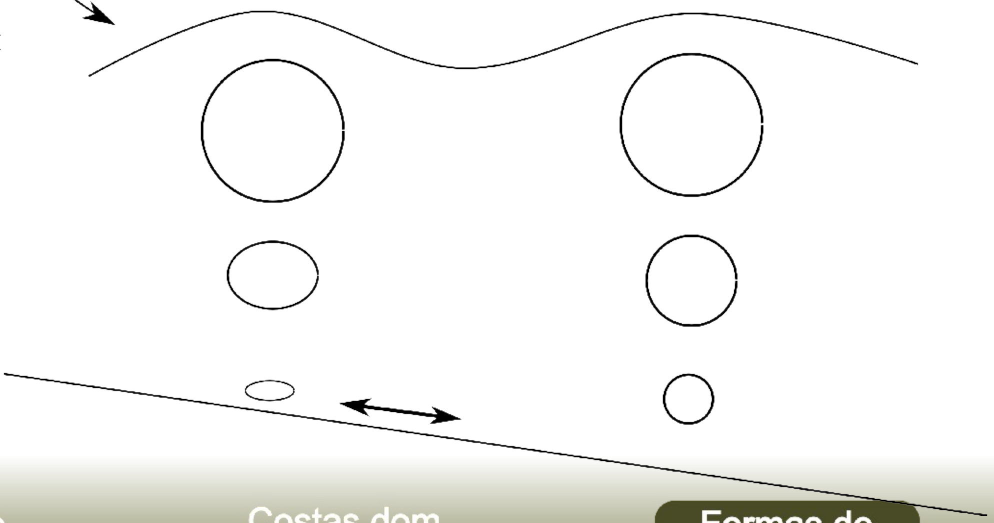
Modelo de fácies

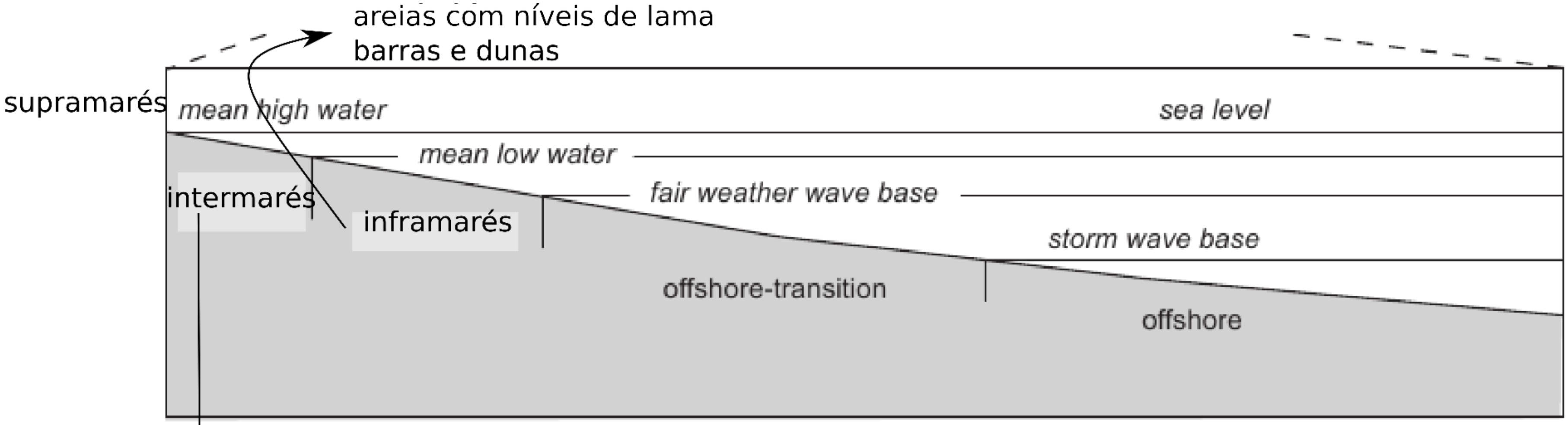




ripples de fluxo oscilatŕorio
- simétricas
- cúspides (men sempre)
- cristas retas e longas (10 a 100 x o comprimento de onda)
- bifurcações em Y







areias com níveis de lama
barras e dunas

+ raso

Planície de lama - domínio de lama com ripples de areia isoladas

Planície mista ripples de correntes separadas por camadas de lama de mesma espessura

Planície de areia - ripples de corrente com filmes de lama

+fundo

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