RADIOLARITES IN THE CARPATHIAN BASIN: OCCURENCES, TYPES AND AGES

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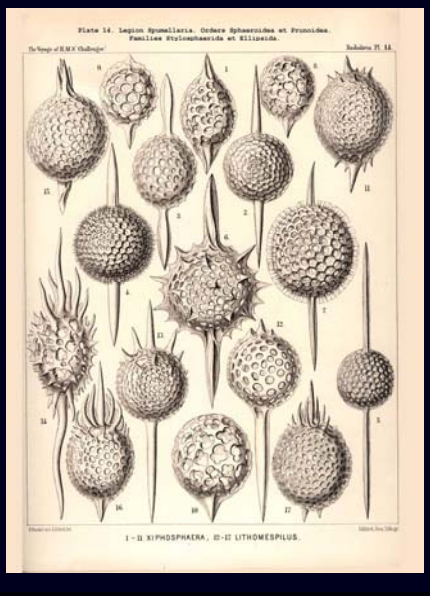
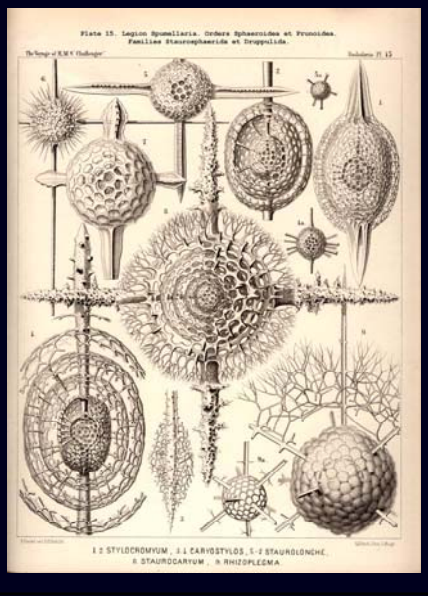
Julius Ferninand MEYEN (1834) – first living radiolaria

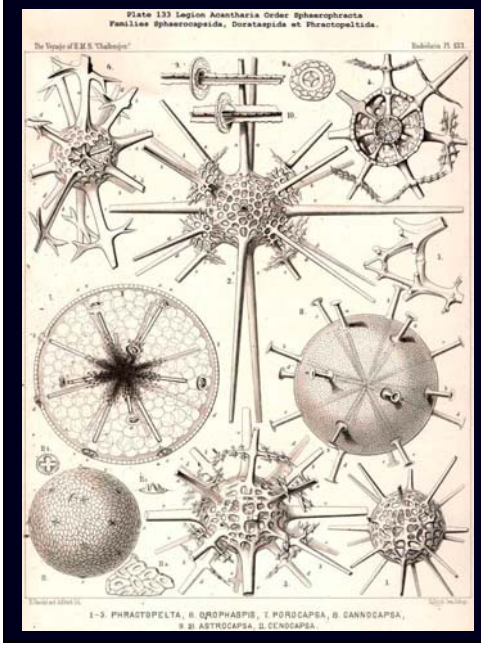
Christaian Gottfried EHRENBERG (1838)- fossil radiolaria

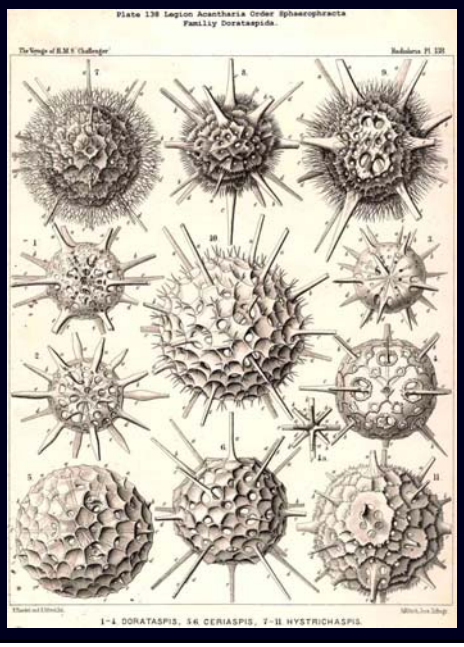




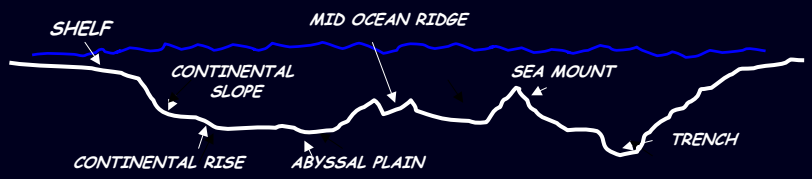
Ernst Heinrich HAECKEL (1834-1919)

Ernst Heinrich HAECKEL (1862)



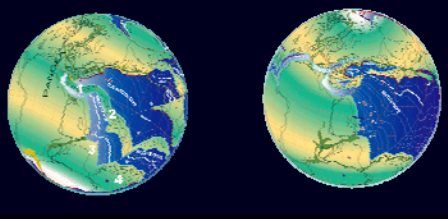


RADIOLARIANS



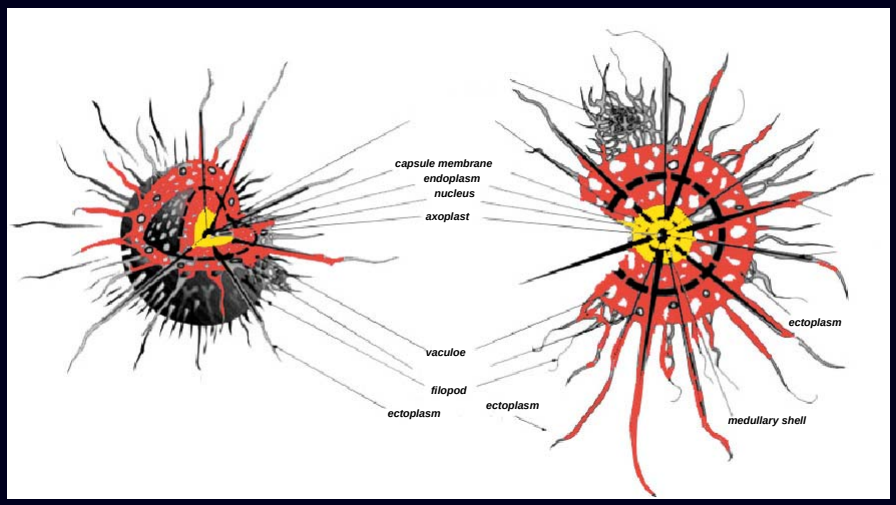
Radiolarians – planktonic protozoa
non-motile organisms
skeleton = amorphous silica
test is most characteristic morphological feature of the radiolarians

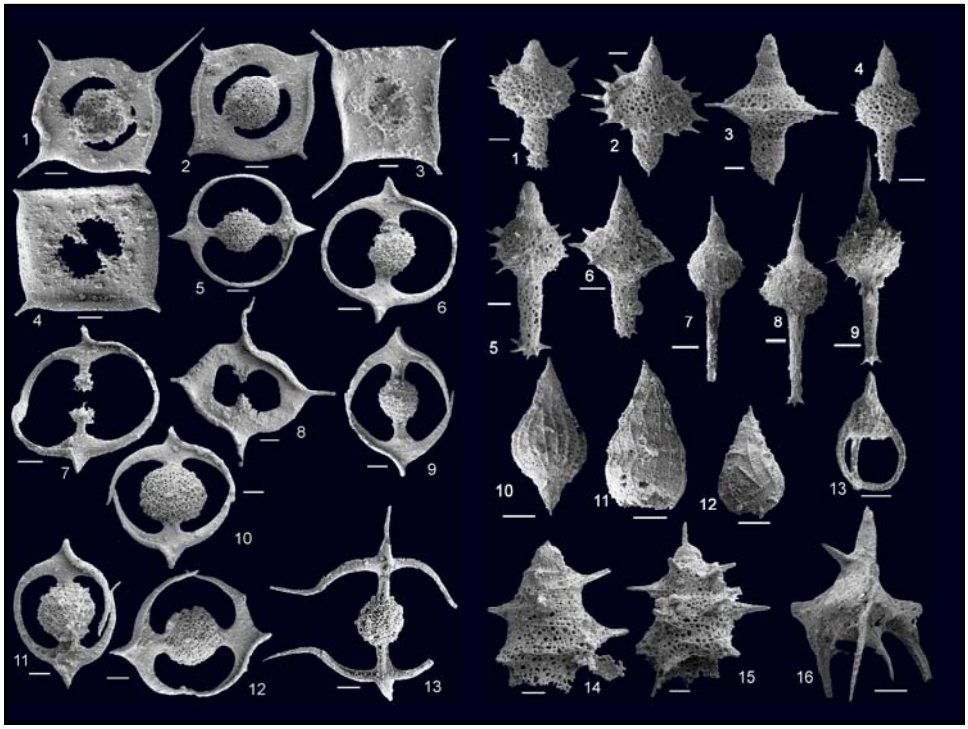
Radiolarites – importance for paleoceanographic reconstruction because their batymetric significance and their frequent association with ophiolites are used to date old oceanic crust.



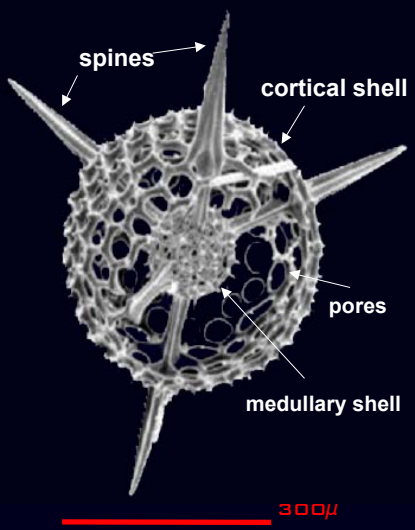
RADIOLARIANS

Living radiolarian cell is devided into two major region:
1) endoplasm 2) ectoplasm



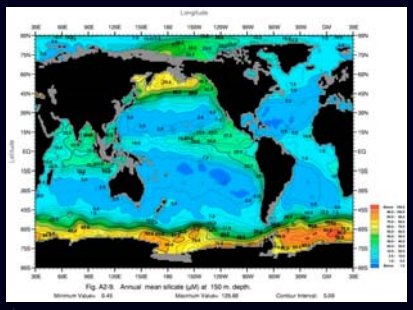


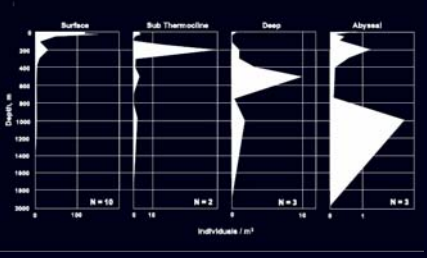
RADIOLARIAN SKELETON



- Solitary forms
- Size: 30µm – 1500µm
- Some groups may form macroscopic colonies consisting of hundreds of cell interconnected by cytoplasm
- Size: centimetre to several metres
- Material: biogenic silica - opal-A or amorphous opal ($SiO_2 \times H_2O$)
- Test shape: sphaerical, concentric, conical and more complex with radiating spines.
- Test types: latticed, perforated and spongy

FROM PLANKTON TO SEDIMENT





Radiolarian skeletons dissolving

Dissolution intensity is different ”silica corrosion zone” (0 – 1000 m) below the surface.

1-10% of siliceous debris is deposited

Geographic distribution: everywhere!!!

Greatest diversity and largest number of species occurs in the tropics!!!!

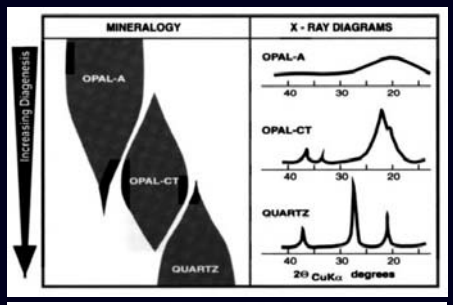
Two main siliceous belt:

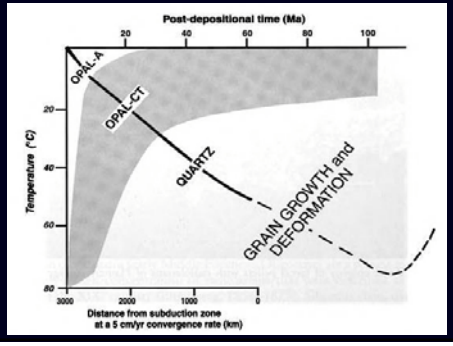
1. Equatorial belt (radiolarian dominance)
2. High latitude belt (diatoms dominance)

Vertical distribution of radiolarian

Quantitative estimates of the radiolarian flux towards the ocean floor are scarce.

FROM SEDIMENT TO ROCKS





Diagenesis of Biogenic Silica:

Dissolution (water column and the upper layer of the bottom sediments.

Recystallisation (diagenetic evolution of siliceous ”sediments” is influenced by the mineralogical composition)

Biogenic silica = opal-A(amorphous)

Increasing diagenesis (increasing temperature and time)

Opal-A converts to OPAL-CT (opal+tridymite+cristobalit)

Throug increasing temperature and time opal-CT transformed into quartz.

Recrystallization of the radiolarian shell is less effective in sediments with a high clay (smectites) content or even in carbonates.

RADIOLARIAN RICH ROCKS

Consedering their composition and degree of induration radiolarian-bearing rocks can be divided into three main categories:

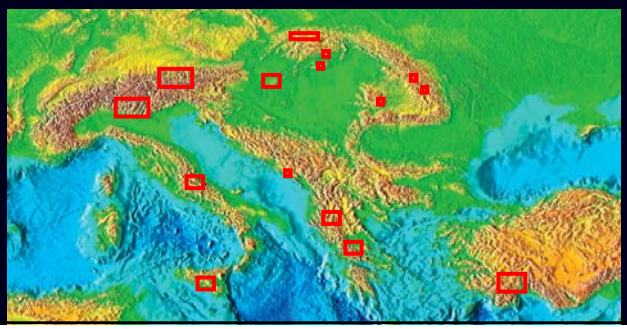
Diatomites

Radiolarites

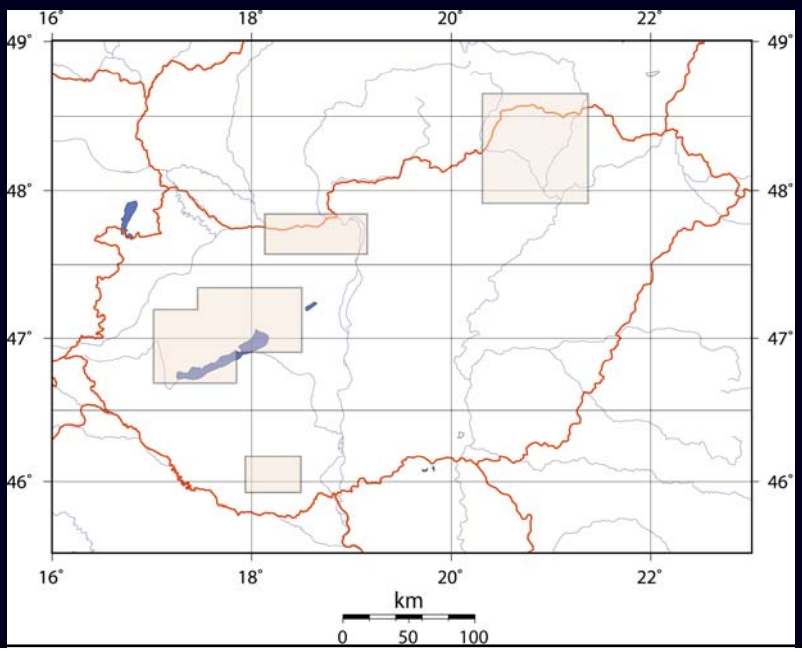
Lydites

RADIOLARITES

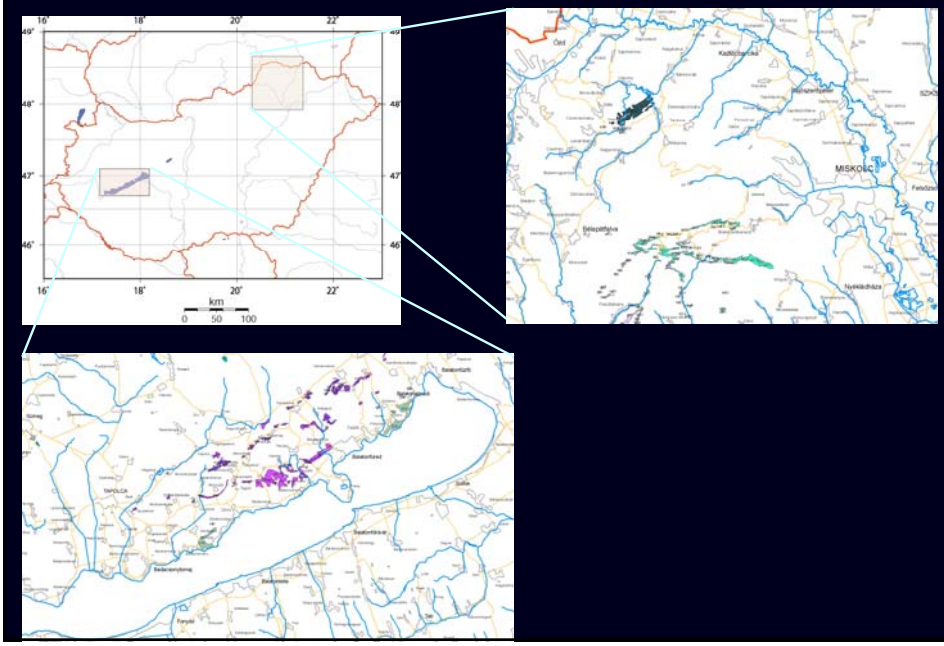
= hard, fine-grained cherts containing circular or elliptical clear areas that represent radiolarian skeletons.



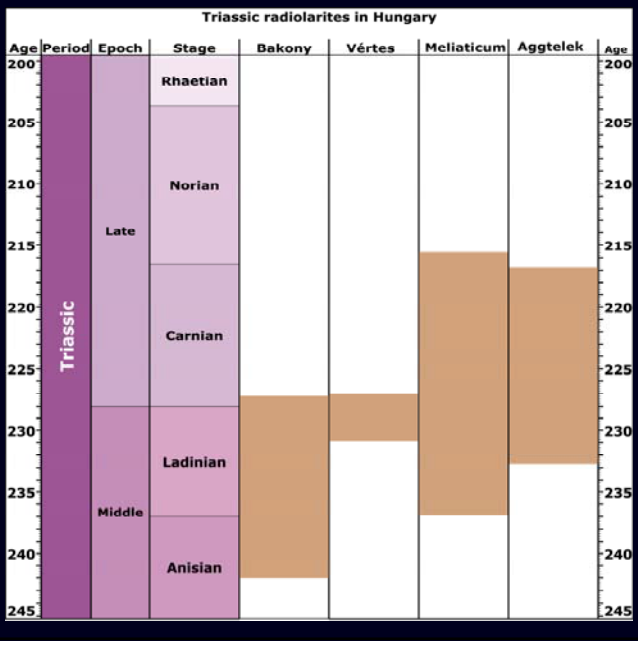
RADIOLARITES in HUNGARY



Oldest siliceous deposite: lidyte



Triassic cherts in Hungary



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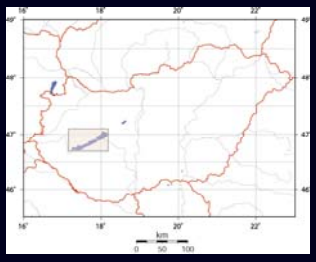
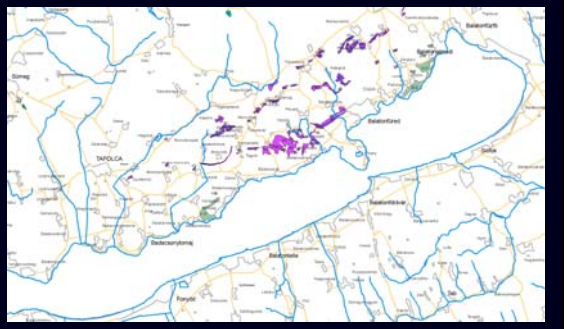
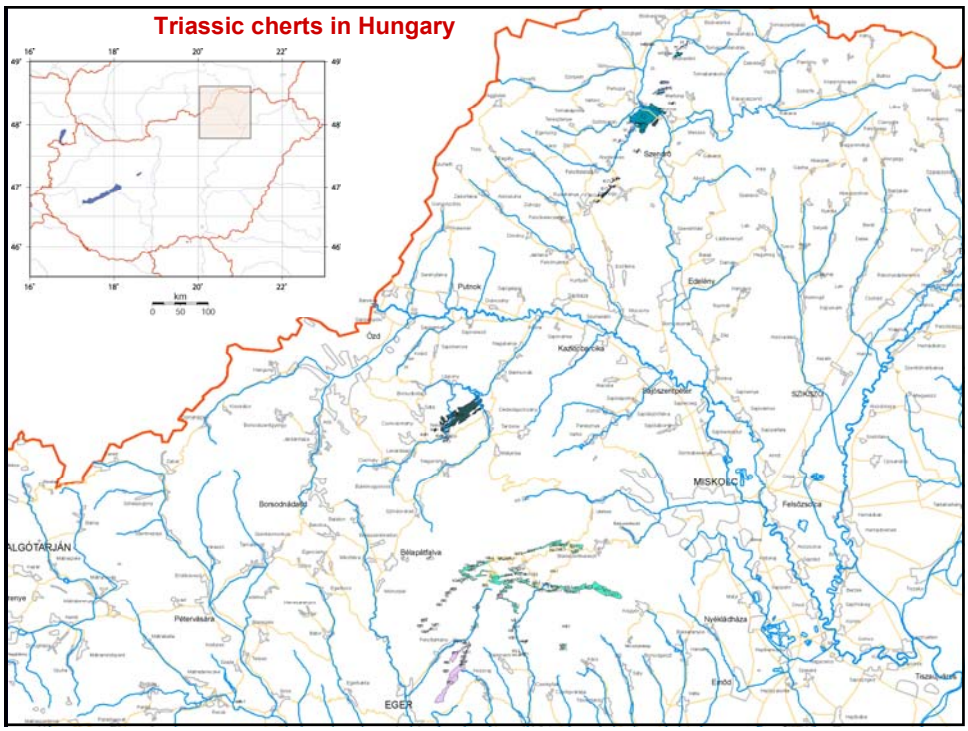


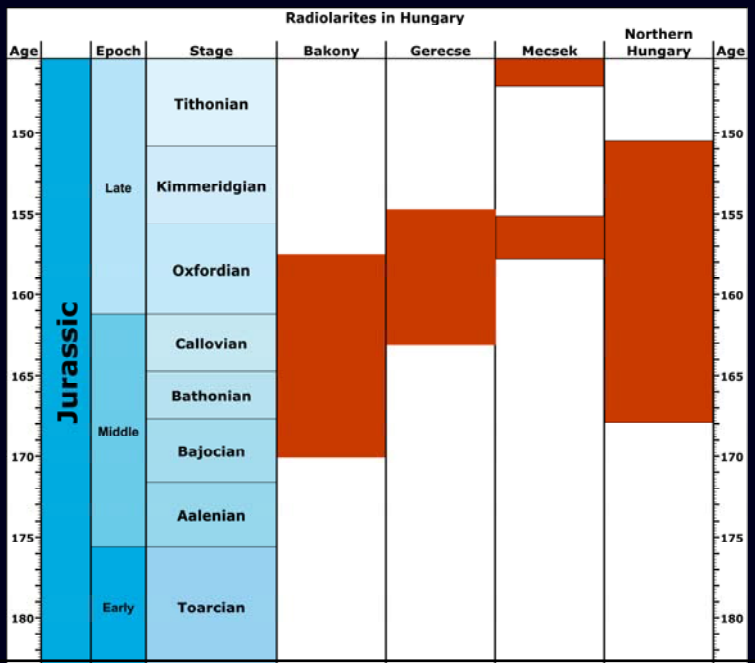


Triassic cherts in Hungary

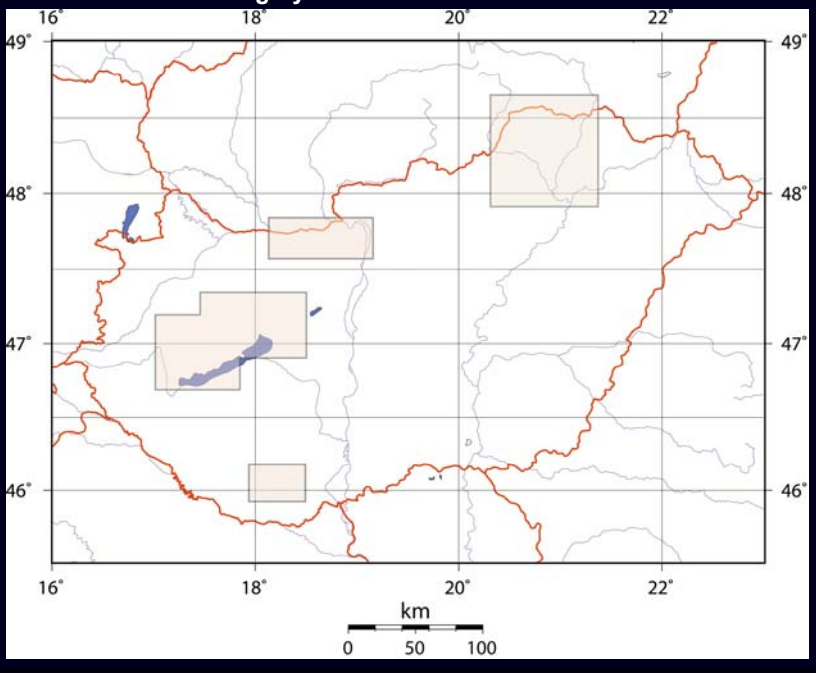


Triassic cherts in Hungary

Jurassic radiolarites in Hungary



Jurassic radiolarites in Hungary



CONCLUSION

Radiolarites – importance for paleoceanographic reconstruction because their batymetric significance and their frequent association with ophiolites are used to date old oceanic crust.

Three different radiolarite preserved in Hungary

Lidyte (Silurian) (Bakony and Uppony Mountains)
Radiolarite (Triassic) (Balaton Highland and Northern Hungary)
Radiolarite (Jurassic) (Transdanubian Central Range, Mecsek, Northern Hungary)