







How many of you have actually

SEE

a river

NATURAL AND MANAGED RESOURCES AND SYSTEMS: THEIR USES

CONTINENTAL AND COASTAL SOCIOECOLOGICAL SYSTEMS

Gerardo M. E. Perillo

Instituto Argentino de Oceanografía &
Departamento de Geología,
Universidad Nacional del Sur





ECOLOGICAL FLOW (E-FLOWS)

E-flows represent those discharges that are required to maintain an adequate and sustainable volume of water for both human and species living downstream, including the ocean. This is especially true for discharges made by dams, but they also have to be considered in the management of any basin.

1800



CONTINENTAL ECOSYSTEMS

- Glaciers
- Rivers
- Deltas
- Lakes
- Continental wetlands

COASTAL ECOSYSTEMS (I)

- Clifffy coasts
- Beaches
- Reefs

COASTAL ECOSYSTEMS (II)

- **Coastal wetlands**
 - **Tidal flats**
 - **Marshes**
 - **Mangroves**
 - **Freshwater marshes (tidal dominated)**
 - **Seagrasses**
- **Estuaries**



COASTAL WETLANDS

AN INTEGRATED ECOSYSTEM APPROACH



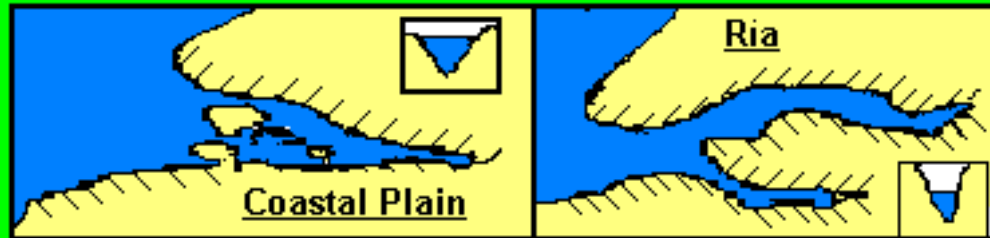
EDITED BY

GERARDO M.E. PERILLO • ERIC WOLANSKI
DONALD R. CAHOON • MARK M. BRINSON

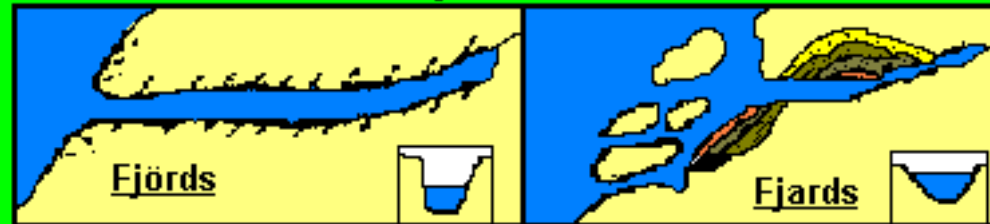
(PERILLO, 1995)

PRIMARY ESTUARIES

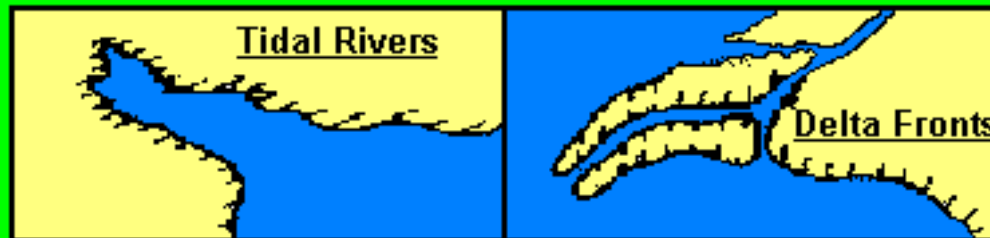
Former Fluvial Valleys



Former Glacial Valleys



River Dominated



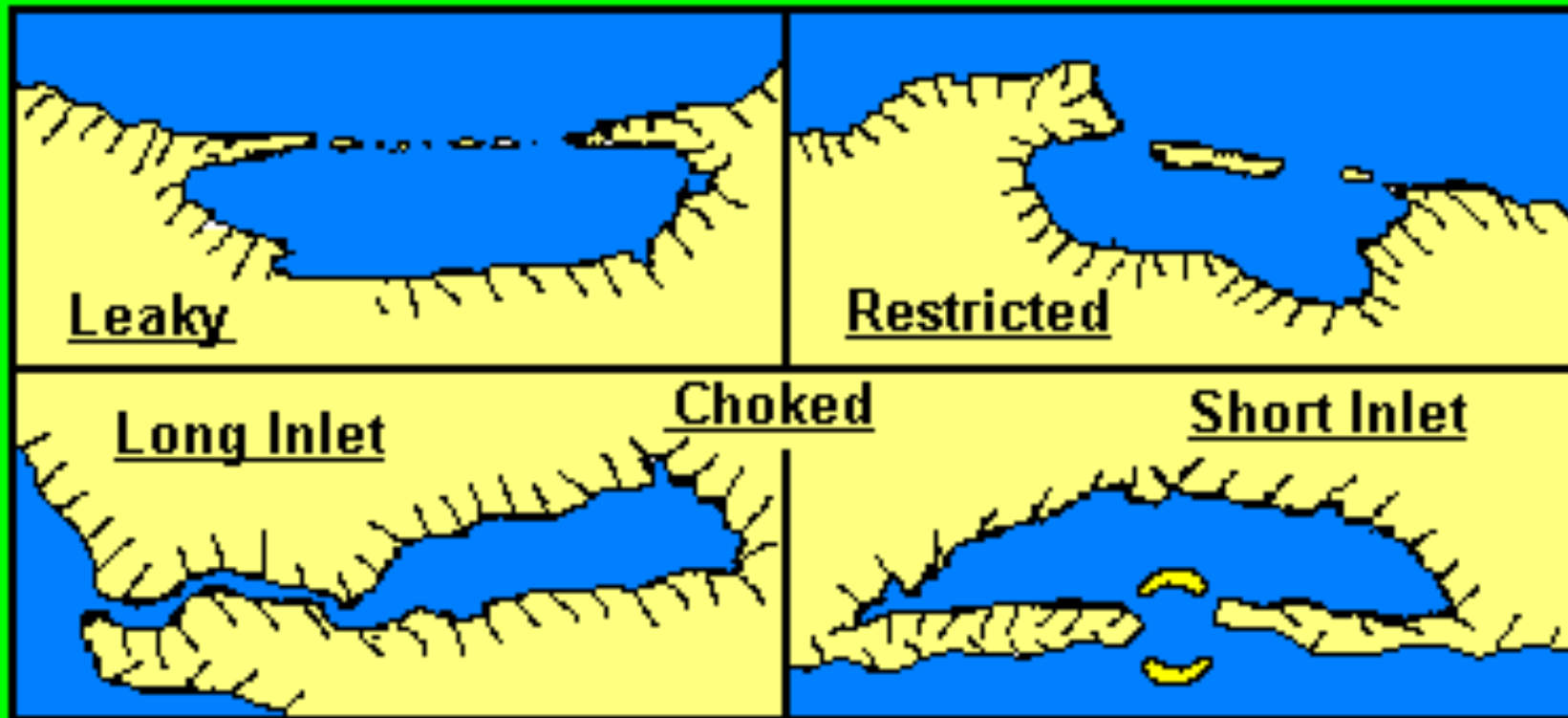
Structural



MORPHOGENETIC CLASSIFICATION (PERILLO, 1995)

SECONDARY ESTUARIES

Coastal Lagoons



Developments in Sedimentology 53

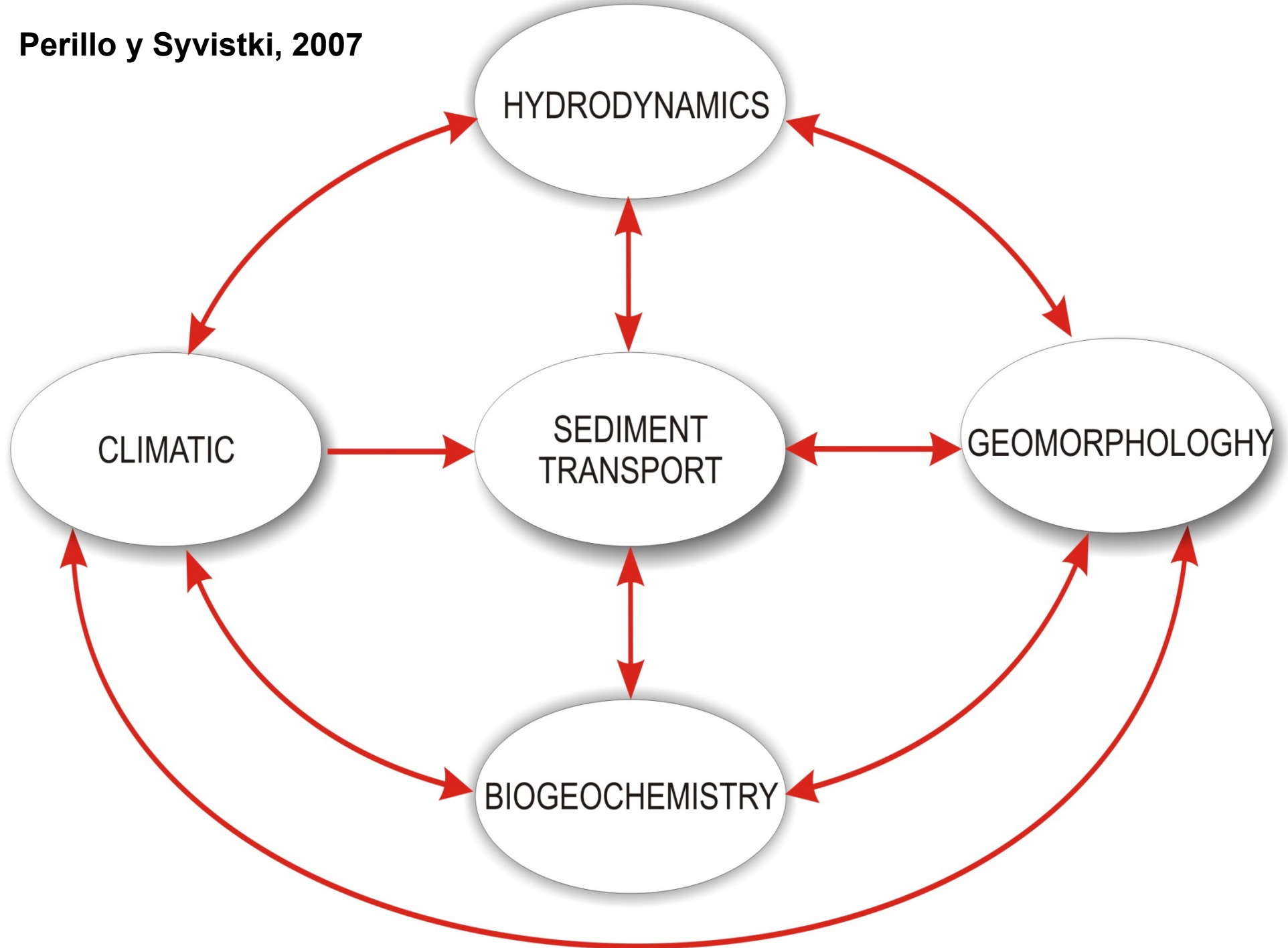


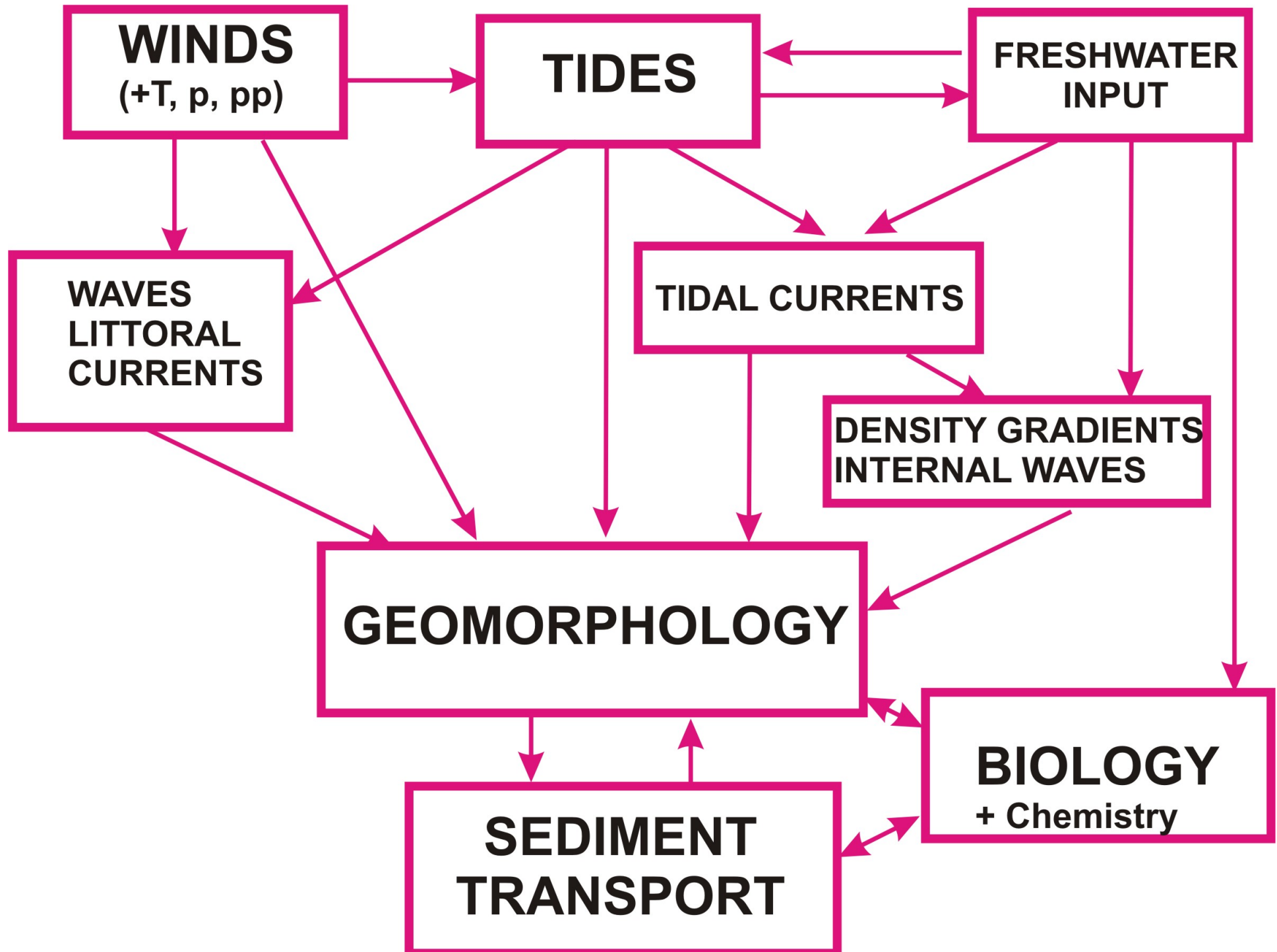
**Geomorphology and
Sedimentology of Estuaries**

G.M.E. Perillo
(Editor)

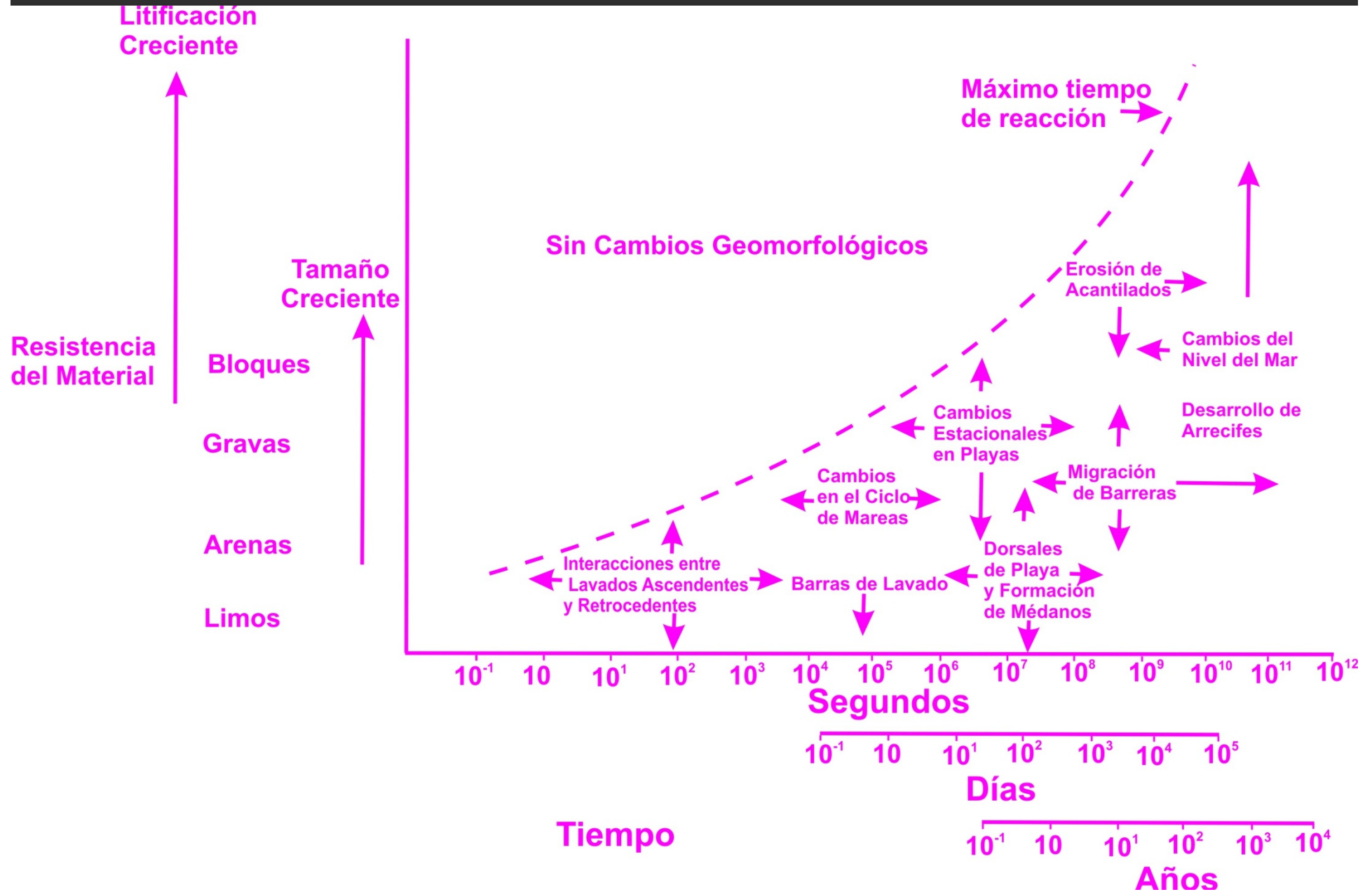
Elsevier

Perillo y Syvistki, 2007





COMBINATION OF SCALES



CONTROLLING FACTORS (p.e., COASTS)

- **Climate**
 - Polar & subpolar
 - Temperate
 - Subtropical & tropical
- **Coastal type**
 - Trailing margin
 - Collision margin
 - Marginal seas
- **Coastal lithology**
 - Hard rocks (igneous, metamorphic, consolidated sedimentary)
 - Soft rocks (Poorly consolidated sedimentary)
- **Tidal range**
 - Microtidal
 - Mesotidal
 - Macrotidal
 - Hypertidal
- **Coastal stability**
 - Inmersion
 - Emersion
 - Stable

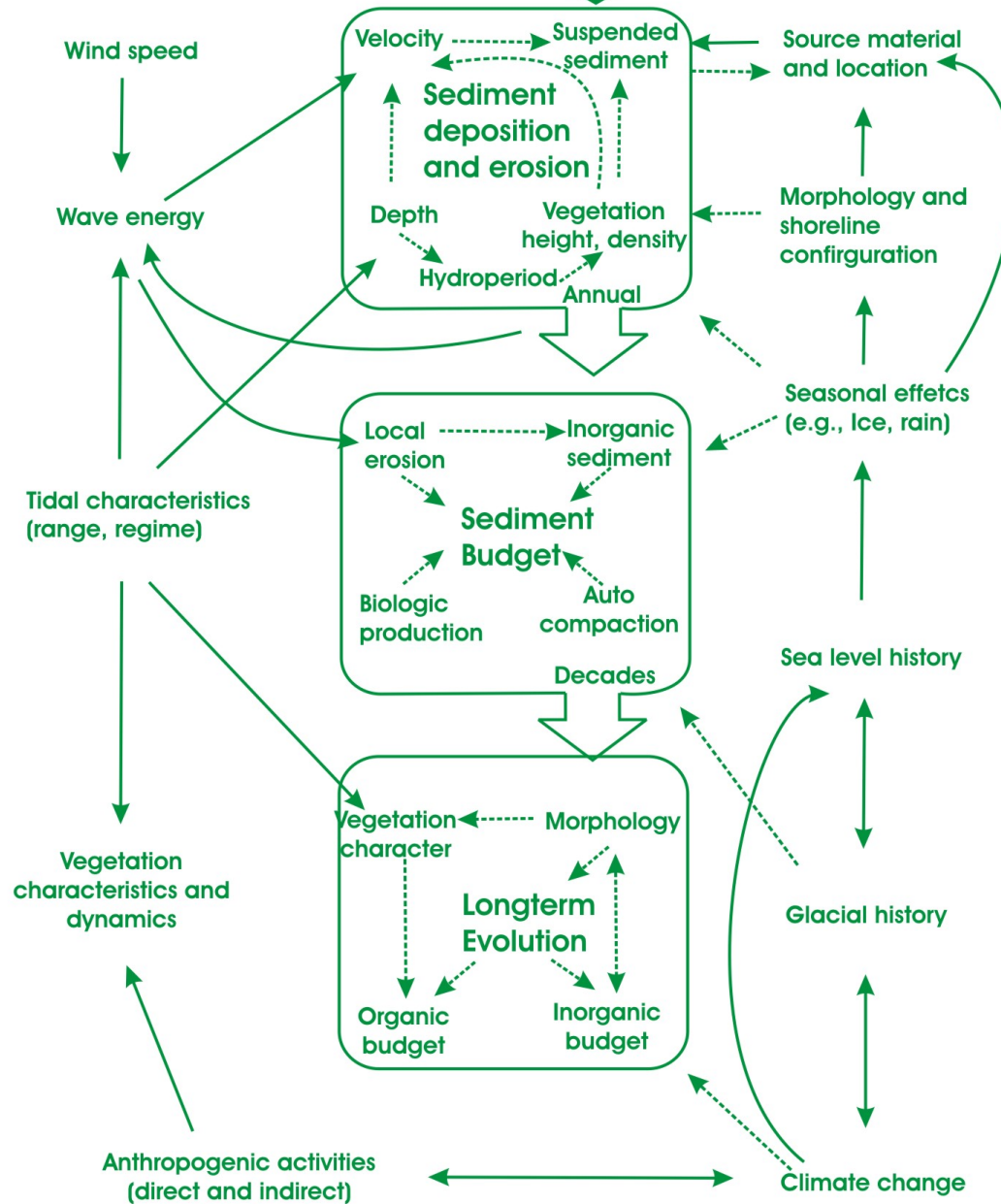
CONTROLLING FACTORS (p.e., COASTS) II

- **River discharge + Solid discharge**
 - High
 - Low
- **Marine difussive forces (waves, tides, littoral currents etc.)**
 - High
 - Low
- **Atmospheric influence**
 - High
 - Low

PROCESS VARIABLES

TIME SCALE

INTRINSIC/
EXTRINSIC FACTORS



(Modified from Davidson-Arnott et al., 2002)

ENERGY BALANCE (p.e. coastal environment)

CONTINENTAL ENERGY

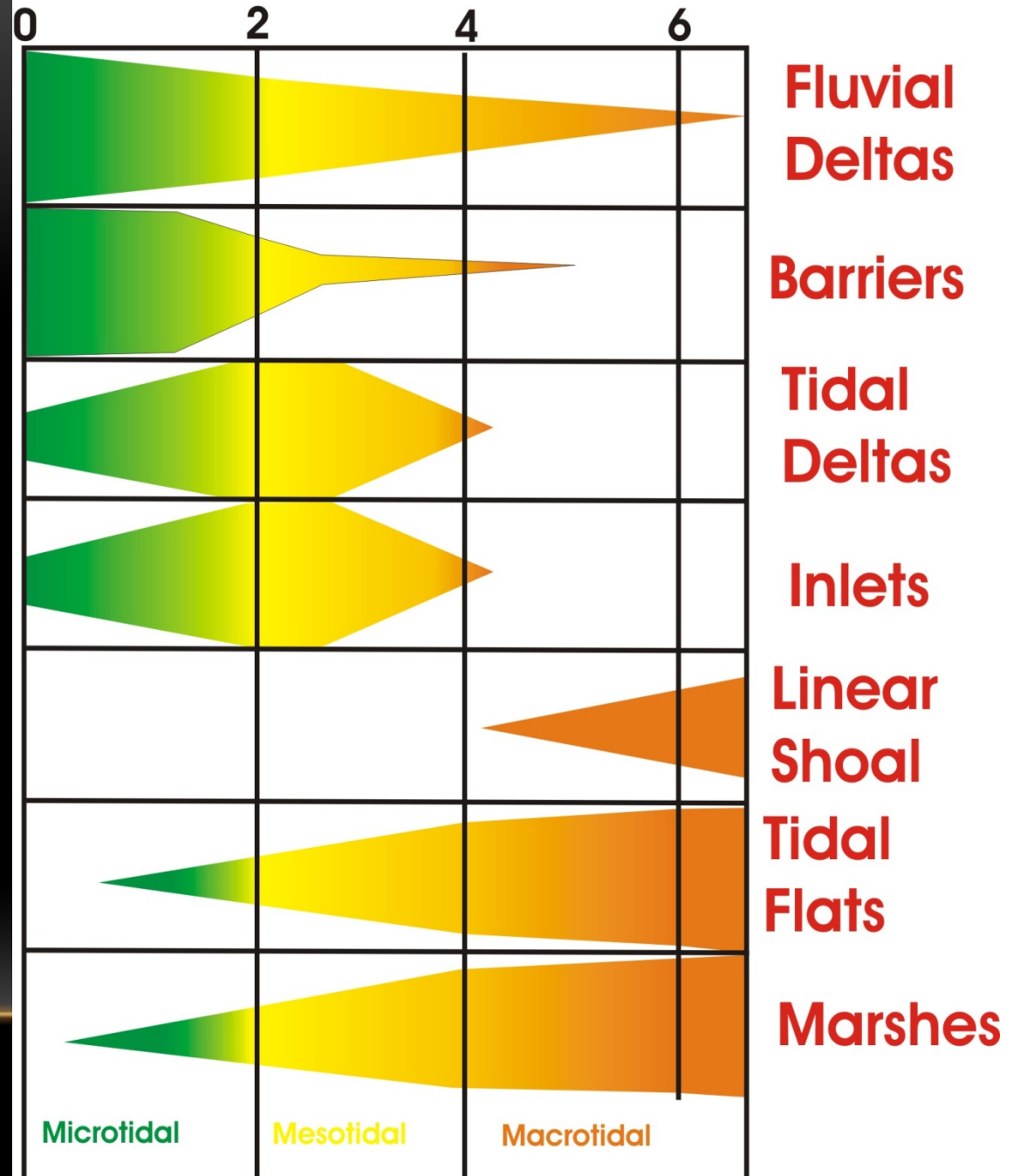


MARINE ENERGY

THE COAST

- Relation oceanic vs continental energy
- Sediment supply
- Coastal stability
- Climatic regions

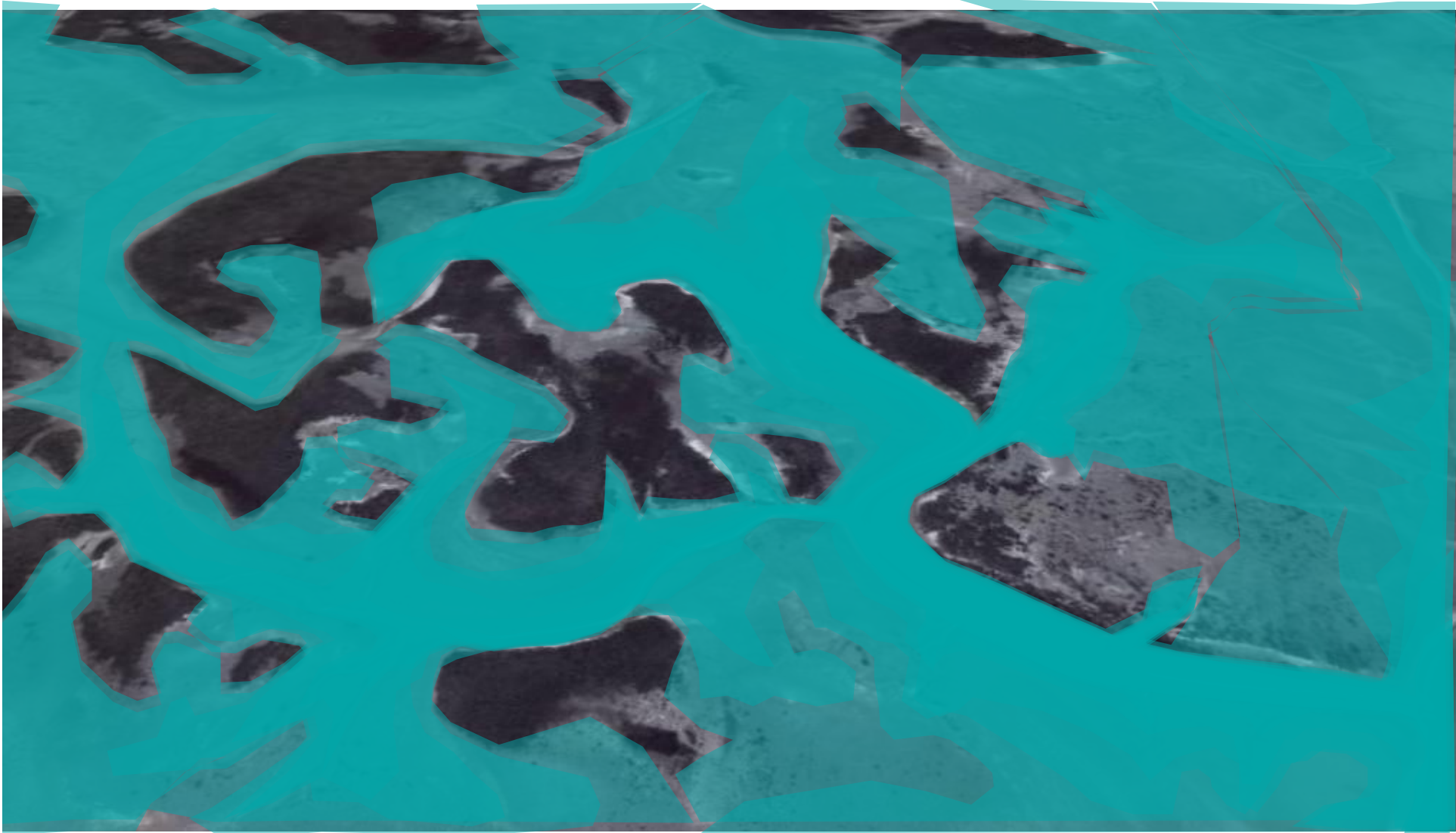
Tidal range (m)

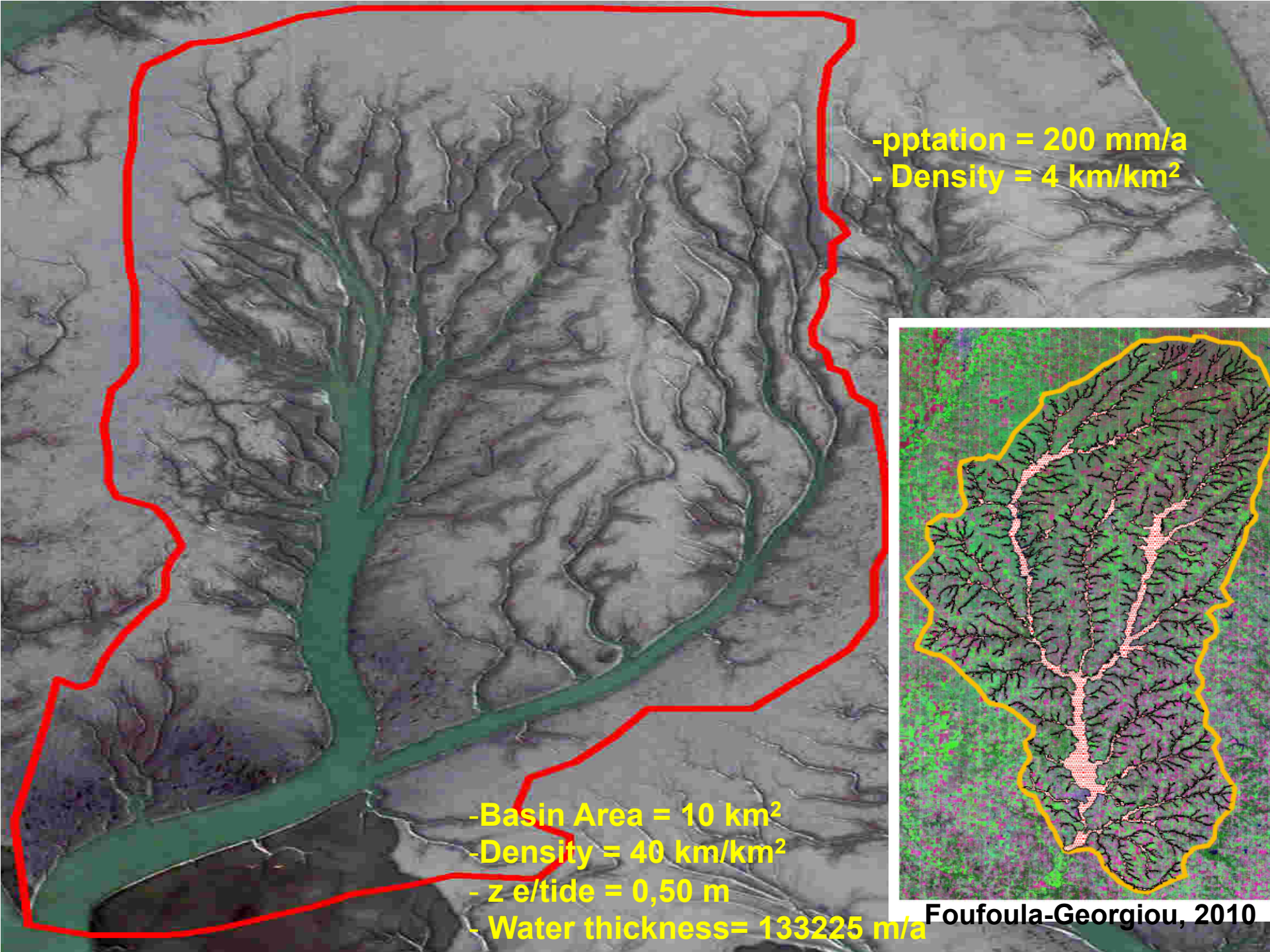


Modified from Hayes, 1975









-pptation = 200 mm/a
- Density = 4 km/km²

-Basin Area = 10 km²
-Density = 40 km/km²
- z e/tide = 0,50 m
- Water thickness= 133225 m/a

Foufoula-Georgiou, 2010