

ON THE DIFFICULTIES
OF STRATIGRAPHIC HIATUSES
INTERPRETATION

Bernard Mamet & Alain Préat
University of Brussels

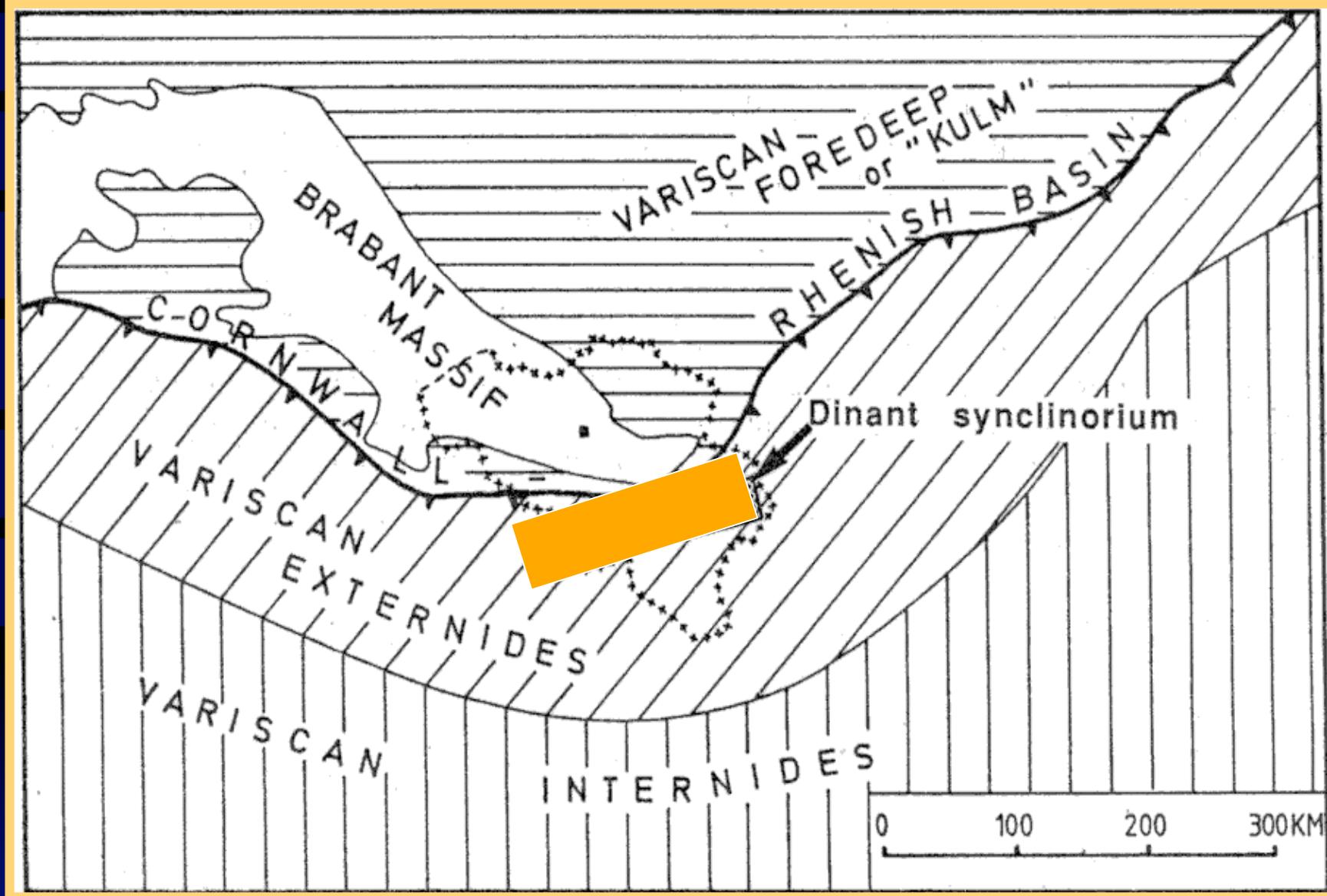
MAMET B & PREAT A (2003)
Sur les difficultés d'interprétation des hiatu stratigraphiq
(exemple tiré de la transition dévono-carbonifère,
Bassin de Dinant).
Geologica Belgica 6/1-2:49-65, 6figs

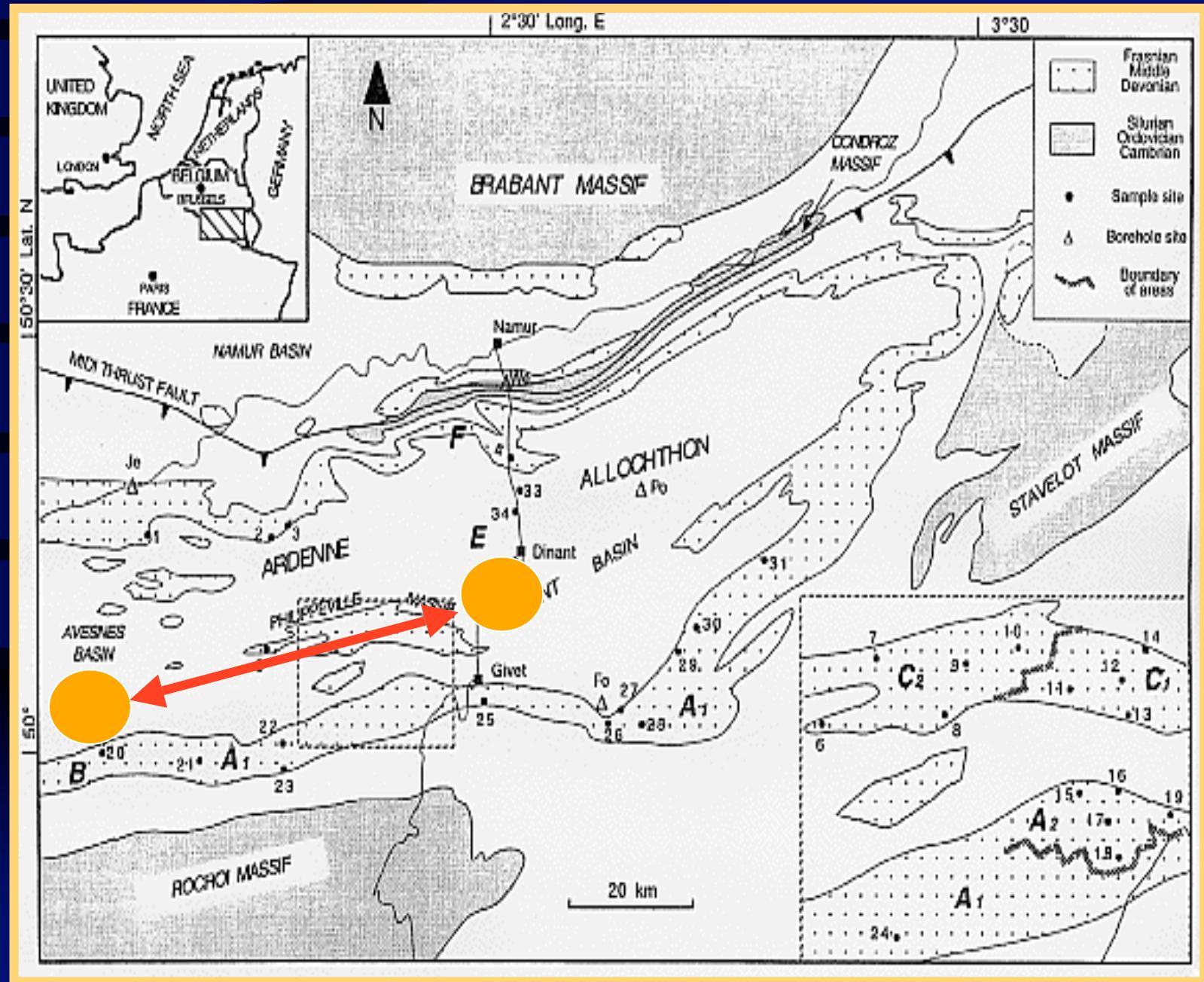
THE AVESNOIS ‘BASIN’

VS

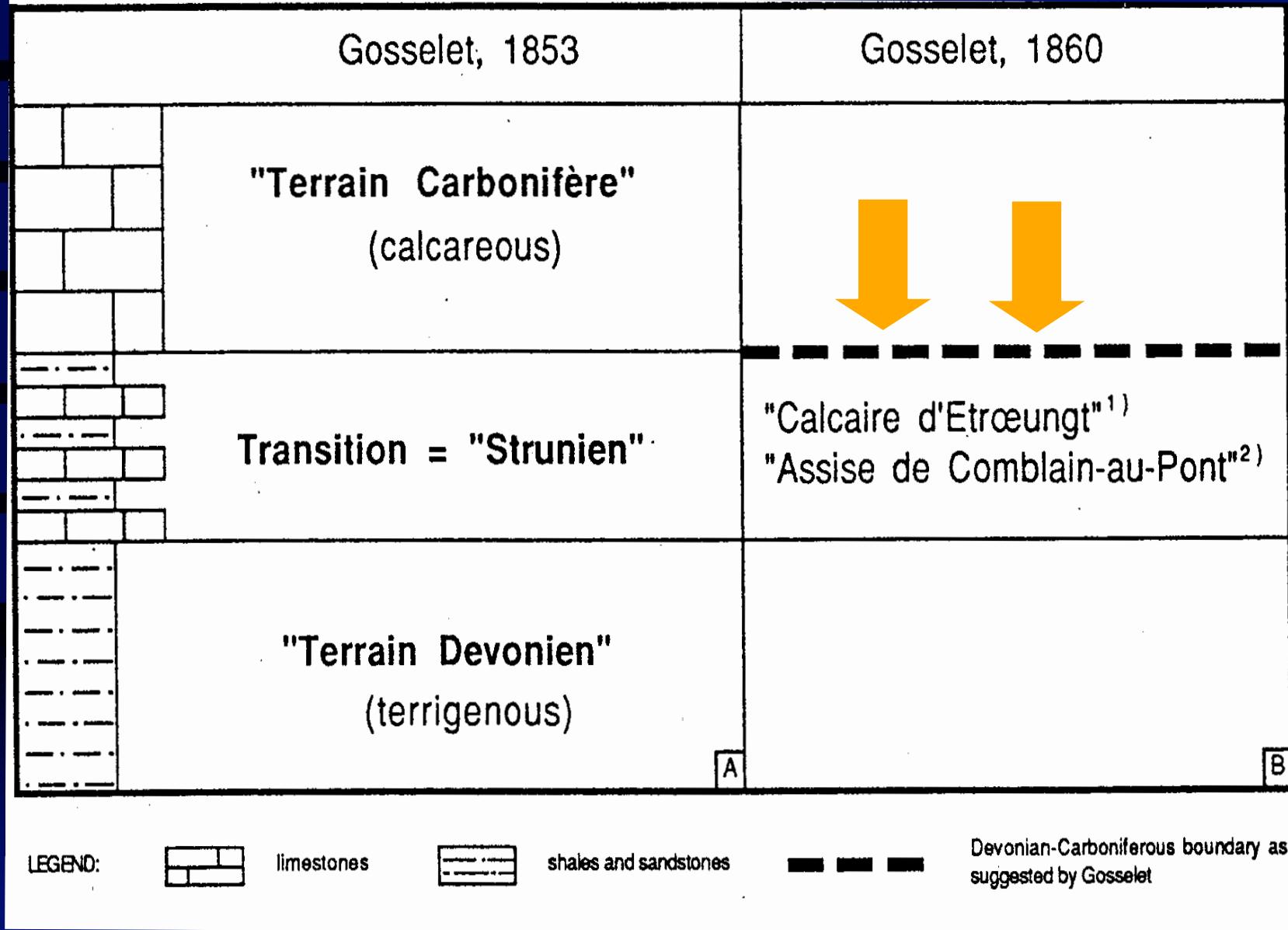
THE DINANT BASIN

- a case study?
- with possible consequence(s)...



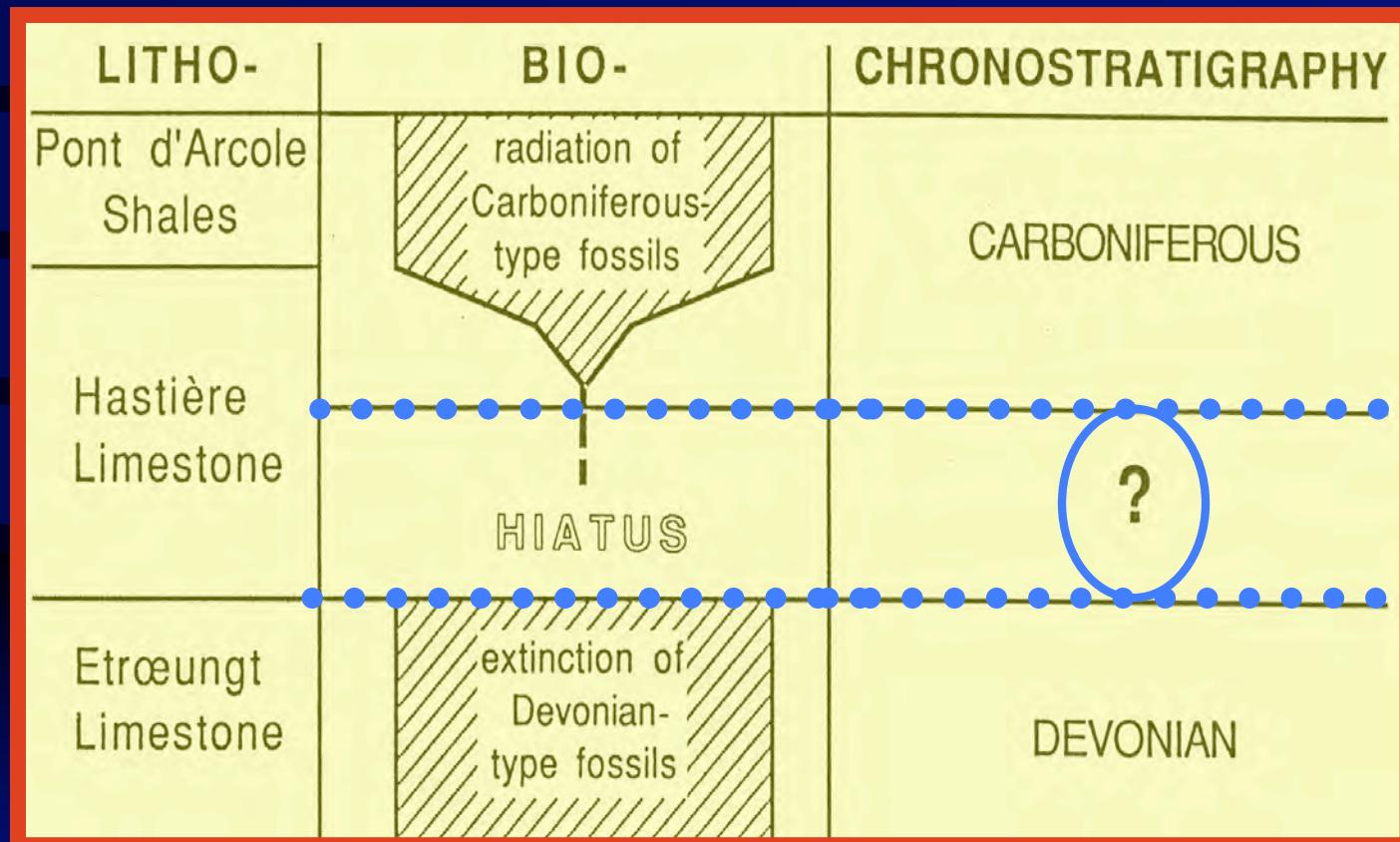


Van Steenwinkel, 1988



THE PROBLEM ???

A biostratigraphic hiatus at the D-C transition



Van Steenwinkel, 1988

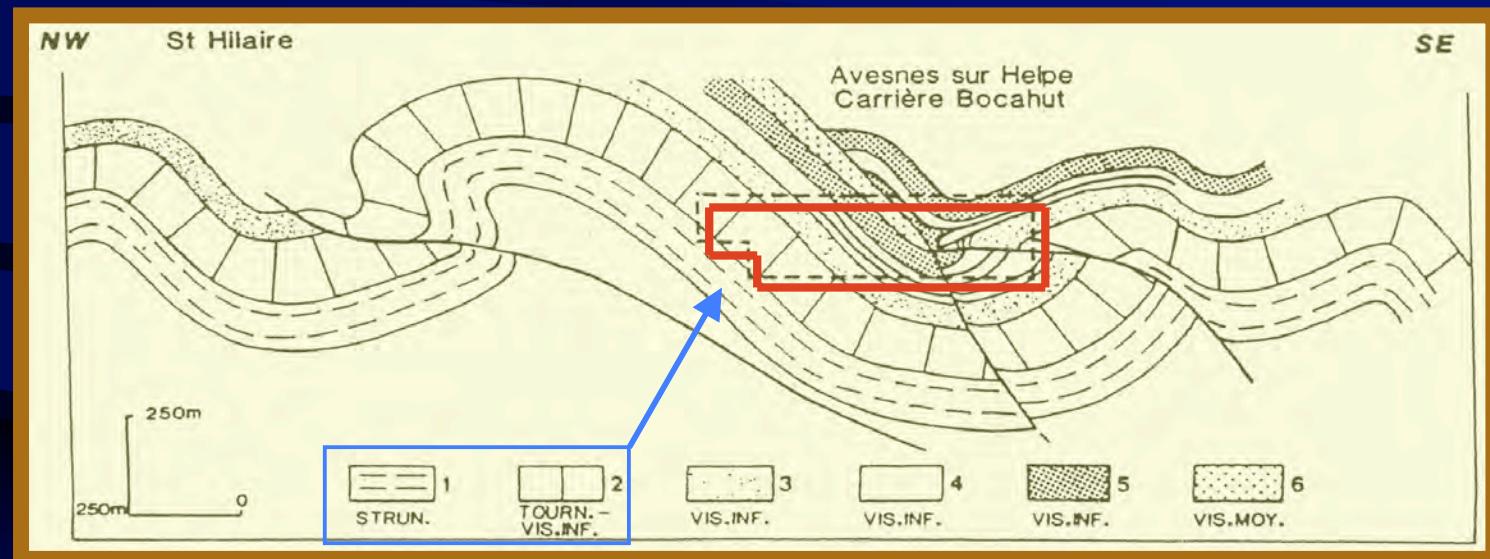
Conodont guides defining the D-C/b ARE NOT recorded in the Dinant and Avesnois basins

CHRONO-	BIO-	LITHOSTRATIGRAPHY
DEVONIAN CARBONIFEROUS		
TOURNASIAN		Tn 2b Lodelies Limestone (25-30m)
	<i>Siphonodella duplicata</i>	Tn 2a Pont d'Arcole Shale (12-15m)
	<i>Siphonodella sulcata</i>	Tn 1b Hastière Limestone (12-30m)
STRUNIAN	<i>Siphonodella praesulcata</i>	Tn 1aγ Etroeungt Limestone Comblain-au-Pont Fm. (15-40m)

studied interval



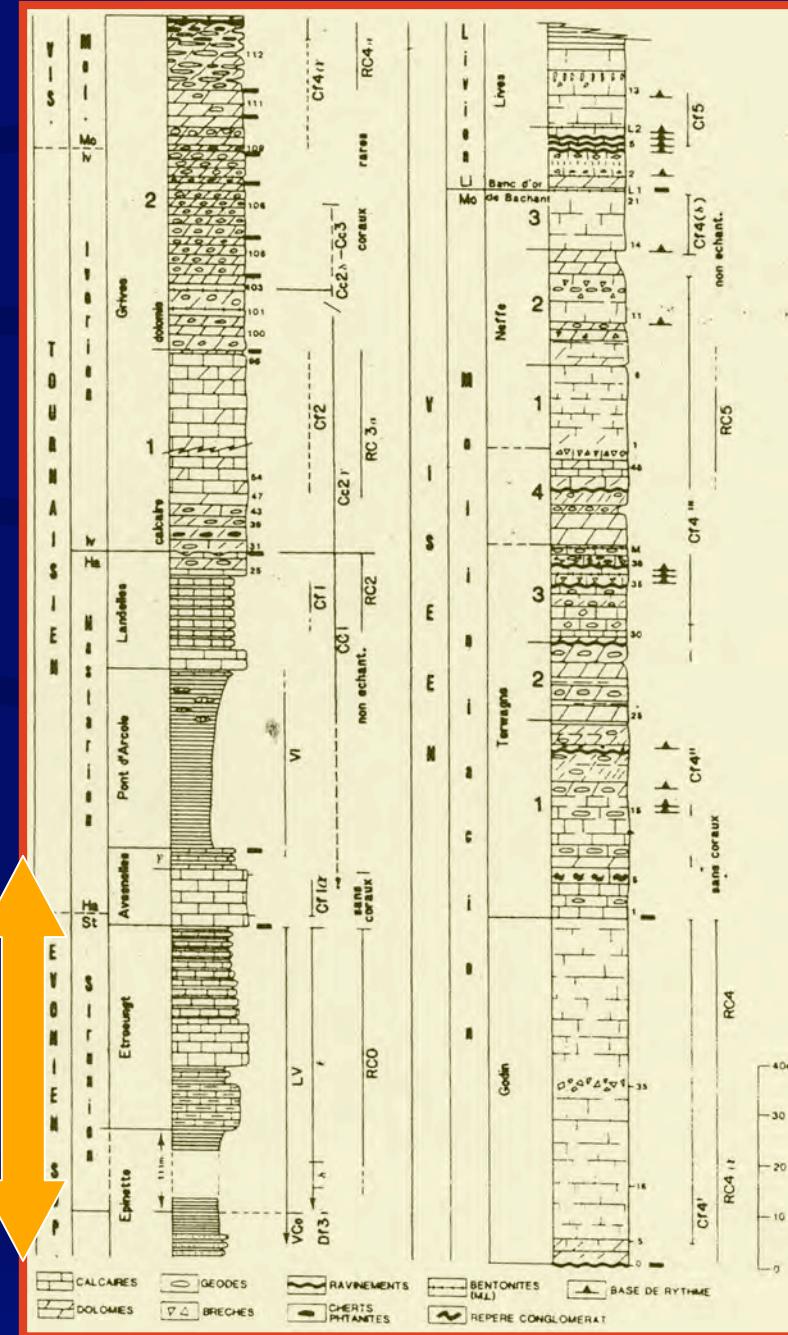
1-2: Epinette+Etroeungt+Avesnelles +Pont d'Arcolle+Grives



STRATIGRAPHY OF AVESNOIS and of BOCAHUT QUARRY

(Mansy et al., 1988)

studied
interval



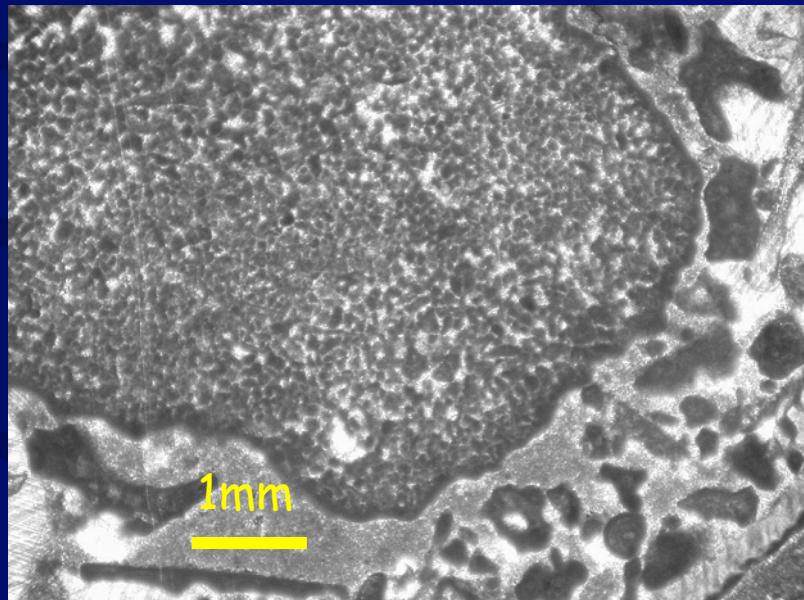
SEDIMENTOLOGY

‘bed/bed analysis’

- ± 350 samples (100m)
AVESNES/HELPE
- 120 samples (40m)
ANSEREMME



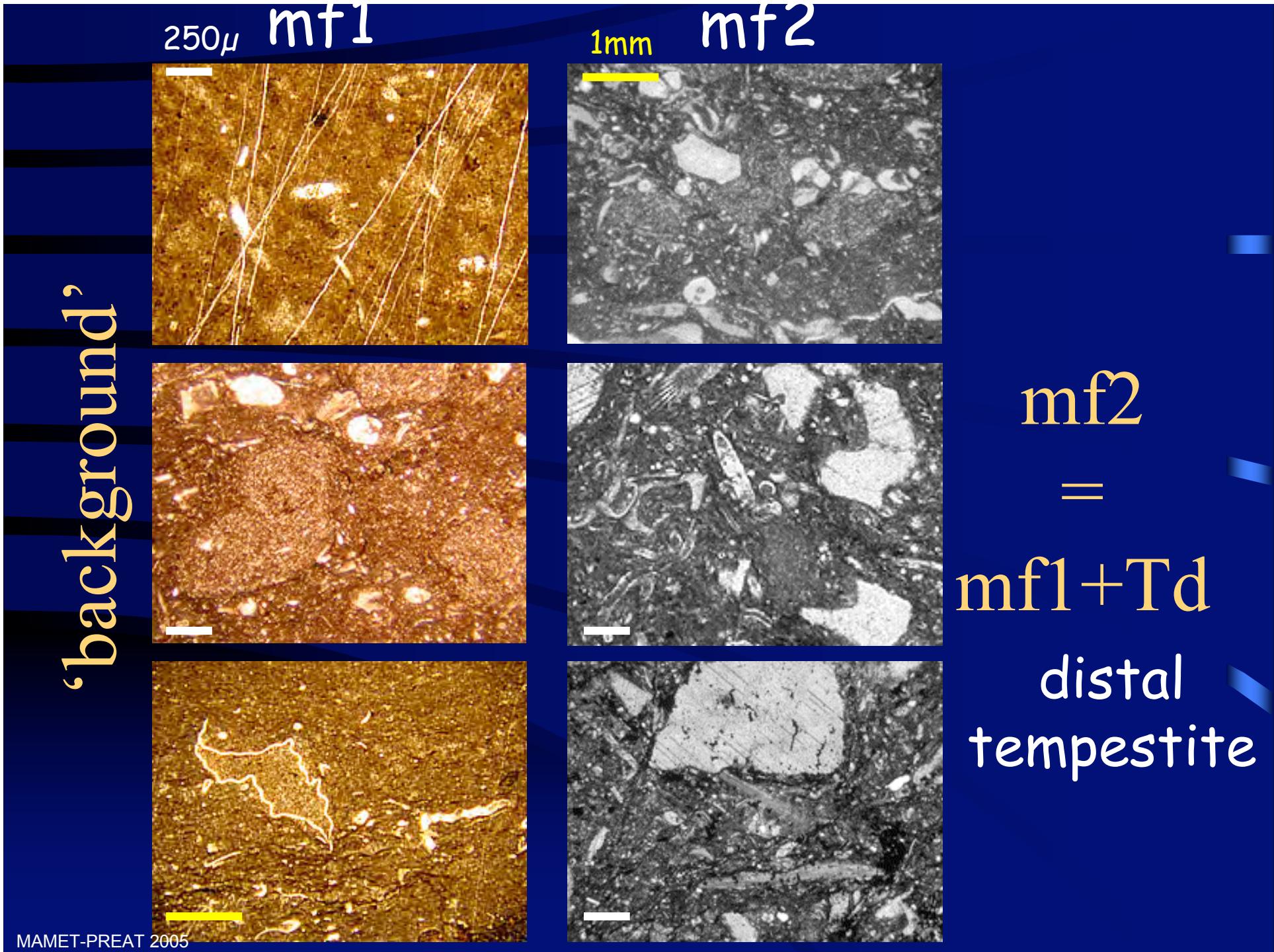
7 MICROFACIES
FAMILIES

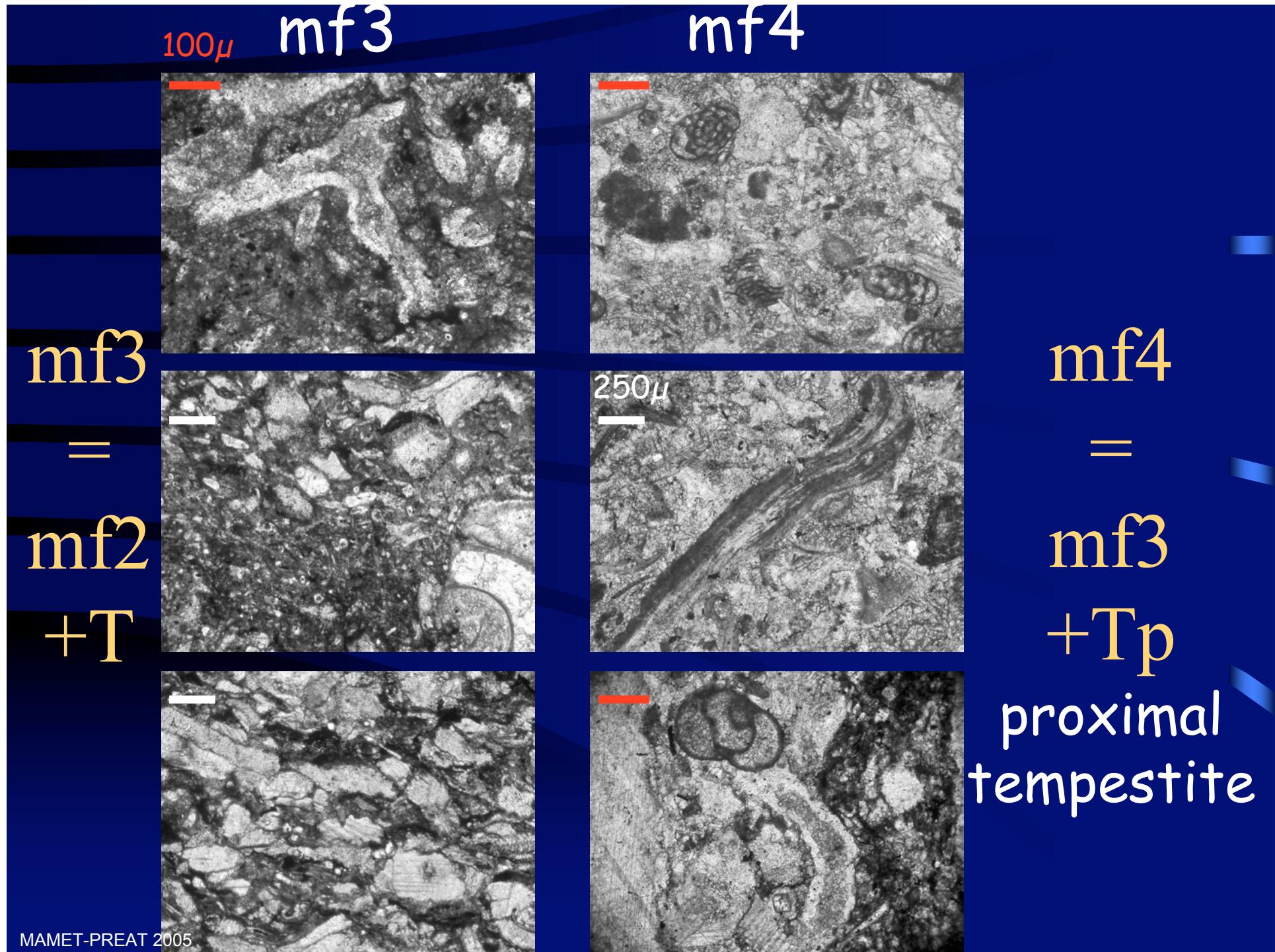


M I C R .O F A C I E S

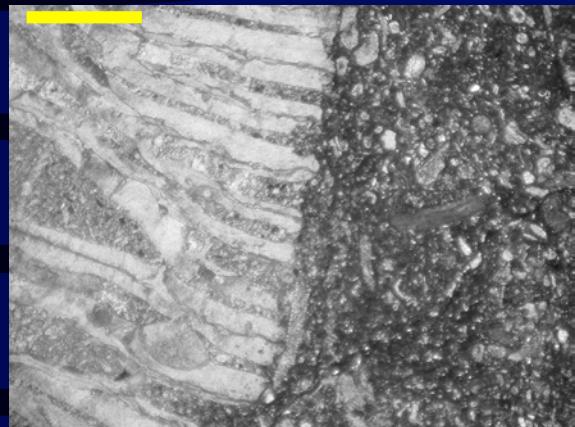
COUCHES DE TRANSITION D-C, AVESNES-SUR-HELPE (NORD DE LA FRANCE)						
	MICROFACIES	DESCRIPTION	ENVIRONNEMENTS			
MF 7		G./Microconglomérats oolithes, bahamites, lumps, terriers dolomitiques, bioclastes	PF SMR	MARAIS MARITIMES DUNES OOLITHIQUES	Supratidal émergence	
MF 6		G.R. à Strom.-Coraux-Echin. et Foram. stratifications obliques	rampe interne	PETITES BIO-CONSTRUCTIONS	Inter tidal	Z.A.V. 20-25m
MF 5		P/F. à Strom-Coraux-Algues	Zone euph.	BANCS ALGAIRES		
MF 4		P. laminaires à bioclastes grenus et abondants	rampe méd.	PRAIRIES à CRINOÏDES		
MF 3		W. /P. argilo-silteux bioturbés à bioclastes grenus	rampe externe	DECANTATION BOUES ARGIGO-CARBONATÉES	Subtidal	Z.A.T. 40-55m
MF 2		W. argilo-silteux bioturbés à bioclastes	Zone dysph.			
MF 1		M. argilo-silteux bioturbés et spiculites noires				

bioturbation
 lamines bioclastiques
 stratifications obliques et entrecroisées

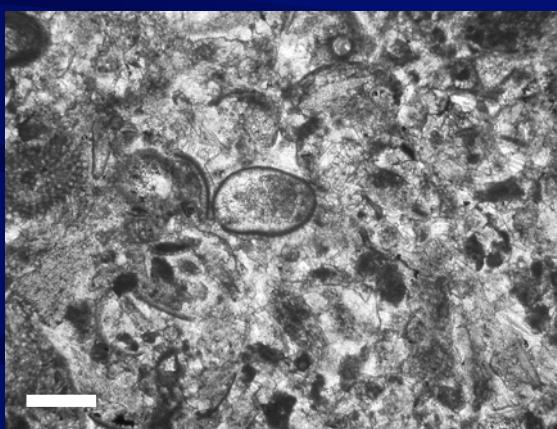
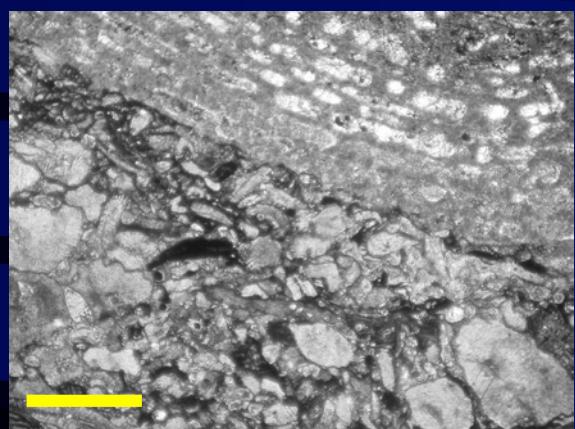
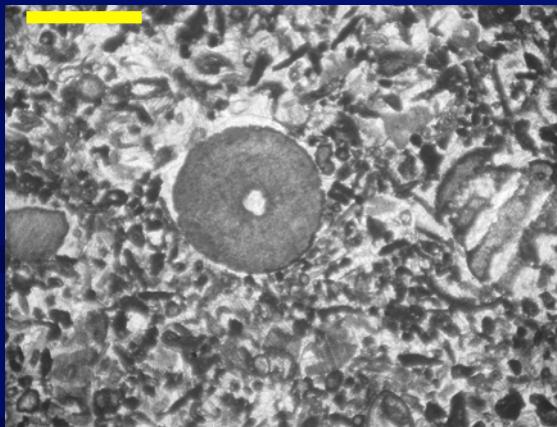




mf5



1mm mf6



Fair
Weather
Wave
Base

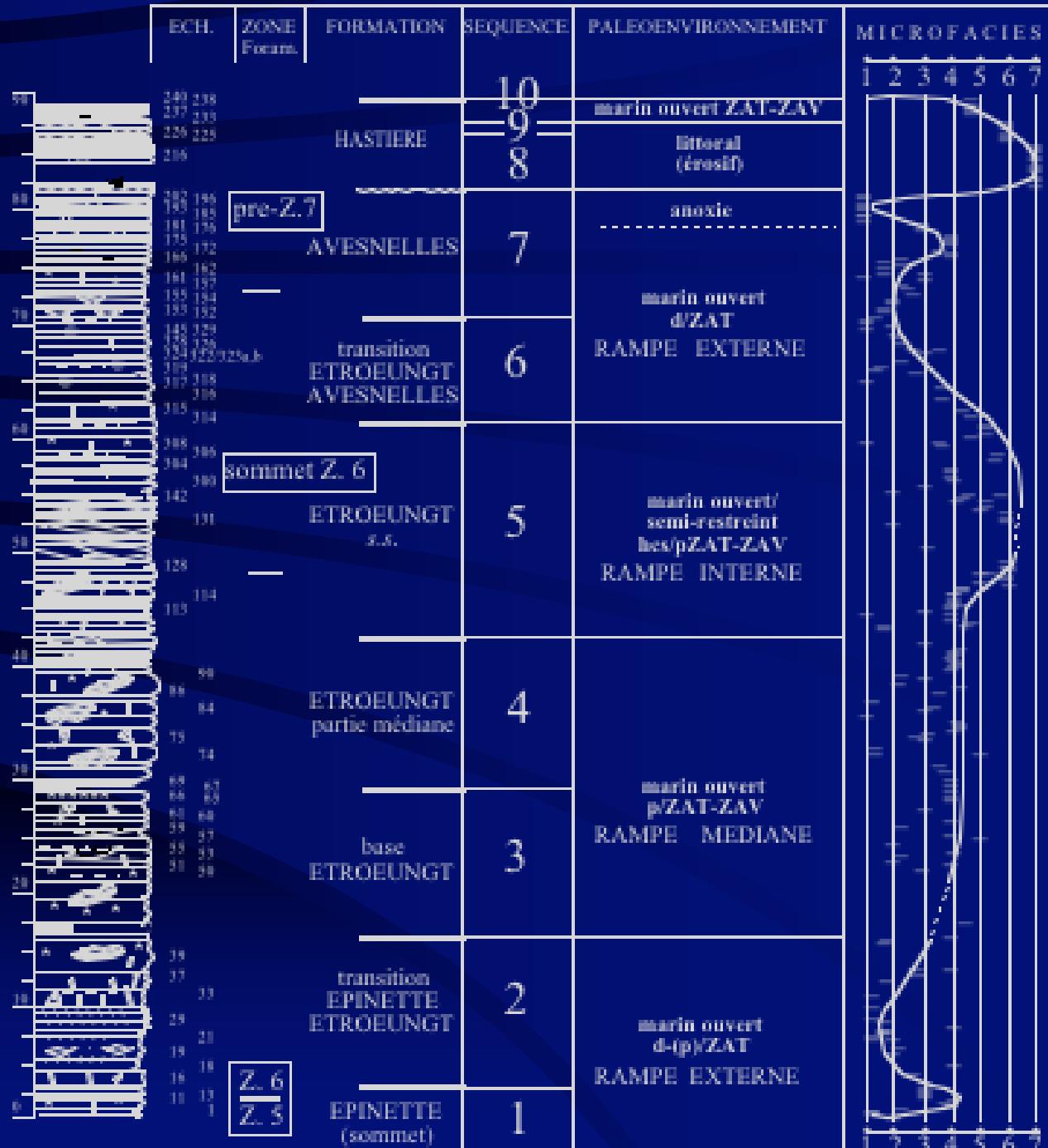
mf7

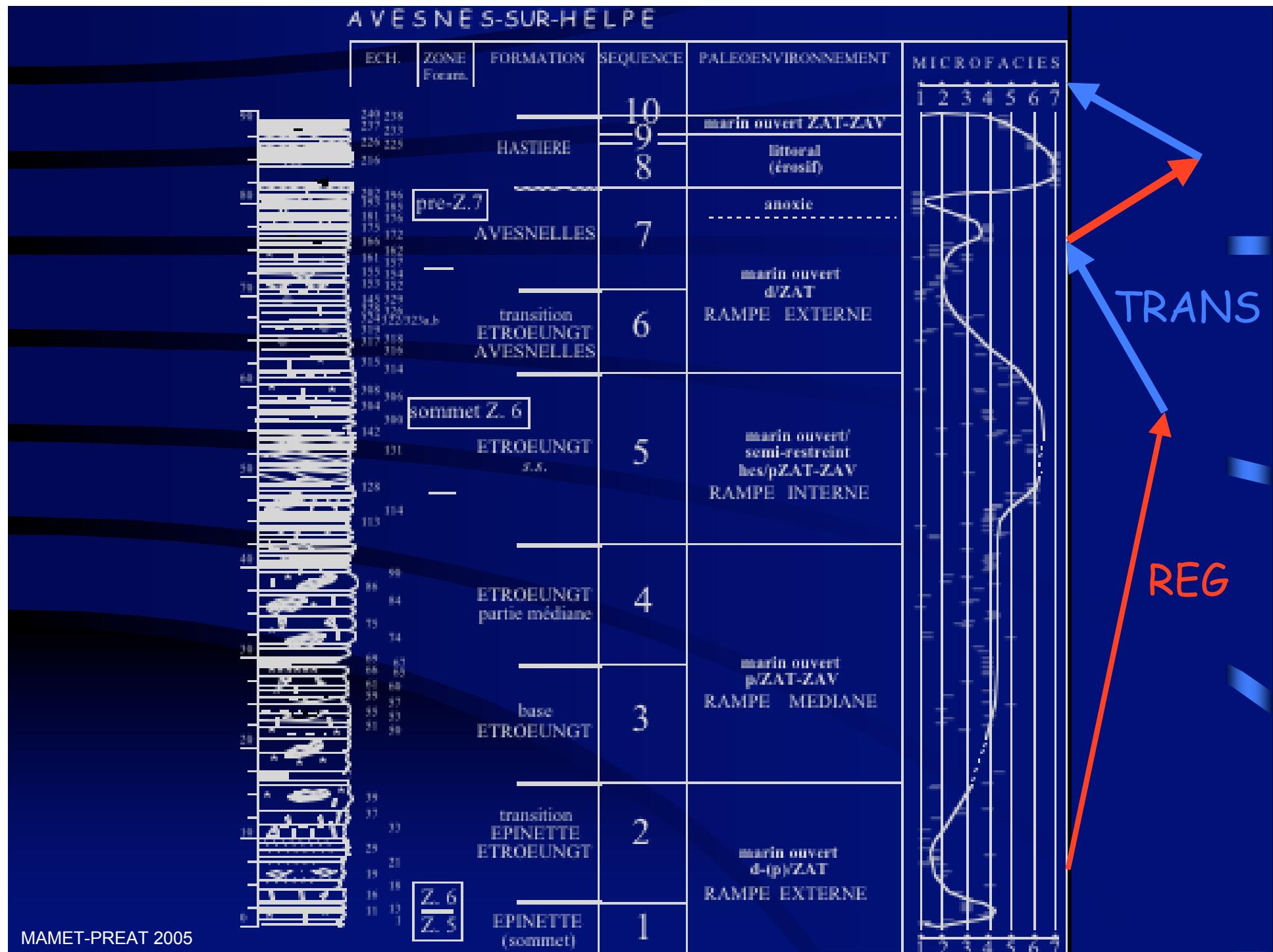
semi-
restricted
platform

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MAMET-PREAT 2005

AVESNES-SUR-HELPE



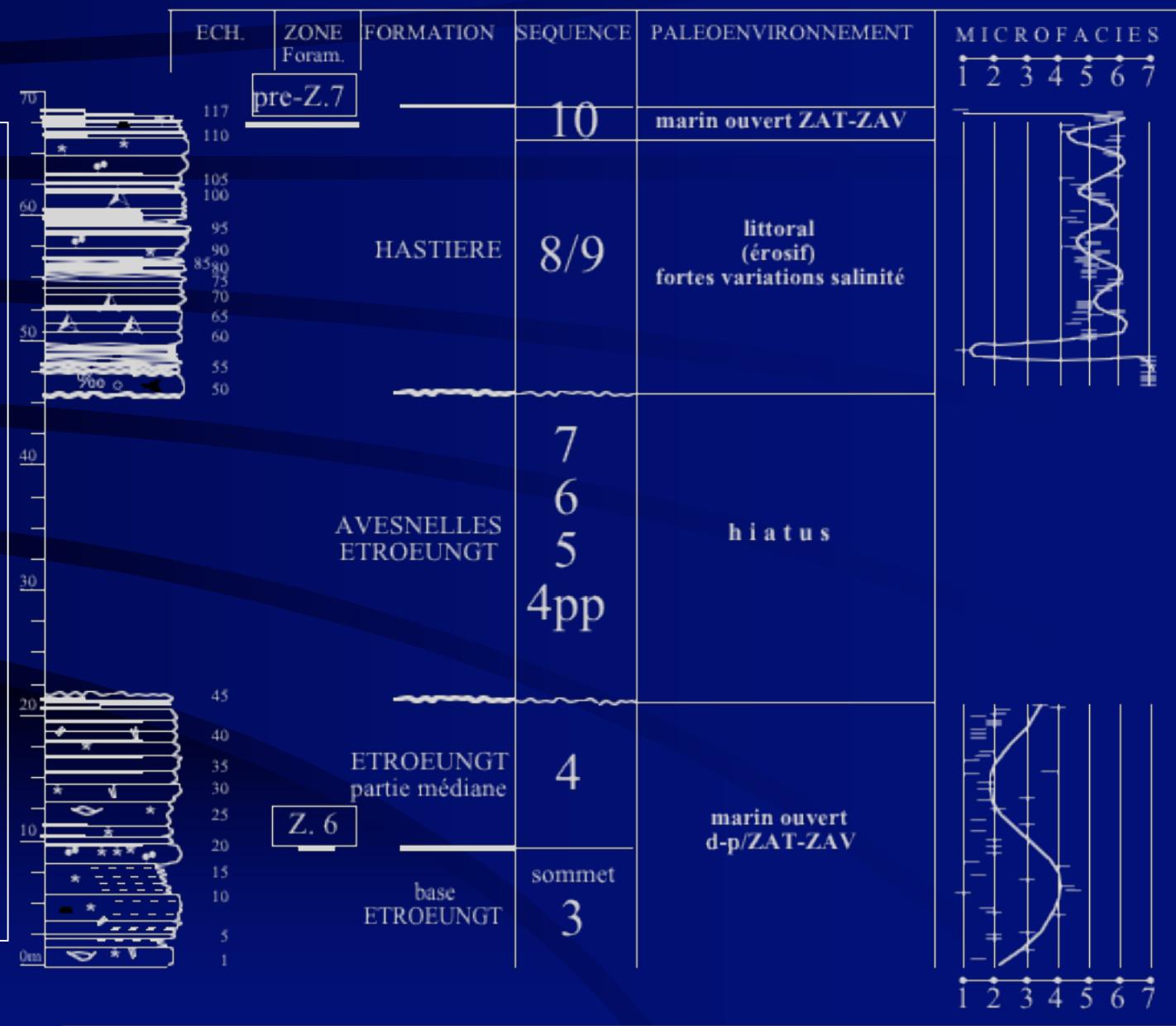


AVESNES-SUR-HELPE

- thick and 'continuous' profile
- RAMP + PLATFORM settings
(SWB-FWWB)
- relative sea level fluctuations
- erosive event near the 'D/C b'

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ANSEREMME



ANSEREMME

- thinner and 'discontinuous' profile
- RAMP + PLATFORM settings
(SWB-FWWB)
- strong salinity fluctuations
- important erosion near the 'D/C b'

MICROBRECCIA ANALYSIS

microbreccia do not contain ‘pre-Hastièrre’
sediments/rocks (Etroeungt-Avesnelles)

BUT CONTAIN ONLY

Hastièrre sediments/rocks
(reworked littoral lagoonal environments)

INTERPRETATION?

HIATUSES

biostratigraphy

sequence stratigraphy

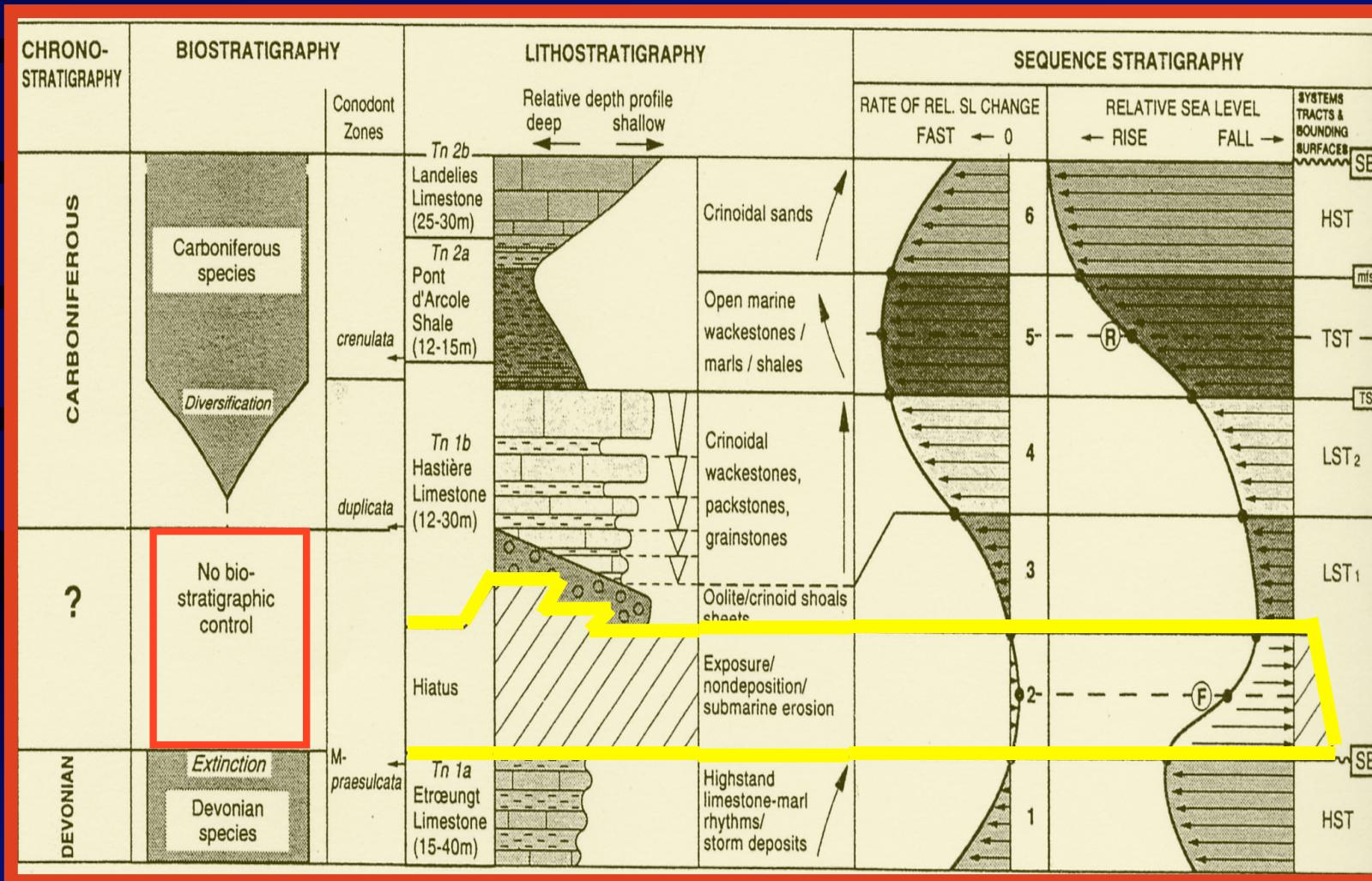
D/C boundary

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SEQUENCE STRATIGRAPHY

Van Steenwinkel, 1993



CONCLUSION

origin of the hiatuses?

1 steady subsidence?
2 facies constancy?
3 sea level fluctuations?
.... ?
nb
paraconformity as a rule

1' numerous parasequences
2'salinity and energy fluctuations
3' they surely exist BUT
no detailed correlations
are possible (Van Steenwinkel
1993 and this work....)

CONCLUSION origin of the hiatuses? SO WHAT?

- non deposition?
(pre-Hastière)
- erosion of an unknown
lower Hastière part

BLOCK-FAULTING
➡ can match all the
observations

bear in mind that...

- *the profiles are in a same basin, near each other
- *the succession is 'apparently' the same
- *the microfacies, the microfaunal/floral assemblages and the lithologies are also the same ...
these similarities are fallacious

despite similar eustatic fluctuations
HALF OF THE SERIES ARE MISSING

HASTIERE LIMESTONE

cm-dm microsequences [18m at Ansermme]

- (1) proximal crinoidal tempestites
- (2) ‘false’ peloidal grainstones with calcisphaerids, *Bisphaera*, brachiopods, crinoids [open lagoon]
- (3) ‘false’ grainstones with very abundant ostracods and *Earlandia minima* + a few *Quasiumbella* [lagoon]
- (4) packstones-‘false’ grainstones with micritized grains and ‘cut in bits’ lumps

HASTIERE LIMESTONE

the (micro)parasequences are not

bathymetric BUT record

strong salinity fluctuations

HASTIERE LIMESTONE

facies (1) to (4)  evaporitic diagenesis
[calcite pseudomorphs, idiotopic dolomite...]

UNSTABLE ENVIRONMENTS WITH
STRONG SALINITY FLUCTUATIONS
semi-open to restricted with reflux brines

HASTIERE LIMESTONE

(upper part)

- normal salinity with the photic zone of an open marine environment
- return of plurilocular foraminifers, of girvanella
-
- same evolution at Avesnes **AND** Anseremme