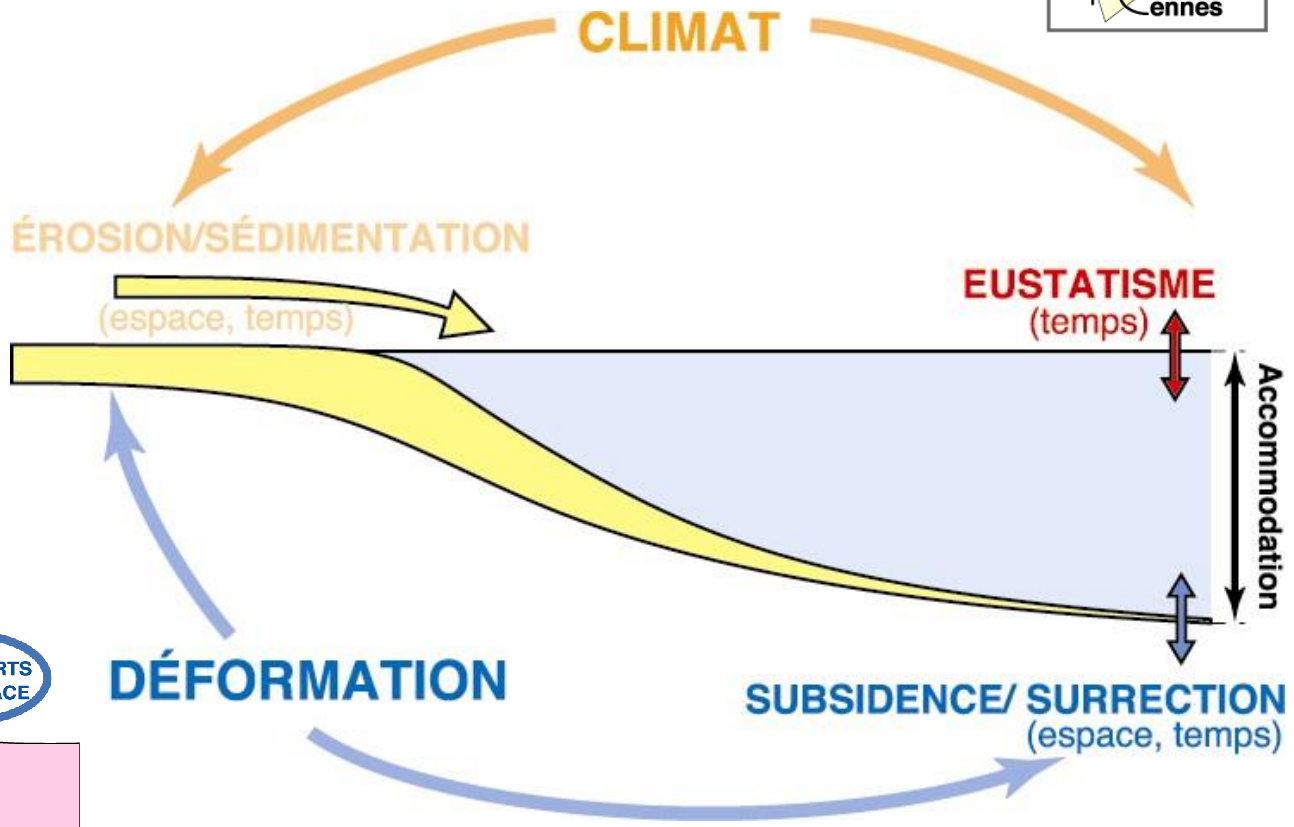
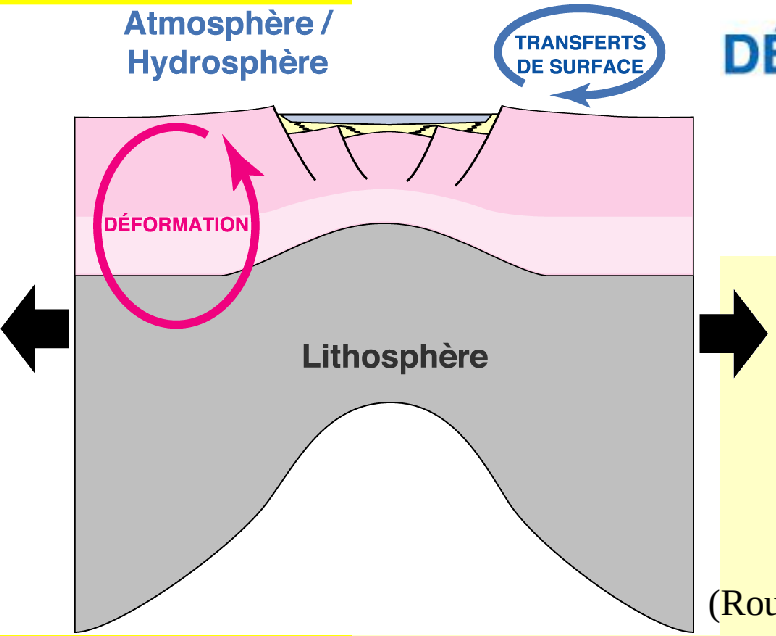
La Stratigraphie Séquentielle Haute Résolution

C. ROBIN (Géosciences - Université de Rennes)

L'enregistrement sédimentaire

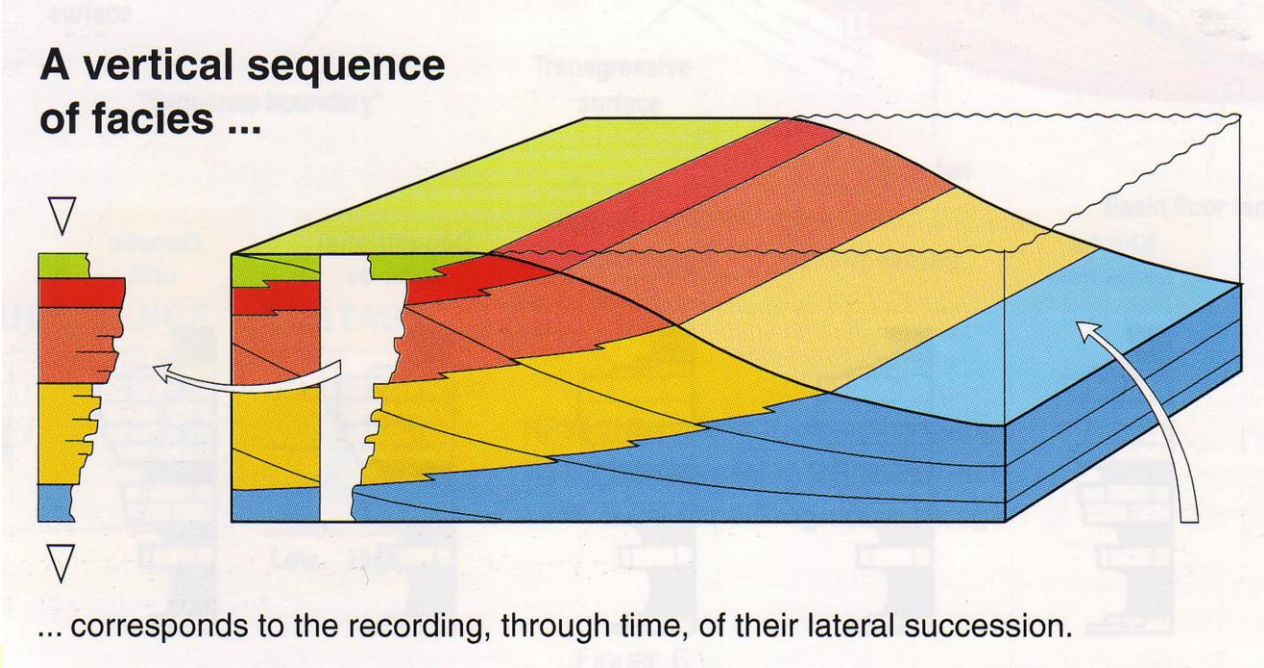


(Robin & Guillocheau, inédit)



(Rouby, 2002)

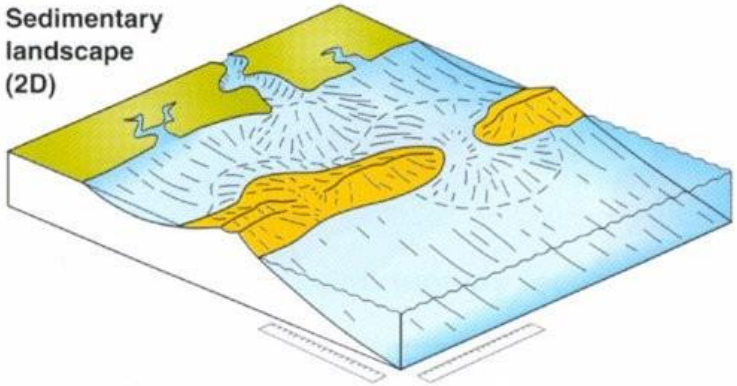
La loi de Walther



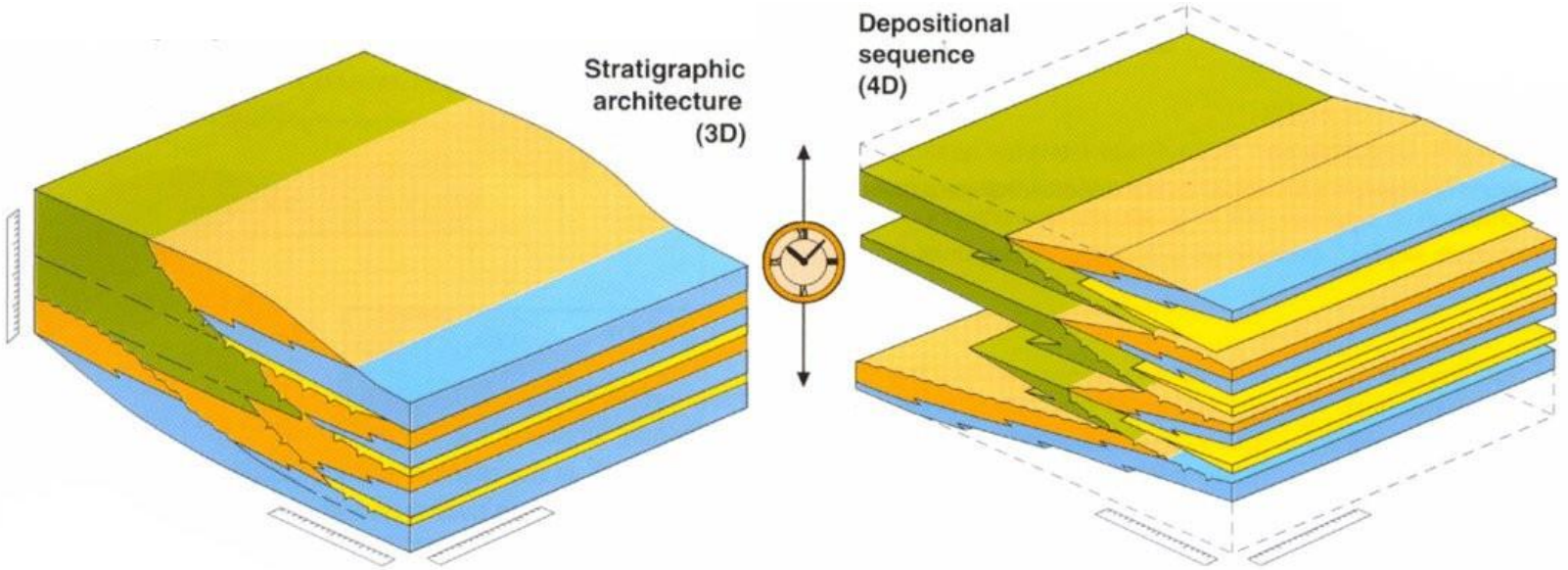
(Homewood et al., 1999)

La stratigraphie séquentielle

1. reconstitution des environnements de dépôts



2. succession des environnements de dépôts dans l'espace et dans le temps



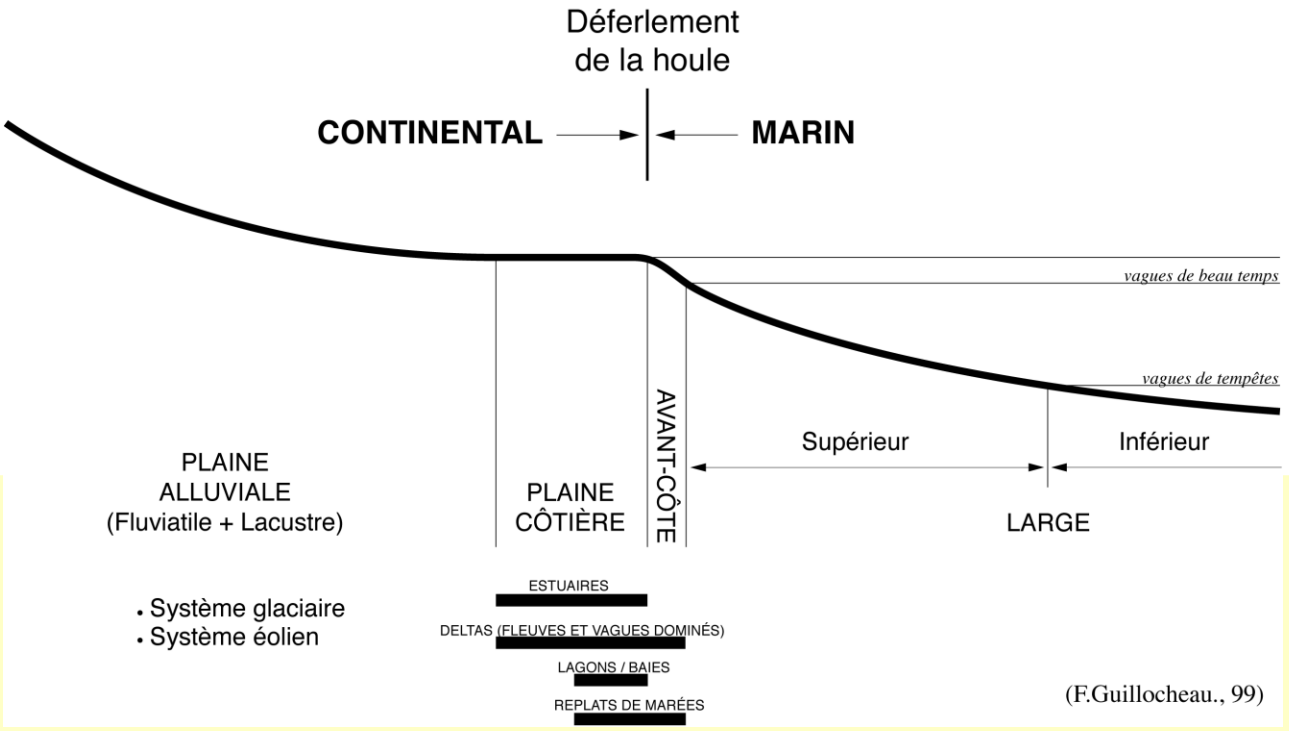
(Homewood et al., 1999)

Les processus autocycliques

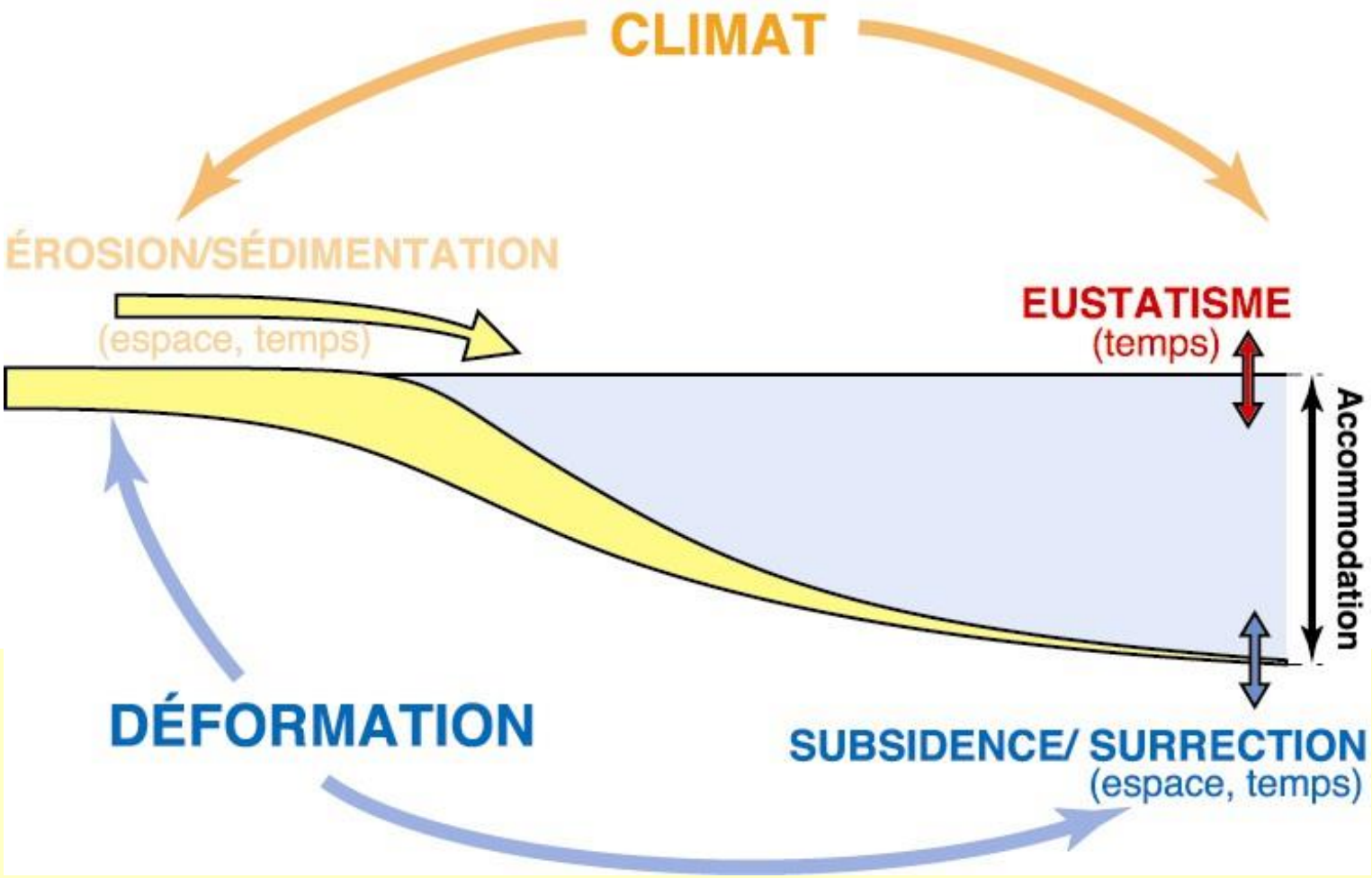
PROCESSUS AUTOCYCLIQUES

Milieux de dépôts - Processus hydrodynamiques

LA SEDIMENTOLOGIE DE FACIES



Les processus allocycliques

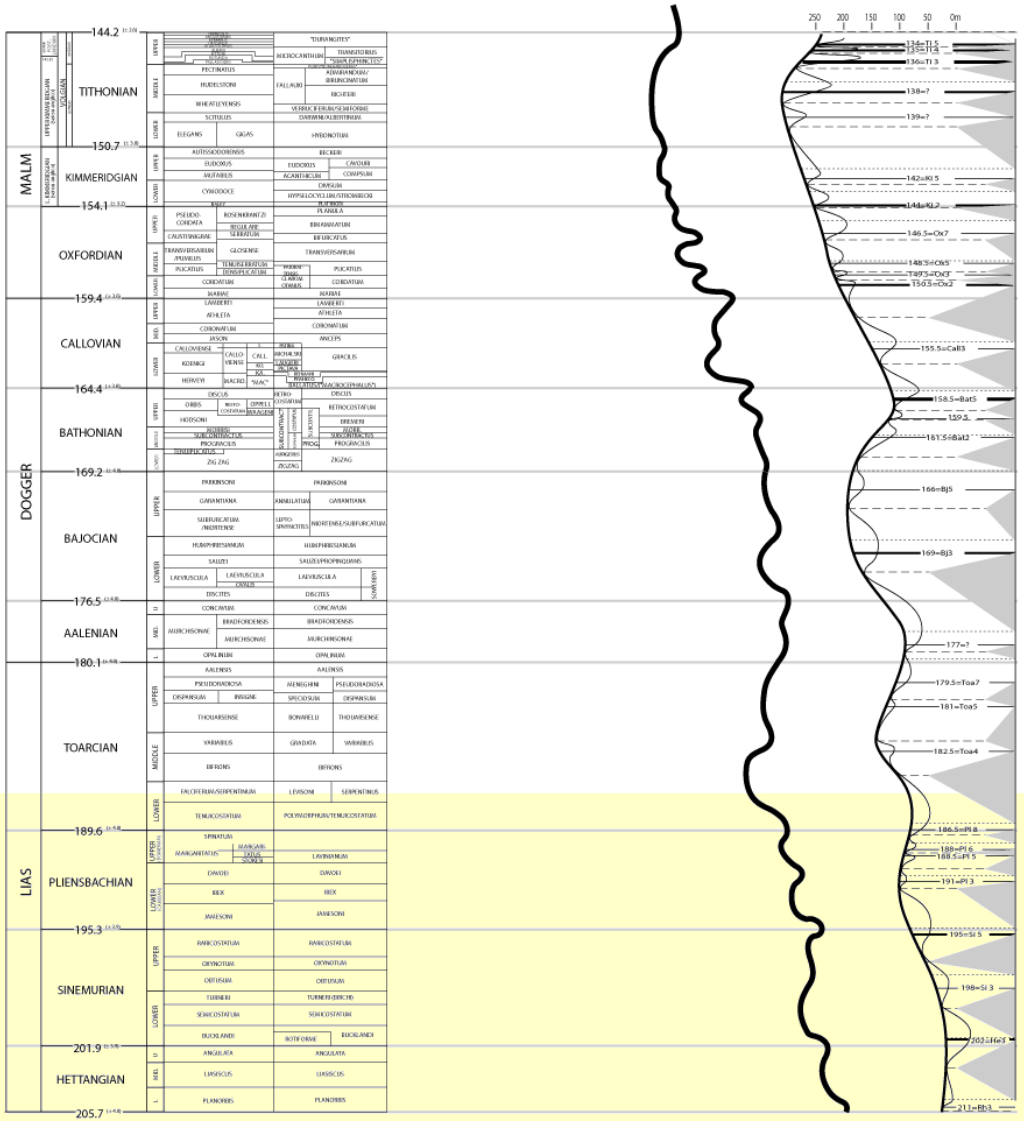


(Robin & Guillocheau, inédit)

L'eustatisme

CHARTE BIOCHRONOSTRATIGRAPHIQUE — Hardenbol et al. (1998)

CHARTES EUSTATIQUES — Hallam (1988) Hardenbol et al. (1998)

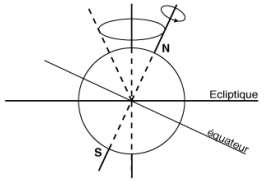


(Haq et al., 1987)

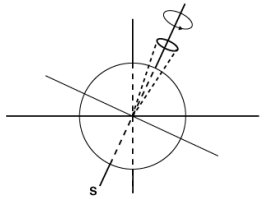
Le glacio-eustatisme

PARAMETRES ORBITAUX DE LA TERRE ET CYCLES DE MILANKOVITCH

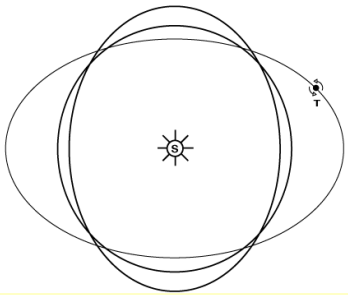
PRECESSION : 21 000 ans



OBLIQUITÉ : 40 000 ans

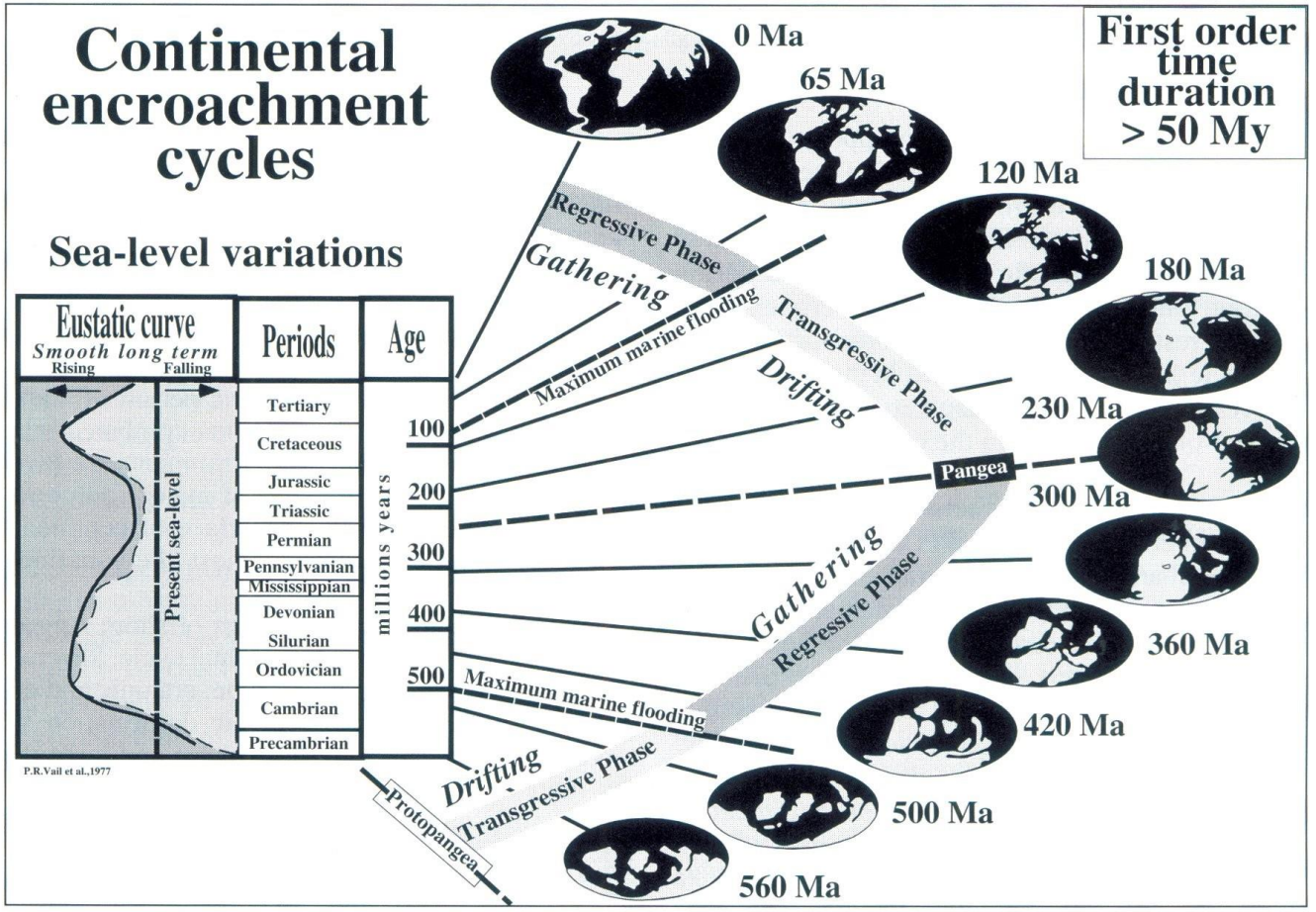


EXCENTRICITÉ DE L'ORBITE : ≃ 100 000 ans



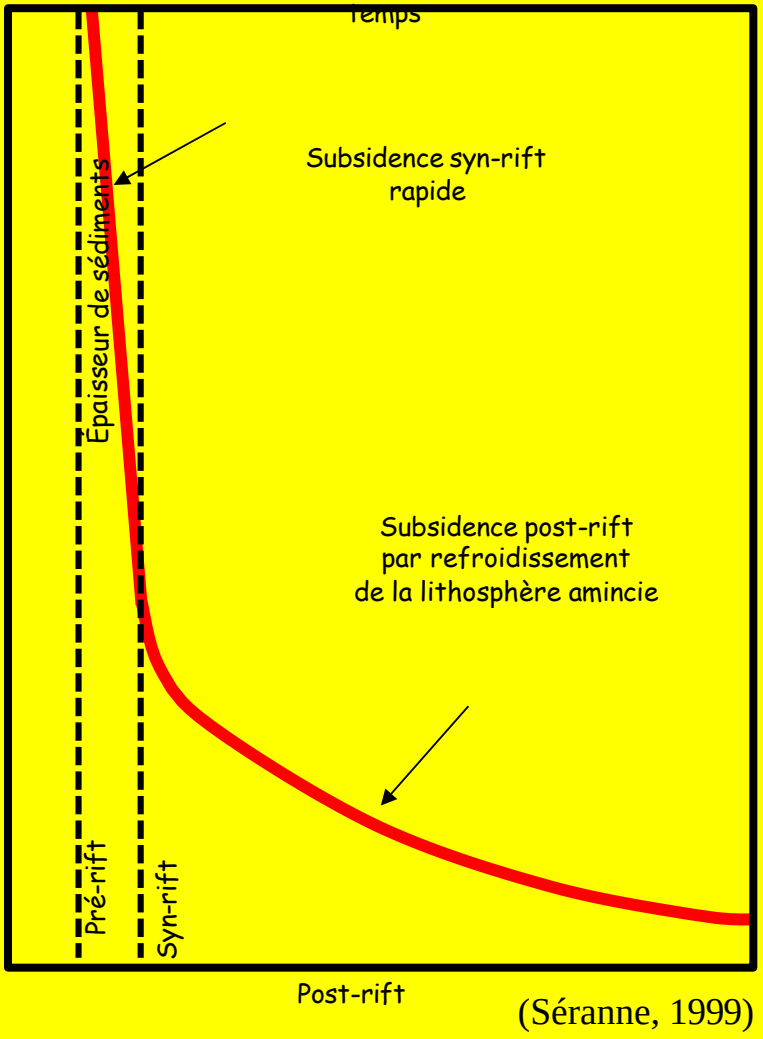
(Labeyrie, 1985)

Cycle de Wilson et tectono-eustatisme



(Duval et al., 1997)

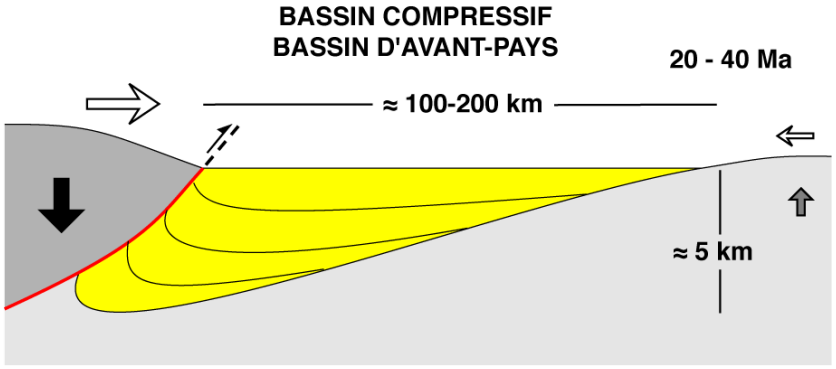
Tectono-eustatisme

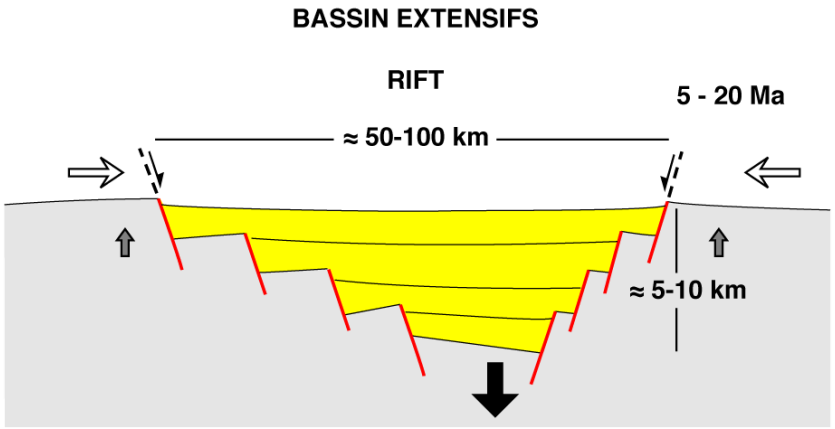


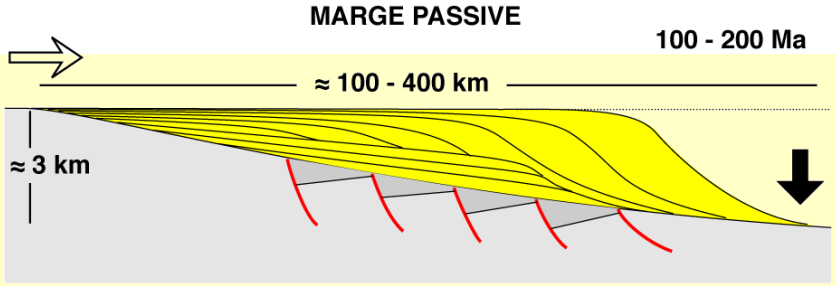
(Séranne, 1999)

- **Vitesse de croissance des rides?**
- **Age moyen des fonds océaniques?**

Le facteur tectonique



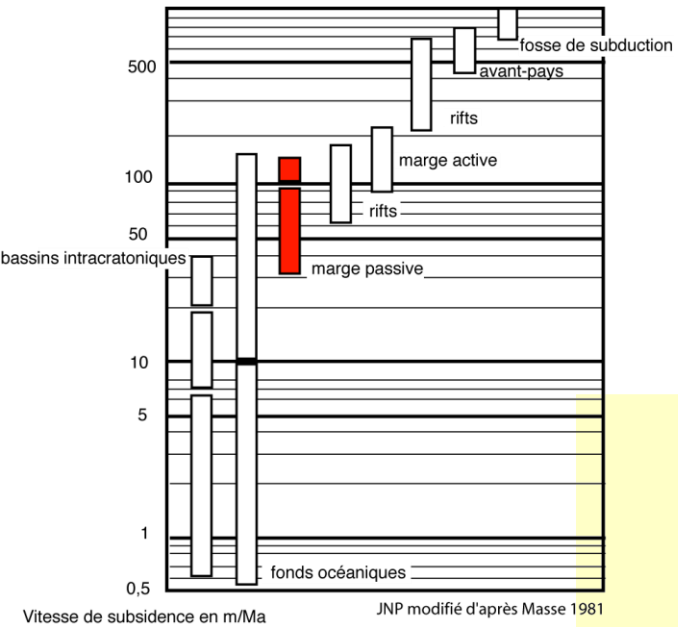


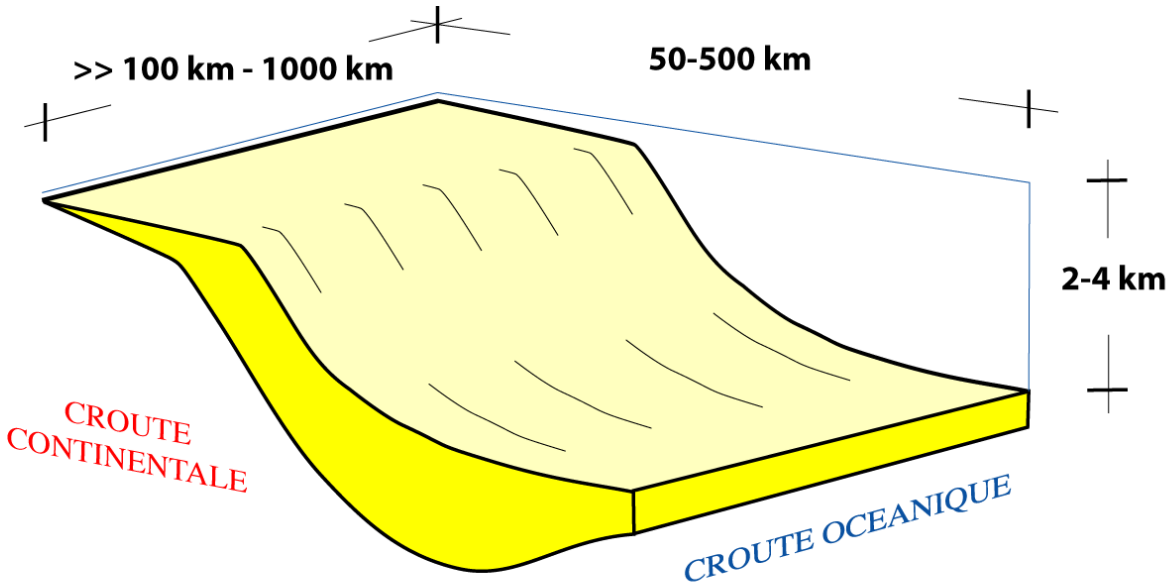


TN, FG

(Nalpas, inédit)

Ex : une marge passive





VITESSE DE SUBSIDENCE : **30-100 m/Ma** (maximum 150 m/Ma)

DUREE : **100-200 Ma**

ACCUMULATION MOYENNE : **3-5 km**

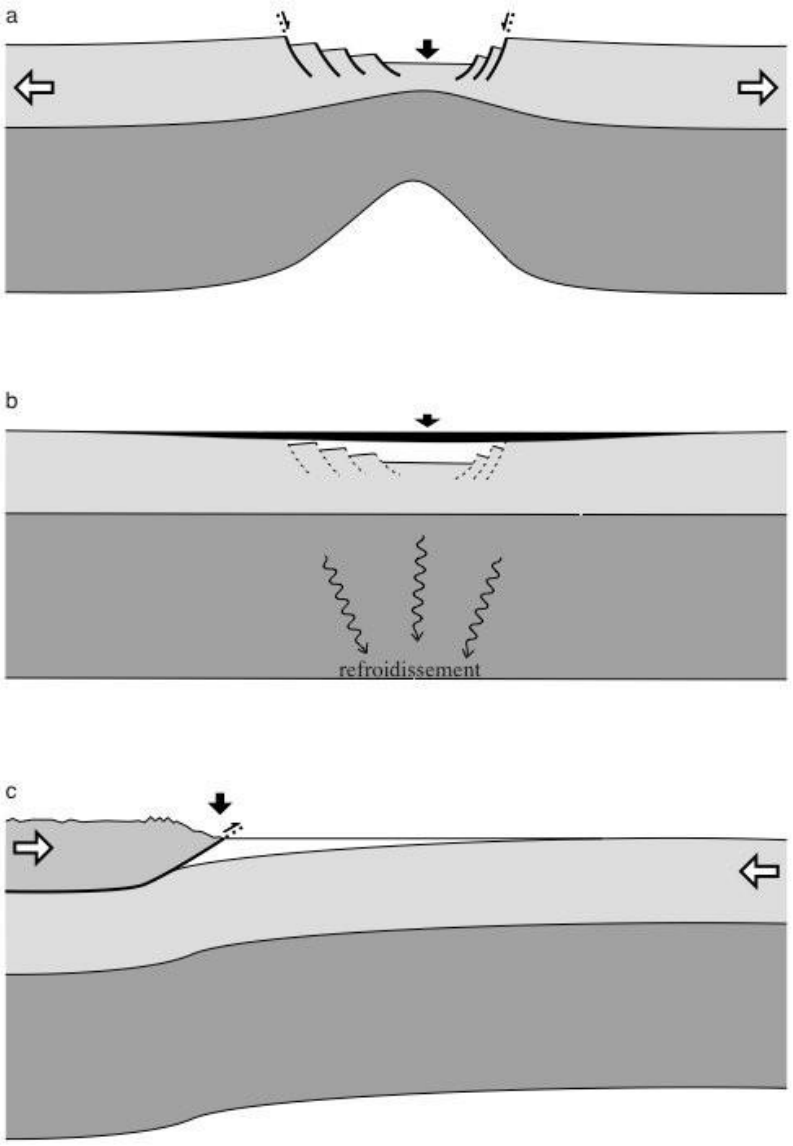
(F. Guillocheau, inédit)

Les subsidences

Subsidence tectonique

Subsidence thermique

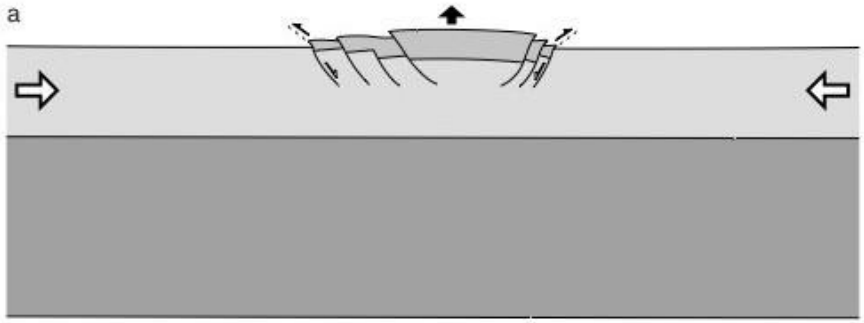
Subsidence gravitaire
Ou Isostasie



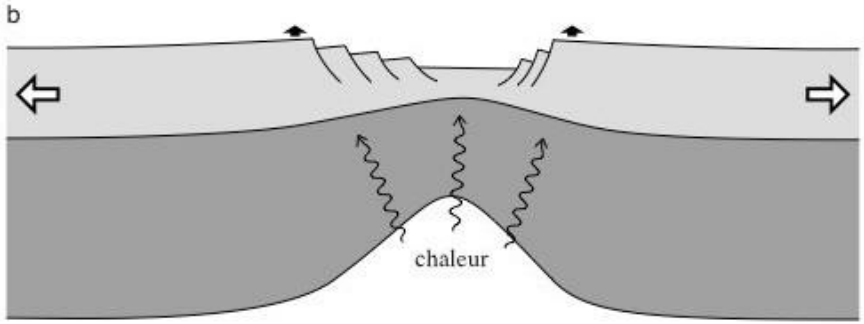
(Nalpas, inédit)

Subsidence / Surrection

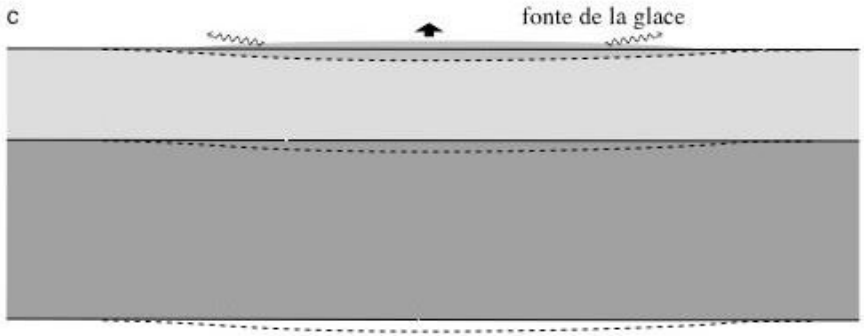
Subsidence tectonique



Subsidence thermique



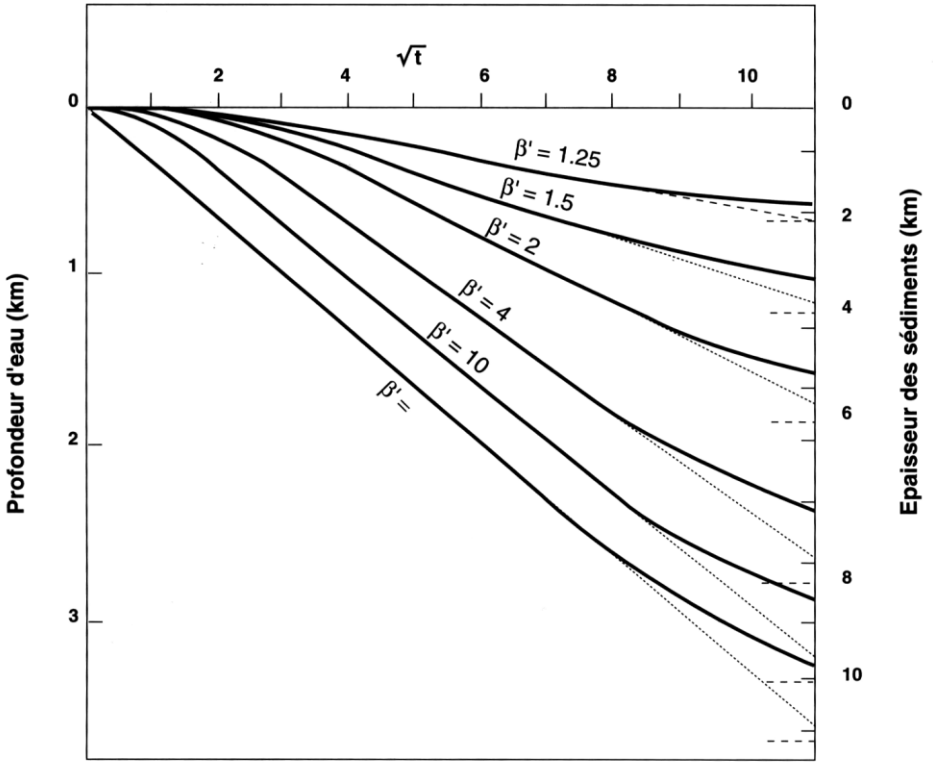
Subsidence gravitaire
Ou Isostasie

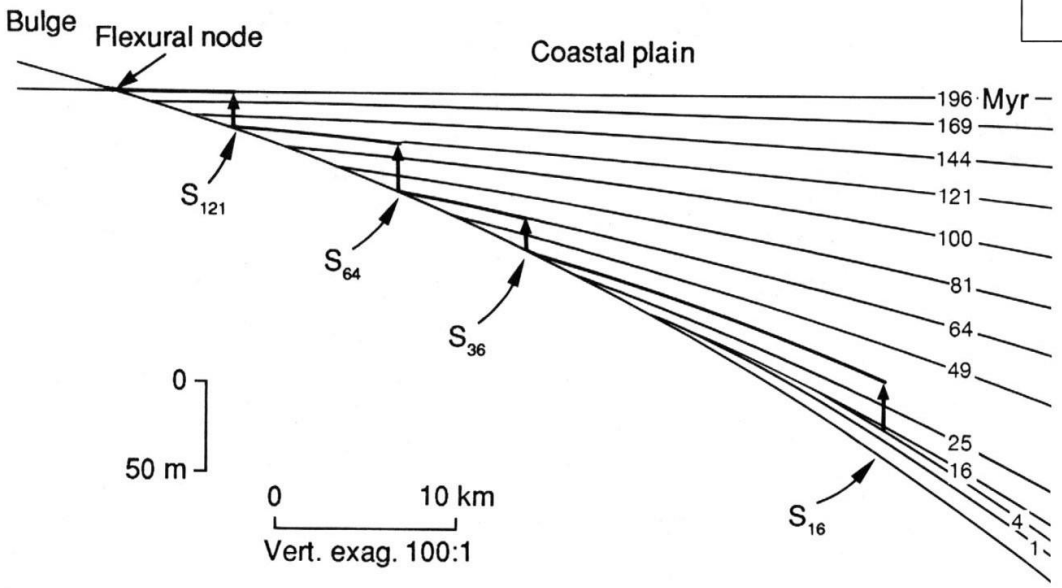


(Nalpas, inédit)

Modélisation

EXTENSION SYN-RIFT
et
SUBSIDENCE THERMIQUE
(McKenzie, 1978)



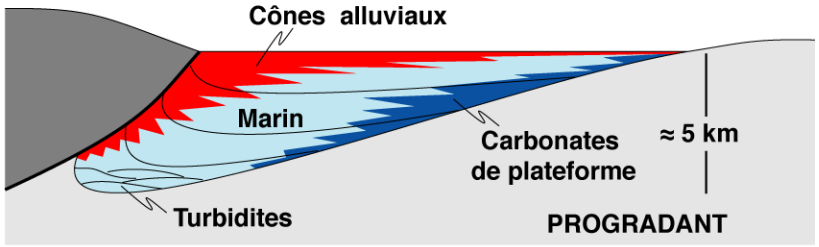


FLEXURE D'UNE MARGE
(Watts, 1982)

Remplissage des bassins sédimentaires

BASSIN COMPRESSIF
BASSIN D'AVANT-PAYS

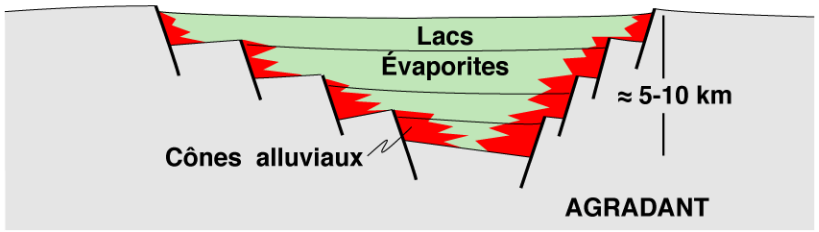
20 - 40 Ma



BASSIN EXTENSIFS

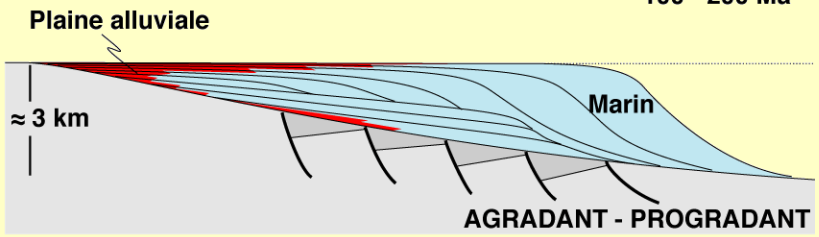
RIFT

5 - 20 Ma



MARGE PASSIVE

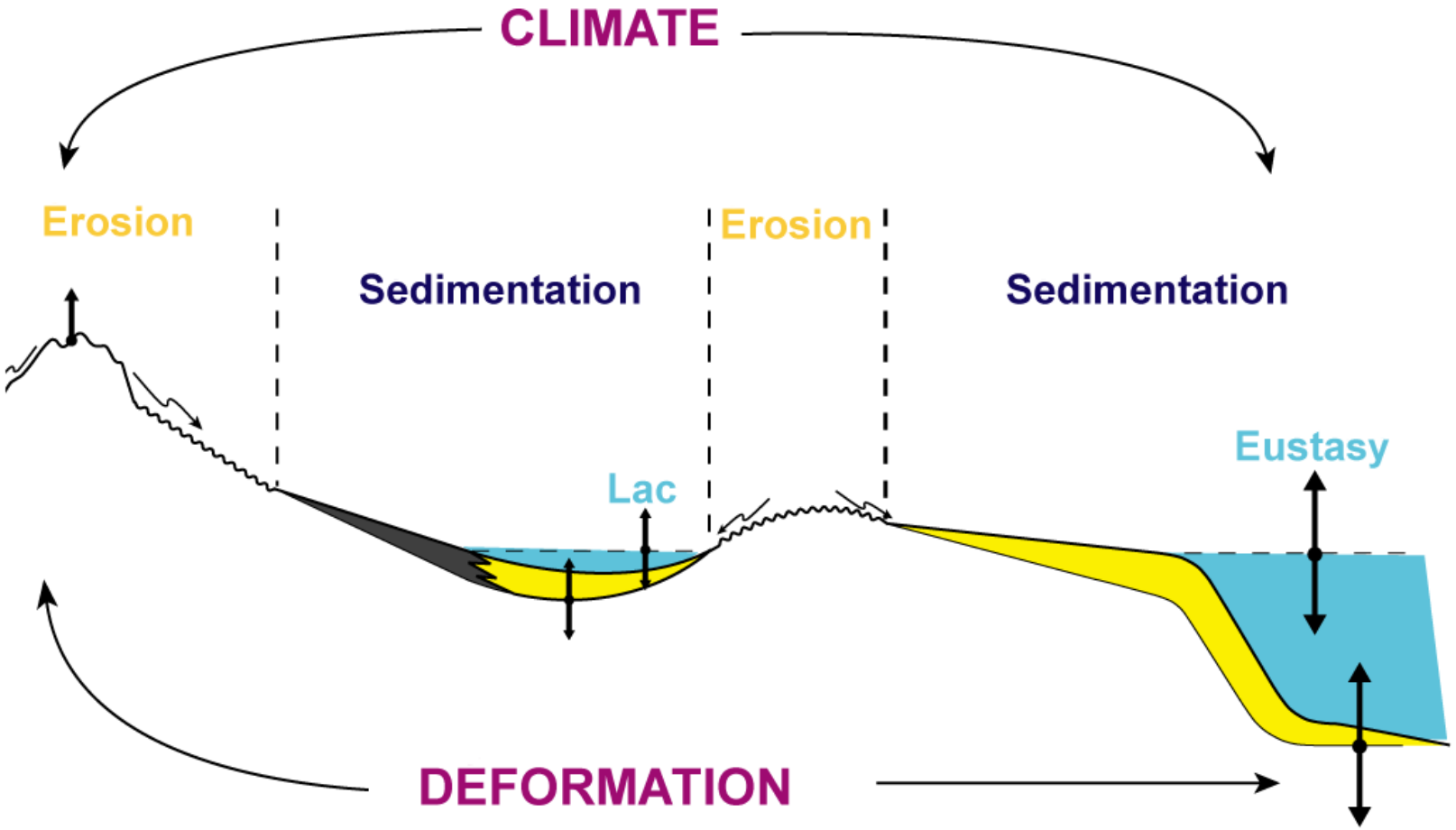
100 - 200 Ma



TN, FG

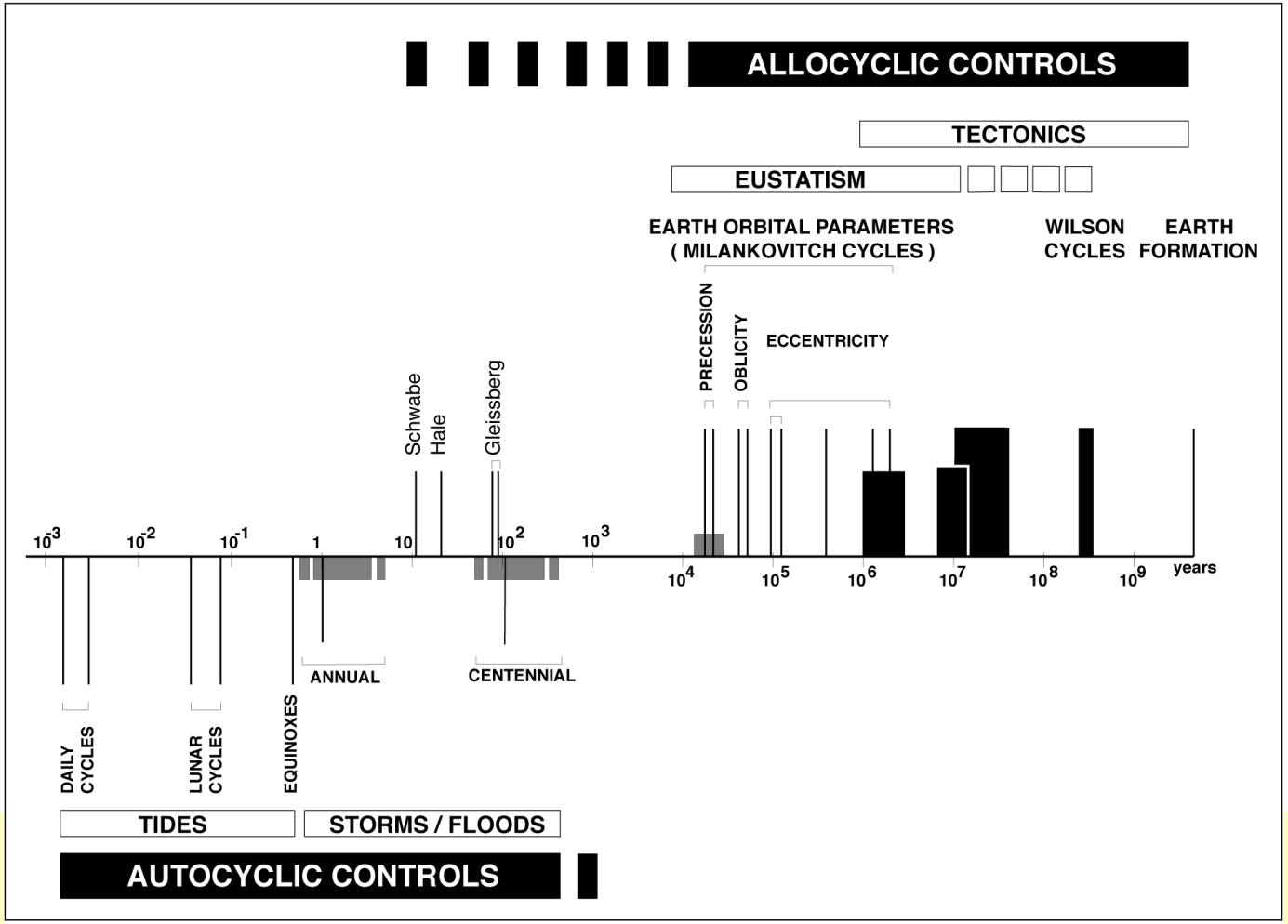
(Nalpas, inédit)

Les flux sédimentaires



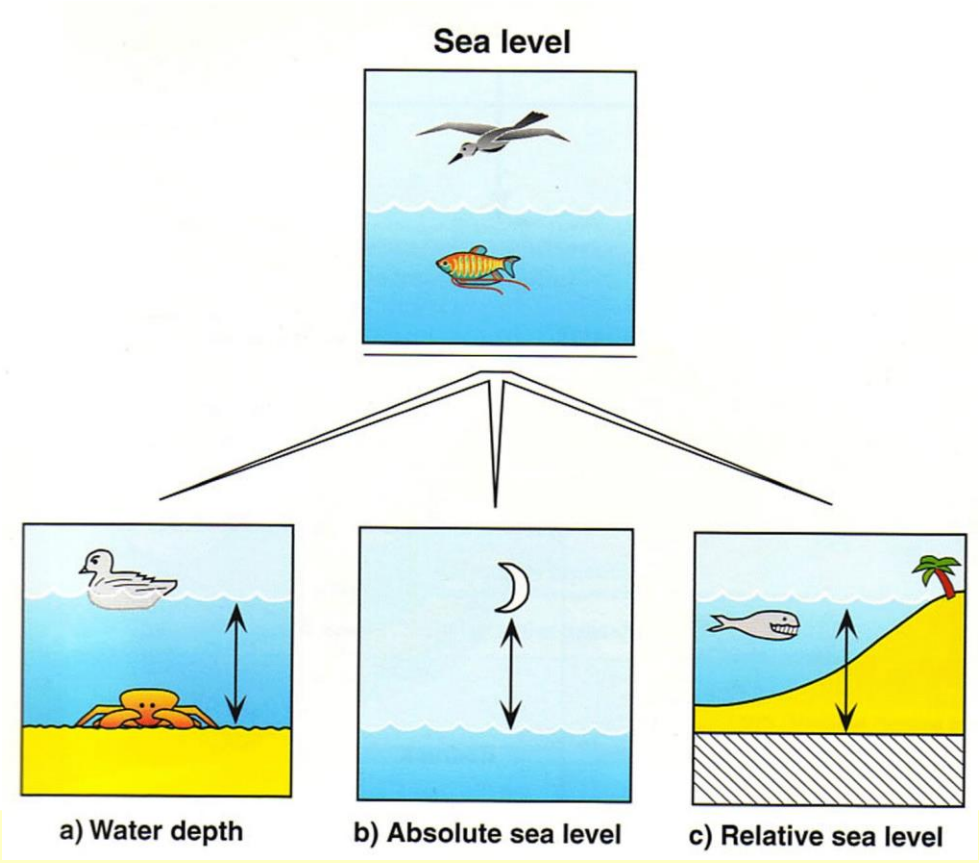
(Bourquin, 2004)

Echelles de temps des facteurs de contrôle



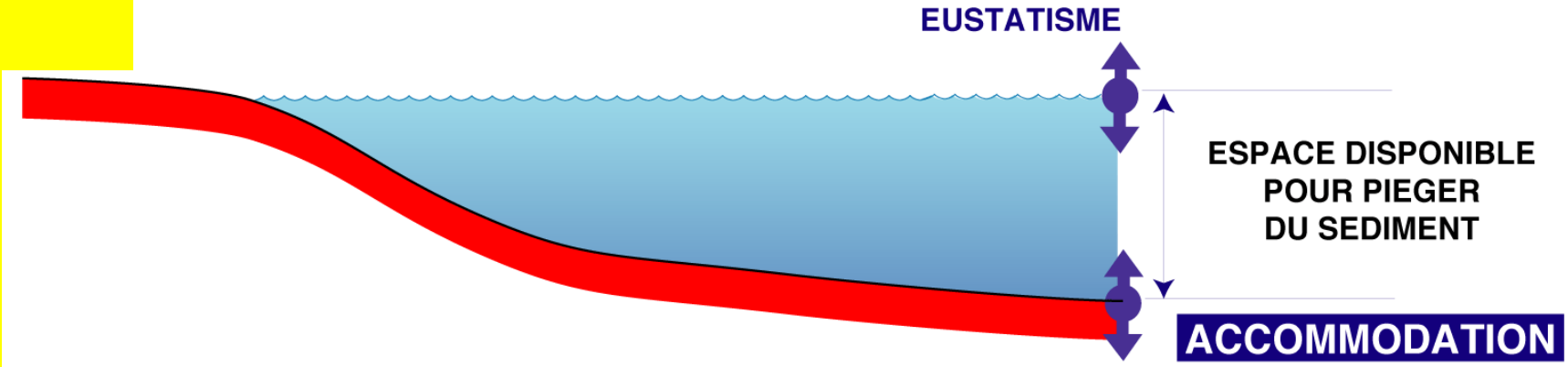
(Guillocheau, 1995)

Les « niveaux marins »

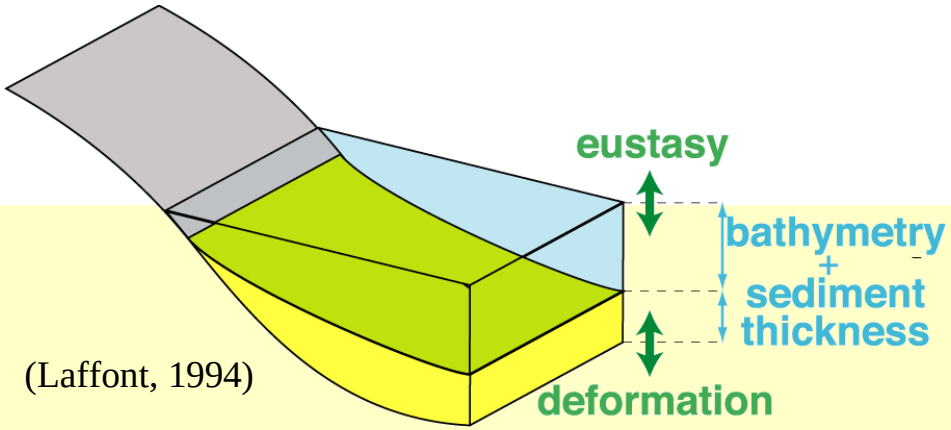


(Homewood et al., 1999)

ARCHITECTURE SEDIMENTAIRE: Notion d'Accommodation [A]



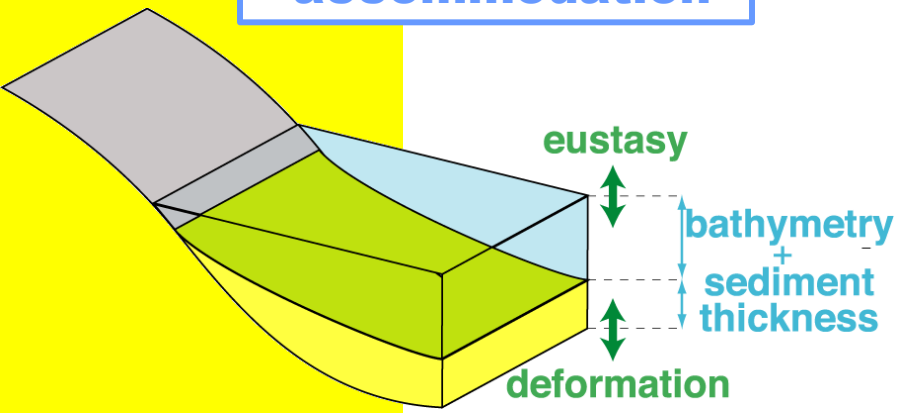
(Robin, 1997)



(Laffont, 1994)

Le rapport [Accommodation] / [Sédimentation]

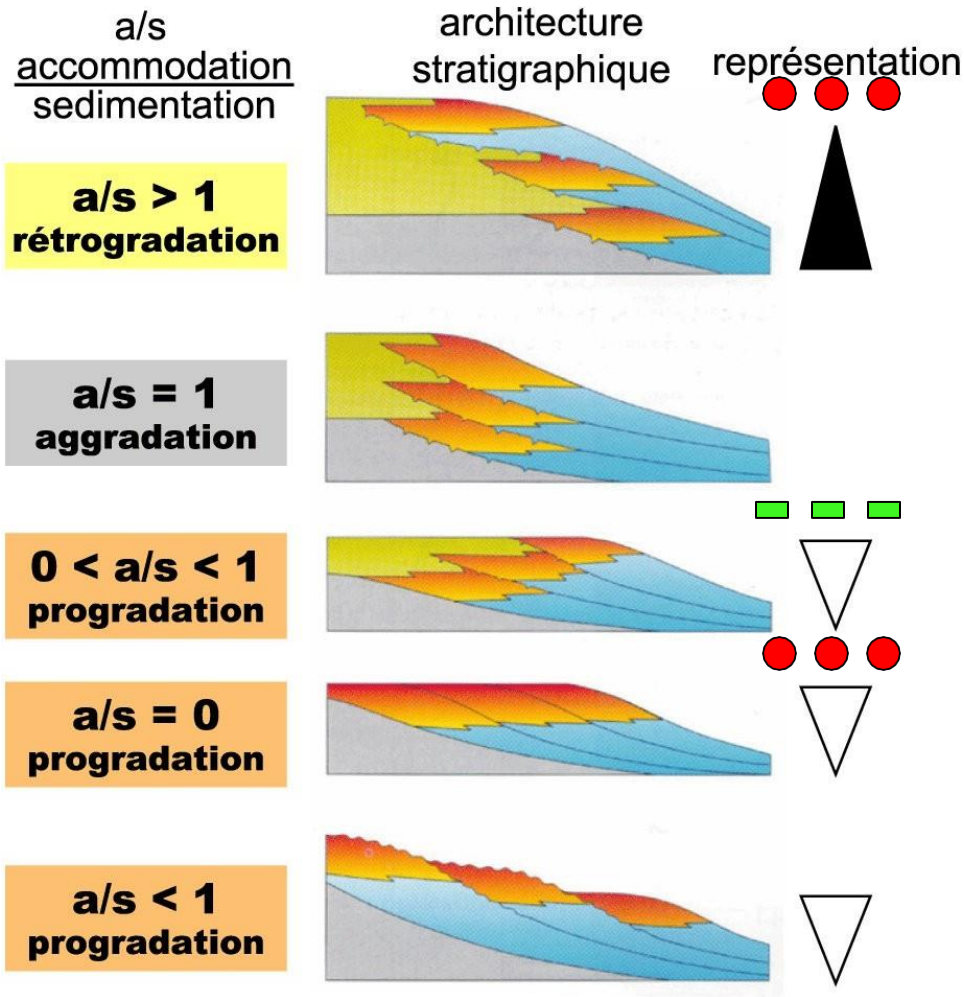
accommodation



Maximum Flooding Surface
MFS

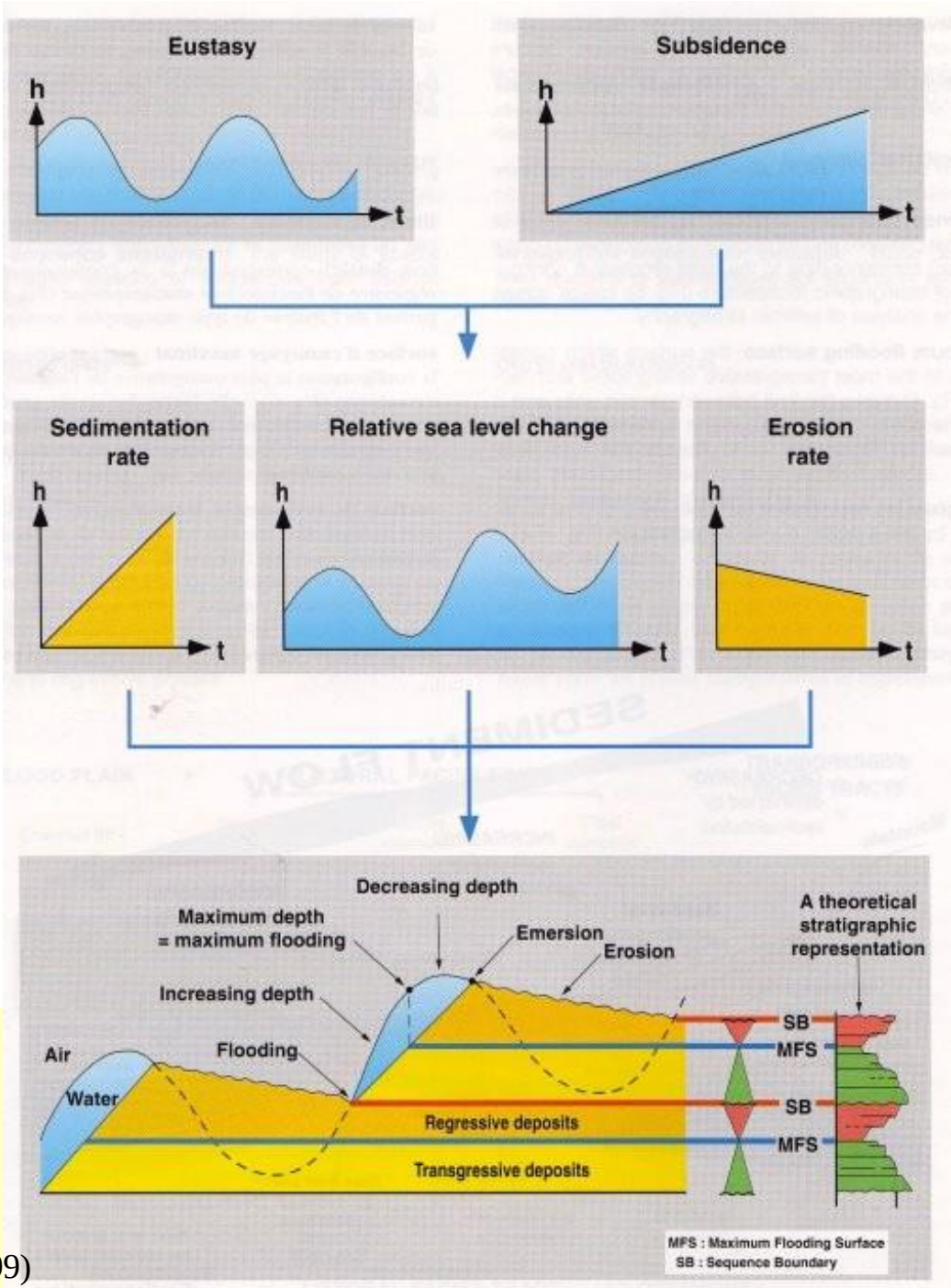
Flooding Surface
FS

éléments architecturaux



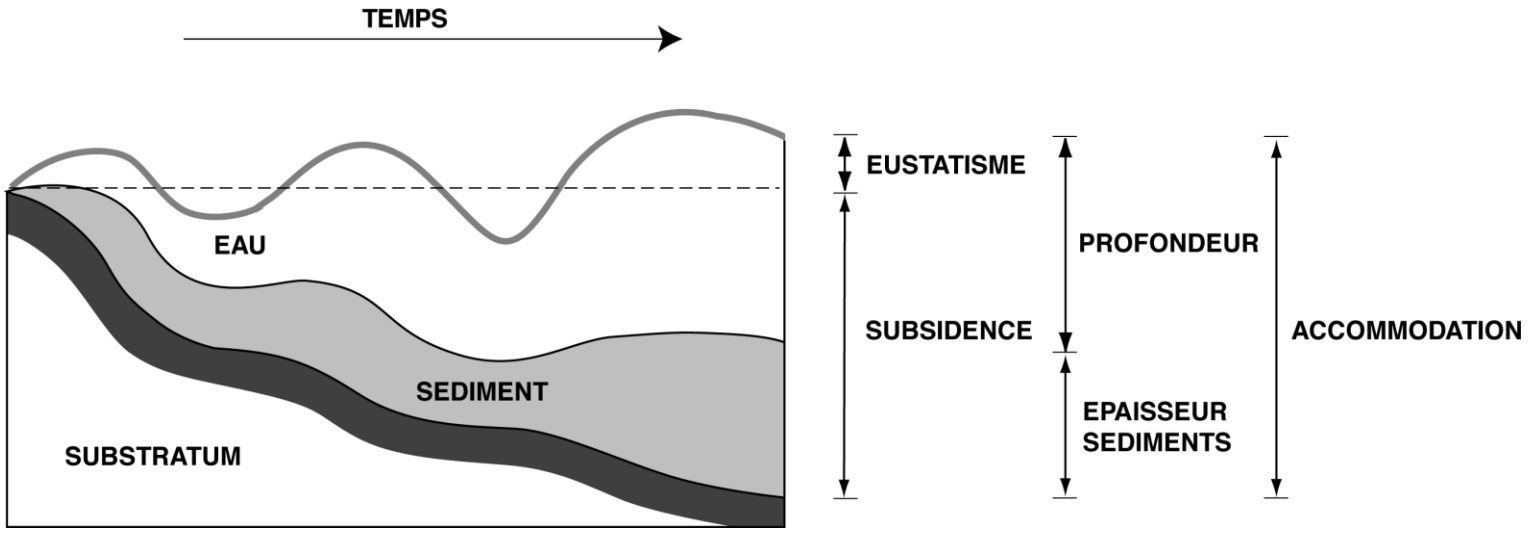
(Homewood et al., 1999)

La séquence sédimentaire



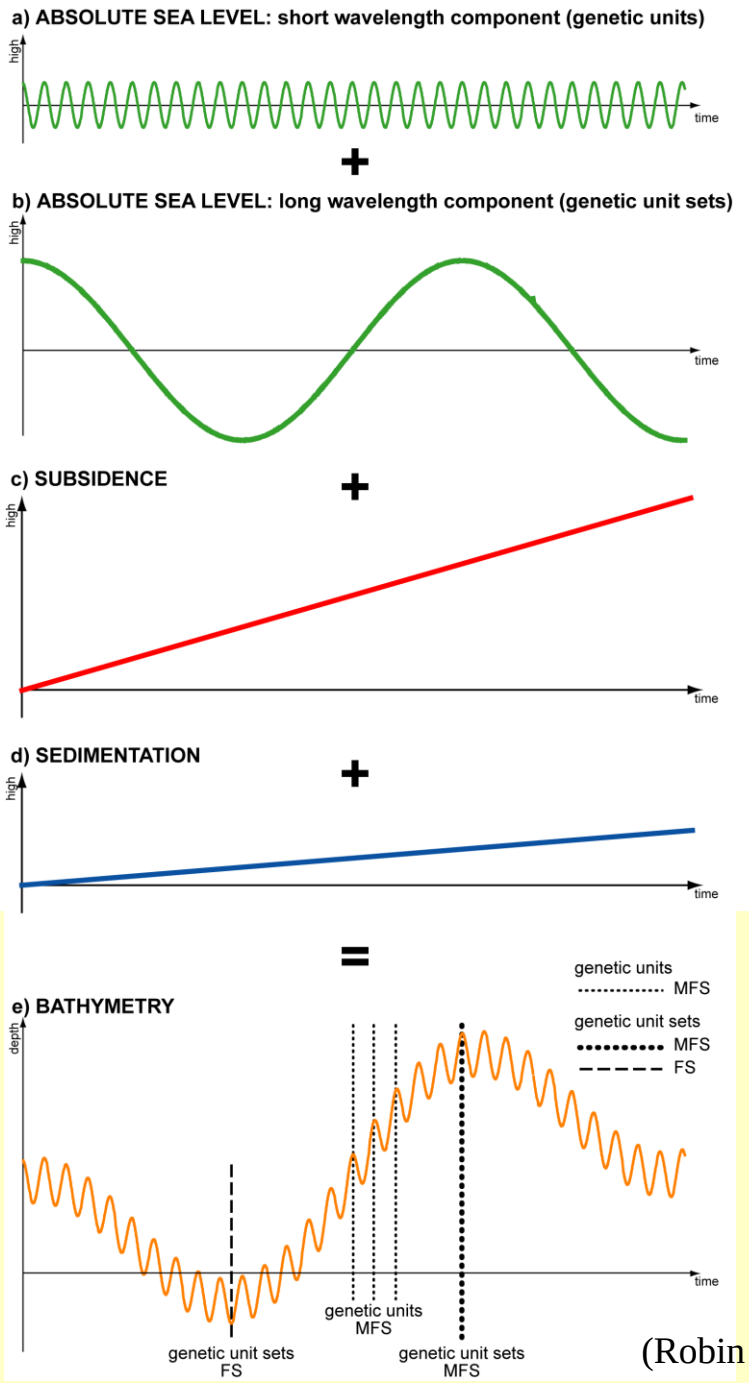
(Homewood et al., 1999)

Mesure de l'Accommodation [A]



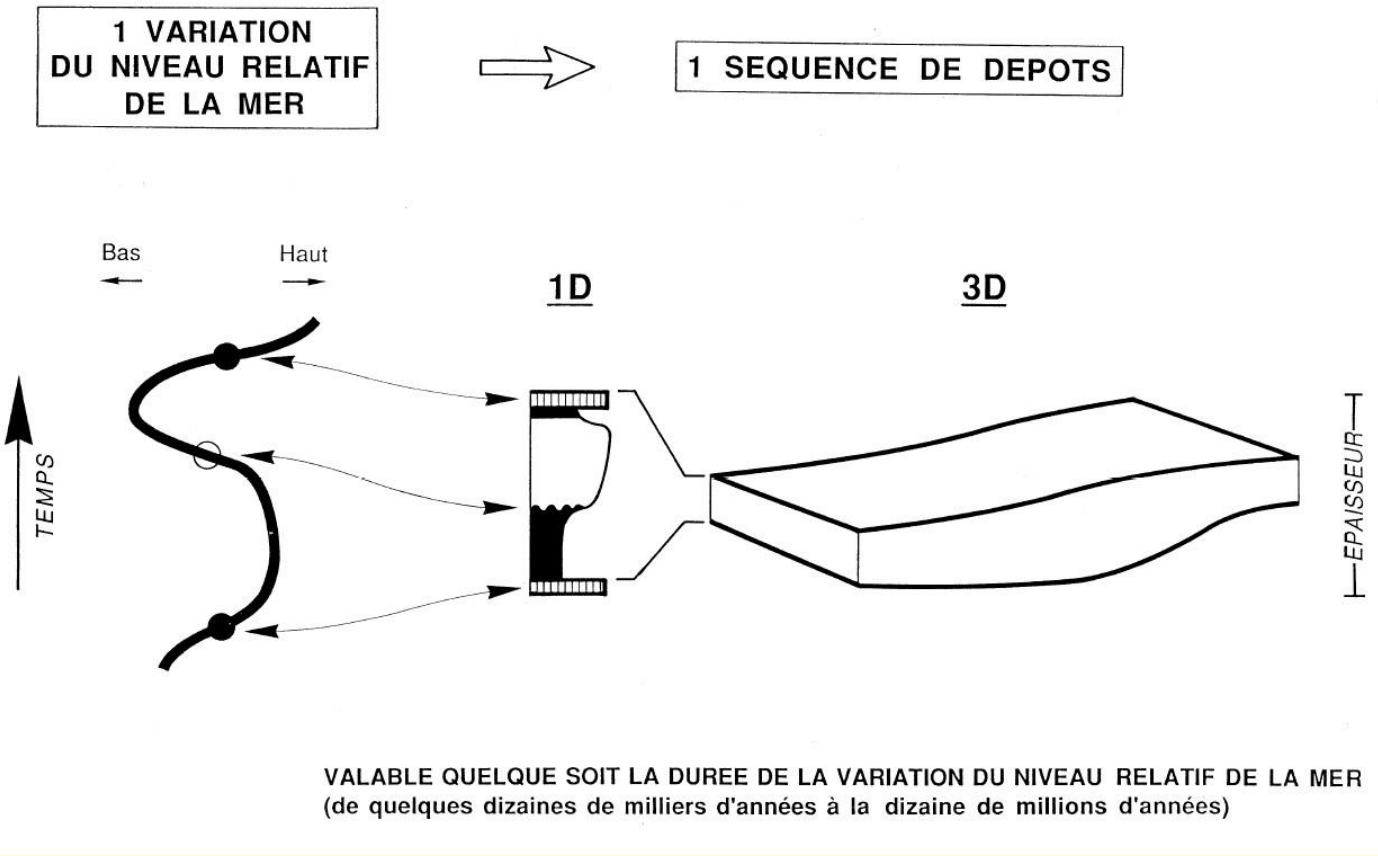
(Robin, 1997)

La séquence sédimentaire



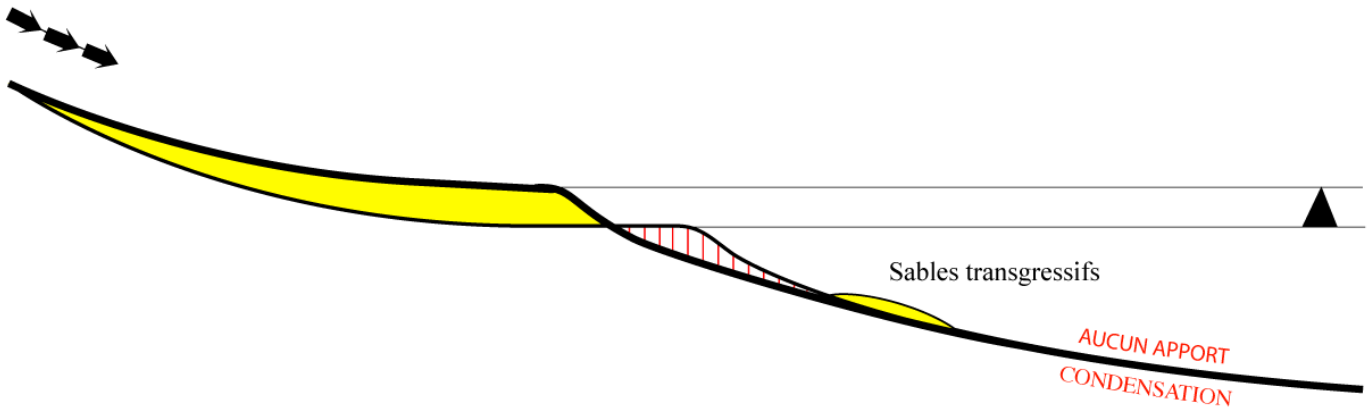
(Robin et al., 2005)

La séquence de dépôt



(Guillocheau, inédit)

Montée du niveau marin

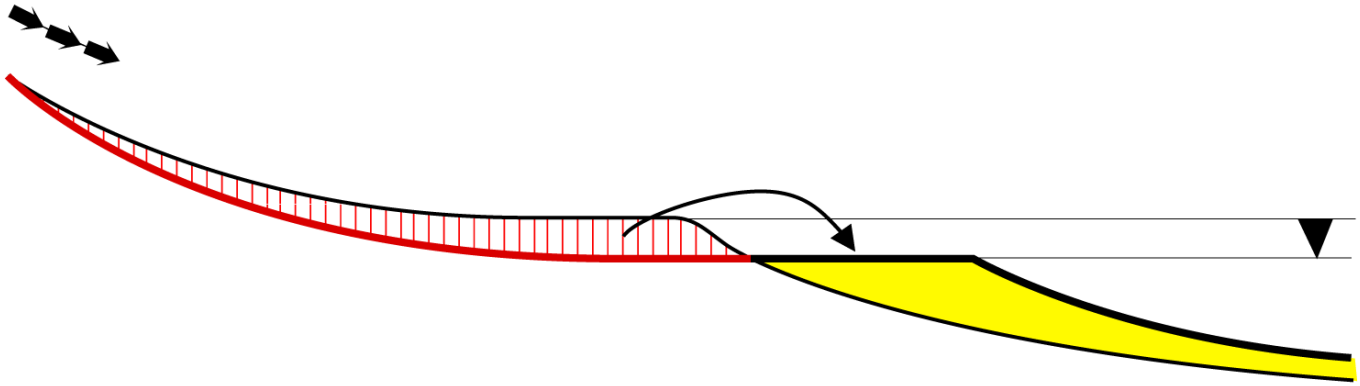


- Adaptation des fleuves à leur niveau de base
- Aggradation fluviatile
- Préservation des sédiments terrigènes dans la plaîne alluviale
- Recul du littoral
- Erosion de l'ancien littoral
- Formation des "sables transgressifs", résidus grossiers de l'érosion par les vagues de l'ancien littoral
- Aucun apport terrigène en domaine marin : condensation

LE CONTINENTAL EST UN VOLUME DE SEDIMENT
LE MARIN EST UNE SURFACE D'EROSION (littoral)
DE NON DEPOT (large)

(Guillocheau, inédit)

Chûte du niveau marin



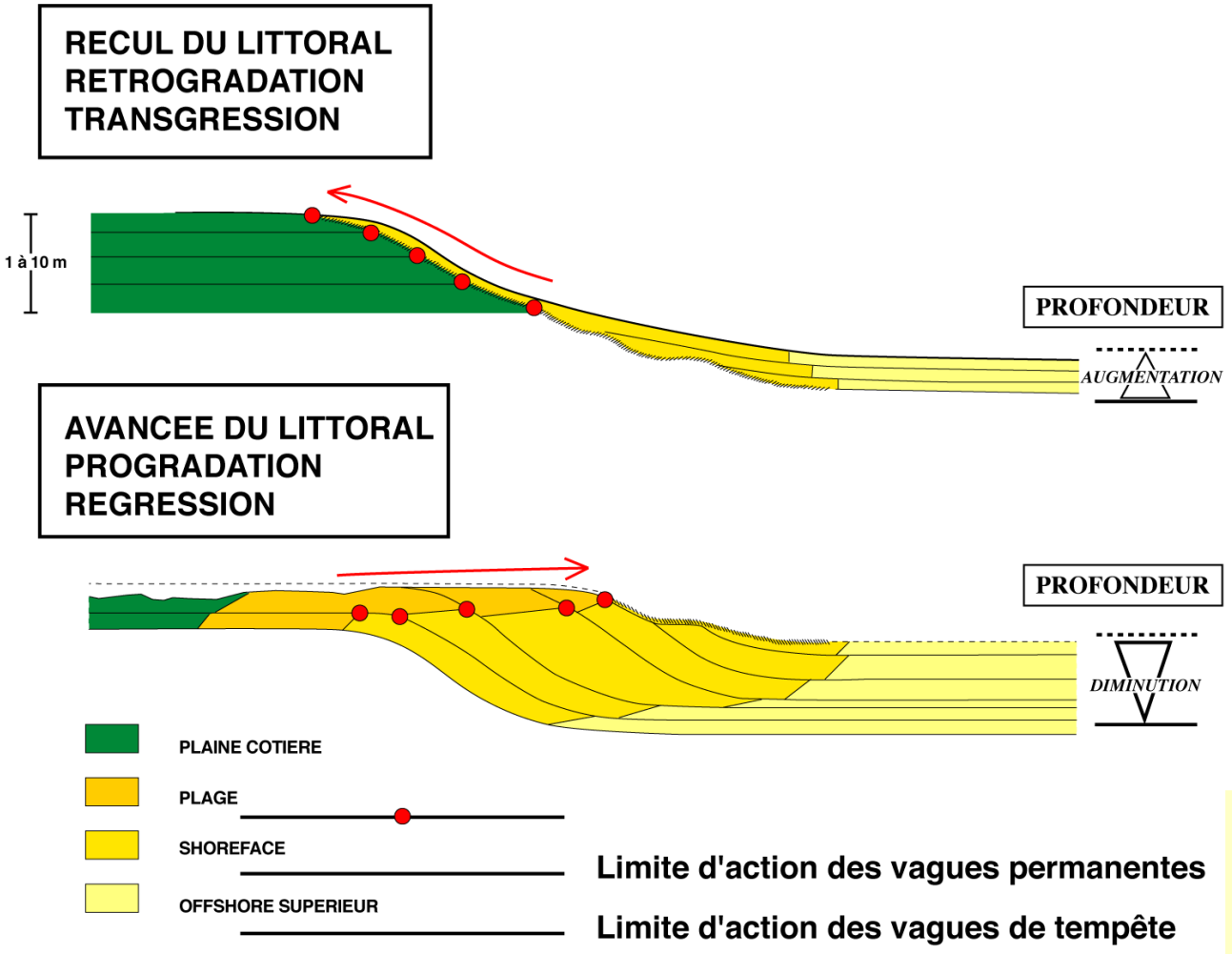
- Adaptation des fleuves à leur niveau de base
- Incision des fleuves
- Transfert des produits d'érosion vers le domaine marin
- Formation d'un prisme littoral progradant

(F.G., 04)

LE CONTINENTAL EST UNE SURFACE D'EROSION
LE MARIN EST UN VOLUME DE SEDIMENT

(Guillocheau, inédit)

Une séquence transgressive / régressive



(Guillocheau, 1995)