

*Посебно издание на
Geologica Macedonica, №.4*

МАКЕДОНСКО ГЕОЛОШКО ДРУШТВО

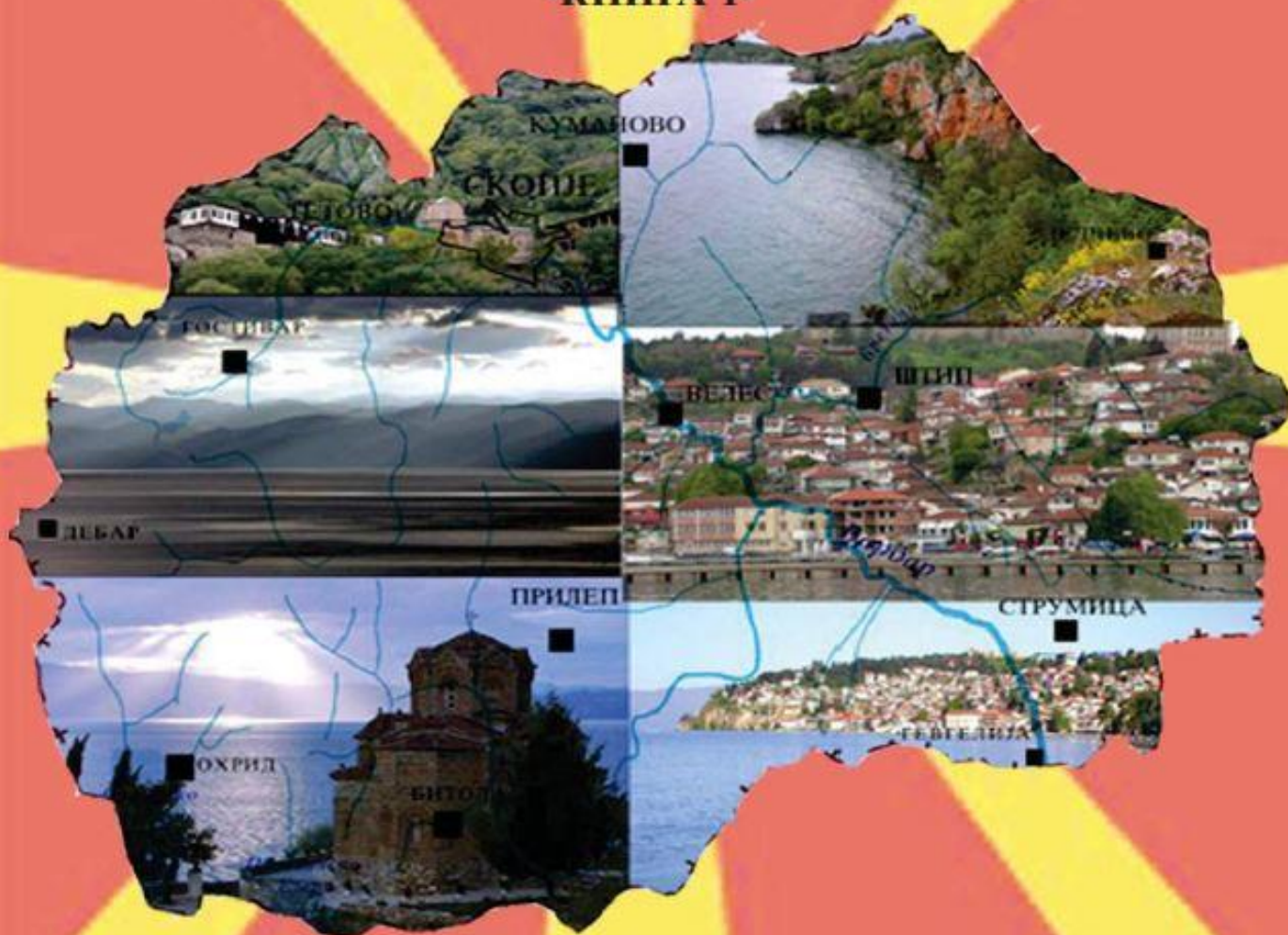
ТРЕТ КОНГРЕС

на

Геолозите на Република Македонија

ЗБОРНИК НА ТРУДОВИ

-КНИГА 1-



Уредници:

Лепиткова, С. & Боев, Б.

Струга, 2016

LEVEL CHANGE IN VRGORAC LAKE - RESULT OF NEOTECTONIC SUBSIDENCE AND INTENSIVE SEDIMENT EROSION

¹Hrvoje Posilović and ¹Lidija Galović

¹Hrvatski geološki institut, Sachsova 2, Zagreb, Croatia
hposilovic@hgi-cgs.hr; lgalovic@hgi-cgs.hr

EXTENDED ABSTRACT

Based on stromatolite structures and limestone dissolution scallops, water level change in Vrgorac paleolake is reconstructed.

Dissolution scallops are scallop-shaped depressions developed on the rock surface, usually up to few centimeters in diameter. Scallop develop in homogenous and fine grained material like micritic limestone. They are formed by dissolution of limestone surface in submerged conditions, especially if some sort of water flow is present. Stromatolites are laminar biomineralization structures formed in saline or fresh water by catching and binding fine sediment grains on the surface of microbial mats. Stromatolites mainly develop on cyanobacterial biofilms in the zone of constant water level fluctuation (Schneider, J.

and Le Campion-Alsumard, T. 1999). During the Pleistocene and Holocene the depression was permanent lake with significant water level fluctuations. In the most recent time there is significant anthropogenic influence caused by digging outlet channels and tunnels through natural dams, transforming and renaming the Vrgorac Lake to Vrgorac polje. In a research presented here we are using dissolution scallops and stromatolite remains as indicators of the former water level. Water level in a lake can be expressed as absolute level (water height above the sea level), or water depth (water rise above the lake bottom). Absolute water level and water depth depend on water volume held in a lake and sediment amount at the lake bottom.

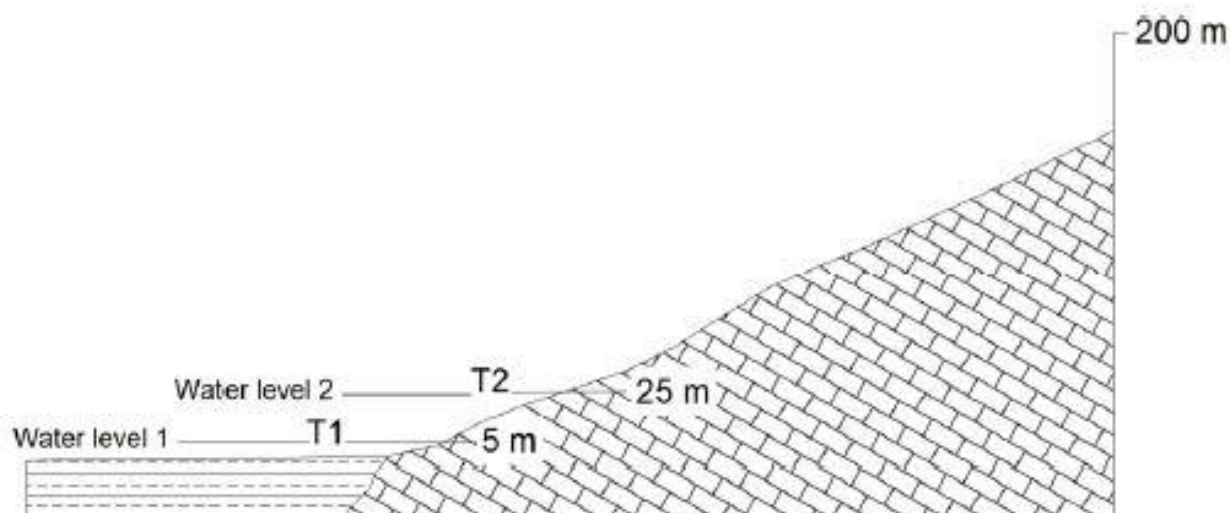


Fig. 1 Section representing lake shore with present day (T1) and reconstructed paleo water level (T2).

Today Vrgorac polje depression is periodically flooded during the winter and autumn; water level can reach up to ten meters above present day lake bottom. In the zone of five meters above the lake bottom, recent stromatolites and endolithic algae can be found (Figure 2a).

Recent stromatolites are developed as a crust on cretaceous limestones up to 2 cm in thickness. Figure 2b shows numerous algal filaments at the contact of stromatolite crust and base rock. Position of these stromatolites is marked with T1 on Figure 1.

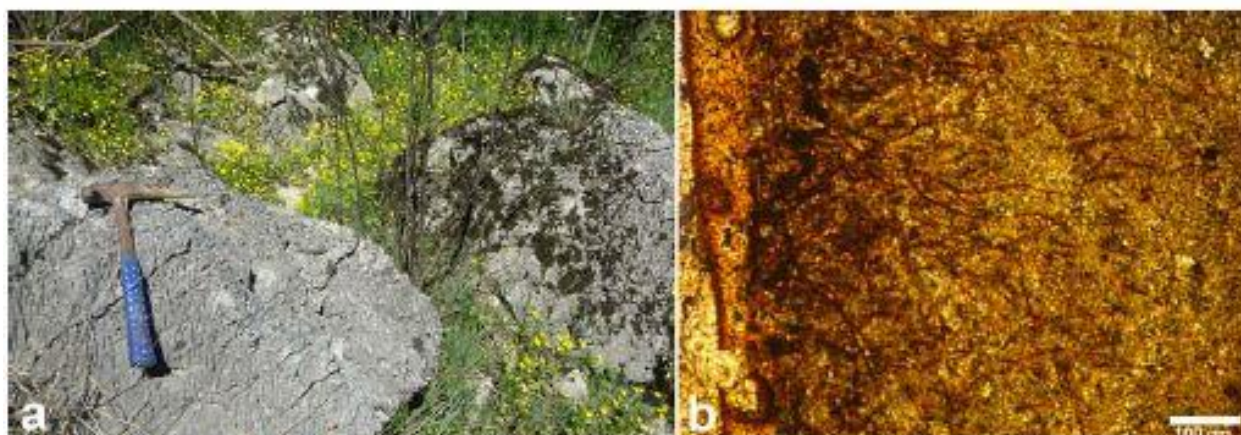


Fig. 2 a) Cretaceous limestones covered with recent stromatolites and endolithic algae. b) Thin section showing algal filaments penetrating cretaceous limestone.

We found stromatolite traces and dissolution scallops about 25 meters above present day lake bottom (50 m.a.s.l.) (Figure 1.). Figure 3a shows stromatolite remains and dissolution scallops found at that altitude without preserved stromatolite crust visible by naked

eye. However, in thin section of the sample (Figure 3b) endolithic algae remains are still visible, but stromatolite incrustation is eroded. Position of these stromatolites is marked with T2 on Figure 1.

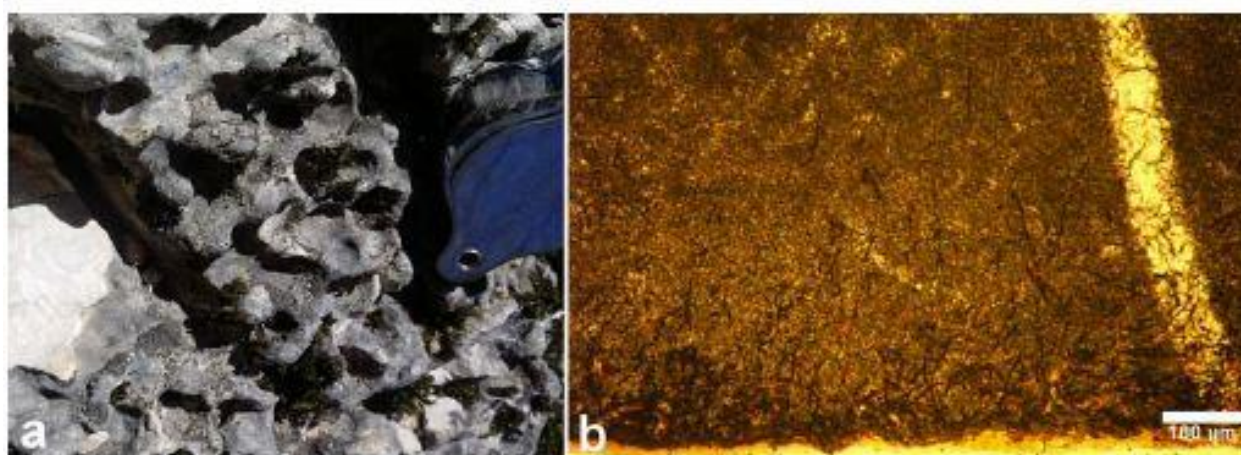


Fig. 3 a) Cretaceous limestones with dissolution scallops 25 meters above present day lake bottom. b) Thin section of limestone with scallops, preserved boreholes of algal filaments penetrating cretaceous limestone are visible.

Reasons of water level change in the Vrgorac Lake are multiple. Water dynamic in the lake was very intensive. Erosion and re-sedimentation of the lake sediment is evident and important factor in water level change. If intensive sedimentation occurs, water level will rise. Contrary, in the case of extensive erosion water level will drop. The most

important influence on water level is neotectonic subsidence of the bottom and/or rise of the lake shore. Bottom and shore movements are result of the tectonic movements. Today Vrgorac area is among the most active neotectonic zones in Outer Dinarides (Dragičević et al., 1999).

Key words: Vrgorac polje, Paleolake, water level, stromatolite, dissolution scallops

REFERENCES

Dragičević, I., Prelogović, E., Kuk, V., Buljan, R., 1999. Recent Tectonic Activity in the Imotsko Polje Area. *Geologia Croatica*, 52(2): 191-196.

Schneider, J. and Le Campion-Alsumard, T. 1999. Construction and destruction of carbonates by marine and freshwater cyanobacteria, *European Journal of Phycology*. 34(4), 417-426.