

MILANKOVITCH CYCLICITY: THE RECORD FROM MOSCOVIAN-KASIMOVIAN TRANSITION IN DONETS BASIN (UKRAINE)

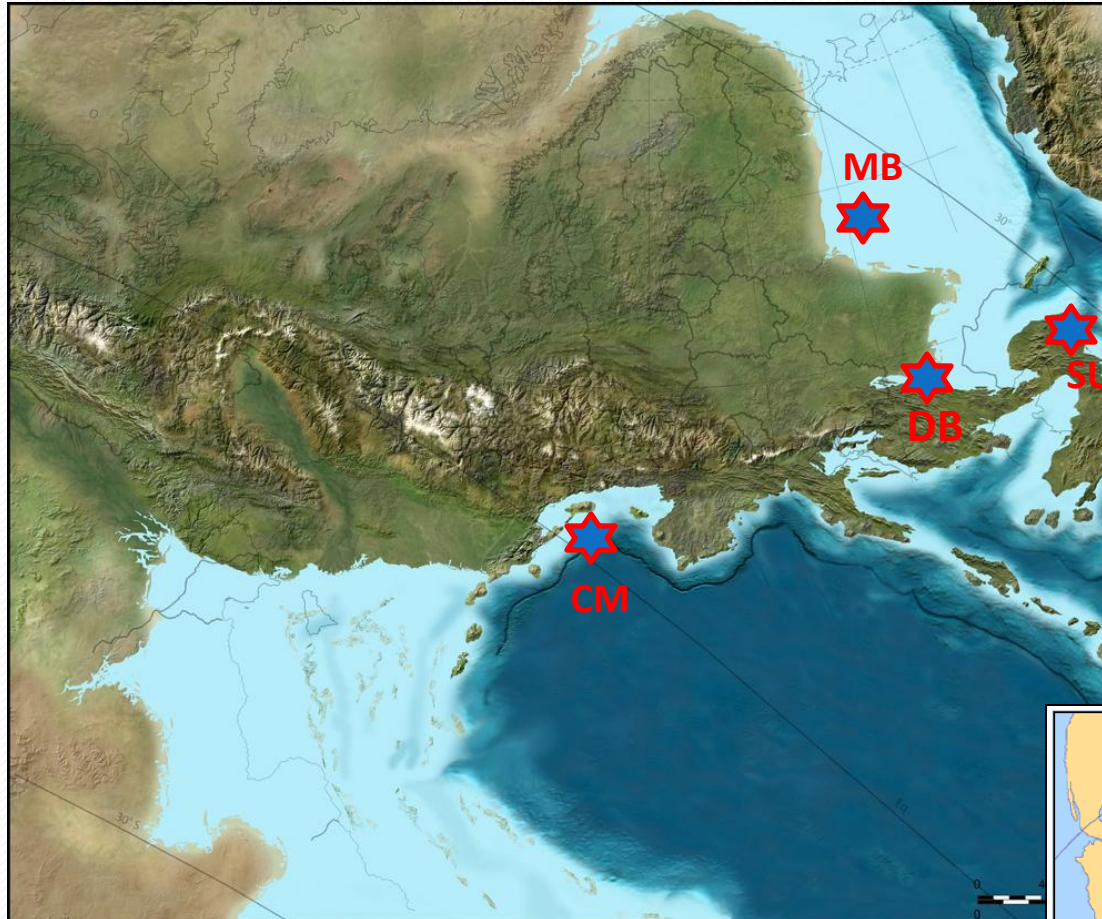
R.Khodzanyazova, V.Davydov, and M.Schmitz

Boise State University

October 11, 2011

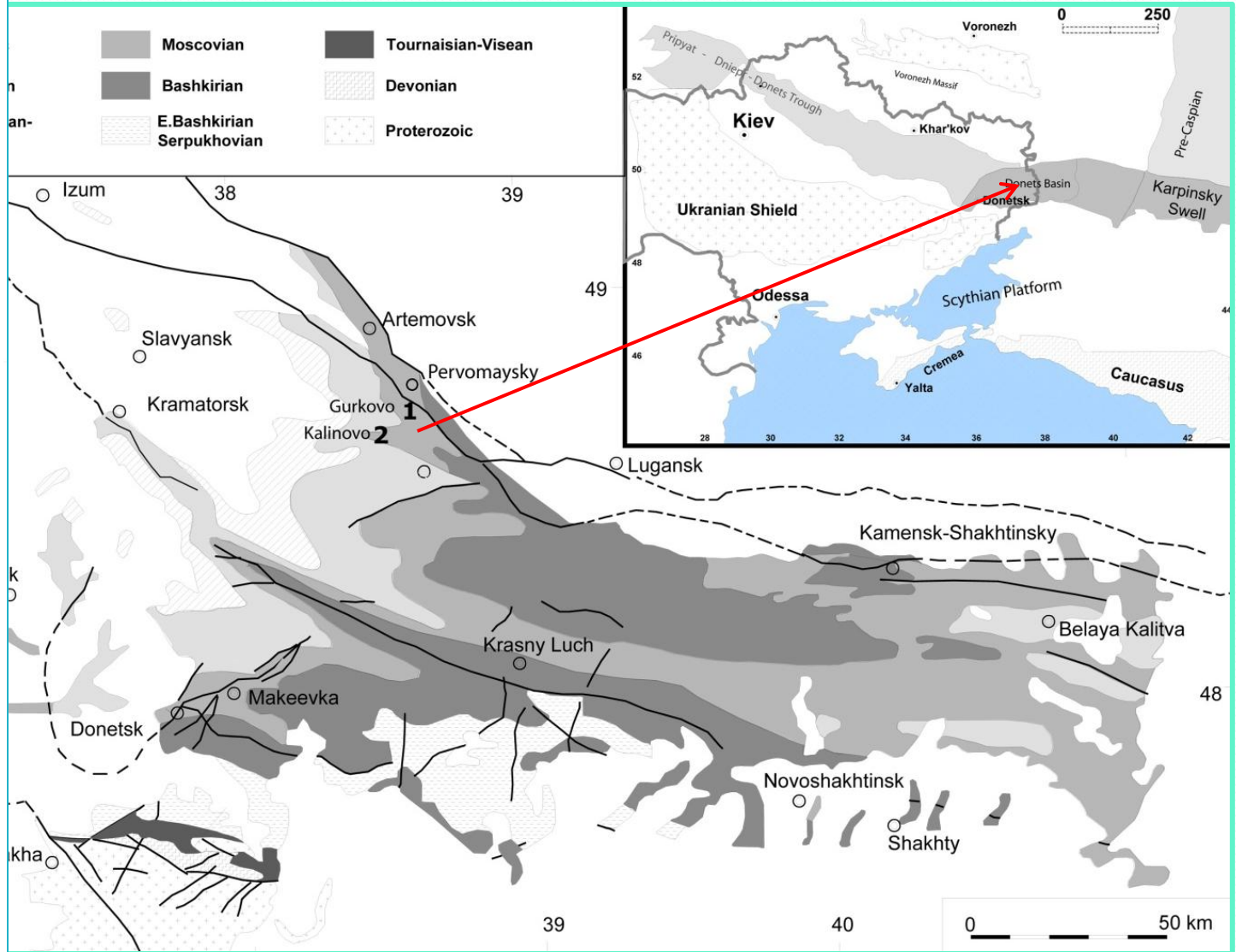
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- Estimates of glacial-eustatic fluctuation are difficult to obtain from sedimentological studies because of uncertainties in determining paleobathymetry and the variable influence of tectonics and climate on erosional and depositional relief”. (Feldman et al., 2005)

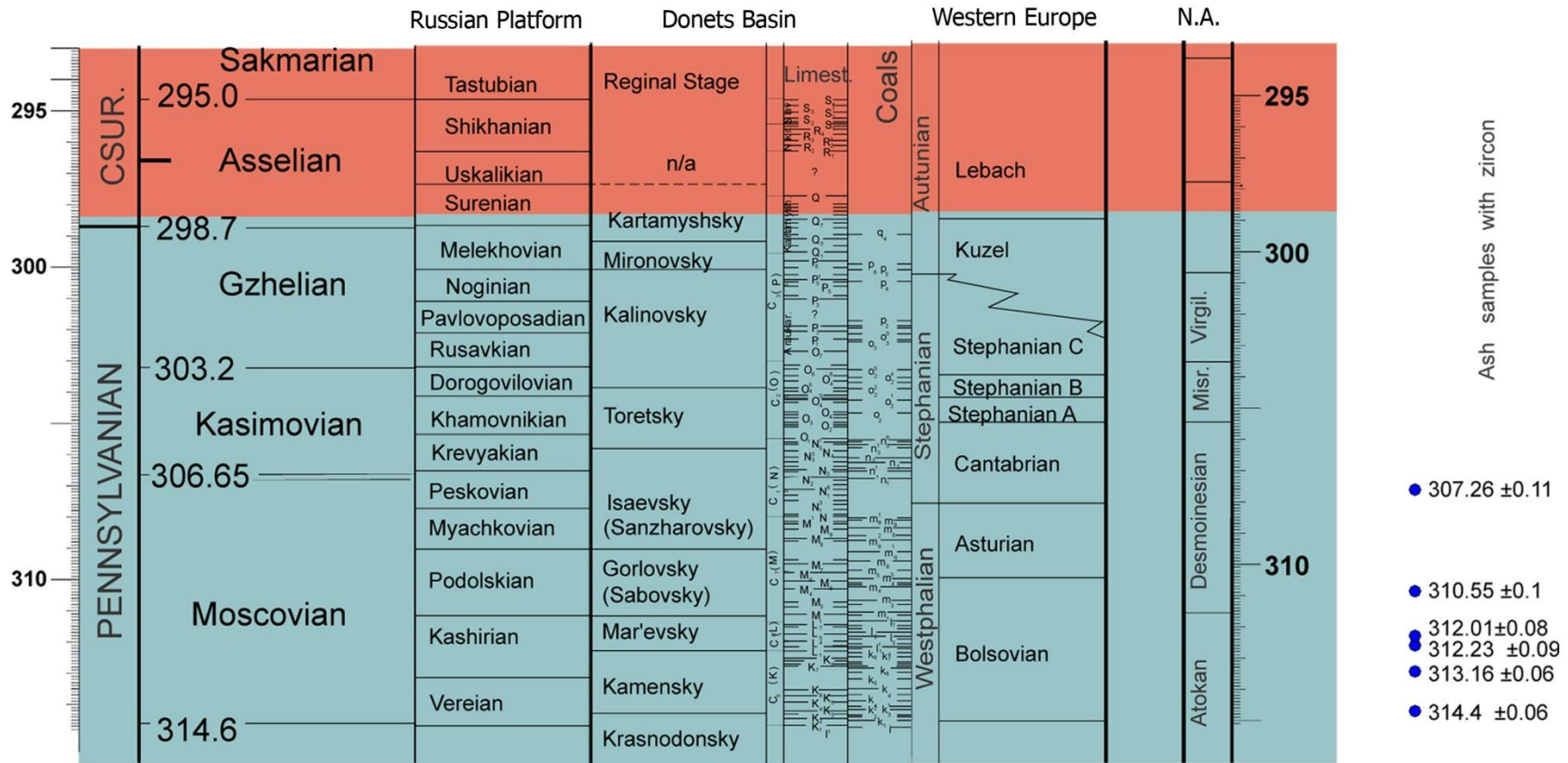
Paleogeography



<http://cpgeosystems.com/europaleogeography.html>

Geologic settings and lithology



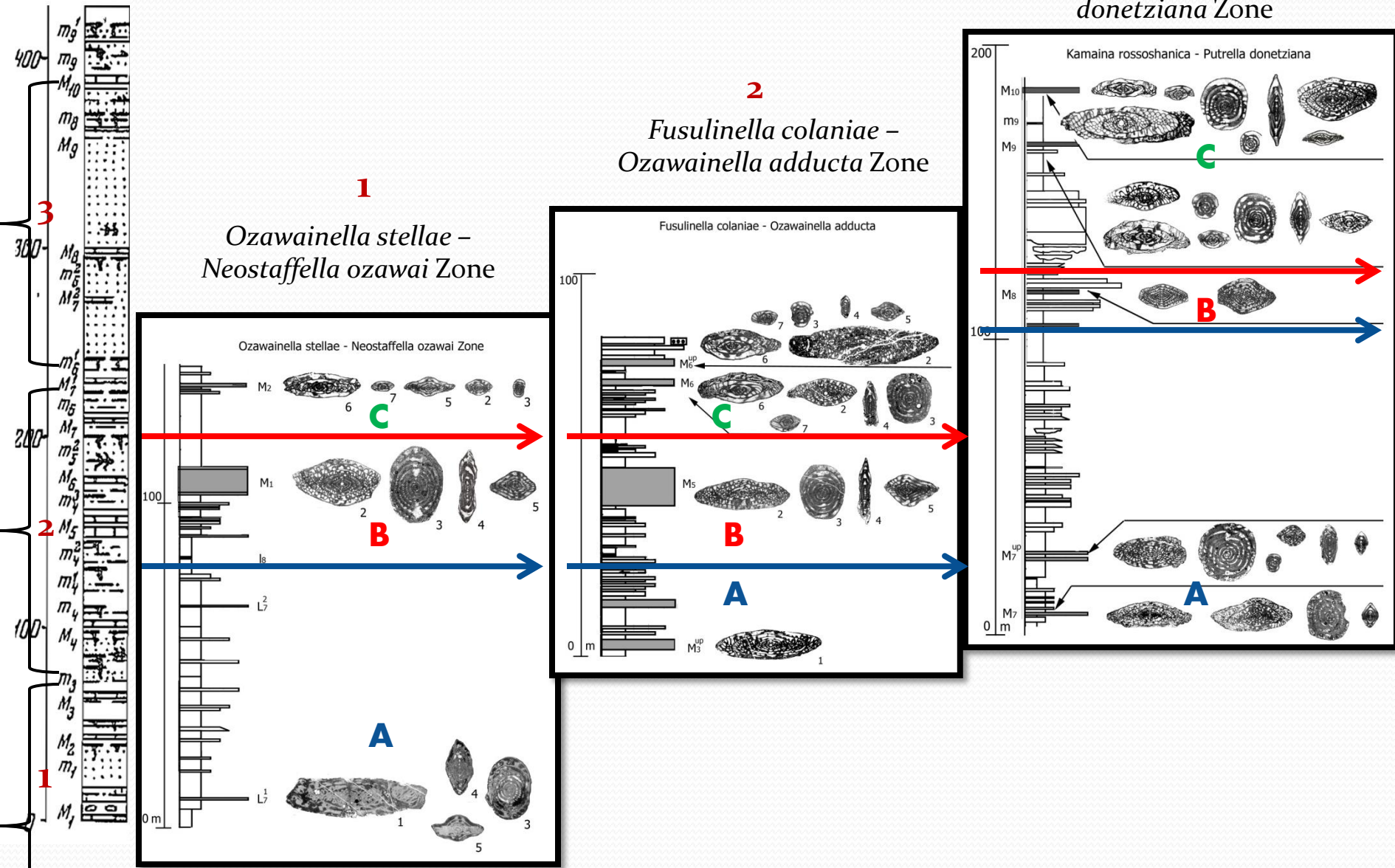


Cyclic distribution of fusulinids 3

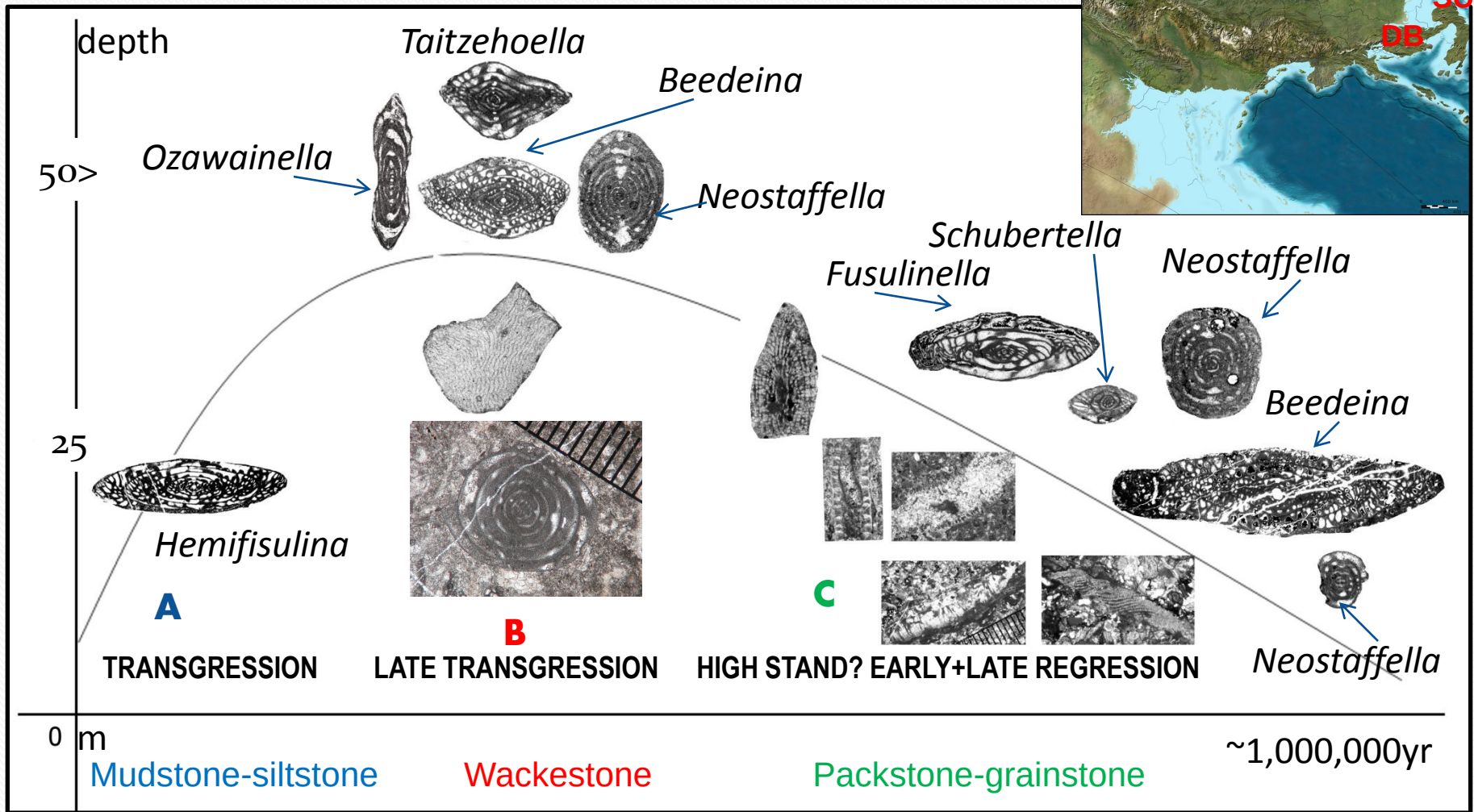
Kamaina rossoshanica – *Putrella donetziana* Zone

2
Fusulinella colaniae –
Ozawainella adducta Zone

1
Ozawainella stellae –
Neostaffella ozawai Zone



ENVIROMENTAL CHANGES WITHIN CYCLE

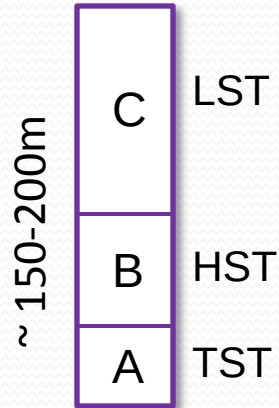


Fusulinid assemblages in intracratonic basins

Donets Basin

Siliciclastic succession

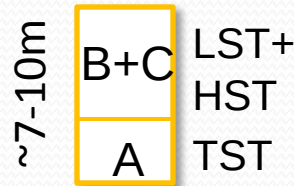
Subsidence rate * - 0.09 mm/yr,
Proximity of land (source
of siliciclastic)



Moscow Basin

Carbonate condensed succession

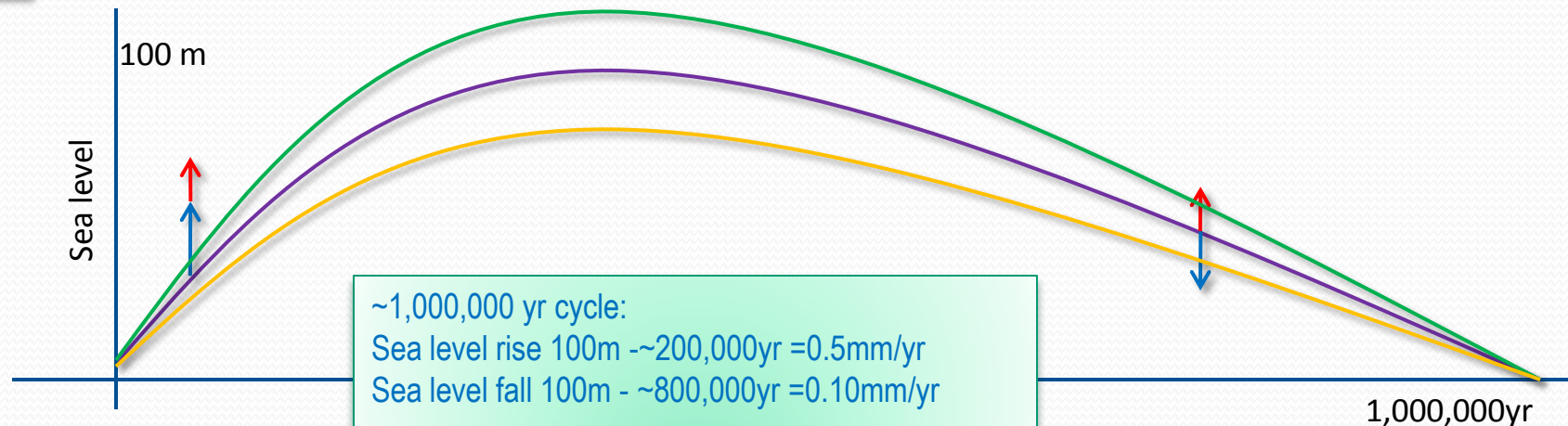
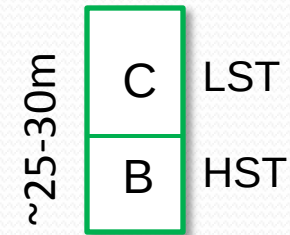
Subsidence rate* - 0.04 mm/yr,
Proximity of land (source
of siliciclastic)



Southern Urals, N. China

Carbonate succession

Subsidence rate > MB
Distant from land (source
of siliciclastic)

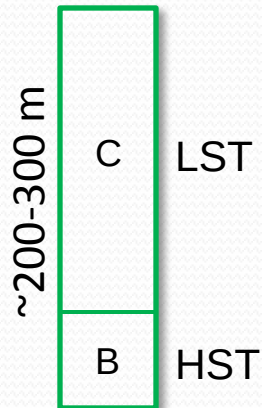


* Izart et al., 2003

Fusulinid assemblages in Central Asia and Cantabrian Mountains - orogenic regions

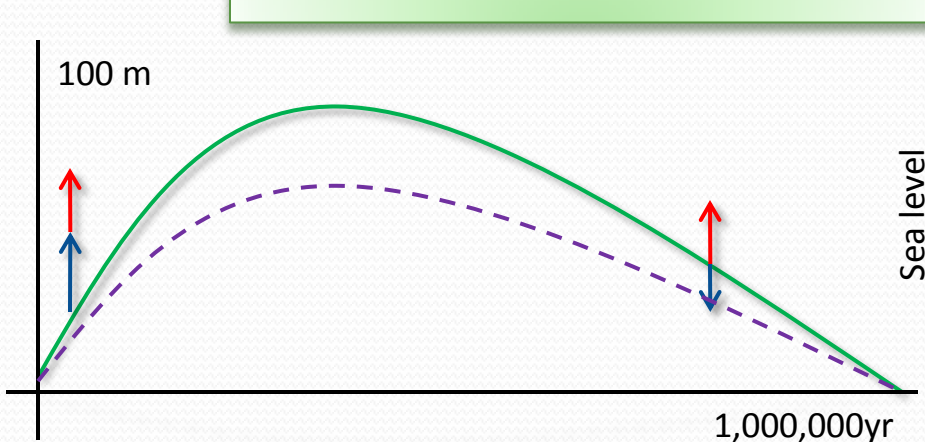
Foreland basins

Siliciclastic-carbonate succession



High sedimentation rate,
High subsidence rate,
Proximity of land (source
of siliciclastic)

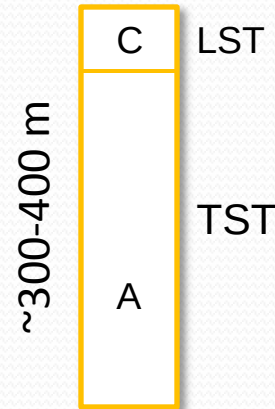
~1,000,000 yr cycle:
Sea level rise 100m ~200,000yr = 0.5mm/yr
Sea level fall 100m ~800,000yr = 0.10mm/yr



----- Donets Basin reference sea level curve

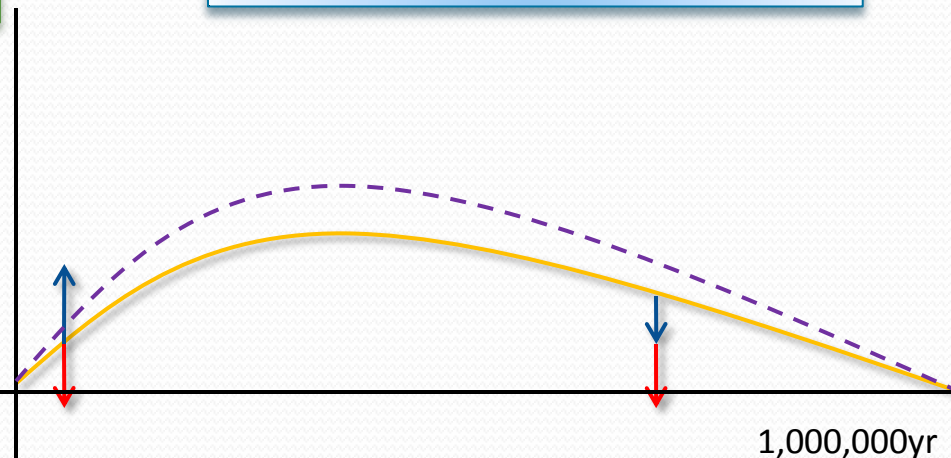
Uplifted areas

Siliciclastic succession

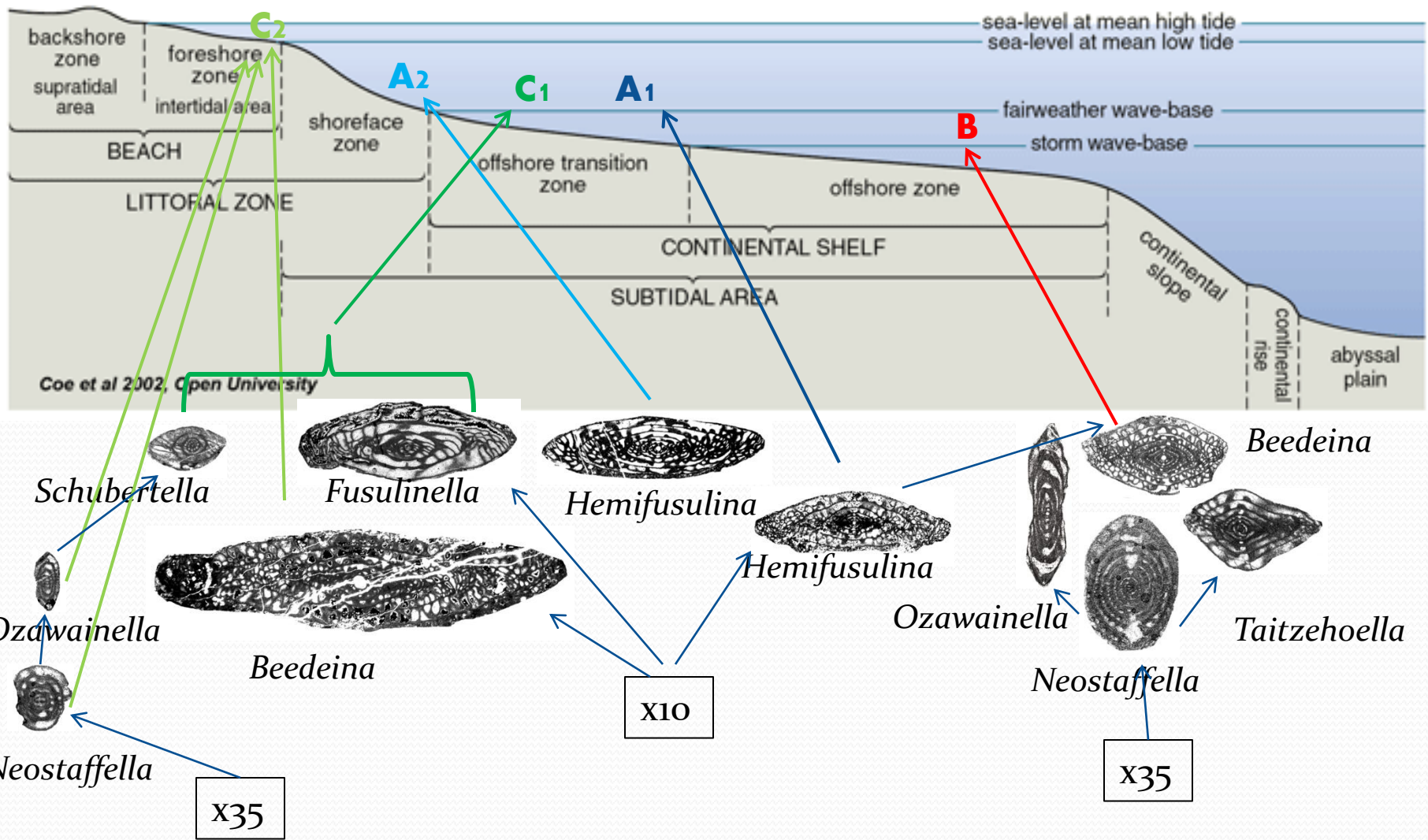


High sedimentation rate,
High mountain build-up rate,
Proximity of land (source
of siliciclastic)

Uplift of the recent mountains –
0.2-18.5 mm/yr (additional sea level fall)
Subsidence of recent basins –
0.1 – 10 mm/yr (additional sea level rise)

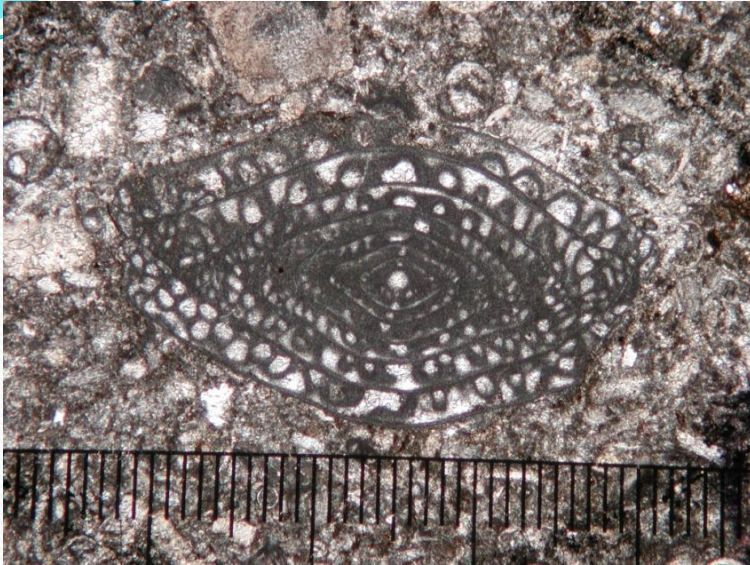


Paleoecology of fusulinids

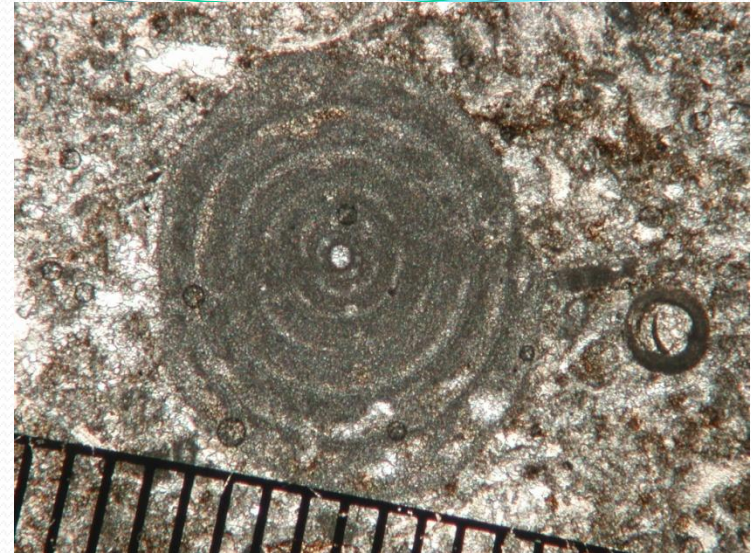


CONCLUSIONS

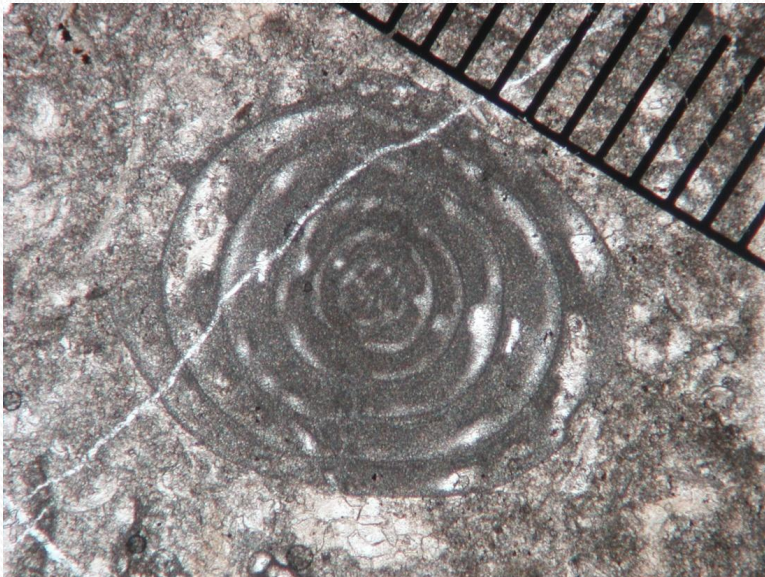
- Applications of fusulinids cyclicity model
 - I. Sequence stratigraphy (A, B, C)
 - II. Basin evolution (A, B, C)
 - III. Global correlation (B)
 - IV. Paleogeographic reconstruction (C)



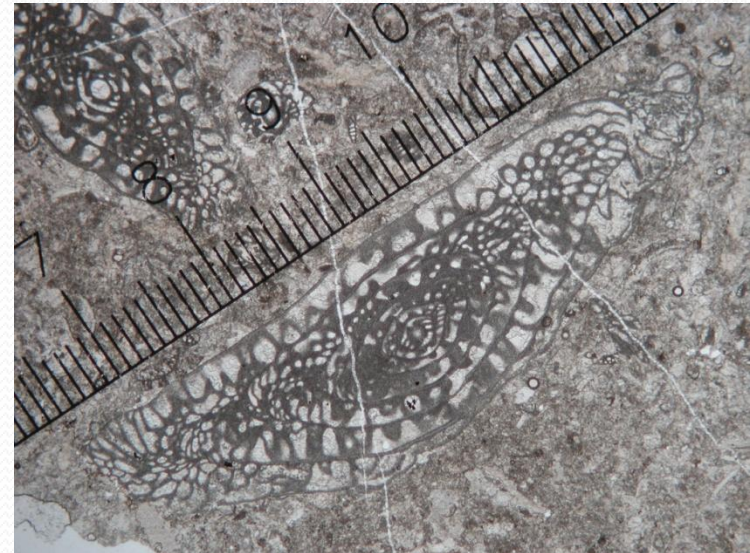
Beedeina in M1 (fusulinid mudstone HST)



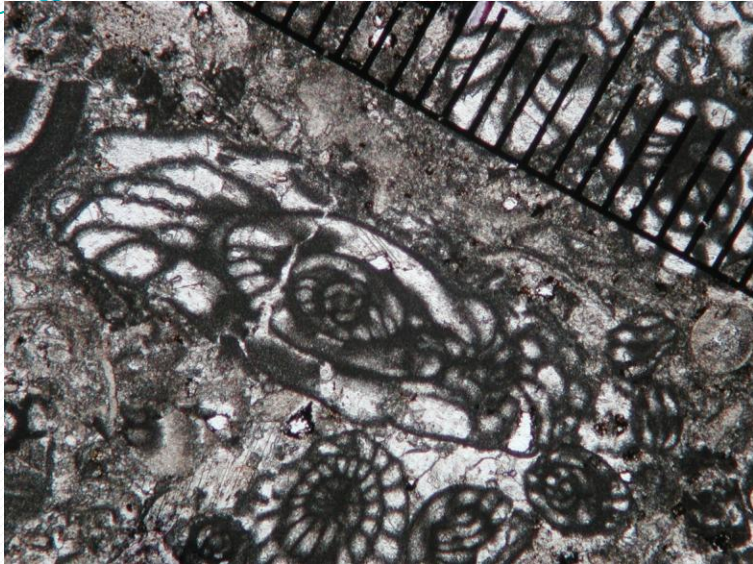
Neostaffella in M1 (fusulinid mudstone HST)



Neostaffella in M5 (fusulinid mudstone HST)



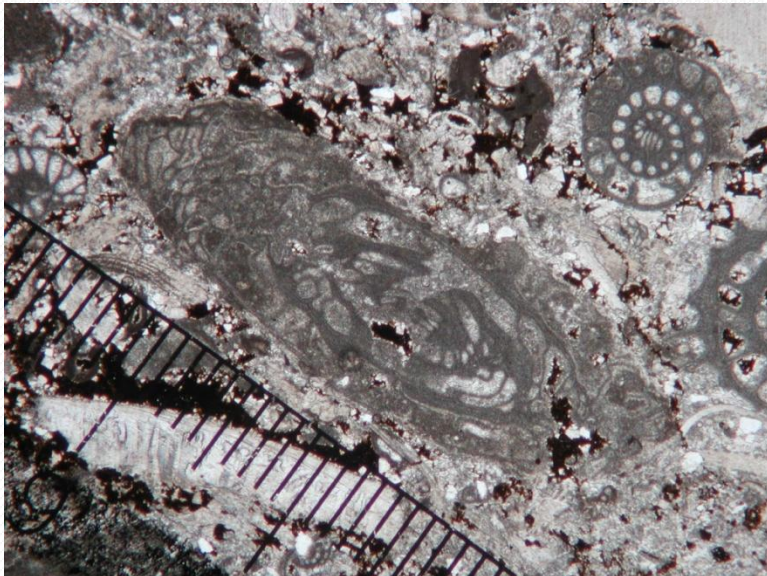
Beedeina in M5 (fusulinid mudstone HST)



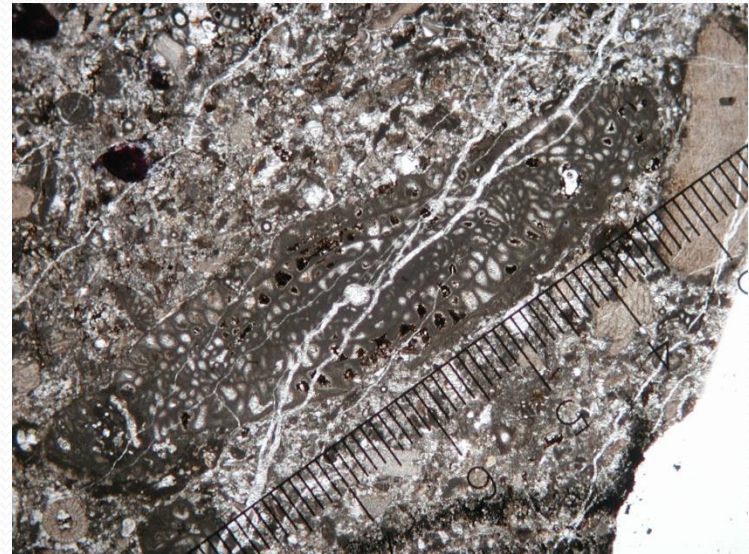
Fusulinella in M2 (fusulinid packstone LST)



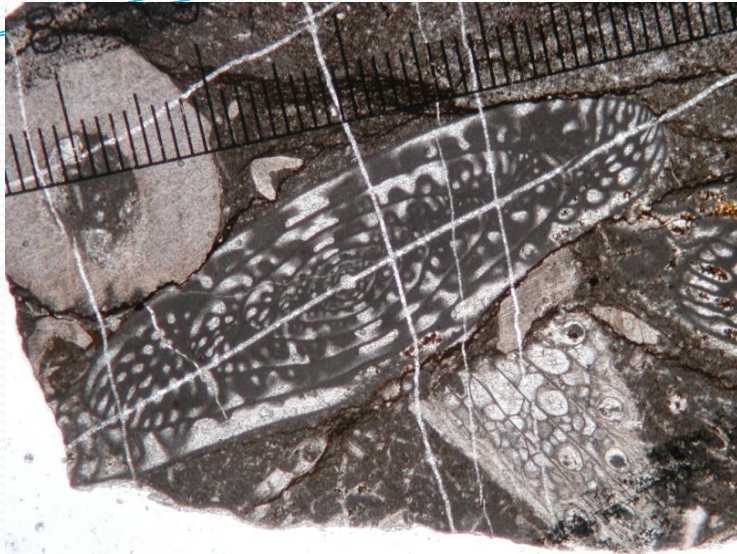
Beedeina in M3 (fusulinid packstone LST)



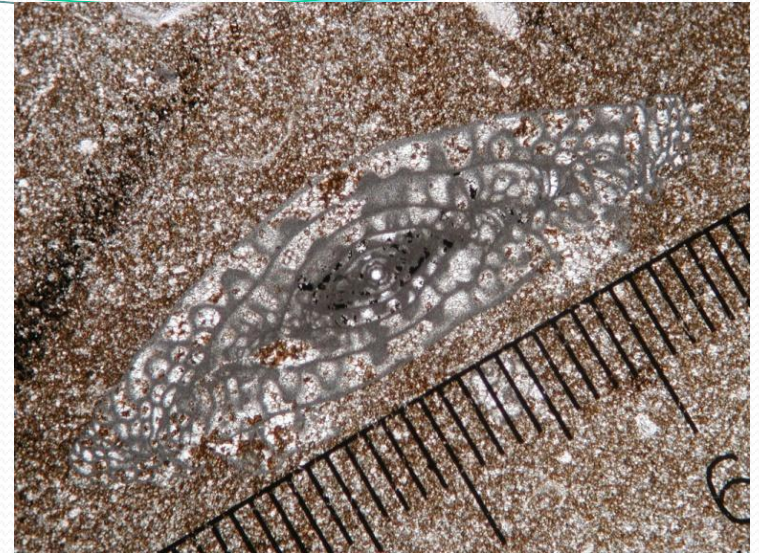
Fusulinella in M6 (fusulinid packstone HST)



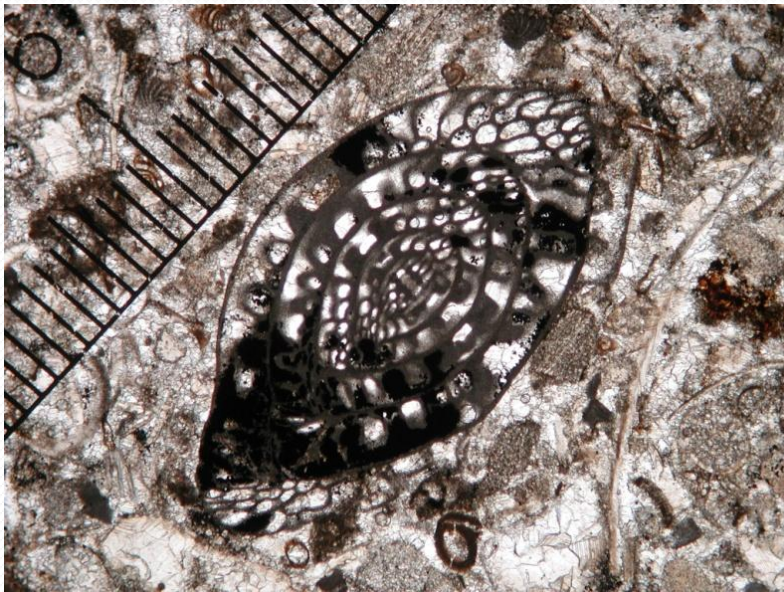
Beedeina in M6up (fusulinid packstone HST)



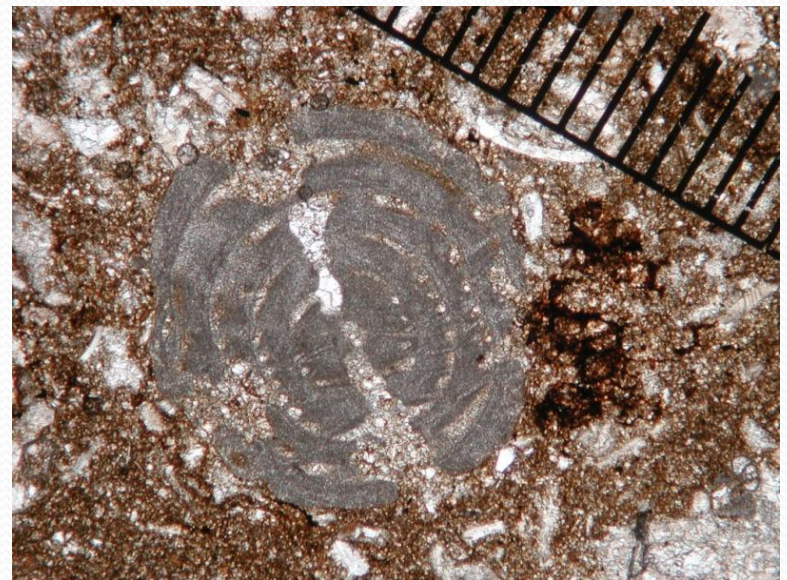
Hemifusulina in M₃up (TST)



Hemifusulina in M₇ (TST)



Hemifusulina M₇up (TST)



Neostaffella in M₇up (TST)