

# **LES RUDISTES DU CRÉTACÉ INFERIEUR**

**EVOLUTION  
STRATIGRAHIE  
PALEOECOLOGIE**

**Jean-Pierre Masse et al.**

**LES RUDISTES DE QUOI S'AGIT- IL ?**

**CLASSE DES BIVALVES**

**ORDRE DES HIPPURITIDA  
DEUX SOUS-ORDRES  
QUINZE FAMILLES**

**LONGEVITE OXFORDIEN –  
MAASTRICHTIEN 100 millions d'années**

# D'OU VIENNENT T- ILS?

Ils dérivent de

**formes à byssus et coquille aragonitique :**  
**MEGALODONTIDAE**



**MEGALODONTIDAE**



**PINNA**

# HIPPURITIDA

Perte du byssus et  
acquisition d'une coquille à deux couches  
calcitique externe et aragonitique interne

Immobilité



**Alcide d'Orbigny**



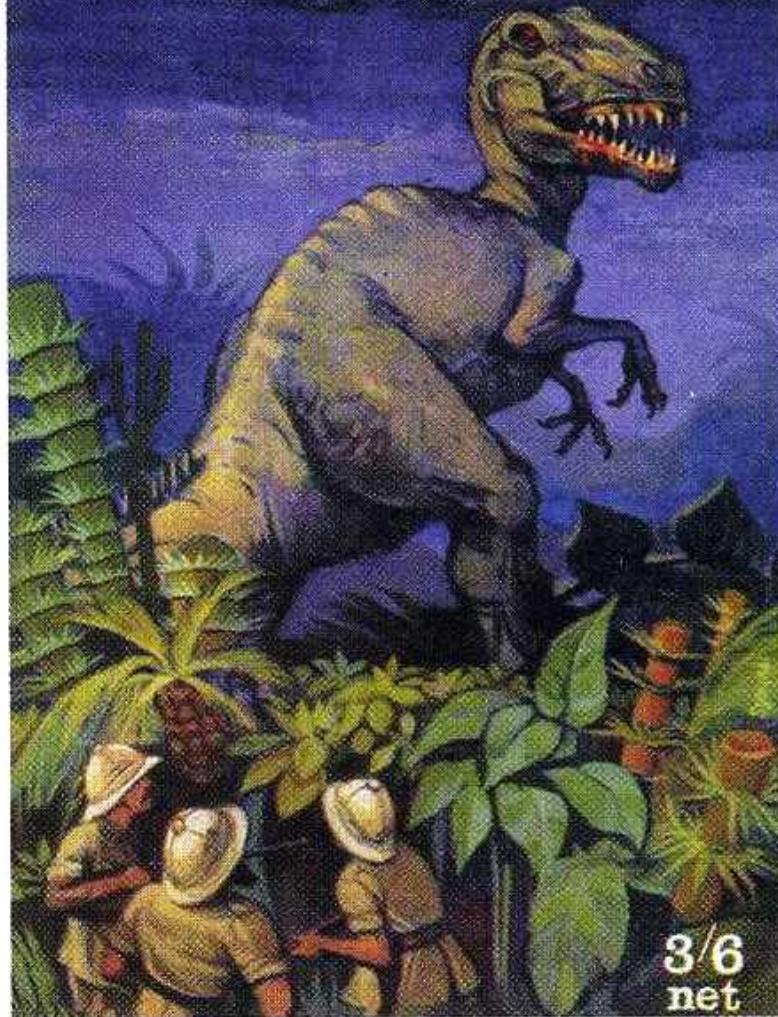
**Philippe Matheron**



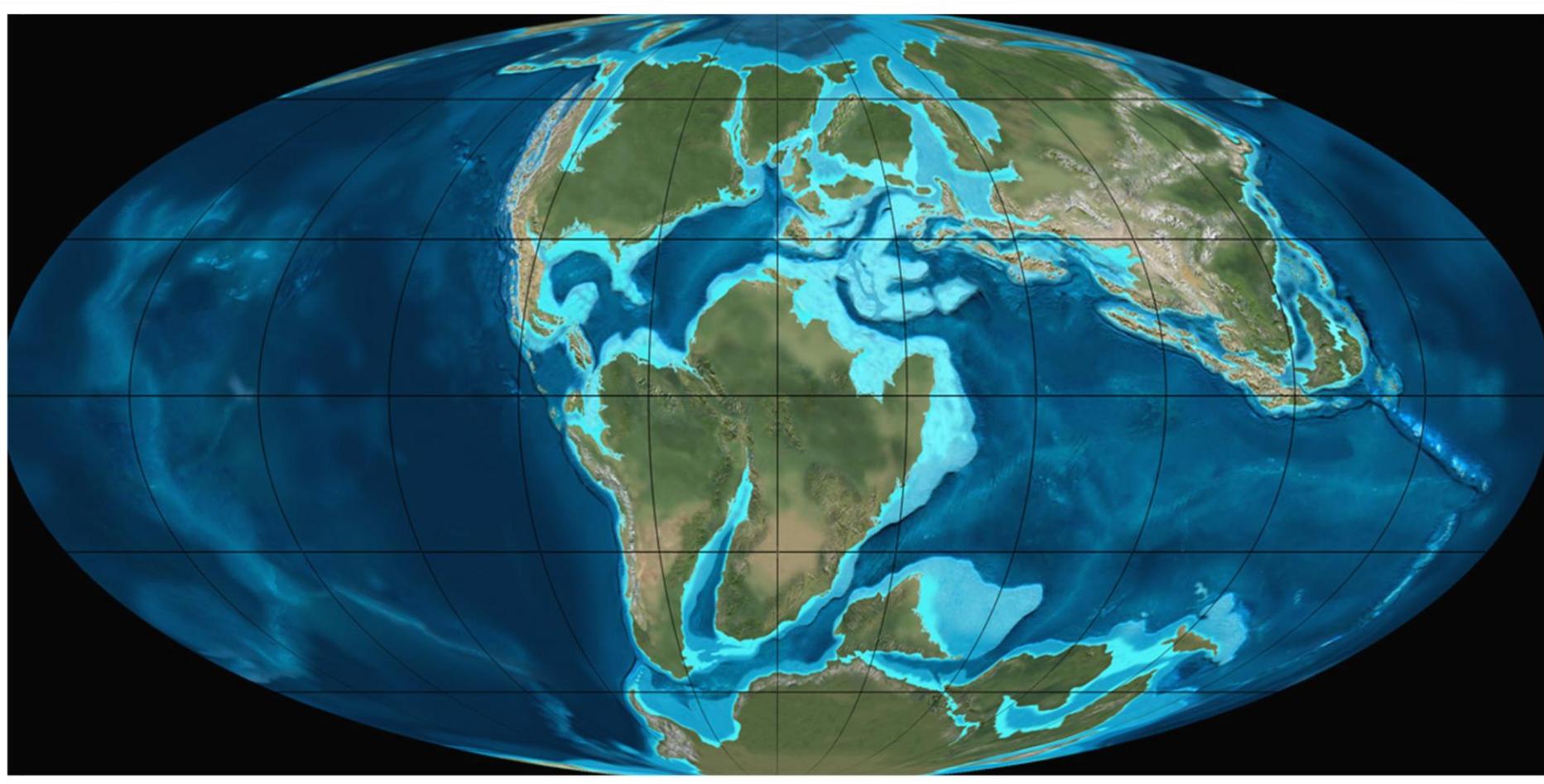
**Henri Douvillé**

# **THE LOST WORLD**

Sir Arthur Conan Doyle

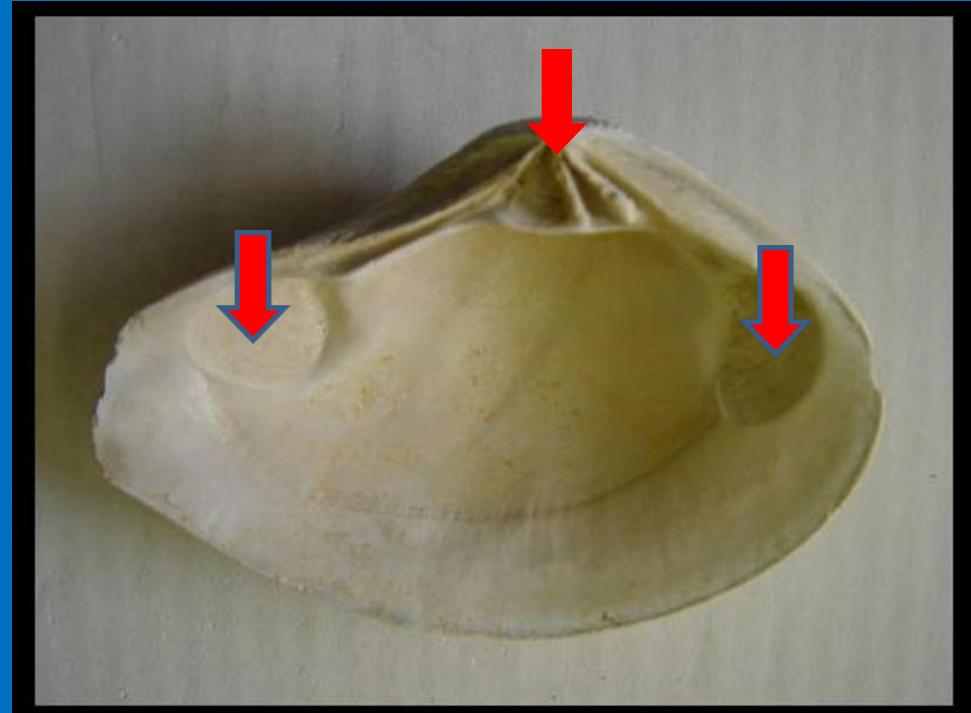
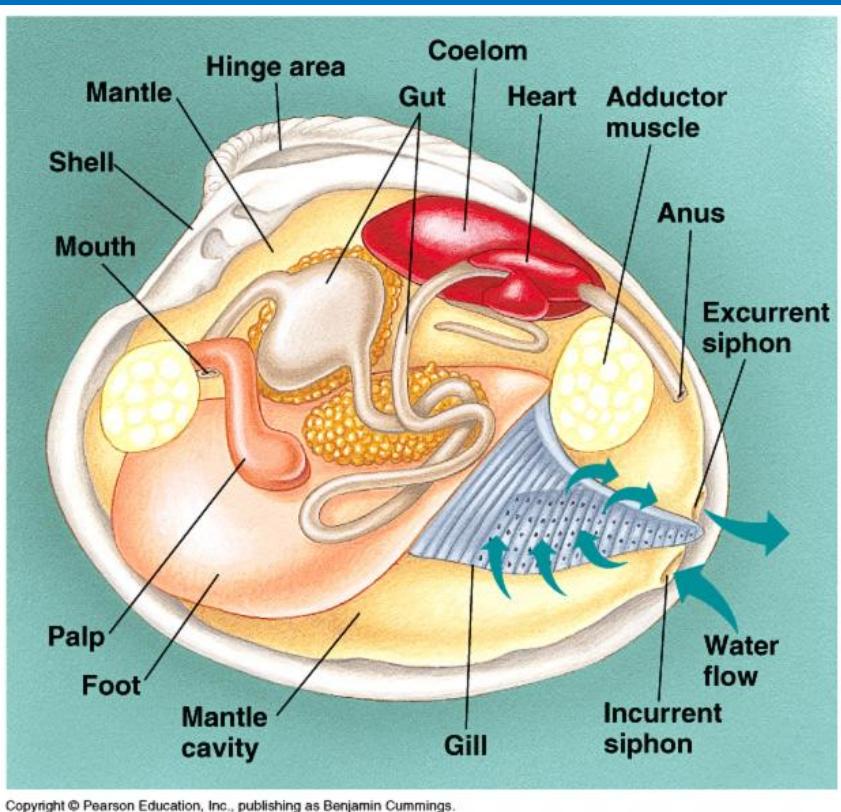


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net**



- Crétacé inférieur 120 Ma

# Anatomie d'un Bivalve actuel

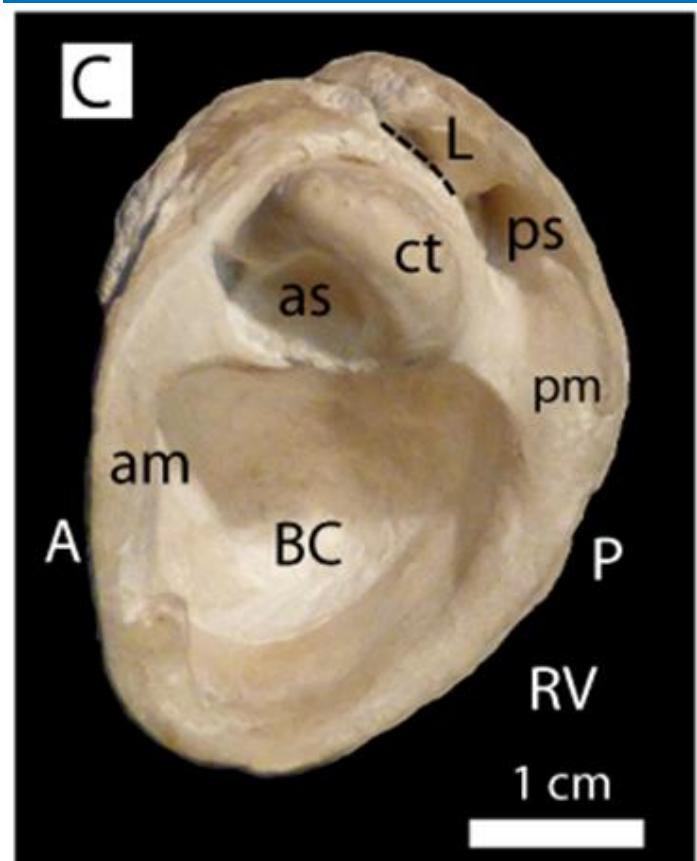


trace du ligament  
dents et fossettes  
empreintes musculaires

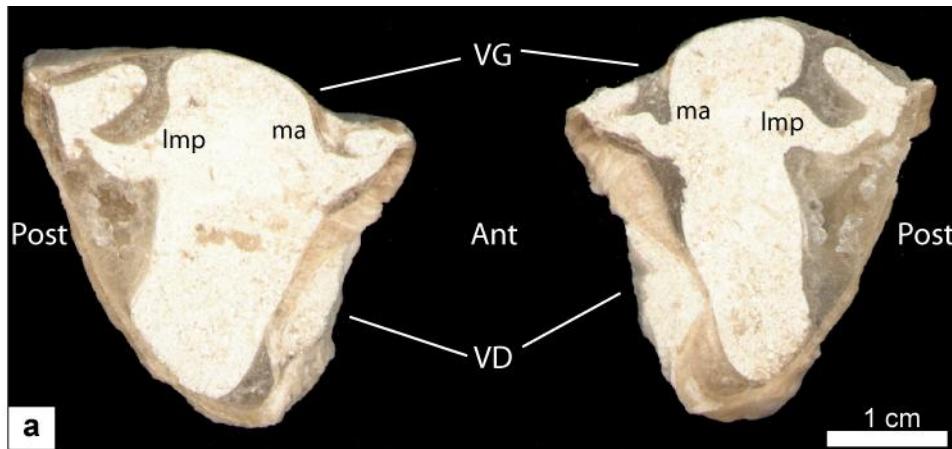
*Himeraelites*



*Monopleura alesta*



APPAREIL CARDINAL

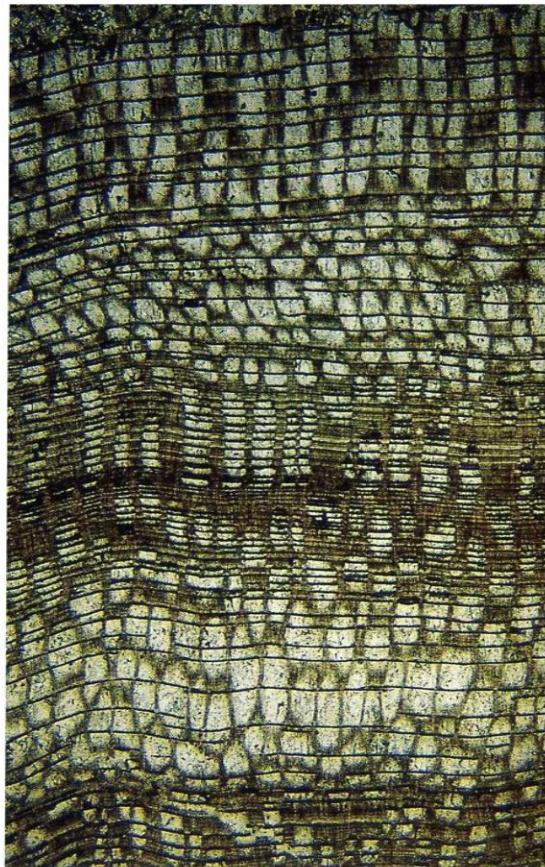


***Horiopleura dumortieri***, sections antero-postérieures d'un spécimen bivalve montrant les caractères internes, Barrémien supérieur (Orgon)

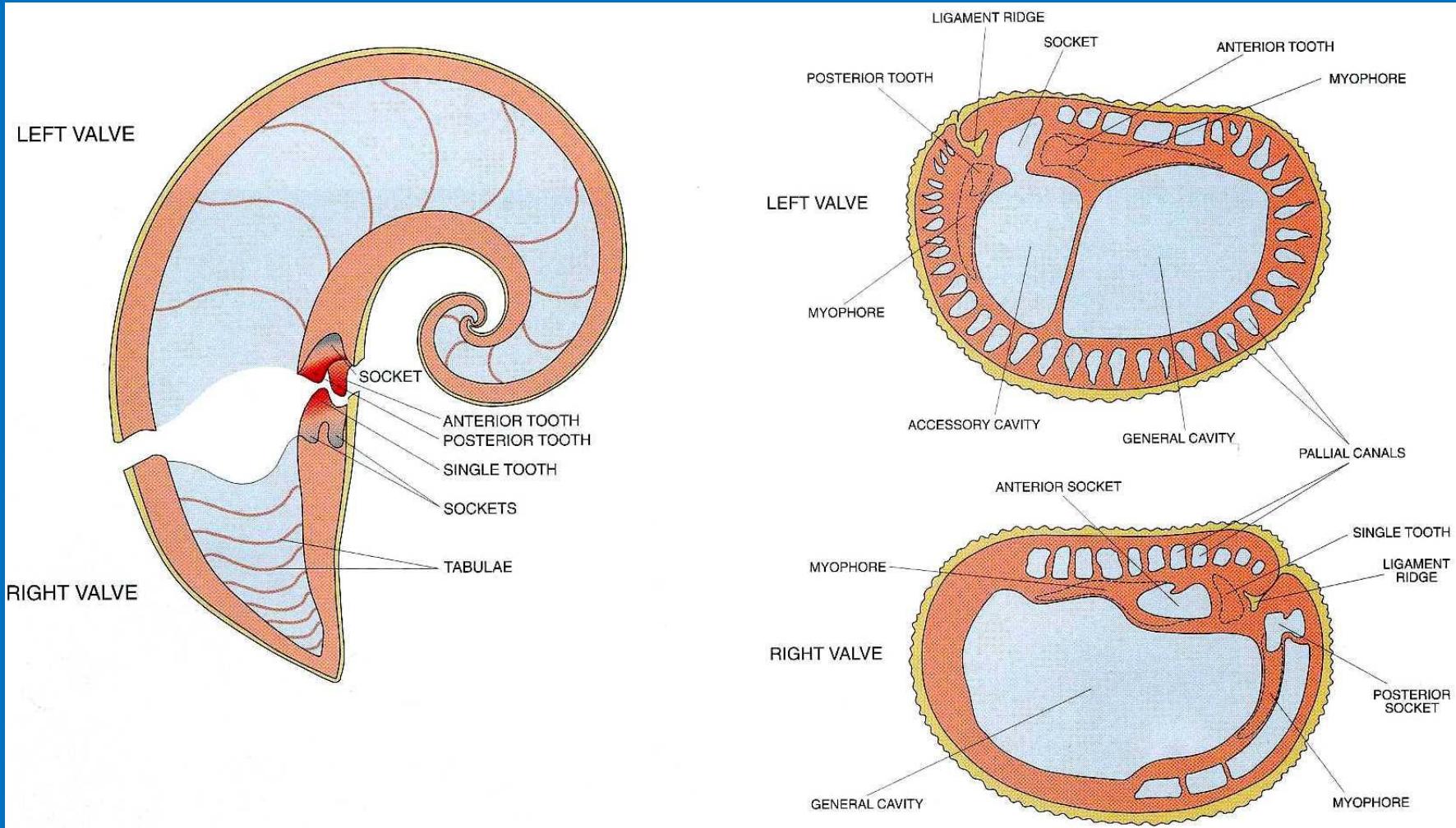
■ Radial thin section of *Radiolites* showing horizontal *laminae* separated by vertical *muri*. Coniacian of Trentinara, Campania, southern Italy. x 1,8.

*Eoradiolites liratus* (CONRAD),  
inner valve. Cenomanian of  
Lebanon. x 2,4.

IA COLL., DIP. SCIENZE DELLA TERRA UNIV. TORINO



In Radiolitidae the growth lines, corresponding to main growth cycles, are well marked and give origin to the shell ornamentation



## STRUCTURE DU TEST

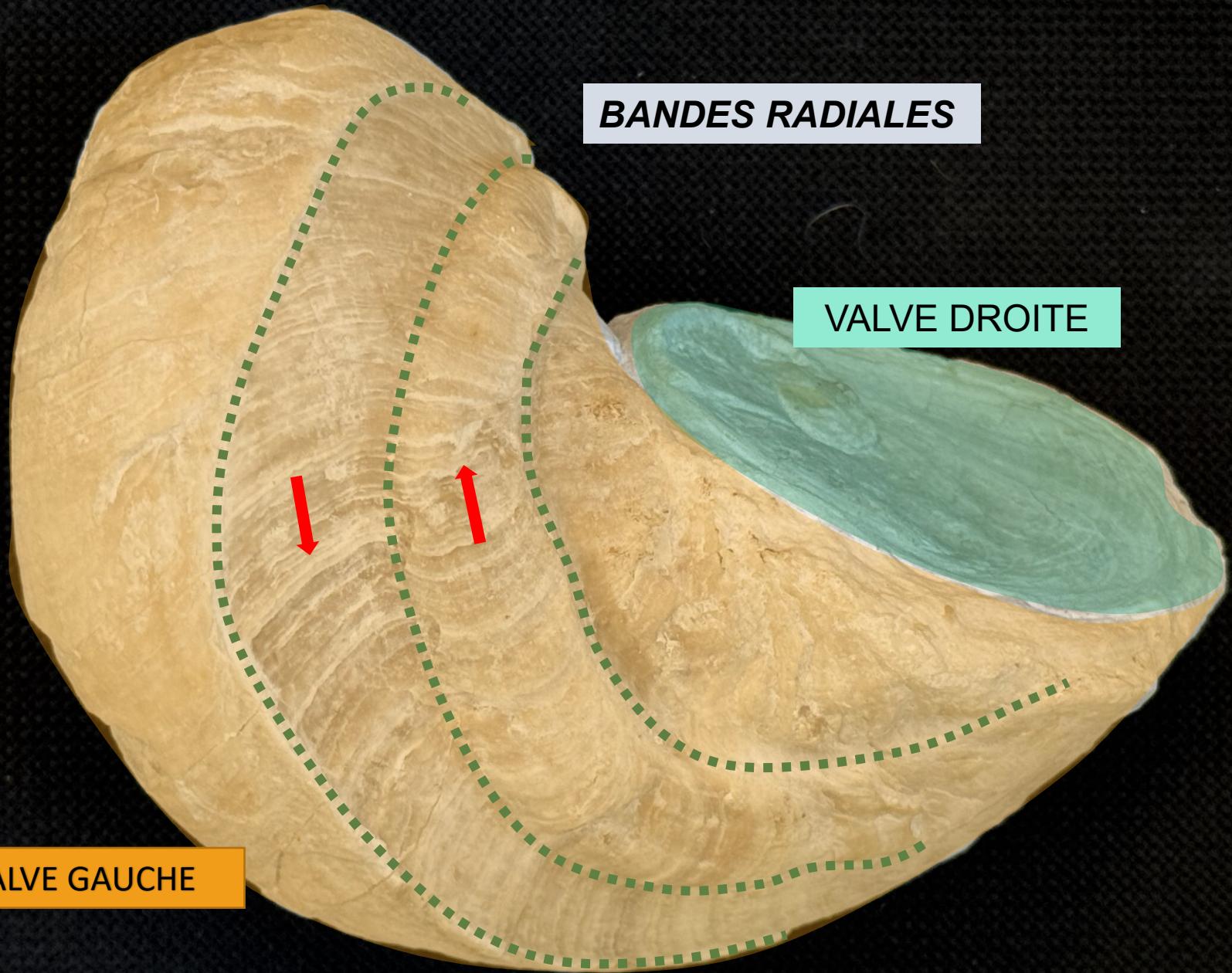


3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

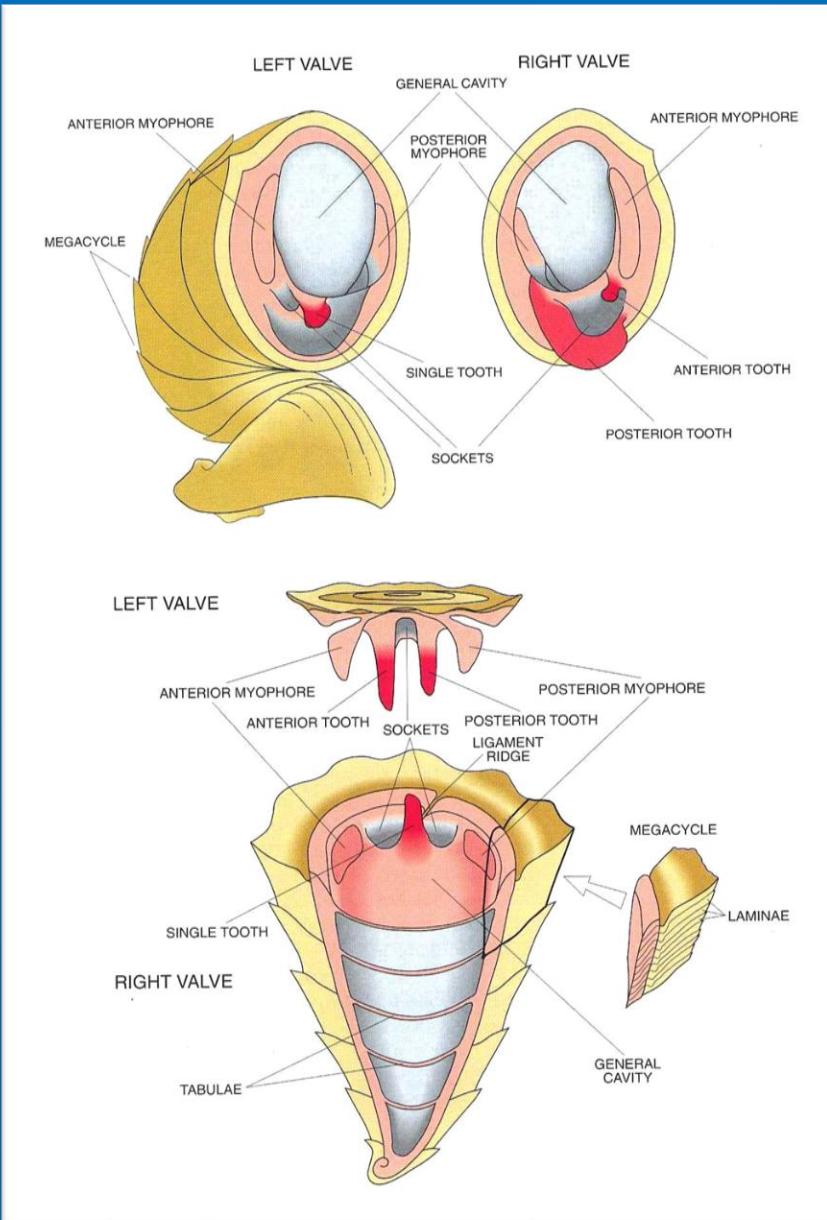
**BANDES RADIALES**

**VALVE DROITE**

**VALVE GAUCHE**



3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22



Fixés par la  
valve gauche

Fixés par la  
valve droite

**LES RUDISTES : DES BIVALVES SINGULIERS**

## **ORDRE DES HIPPURITIDA**

- **Sous -ordre des REQUIENIIDINA**
  - Super-famille des Requienioidea**
- **Sous-ordre des HIPPURITIDINA**
  - Super-famille des Radiolitidoidea**
  - Super-famille des Caprinoidea**

# EXIGENCES VITALES

MANGER  
NE PAS ÊTRE MANGÉ  
SE REPRODUIRE

MANGER + SE REPRODUIRE      NE PAS ÊTRE MANGÉ



manteau



coquille

# FONCTIONNEMENT TROPHIQUE

## ORGANISMES PHOTOSYNTHETIQUES OU FILTREURS DU PHYTOPLACTON ?



*Tridacna*



*Corculum*  
Bivalves actuels photosynthétiques  
avec zooxanthelles

# DISTRIBUTION PALEOGEOGRAPHIQUE DES RUDISTES CRETACE INFERIEUR



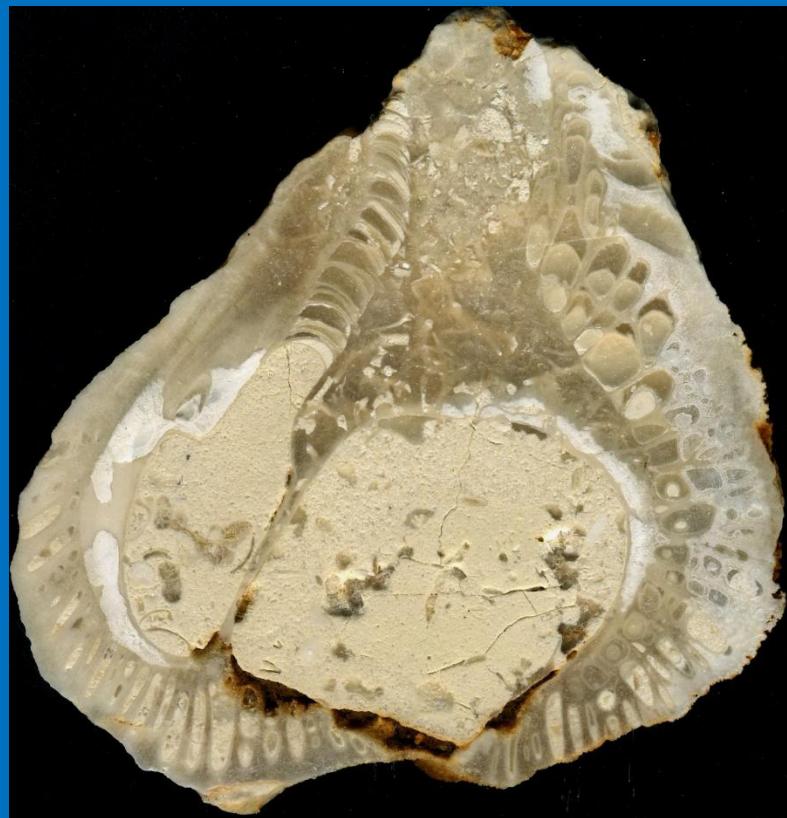
Pseudotoucasia

Atlas marocain

*Pachytraga*



*Caprina*



*Offneria*



Provence

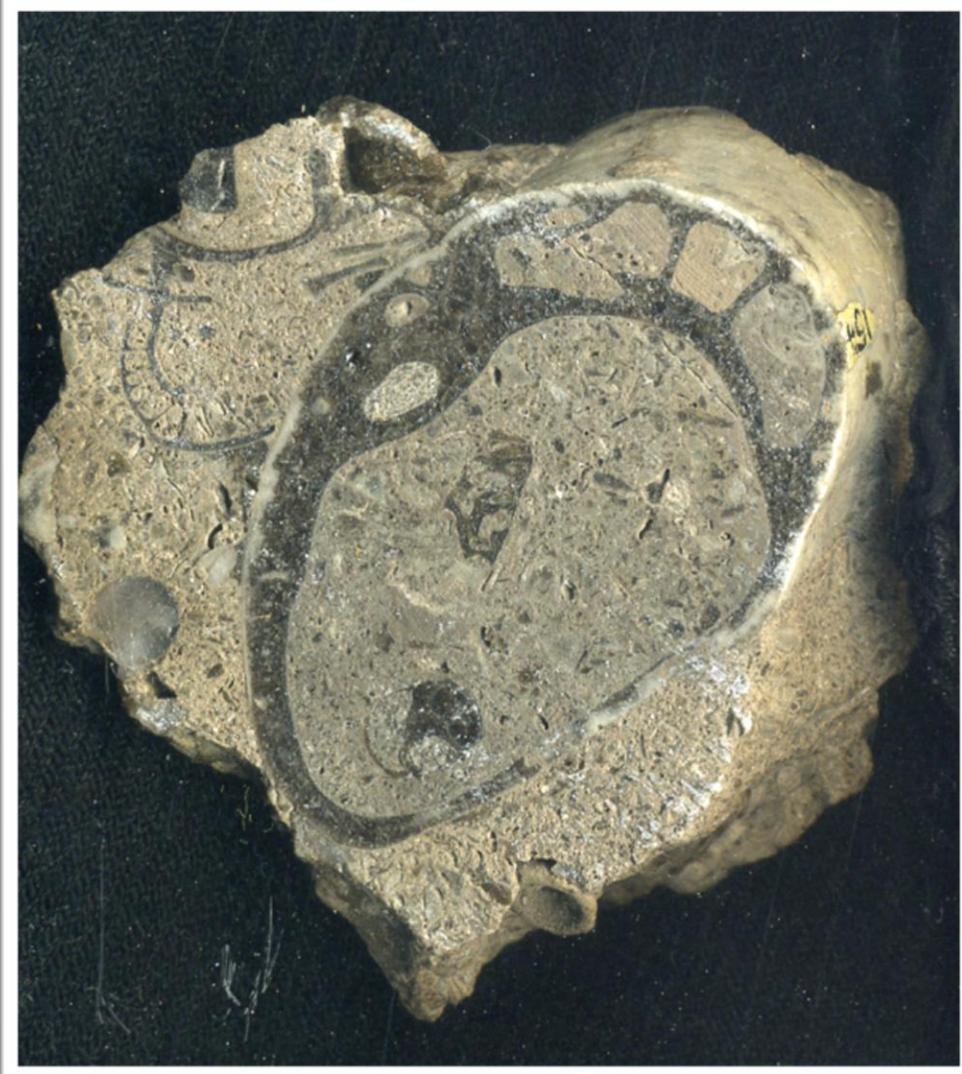


*Monopleura marcida*



*Toucasia patagiata*

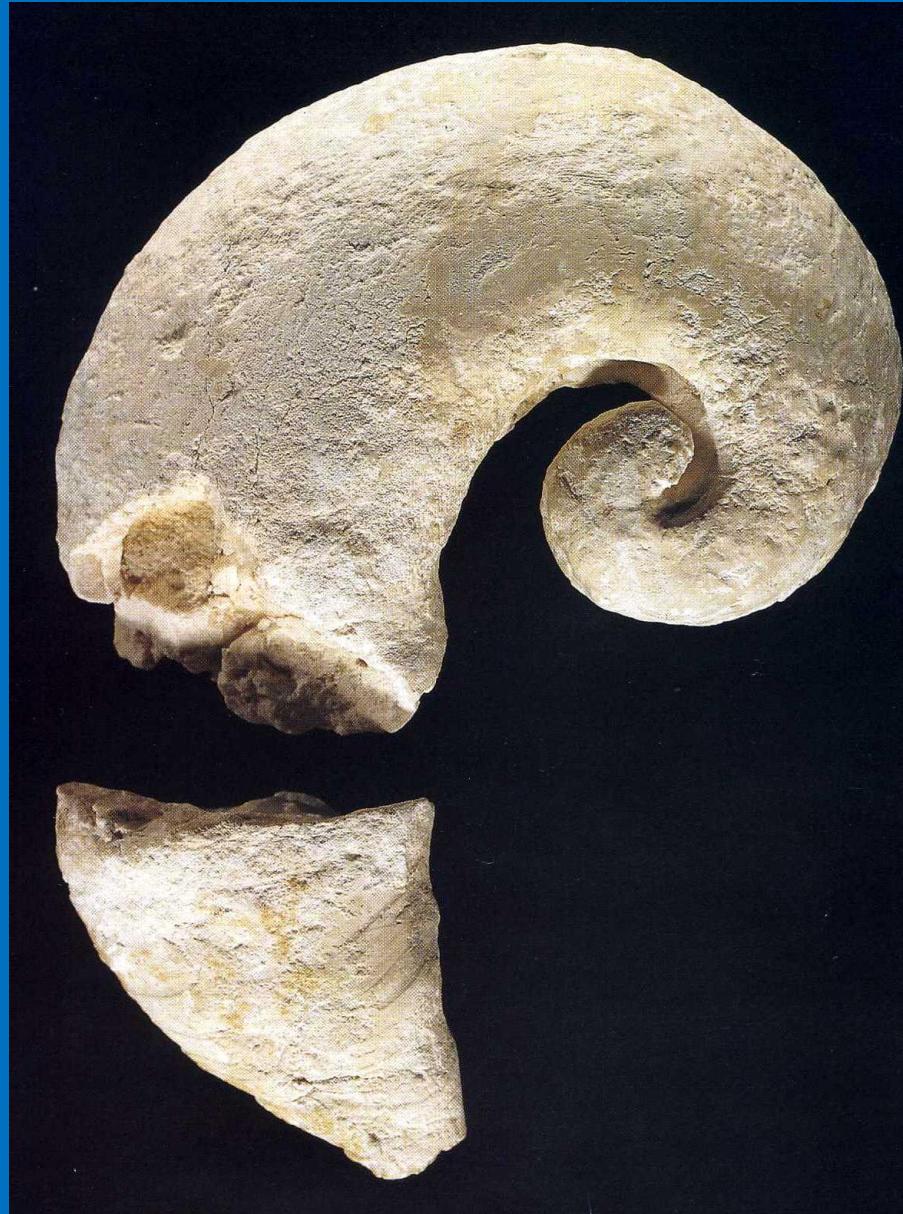
TEXAS



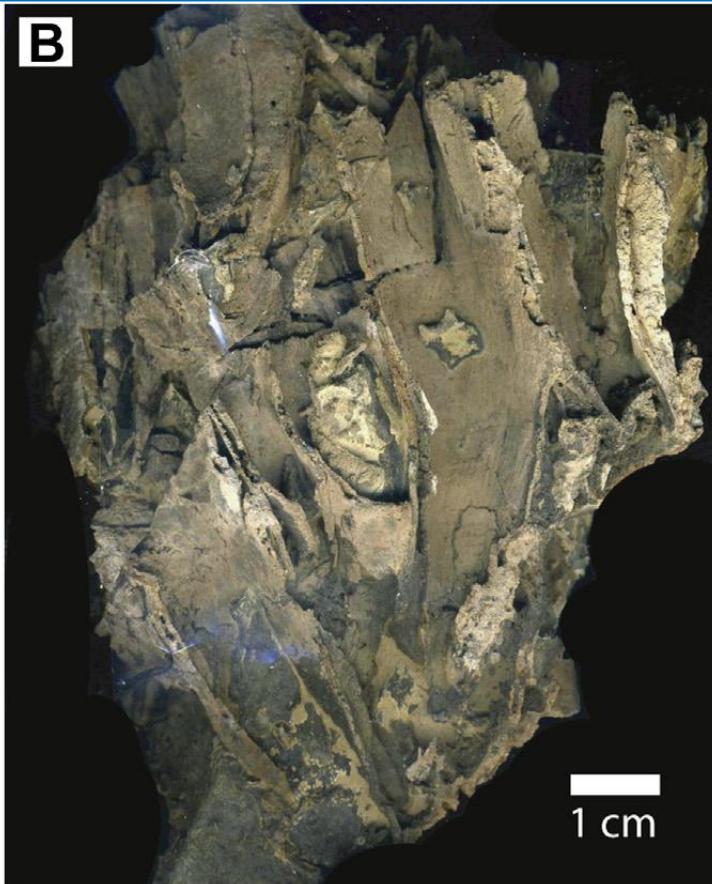
*Pseudocaprina*

Trinidad

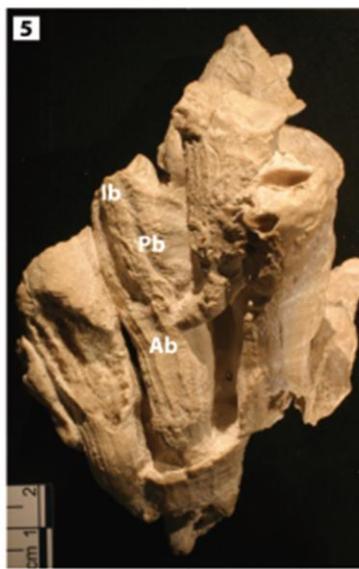
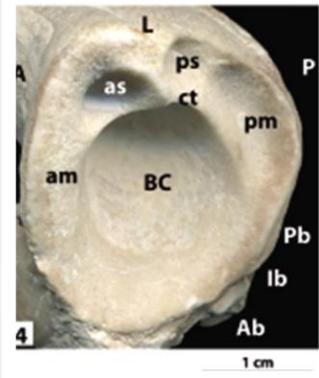
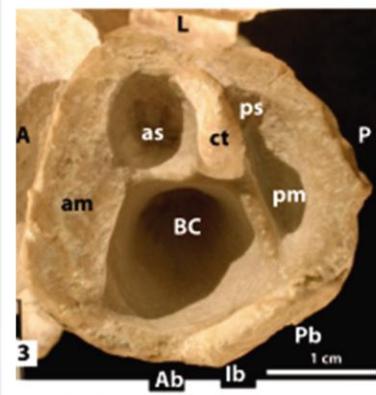
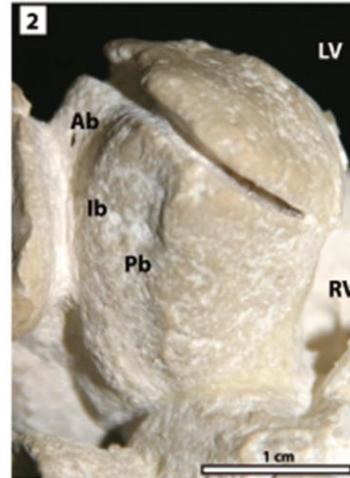
*Caprina*



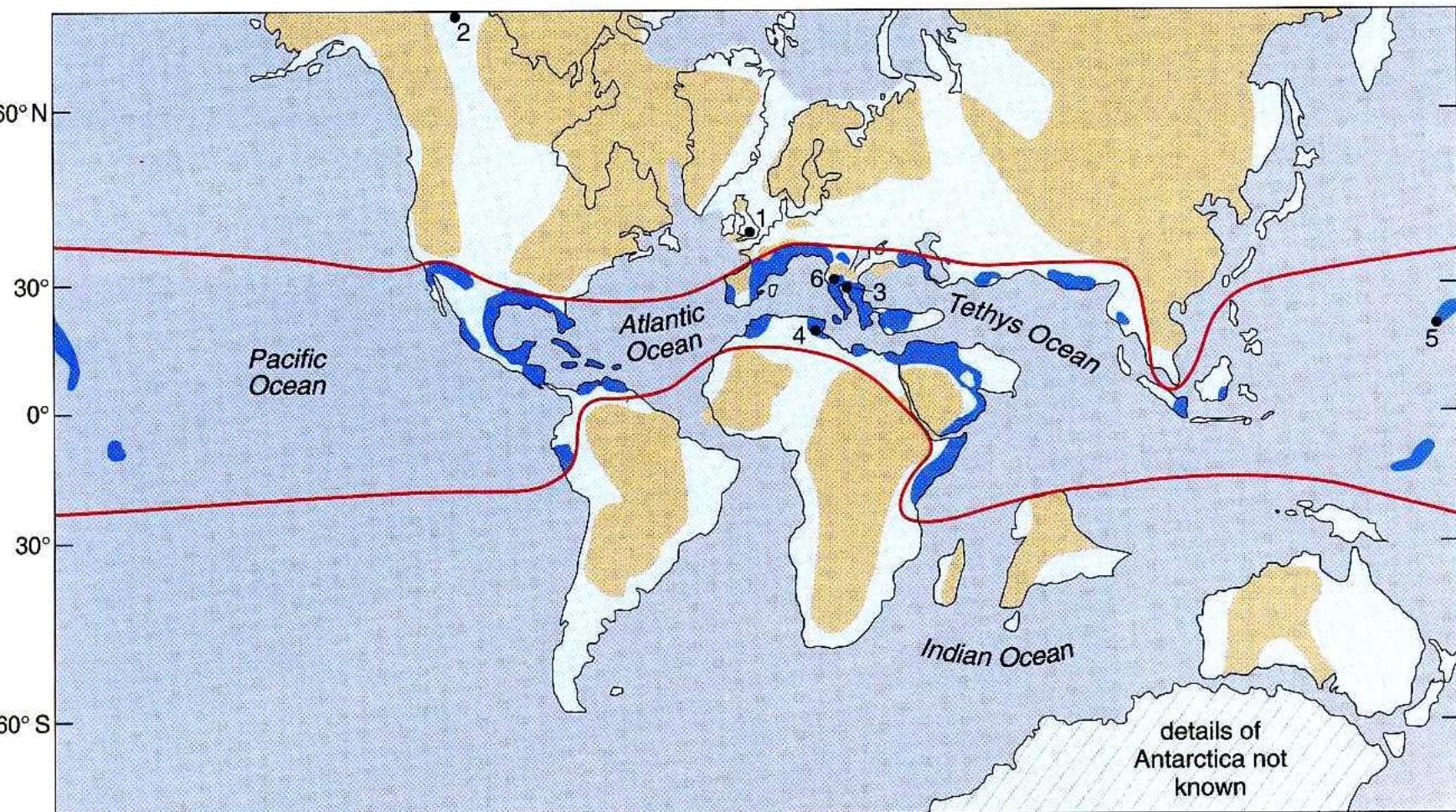
Italie



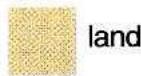
# *Praecaprotina*



Japon



KEY



land



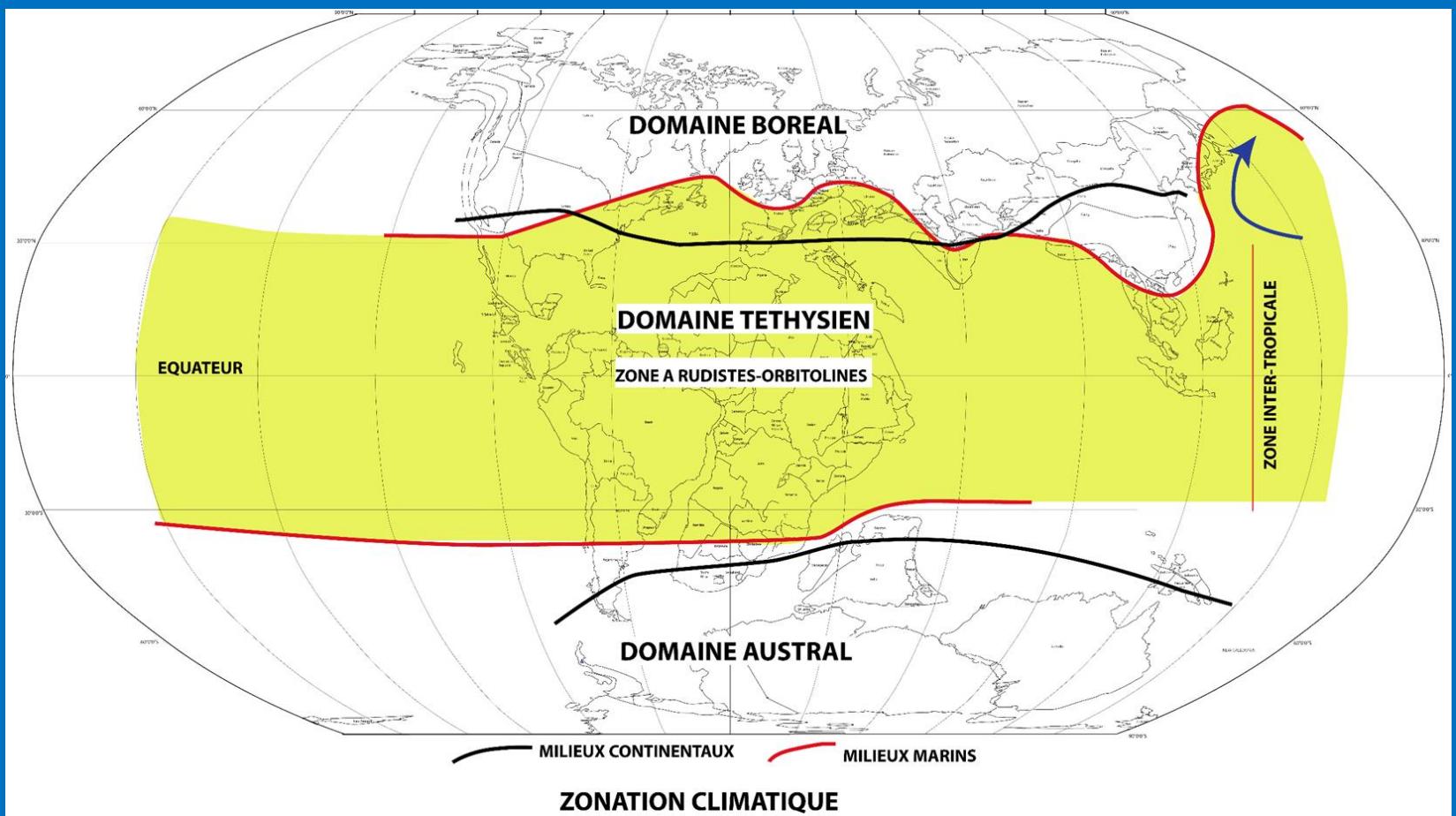
warm-water  
shallow-marine carbonates



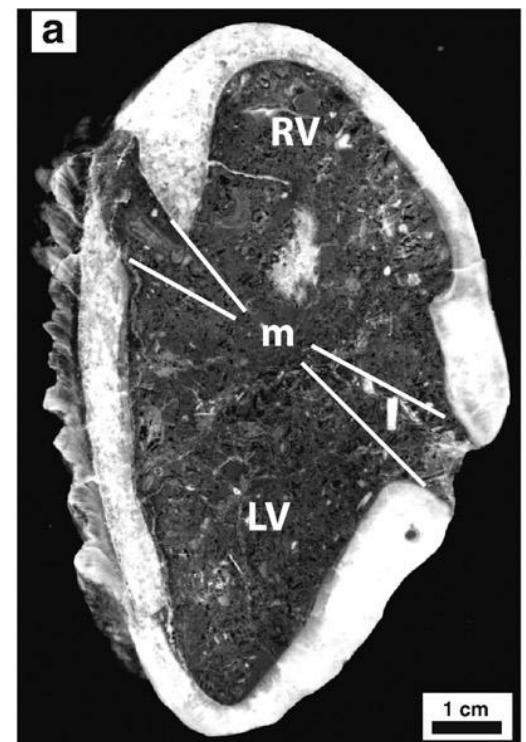
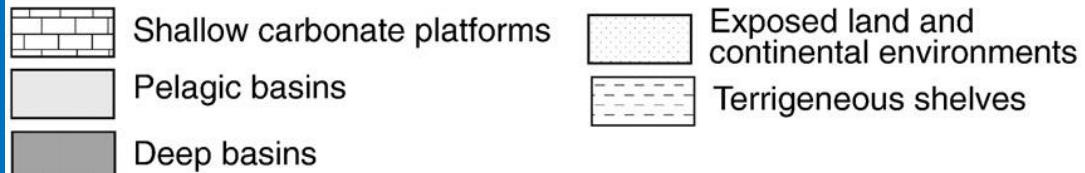
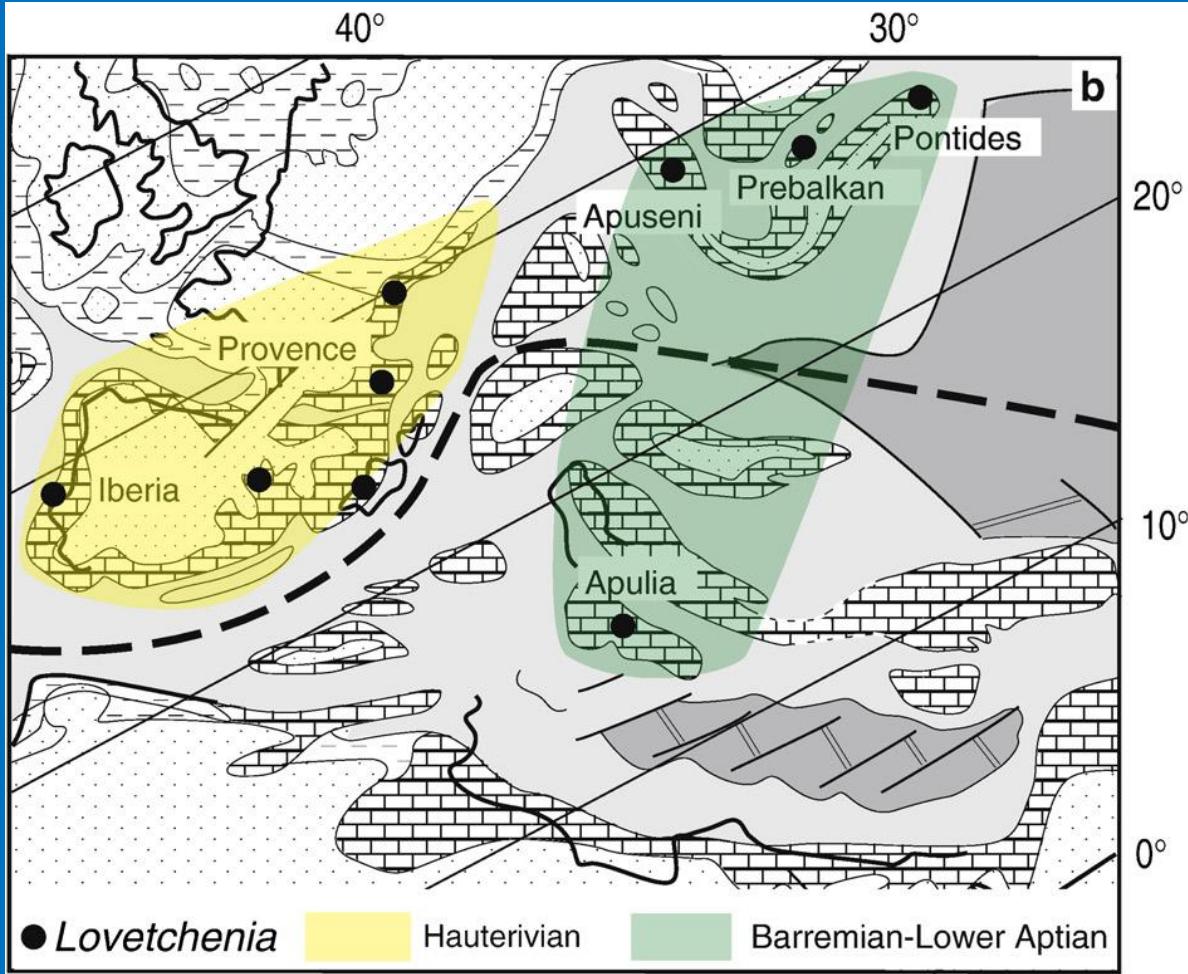
shelf sea including  
pelagic chalk



deep ocean including  
pelagic chalk



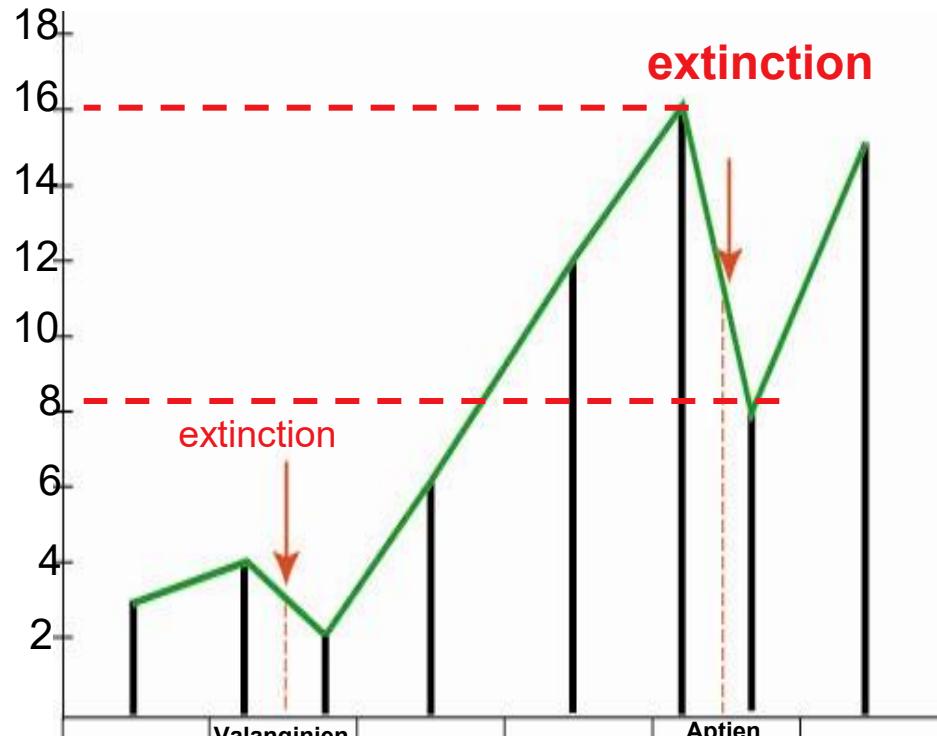
Répartition latitudinale des rudistes au Crétacé inférieur



*Lovetchenia lovetchensis*

— Boundary between  
the European and  
Arabo-African domains

# Nombre de genres



DICERATIDAE

CAPRINIDAE

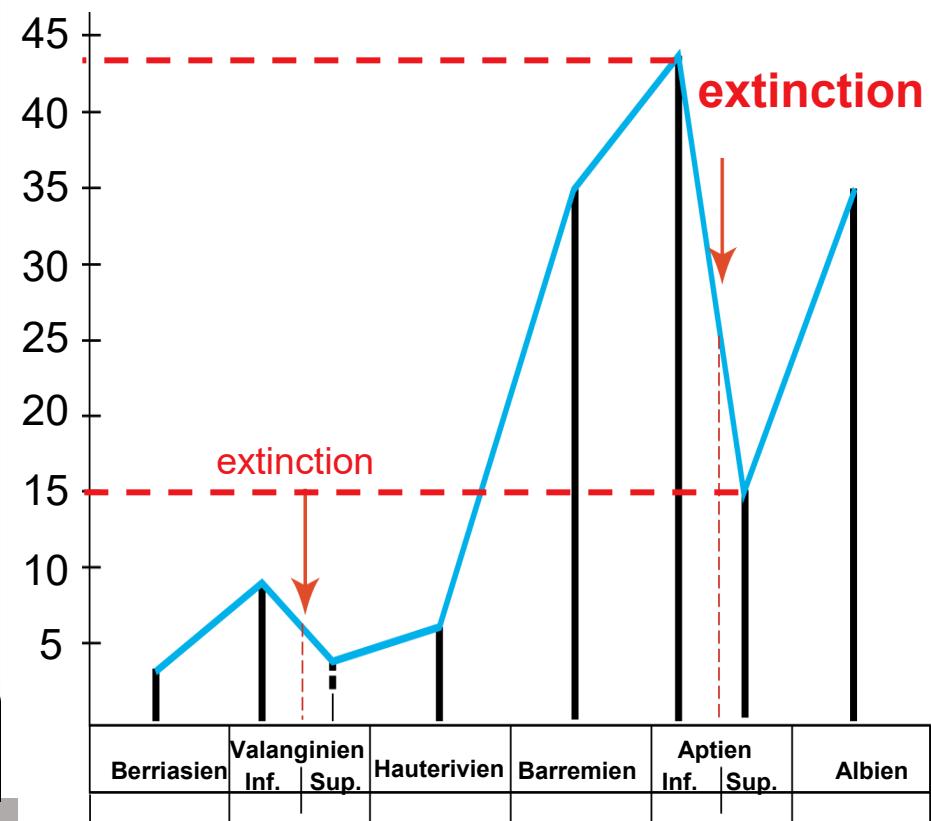
POLYCONITIDAE

RADIOLITIDAE

REQUIENIIDAE

MONOPLEURIDAE

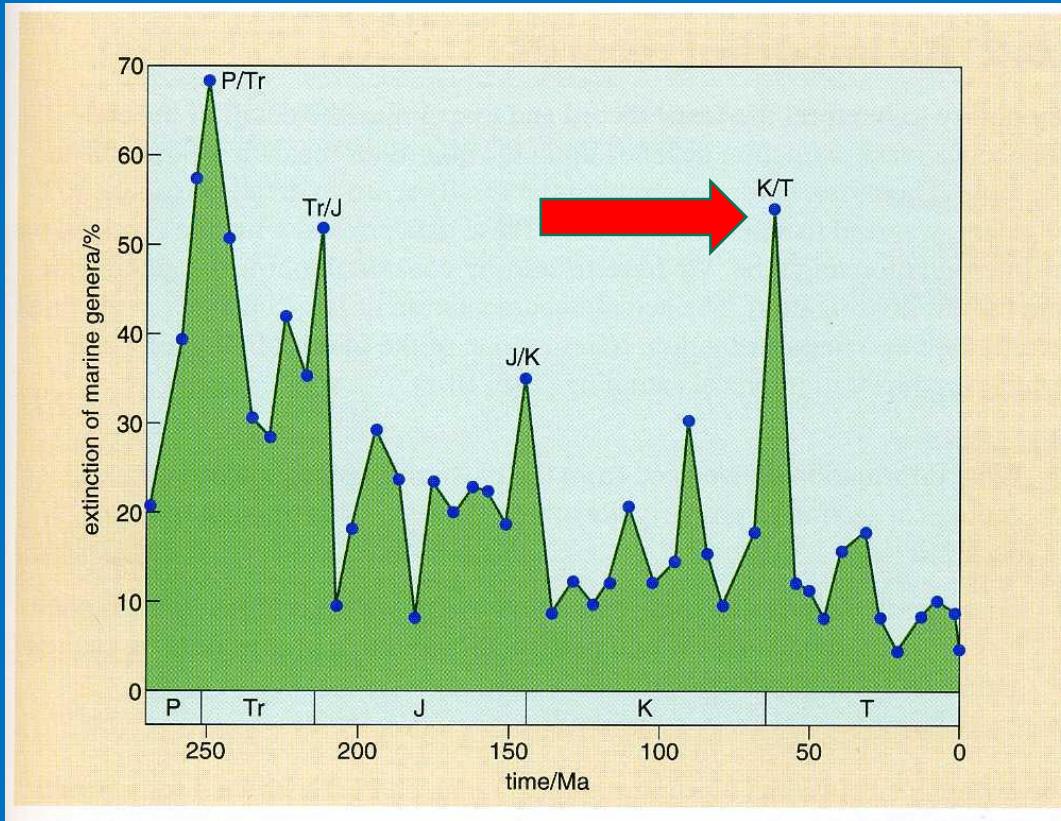
# Nombre d'espèces

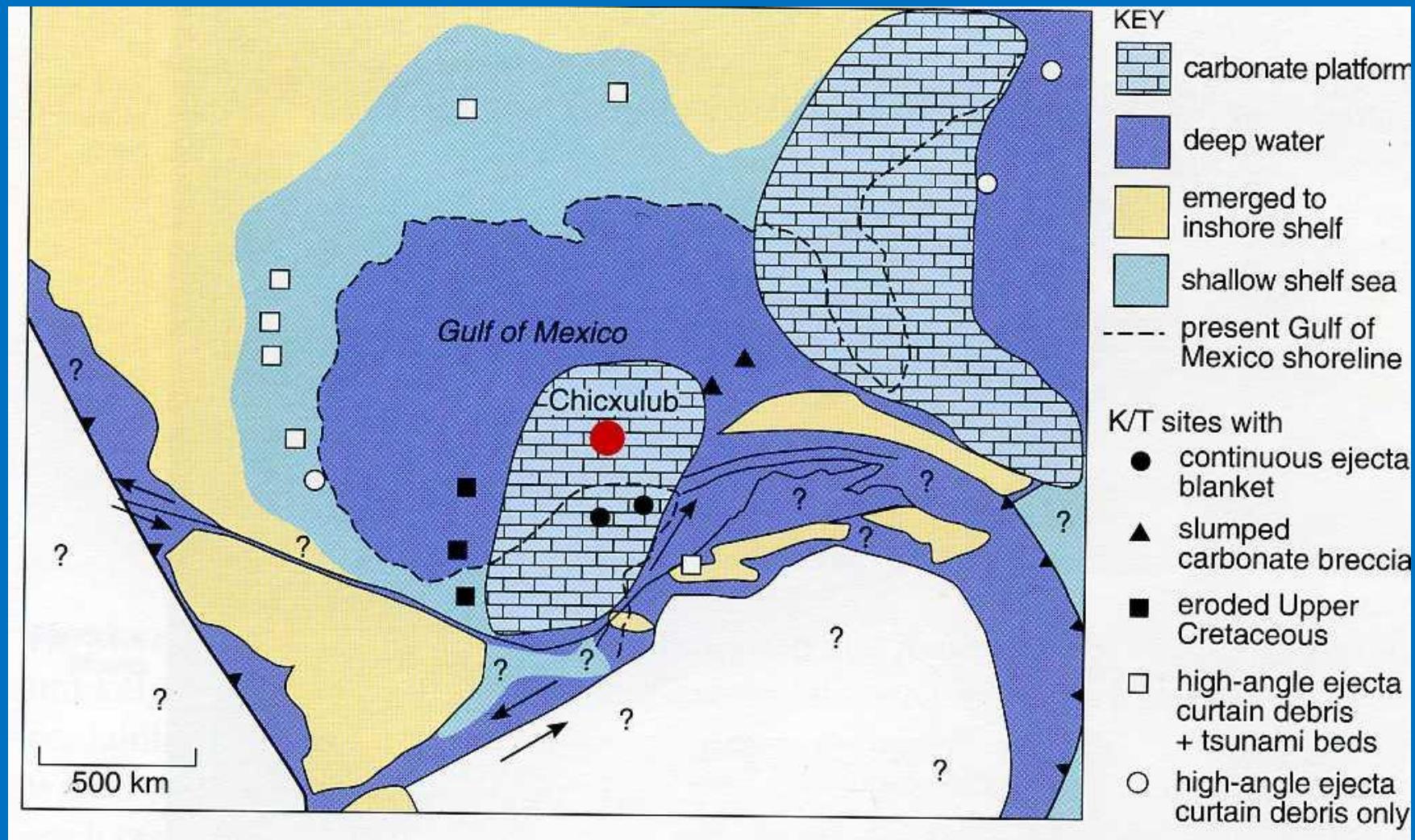


FAMILLES

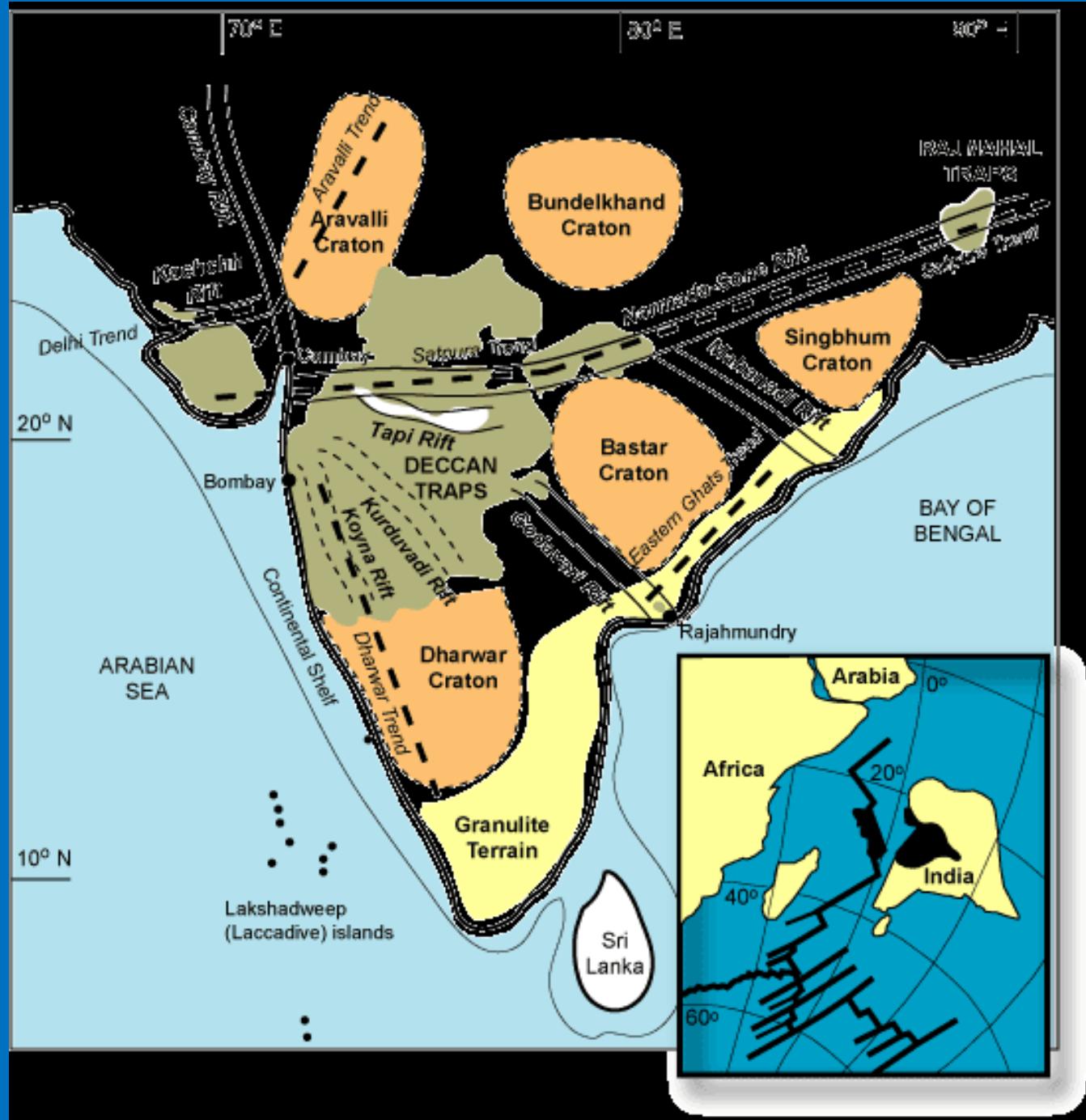
Région Méditerranéenne

# CRISES BIOLOGIQUES





## L'impact fatal?



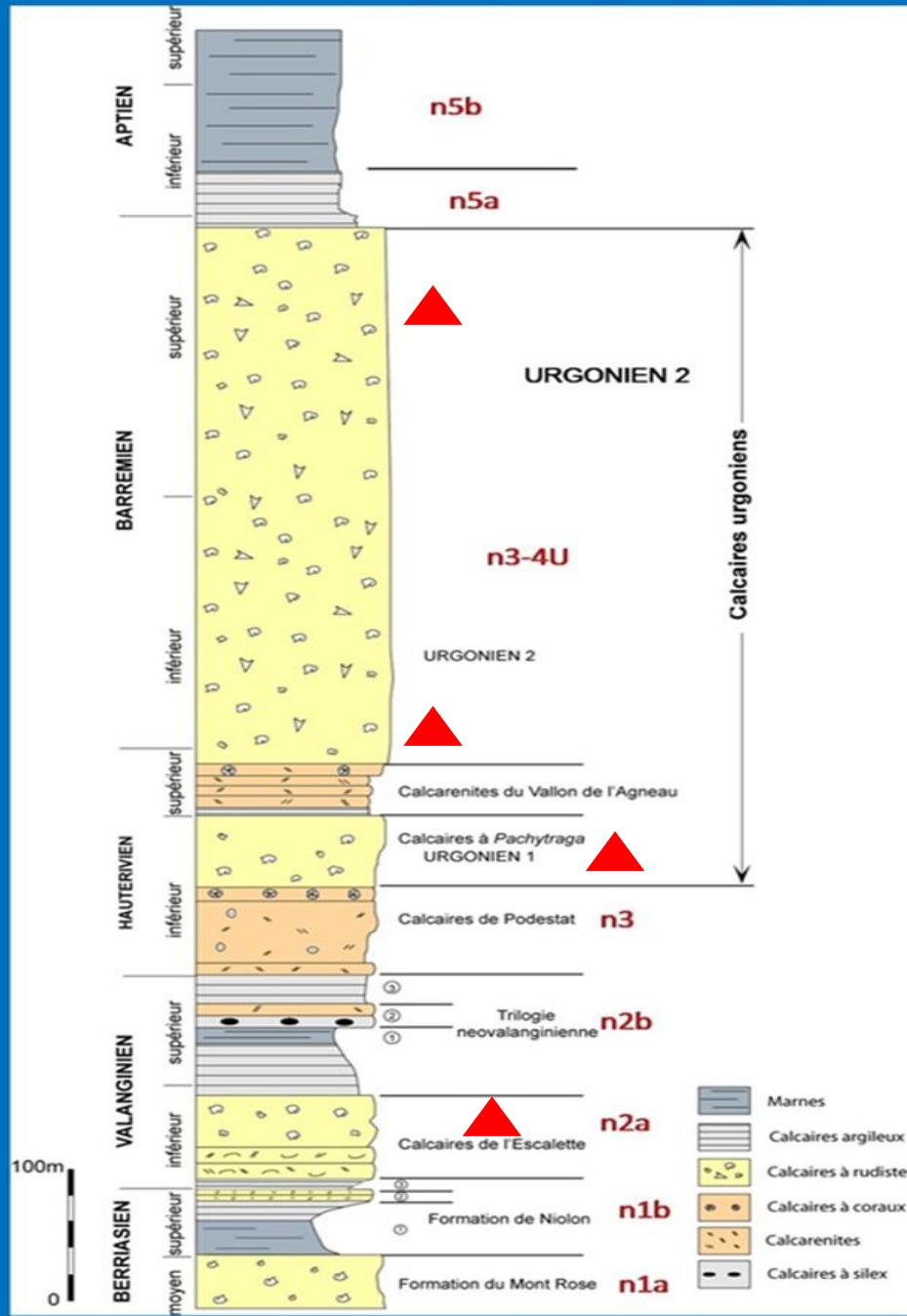
**Les rudistes: outils  
biostratigraphiques**  
**Applications à la Provence**  
**Datation des Calcaires urgoniens**



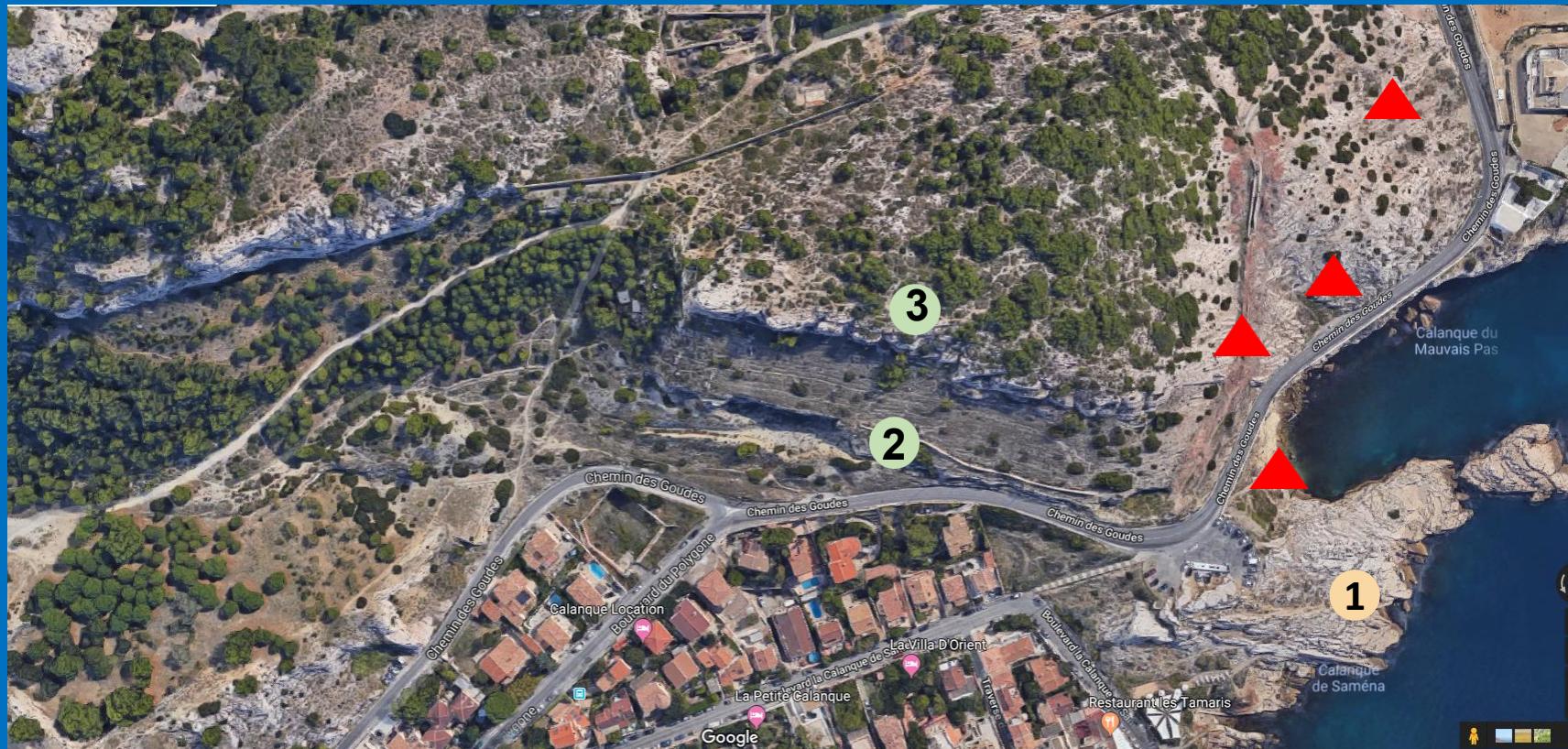
Massif des Calanques

**FAUNES DIFFERENCIEES DANS L'INTERVALLE  
BERRIASIEN - BARREMIEN**

# Colonne stratigraphique du Crétacé inférieur du Massif des Calanques



# Formation de Niolon et Calcaires de l'Escalette Faille de la Calanque du Mauvais Pas

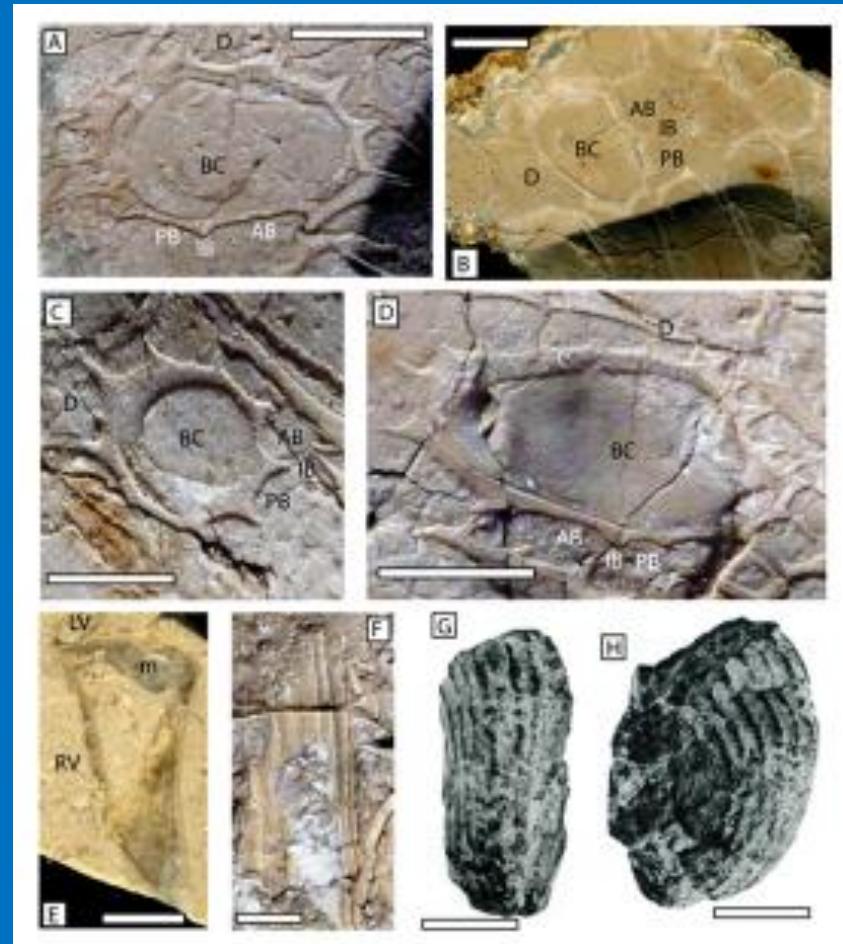


1 Calcaire du Mont  
Rose

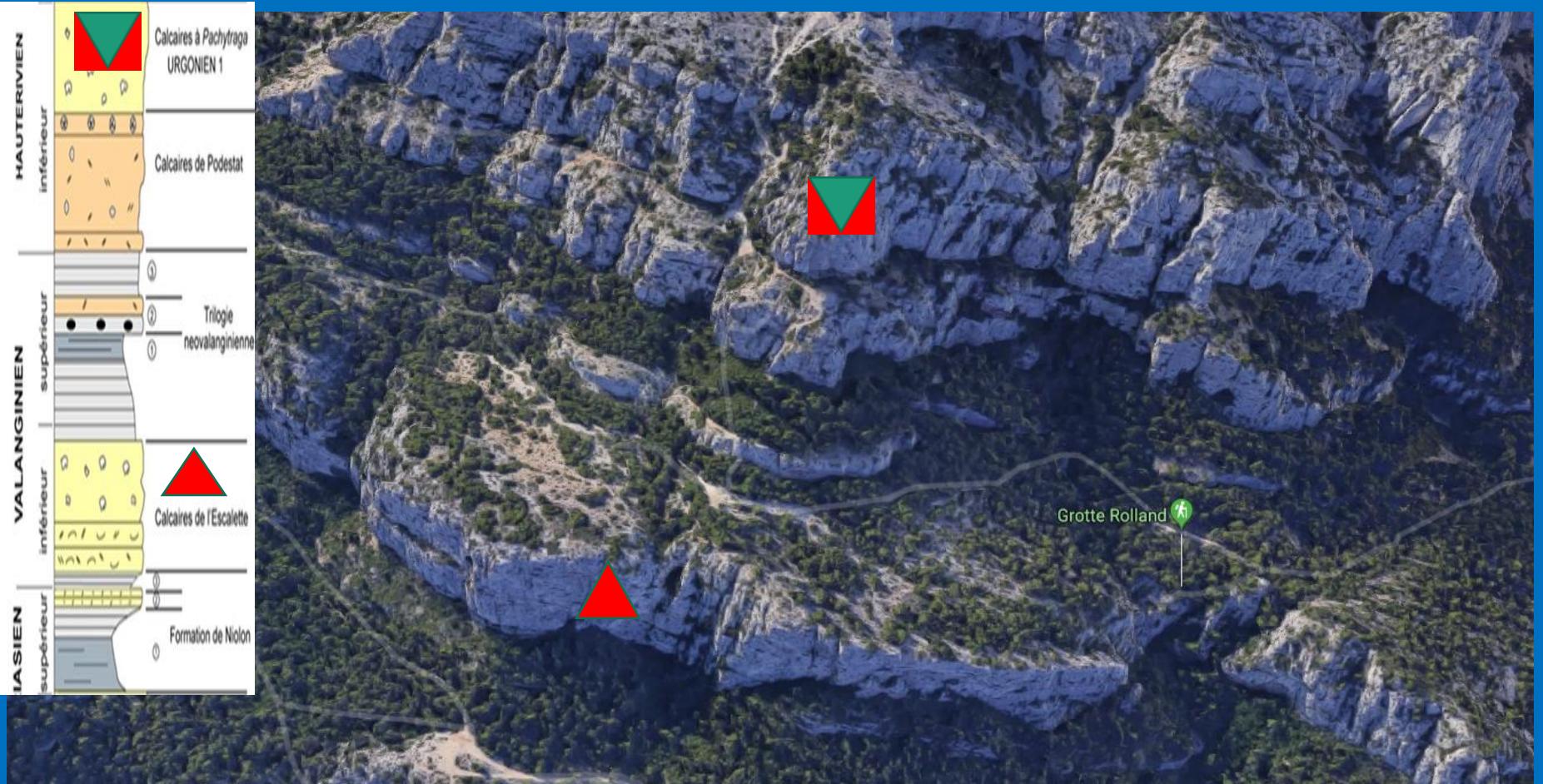
2 Formation de  
Niolon

3 Calcaire de l'Escalette

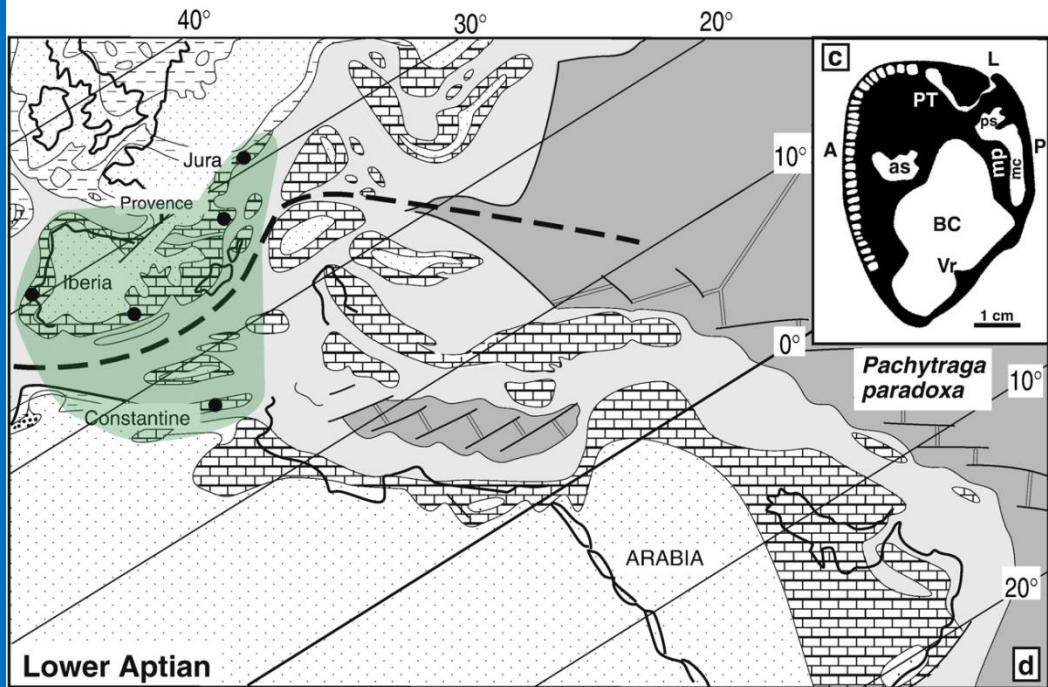
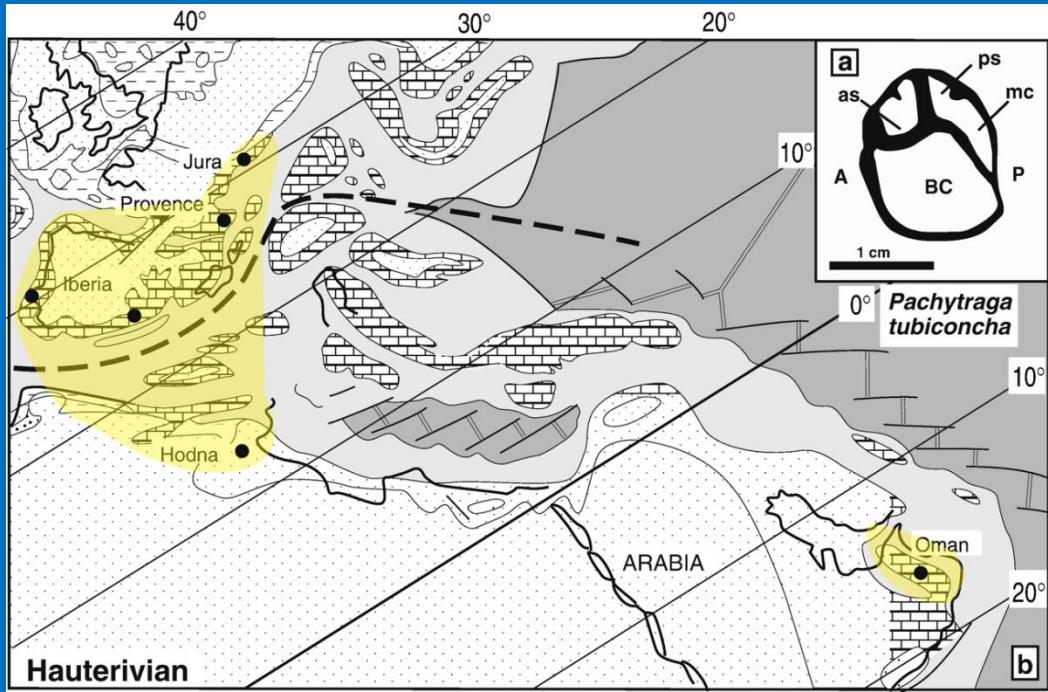
# Rudistes et Gastéropodes des Calcaires de l'Escalette

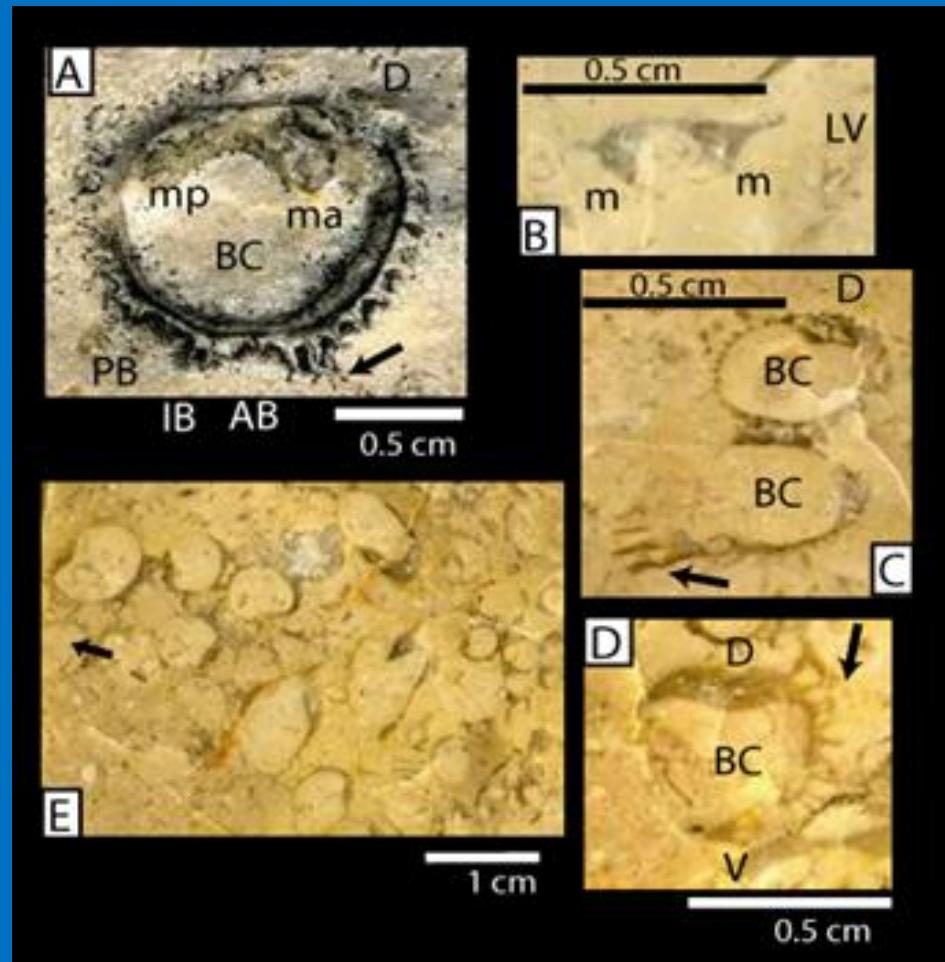


*Debrunia massiliana*

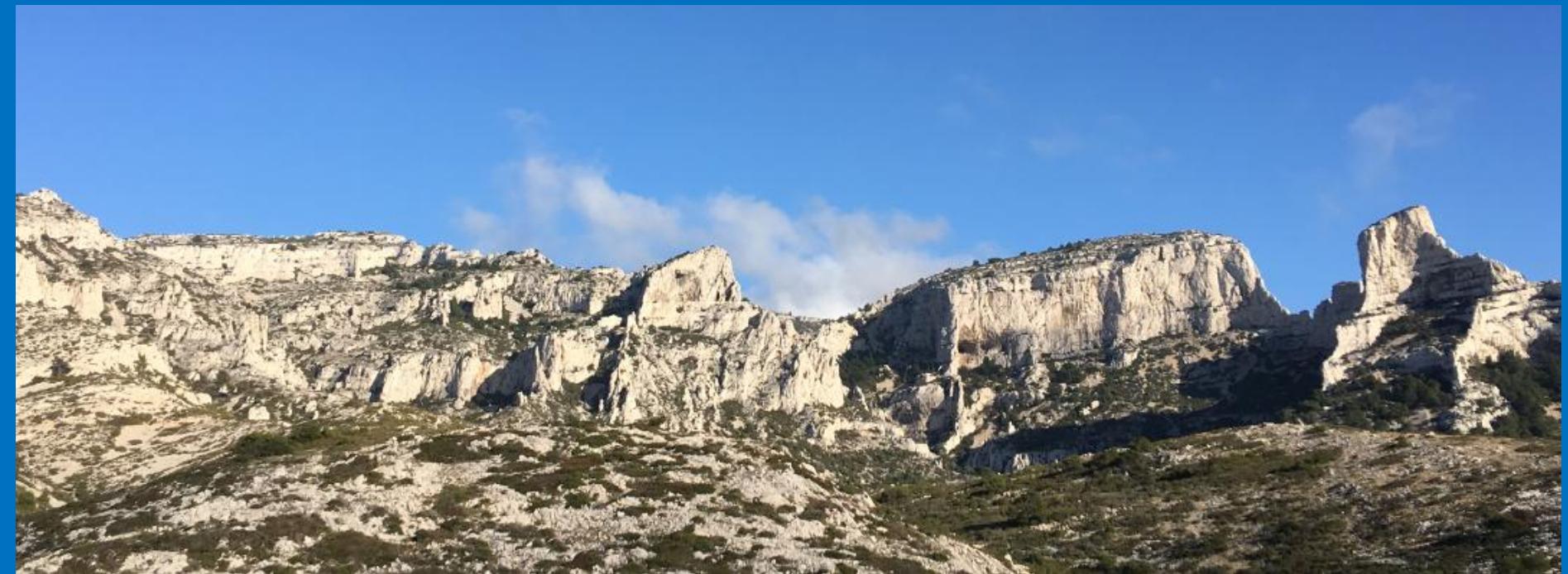


**Massif de Marseilleveyre - Grotte  
Rolland**

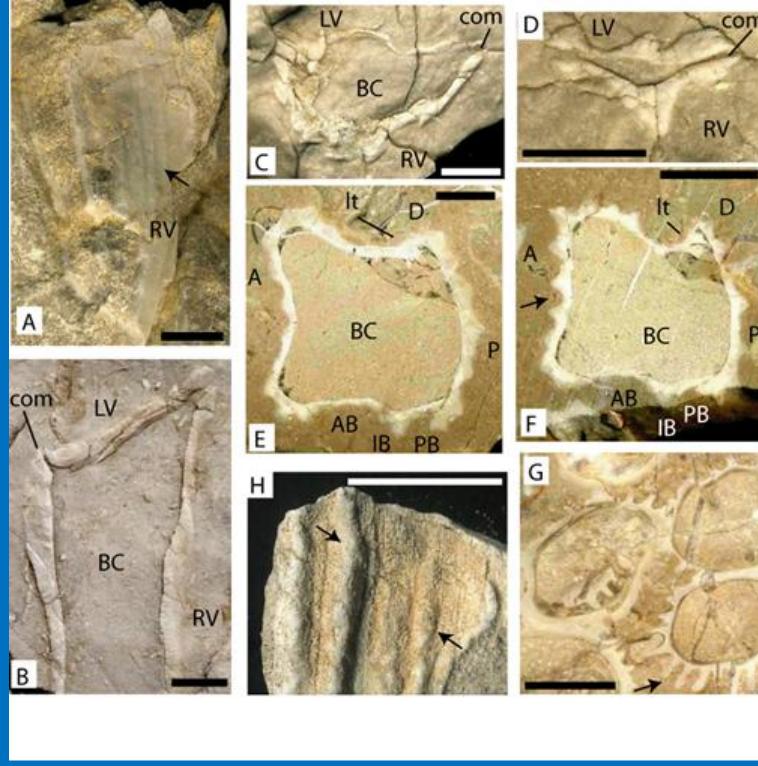




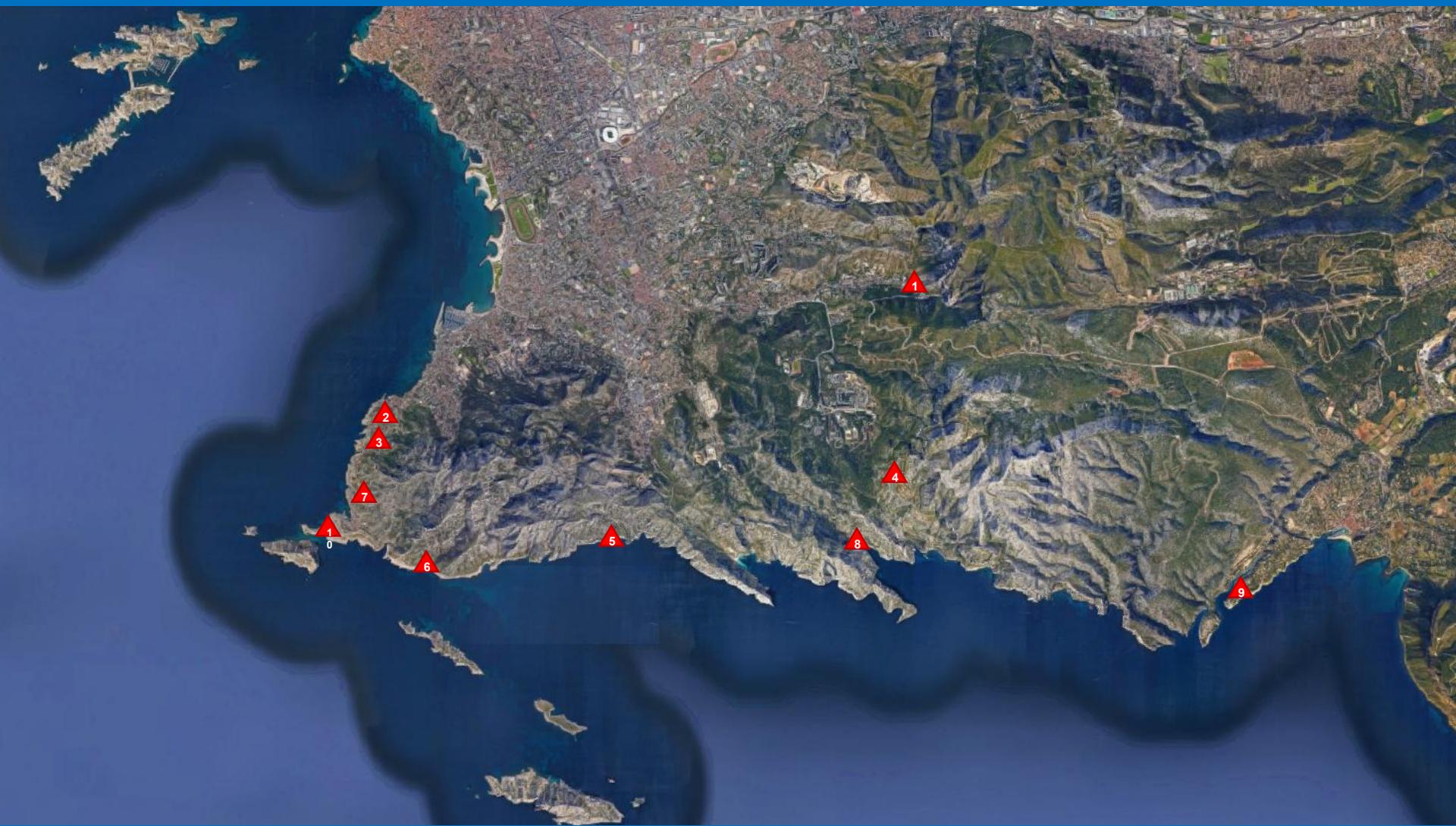
*Debrunia heliomorpha* -  
Hauterivien inférieur

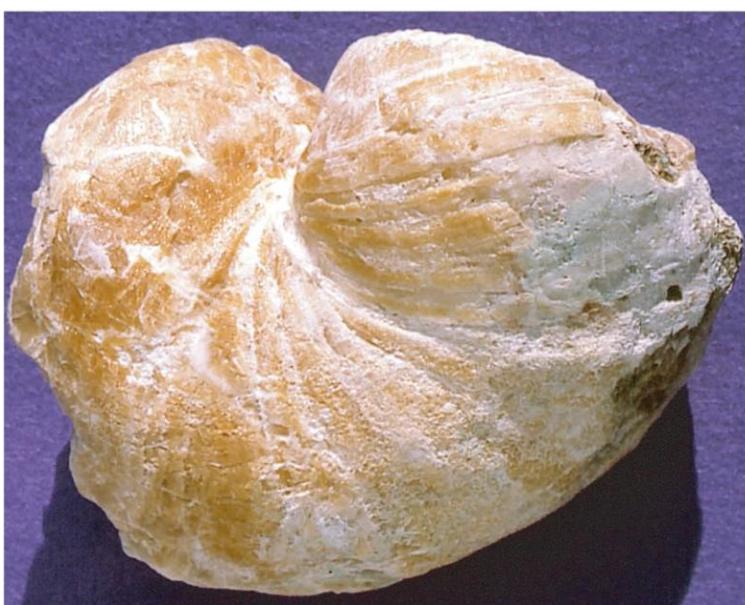


## LES GOUDES – LES FALAISES



*Debrunia acuta* des Goudes  
Base de l'Urgonien





*Toucasia carinata*



*Requienia ammonia*



*Debrunia  
mutabilis*

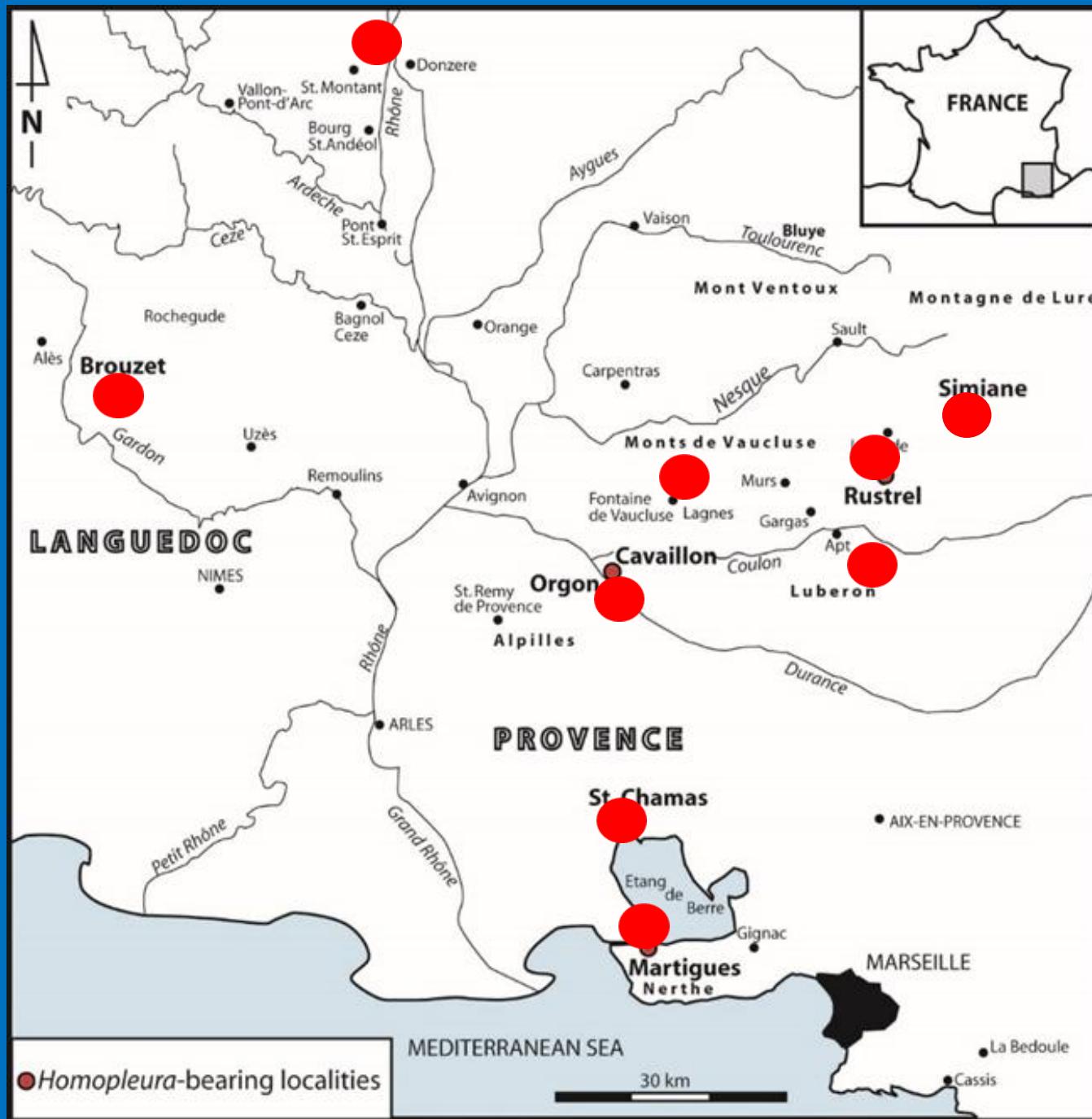


*Requierenia  
migliorinii*

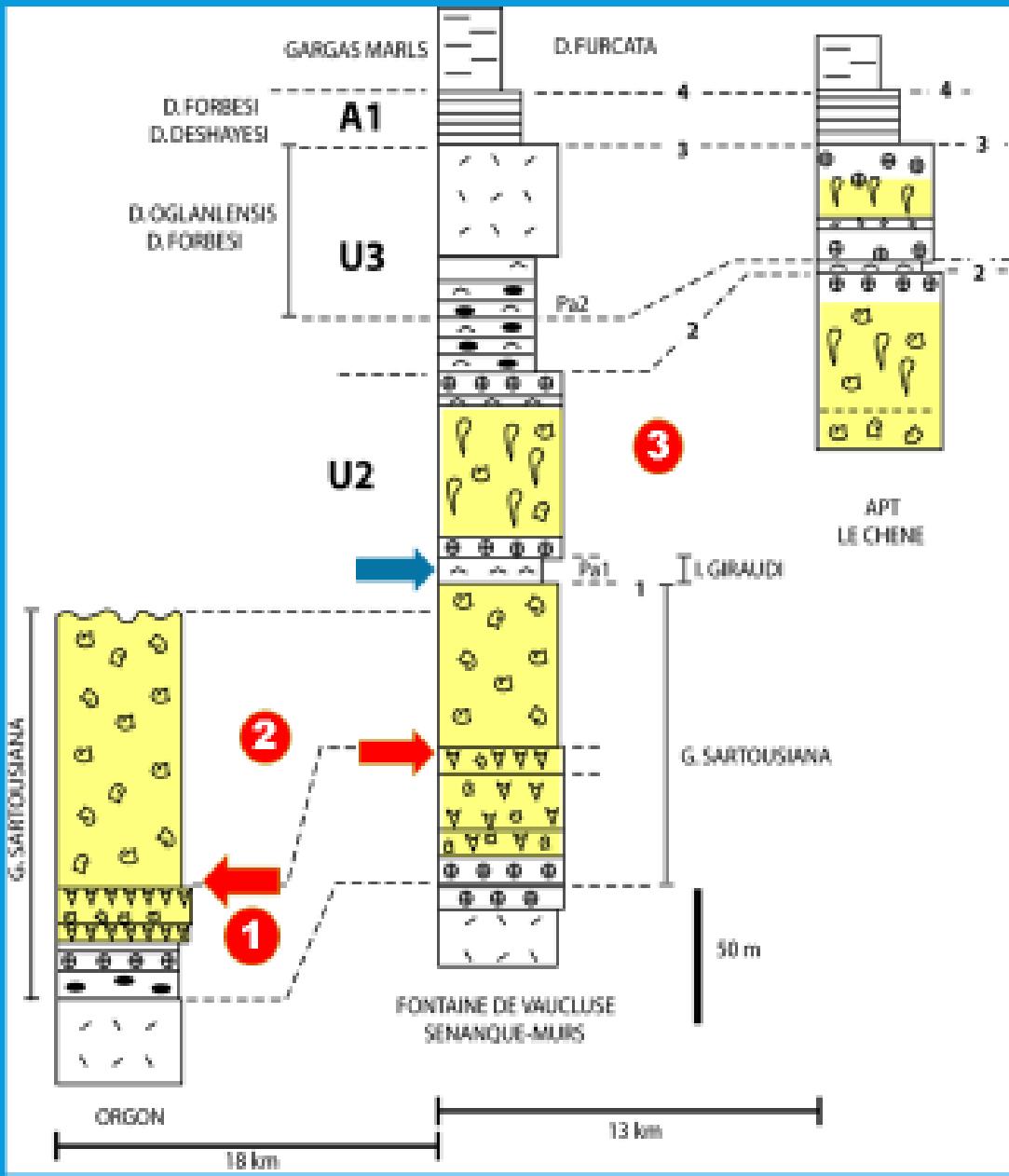


*Agriopleura  
marticensis*

Rudistes du Barrémien  
de la région de Cassis



**TROIS FAUNES  
SUCCESSIVES DANS LE  
BARREMMIEN SUPERIEUR**



→ ECLIPSE  
→ EMERSION

### Faunes

- 1 Brouzet
- 2 Orgon
- 3 Rustrel



*Agriopleura*

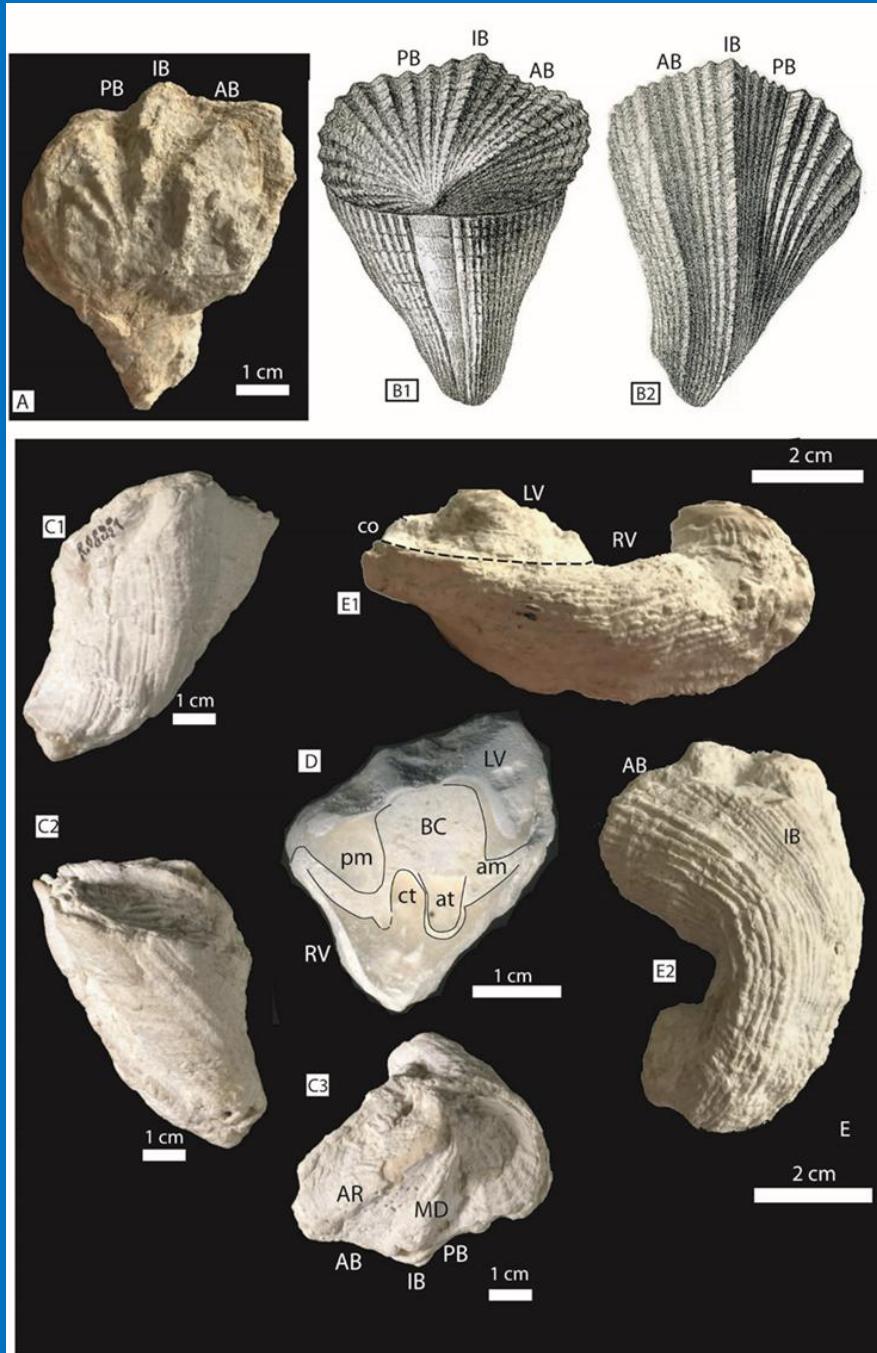


*Debrunia*

● Gisements à Agriopleura  
□ Gisement à Requienia

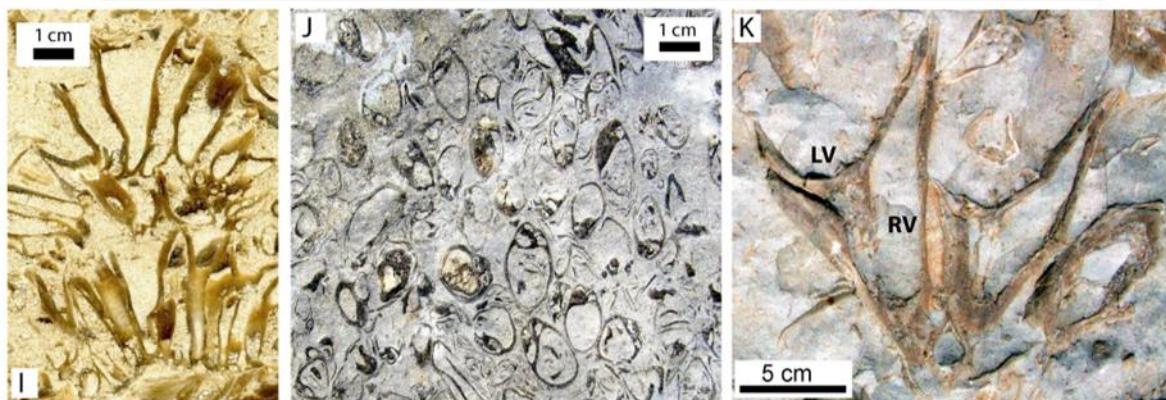
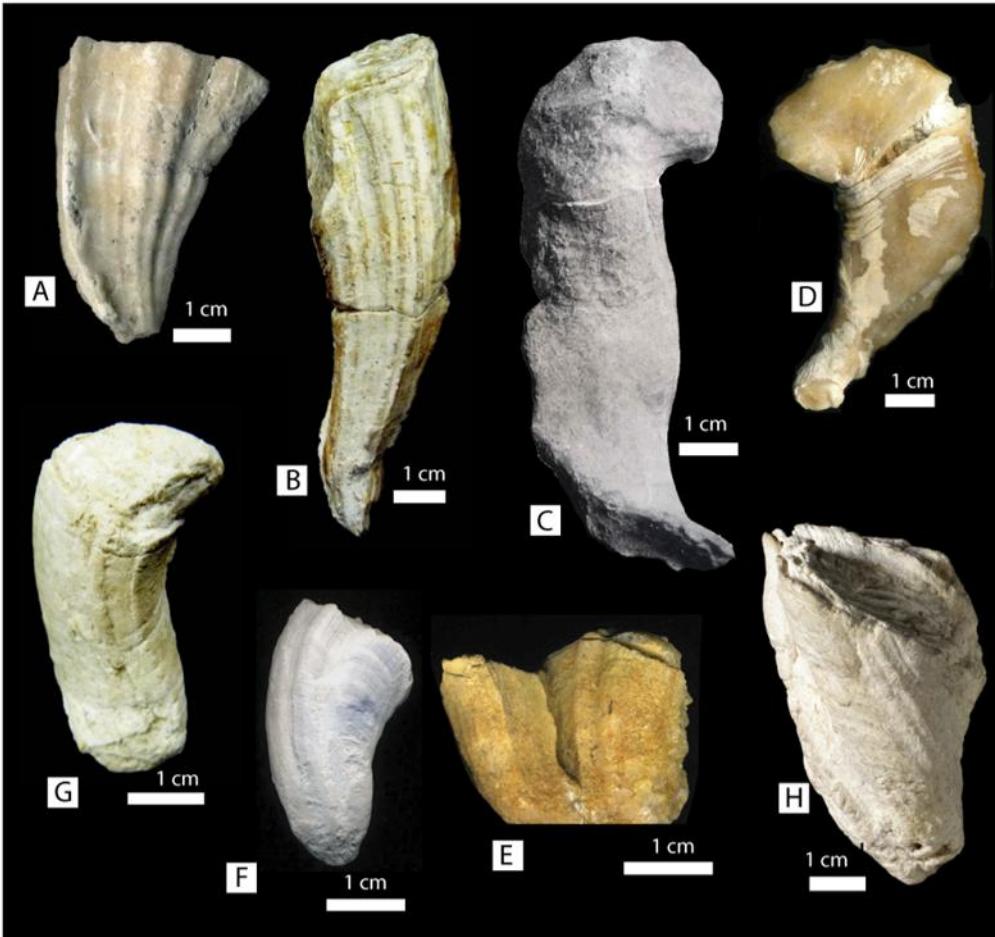


Orgon



Genre *Homopleura*  
Brouzet les Alès

# Agriopleura et Monopleuridae



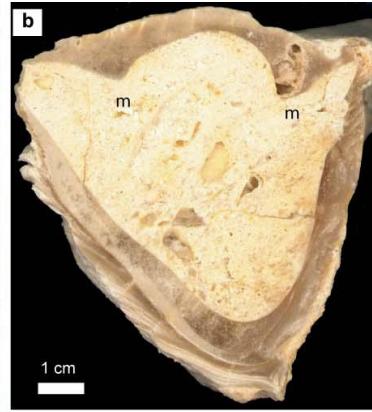
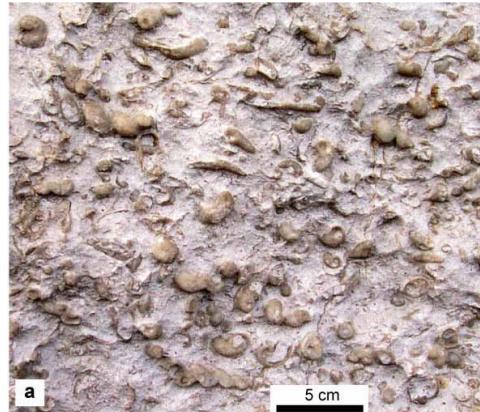


*Toucasia carinata*

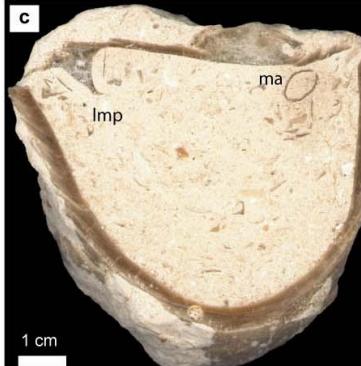


*Requienia ammonia*

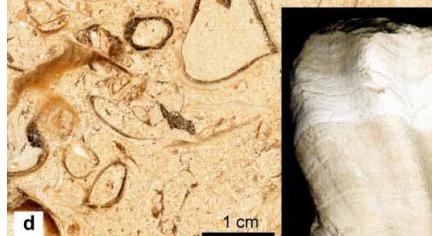
# Communauté et Taxons caractéristiques du Barrémien supérieur à Orgon



b- *Matheronia cf. munieri*, section antéro-postérieure d'un spécimen bivalve montrant les myophores



c- *Requienia ammonia*, section antéro-postérieure d'un spécimen bivalve montrant les myophores



f- *Toucasia sp.*, section antéro-postérieure d'un spécimen bivalve montrant les lames myophores postérieures

d- Communauté à  
*Monopleura urgonensis*

e- *Monopleura urgonensis*,  
spécimen dégagé en vue ventrale

## FAUNE D'ORGON

*Matheronina munieri* Paquier  
*Requienia ammonia* (Goldfuss)  
*Requienia gryphoides* Matheron  
*Requienia semirugata* Matheron  
*Toucasia carinata* (Matheron)  
*Toucasia transversa* Paquier  
*Monopleura varians* Matheron  
*Monopleura cingulata* Matheron  
*Monopleura trilobata* (d'Orbigny)  
*Monopleura martini* Matheron  
*Monopleura depressa* Matheron  
*Debrunia mutabilis* (Matheron)  
*Debrunia favrei* (Matheron)  
*Debrunia occitanica* Masse and Fenerci-Masse  
*Retha munieri* (Matheron)  
*Horiopleura dumortieri* (Matheron)

*Pachytraga*



*Caprina*



*Offneria*



Provence

## FAUNE DE RUSTREL

*Matheronia aptiensis* Matheron

*Matheronia virginiae* (Gras)

*Requieria gryphoides* Matheron

*Requieria ammonia* (Goldfuss)

*Toucasia carinata* (Matheron)

*Toucasia transversa* Paquier

*Monopleura varians* Matheron

*Monopleura trilobata* (d'Orbigny)

*Debrunia occitanica* Masse and Fenerci-Masse

*Debrunia favrei* (Matheron)

*Debrunia ucetiae* Masse and Fenerci-Masse

*Horiopleura brevis* Masse and Fenerci-Masse

*Retha munieri* (Matheron)

*Pachytraga paradoxa* Paquier

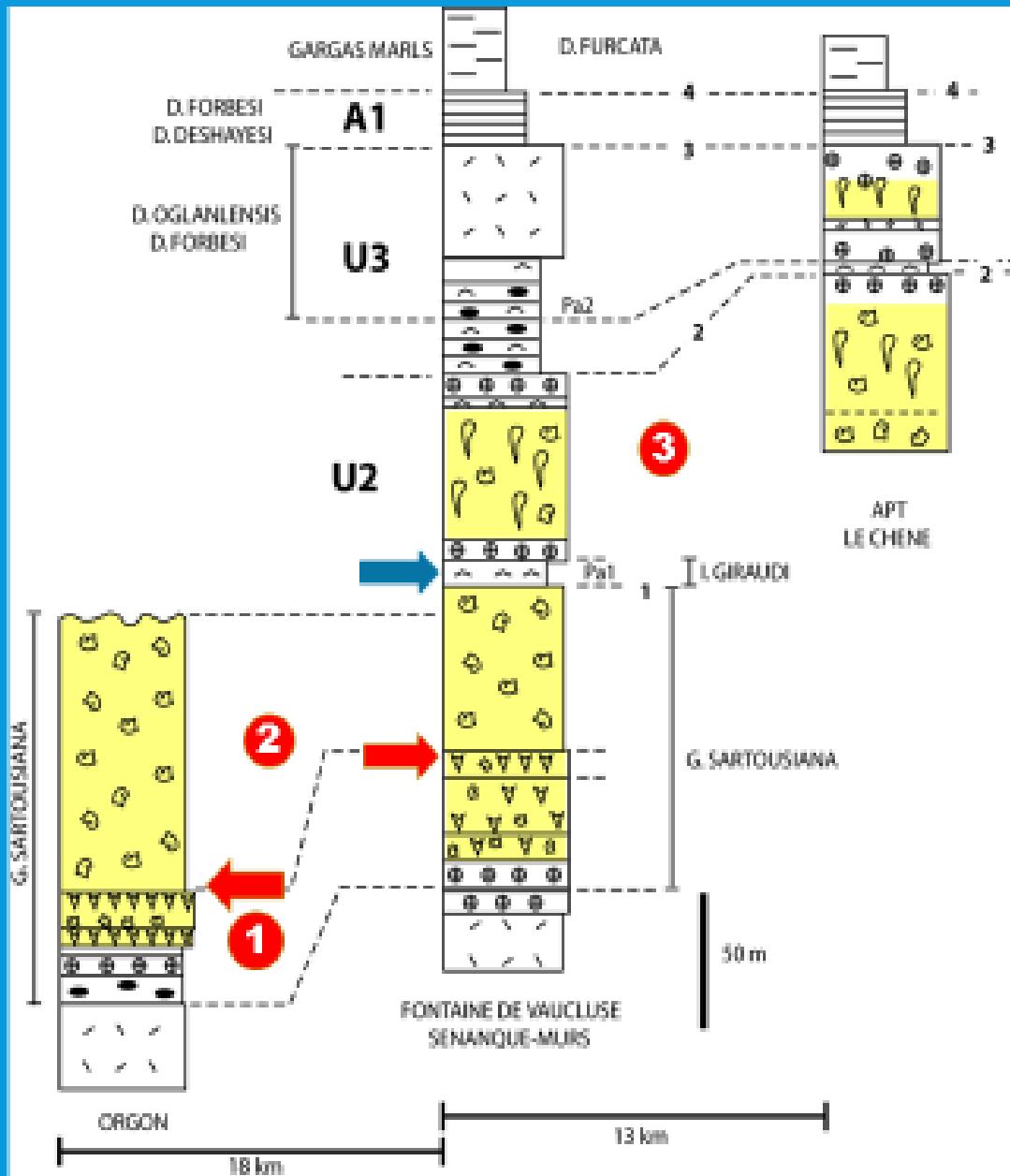
*Praecaprina varians* Paquier

*Praecaprina gaudryi* Paquier

*Caprina douvillei* Paquier

*Offneria rhodanica* Paquier

*Offneria interrupta* Paquier



→ ECLIPSE  
→ EMERSION

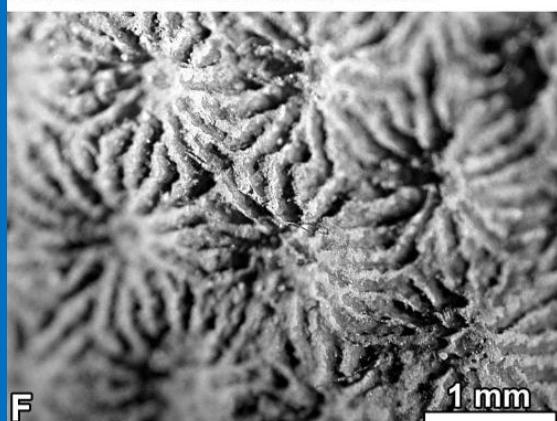
### Faunes

- ① Brouzet
- ② Orgon
- ③ Rustrel

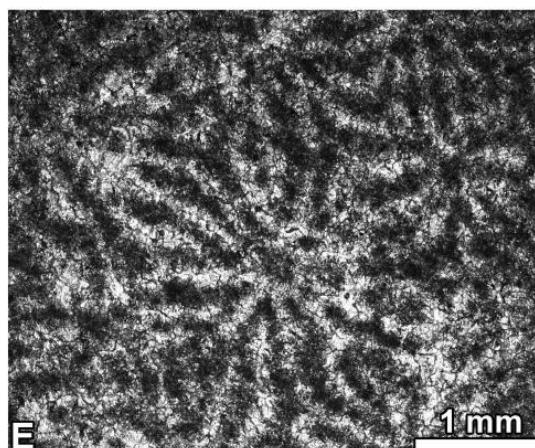
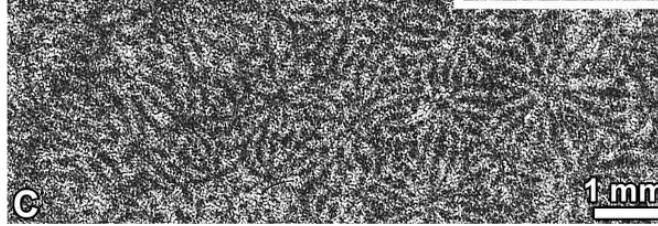


**RECIFS CORALLIENS ACTUELS**

***Stylosmilia corallina***  
Mont-Puget

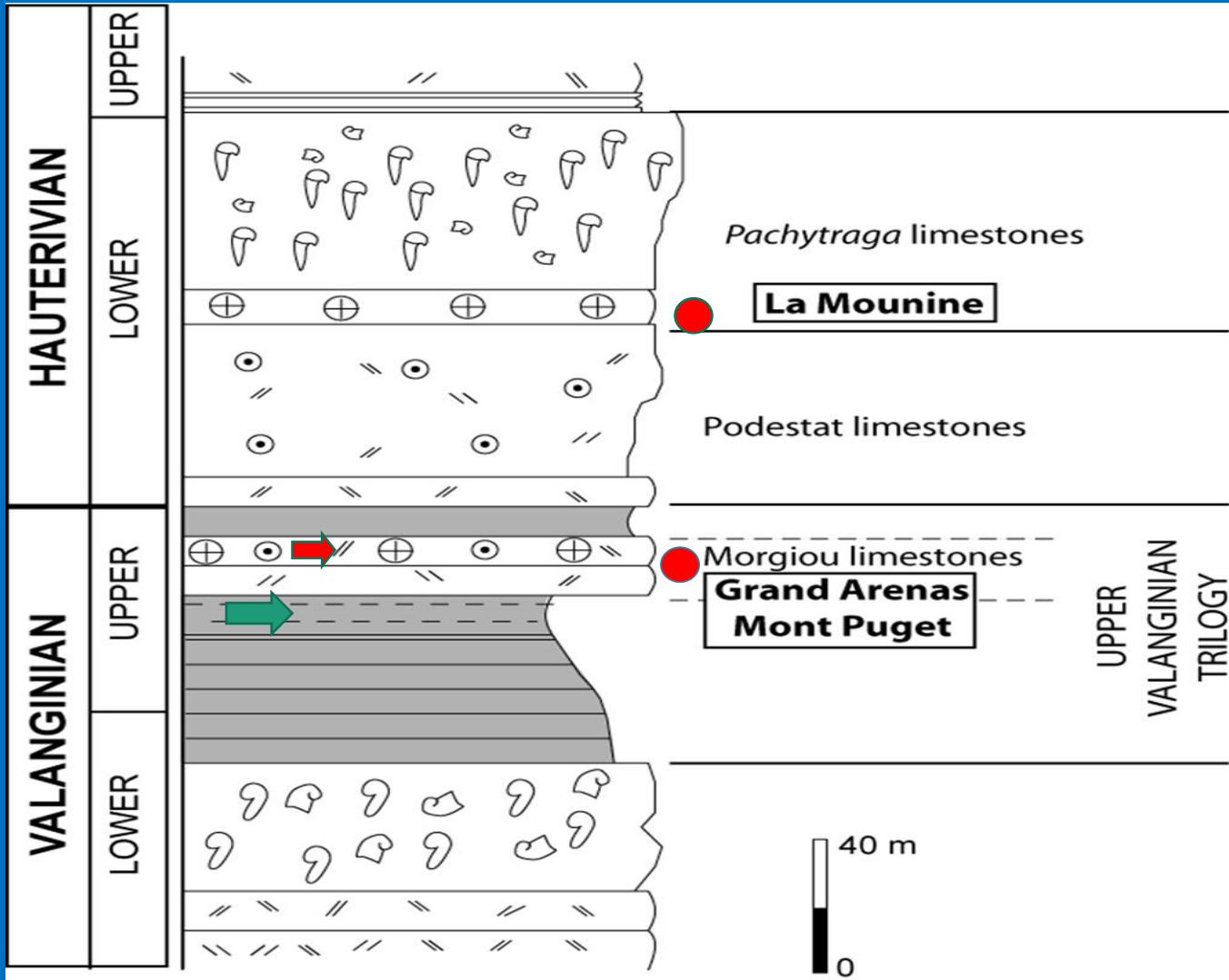


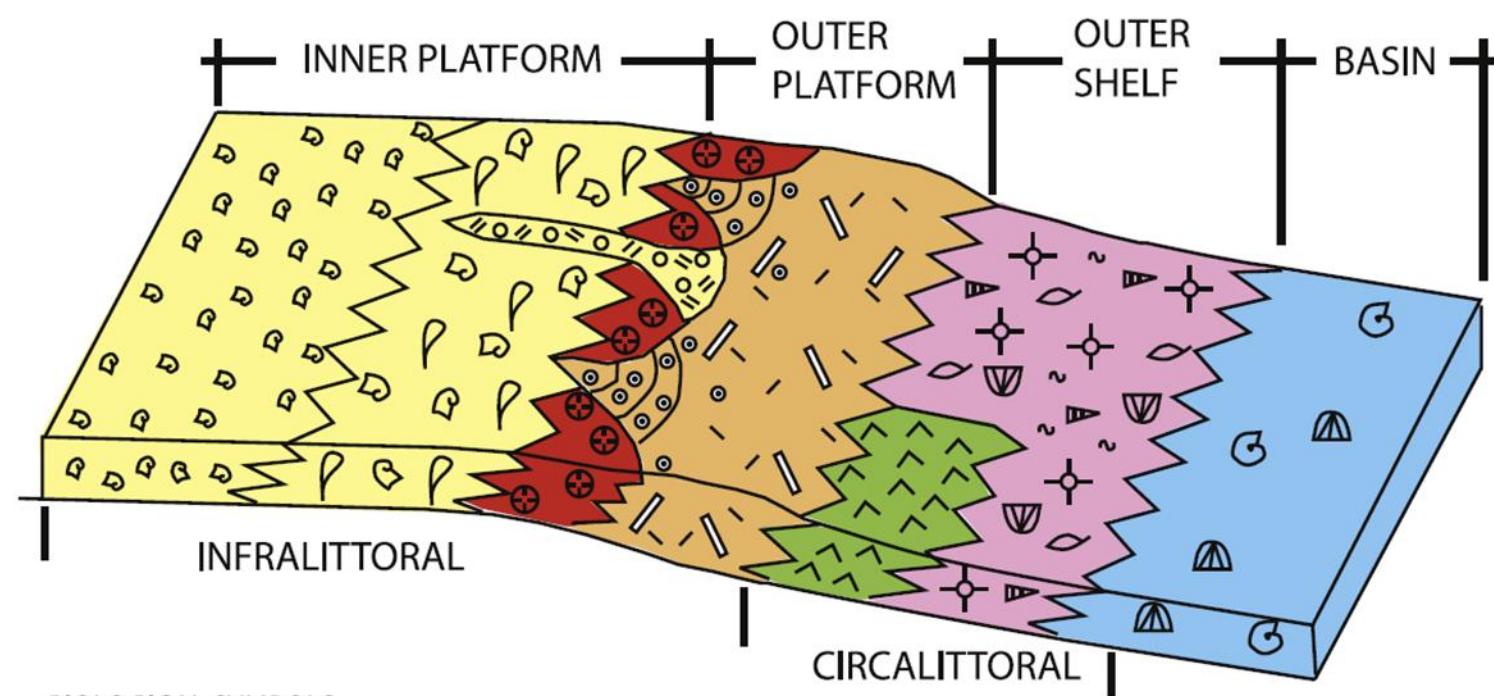
***Mesomorpha ornata*** la  
Mounine



**CORAUX DU  
VALANGINIEN ET  
DE  
L'HAUTERIVIEN**

***Dimorpharaea catalaunica***  
La Mounine



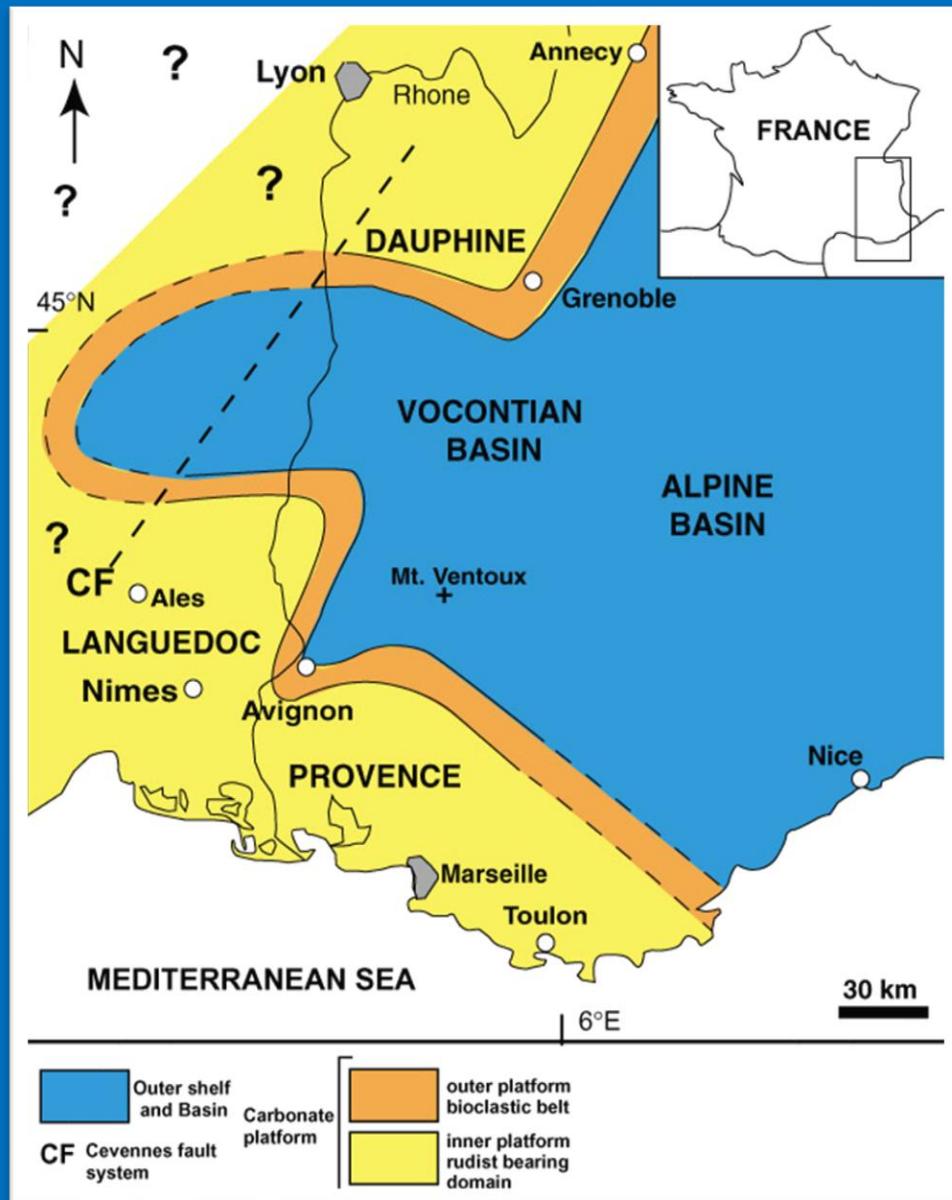


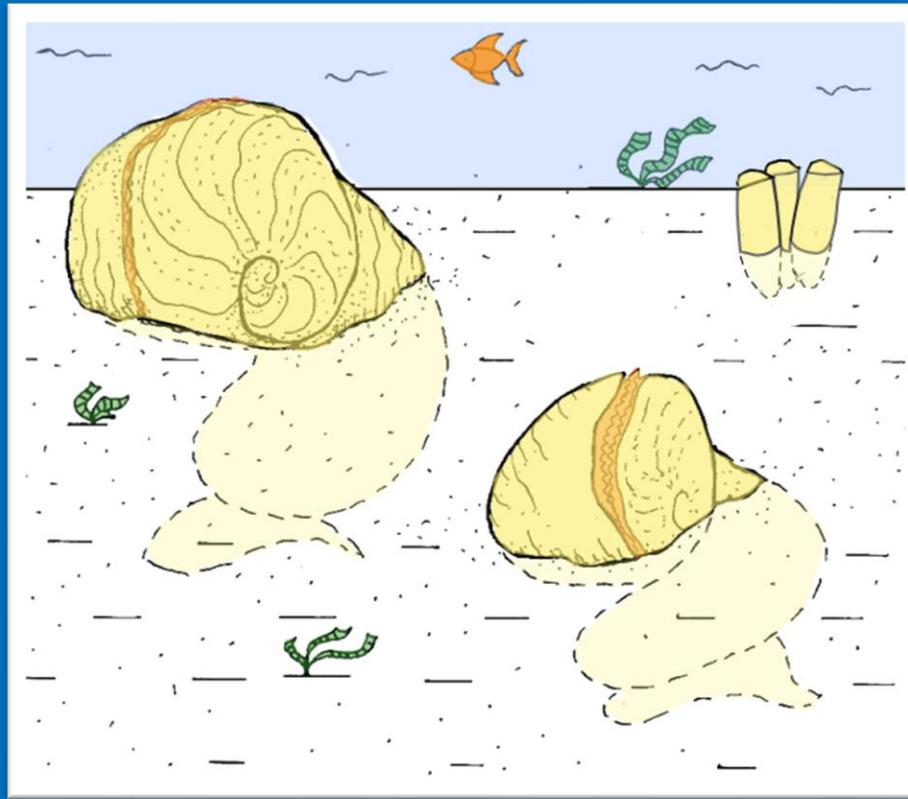
#### BIOLOGICAL SYMBOLS

	small requieniids		corals		brachiopods		gastropods		infaunal echinoids
	large requieniids		dasycladales		sponges		serpulids		
	caprinids		orbitolinids		echinoderms		ammonites		

#### SEDIMENTOLOGICAL SYMBOLS

	rudstones		ooids		bioclastics		deep muddy sediments
--	-----------	--	-------	--	-------------	--	----------------------





Mode de vie de *Requienia ammonia*

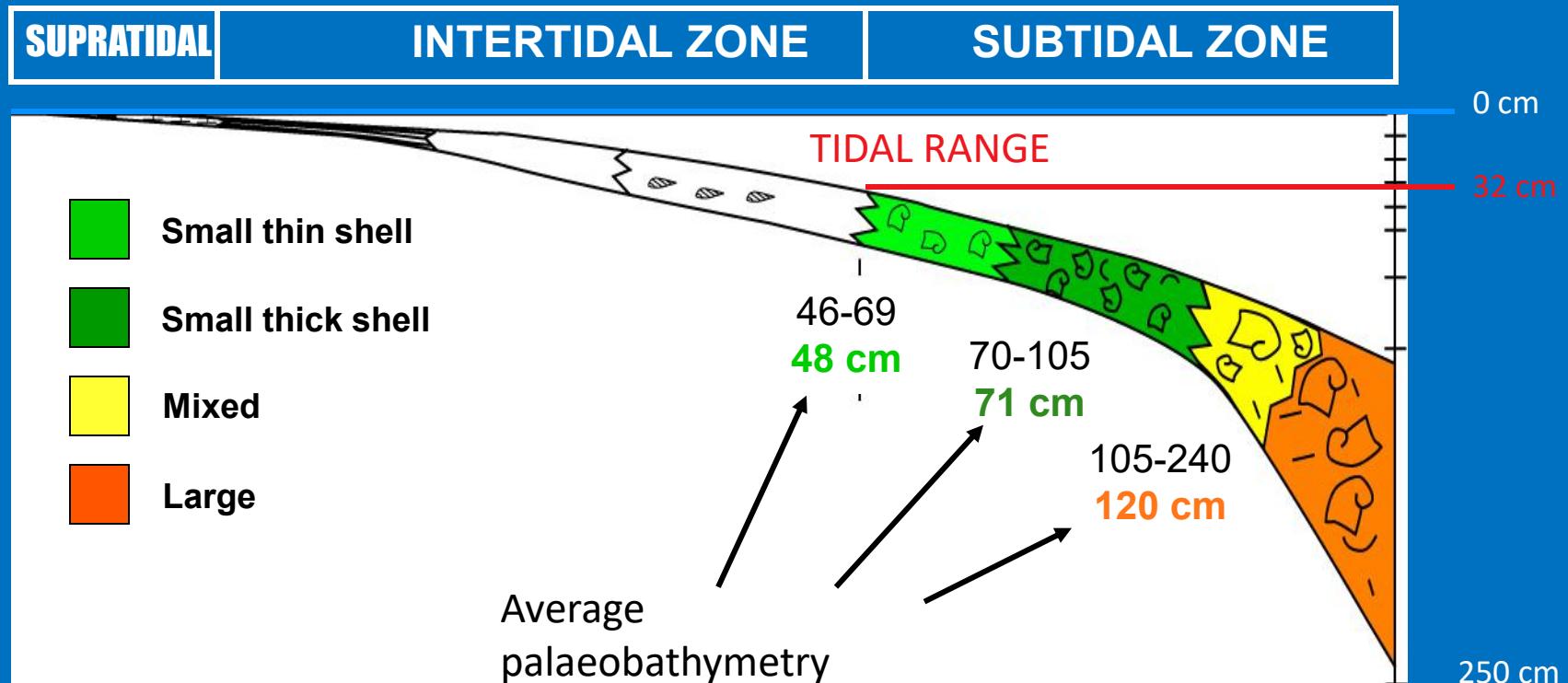


*Agriopleura*



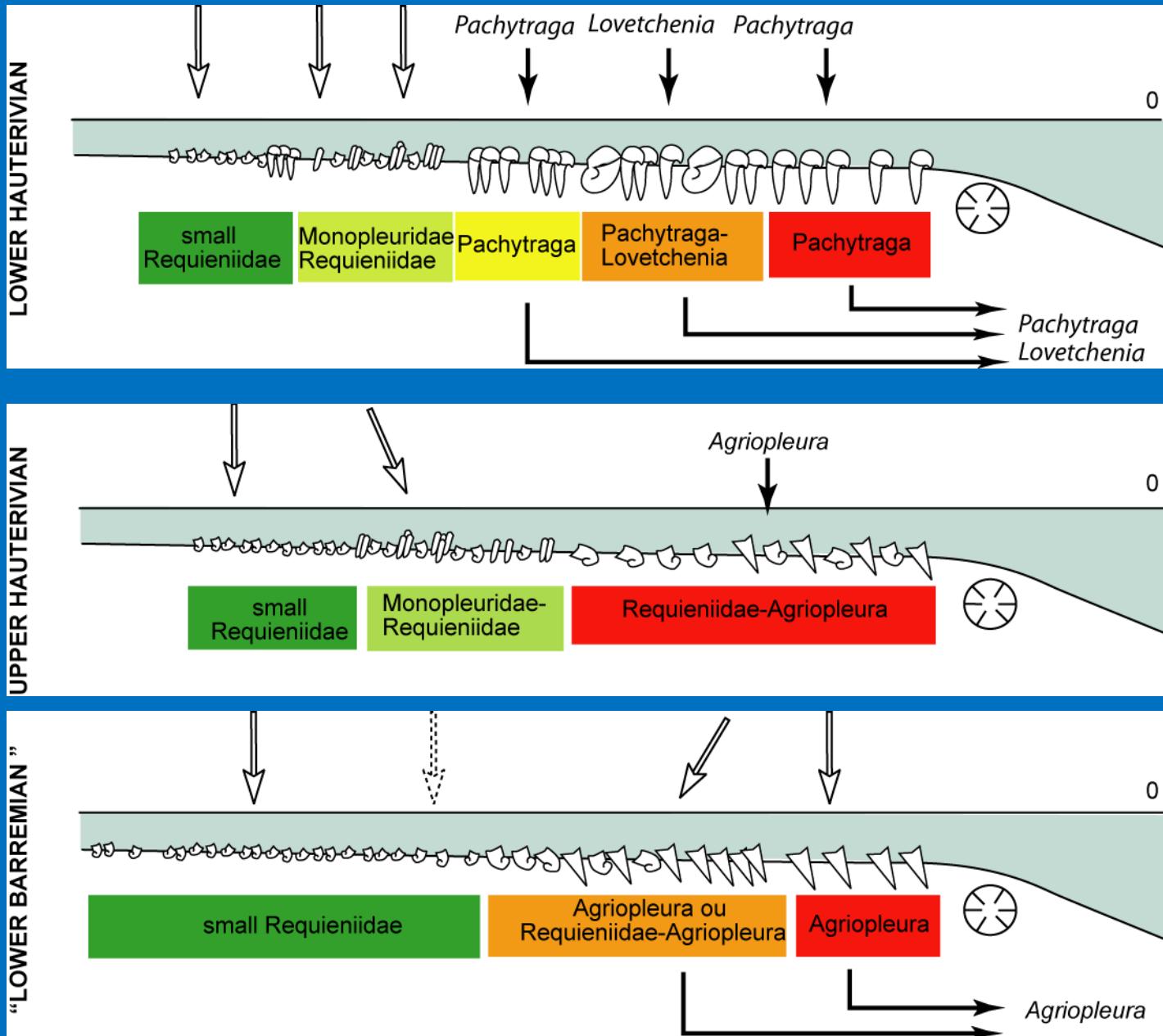
*Debrunia*

# PALAEOBATHYMETRIC ZONATION OF RUDIST COMMUNITIES



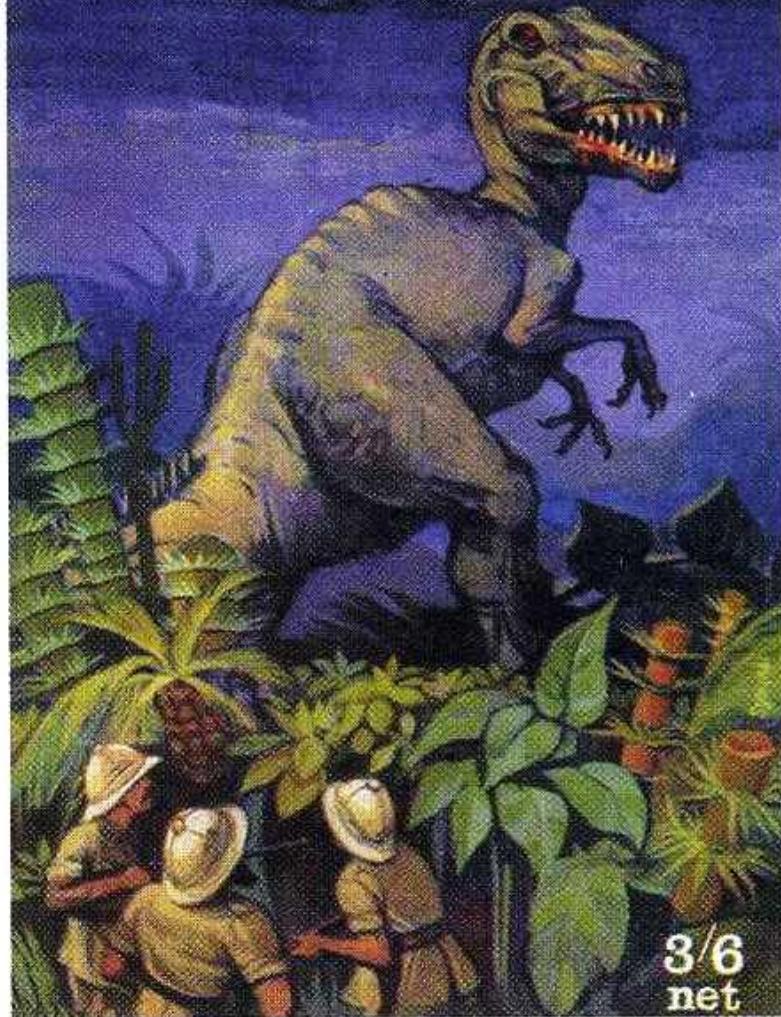
Several tens of kilometers

# PHASE DE L'HAUTERIVIEN A L'APTIEN INFÉRIEUR



# **THE LOST WORLD**

Sir Arthur Conan Doyle



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**MERCI POUR VOTRE ATTENTION**



