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CROATIAN GEOLOGICAL SURVEY

1909 - 2009

RADIOLARITES and RADIOLARIAN CHERTS in NORTHERN CROATIA – a possible sources for the production of artifacts

Josip Halamić & Rajna Šošić Klindžić

Budapest, October 29th 2009

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PRESENTATION CONTENT

- Basic principles. What are radiolarites?
  Definitions:
  - Geological definition
  - Petrographical definition
  - Other kinds of siliceous rocks
- Radioarites and radiolarian cherts in Northern Croatia
  - Spatial distribution and geological setting
  - Triassic and Jurassic radiolarites from the ophiolitic complex (tectonic melánge)
  - Artifacts and source material

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DEFINITIONS

WHAT ARE RADIOLARITES AND RADIOLARIAN CHERTS?

A geological definition:

- Rhythmically cm- to dm-bedded cherts alternating with mm- to cm-bedded shale (ribbon bedded chert) or
- Siliceous rocks built mainly from radiolarian tests

Whitten & Brooks
- A dictionary of geology;

Lehmann
- Paläontologisches Wörterbuch;

Murawski & Meyer
- Geologisches Wörterbuch) and

- They originated from:
  Radiolarian ooze: Deep-sea pelagic sediment (> 3 500m – below CCD line) containing at least 30% opaline-silica tests of radiolarians.

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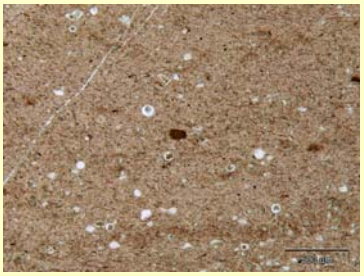
DEFINITIONS....

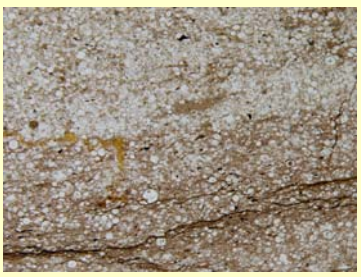
WHAT ARE RADIOLARITES?

A petrographical definition (Pettijohn, Füchtbauer&Müller, Tišljar etc.):

- Radiolarian cherts are siliceous rocks which contain less then 50% radiolarian tests embedded in siliceous matrix.
- Radiolarites are siliceous rocks which contain more then 50% radiolarian test embedded in siliceous matrix.



Radiolarian chert



Radiolarites

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... and more DEFINITIONS.....

WHAT IS CHERT? WHAT IS FLINT? WHAT IS LYDDITE?

CHERT (in general)

Cryptocrystalline silica which may be of organic or inorganic origin. It occurrs as bands, layers or nodules in sedimentary rocks. Sometimes it is a primary deposit, sometimes formed by the confleunce of disseminated silica in rocks and sometimes as secondary replacement material.

FLINT

It is variety of chert occuring primarly in the Upper Cretaceous, and as detrital pebbles in the Tertiary. It has a choncoidal fracture, as opposed to the flat fracture of chert.

LYDDITE

Dense, black variety of chert, formerly used as a touchstone (in Germany the name is sometimes used for Paleozoic and Mesozic siliceous deposits either completely or partially of volcanic origin).

----> SILICA GROUP MINERALS (Common quartz - differnet coloured, tridymite, cristobalite, chalcedony, opal, coesite..).

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Geological map of the Republic of Croaita Scale 1:300 000

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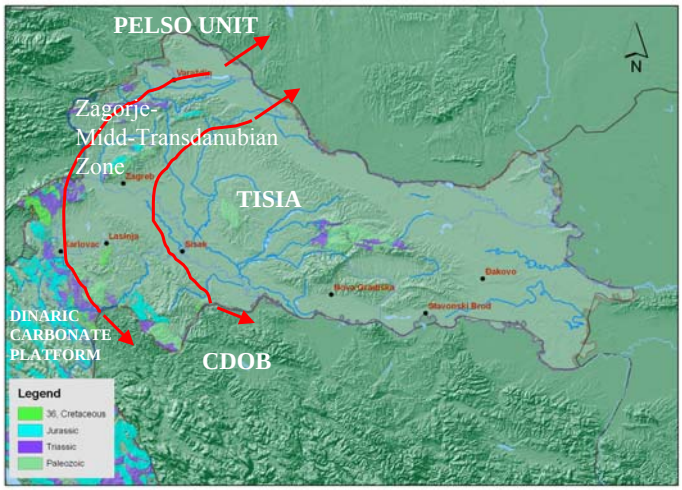

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Occurrences and geological columns of radiolarian cherts and radiolarites in North-Western Croatia

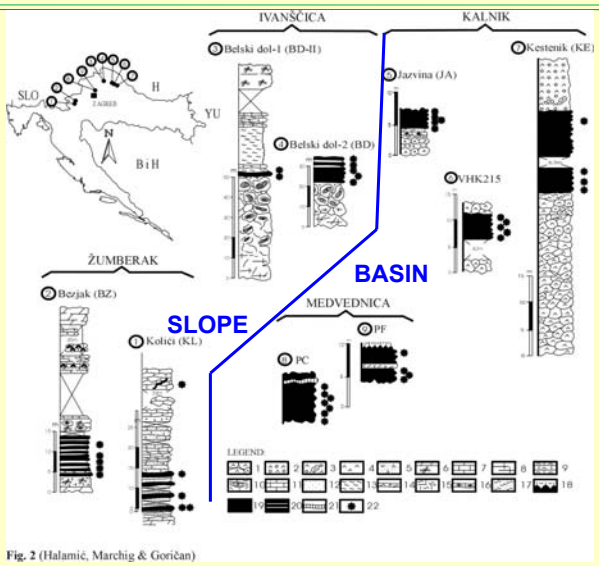

Fig. 2 (Halamić, Marchig & Goričan)

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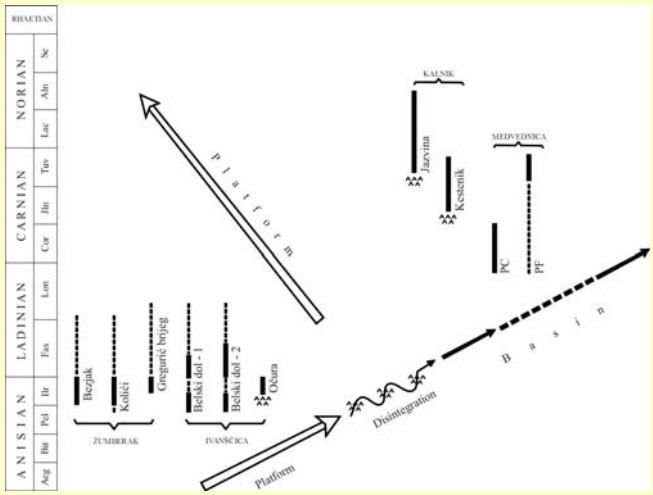
Simplified disintegration model of the carbonate platform and position of investigated radiolarian cherts and radiolarites during Triassic.



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Hypothetical model of sedimentation basin during Middle – Upper Jurassic for the
Medvednica Mt area.

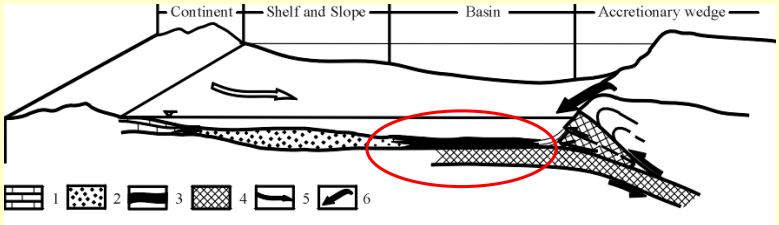

Fig. 7. (Josip Halamić, Vesna Marchig and Špela Goričan)

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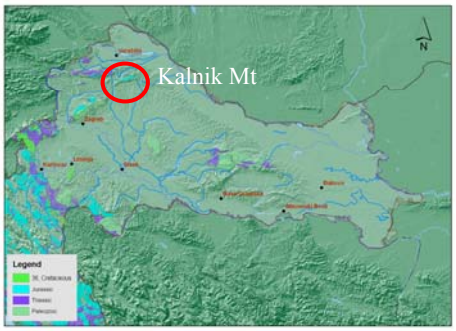
Triassic radiolarites and radiolarian cherts



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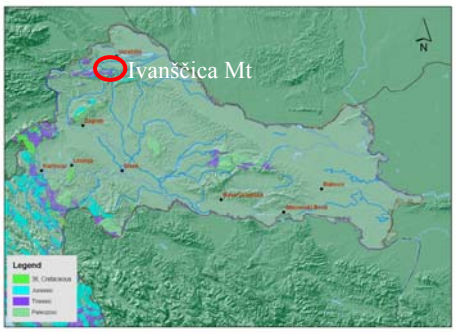
Triassic radiolarites and radiolarian cherts



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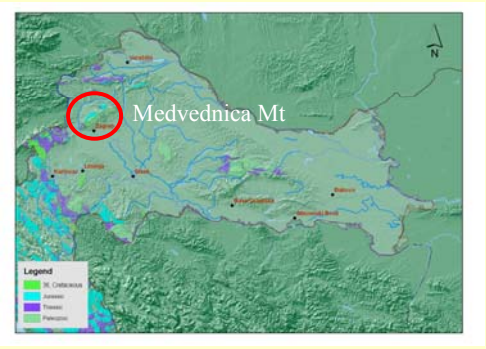
Triassic and Jurassic
radiolarites and radiolarian cherts



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Triassic radiolarites and radiolarian cherts

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Jurassic radiolarites and radiolarian cherts

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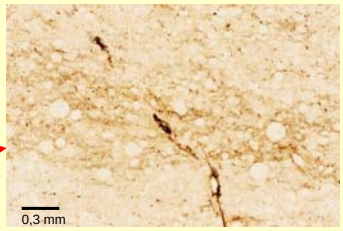
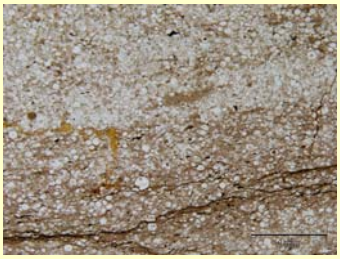
TRIASSIC RADIOLARITES





Microphoto of Triassic radiolarites from ophiolitic zone

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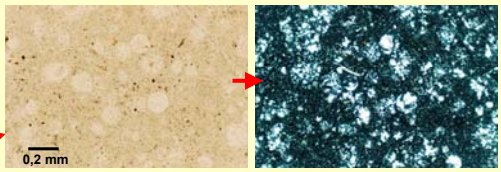
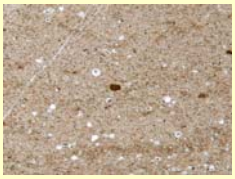
JURASSIC RADIOLARITES





Microphoto of Jurassic radiolarites from ophiolitic zone

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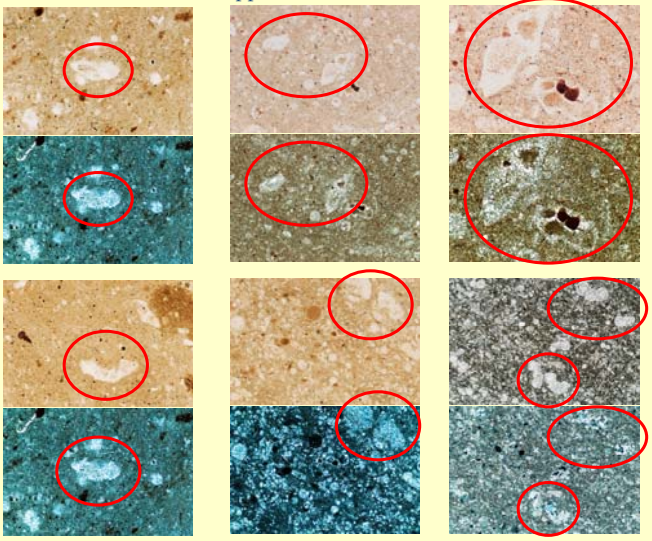
CHERTS

Globotruncanidae *Upper Cretaceous*



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Possible sources of radiolarian cherts and radiolartites for the production of artifacts