

TRANSGRESSIVE-REGRESSIVE CYCLES IN THE TITHONIAN AND BERRIASIAN PELAGIC LIMESTONES OF THE WEST BALKAN UNIT, BULGARIA

Iskra **LAKOVA**, Elena-Koleva **REKALOVA**, Daria **IVANOVA**, Lyubomir **METODIEV**, Silviya **PETROVA**

Two Tithonian and Berriasian sections of pelagic limestone-marl alternations have been studied for determination of transgressive-regressive cycles based on the bedding pattern and abundance curves of microfossils. The biostratigraphy was provided by calpionellids, calcareous nannofossils and calcareous dinoflagellates (Lakova et al., 1999). The studied interval comprises the Upper Tithonian and Berriasian (p.p.) as documented on the continuous succession of the calpionellid zones *Crassicollaria*, *Calpionella* and *Calpionellopsis* and their subzones. The time interval spans 5.4 Ma between the Lower-Upper Tithonian boundary (147.2 Ma) and *Csis simplex* – *Csis oblonga* subzones boundary (141.8 Ma)

Relatively monotonous medium- to thin-bedded micritic and intraclastic limestones with thinner marly interlayers crop out. They belong to the slope and basinal environments of the Late Jurassic and Early Cretaceous basin in the West Balkan tectonic unit. The measuring is bed by bed and thin-section samples have been taken at each 1 m.

The Upper Tithonian and Lower Berriasian (Glozhene Formation) represent mainly limestones, the bed thickness ranging from 10 to 30 cm, exceptionally 5 cm or up to 70 cm. Very thin marly interbeds of 1-3 cm occur randomly separating the limestone beds. A

total of 147 beds are counted, deposited within a time interval of 5.0 Ma. The Upper Tithonian is 10 m thick and consists of 42 beds ("elementary cycles" in the sense of Pasquier, Srtasser, 1997), each formed at average time of 40 Ka. The Lower Berriasian is 20 m thick and consists of 105 limestone beds or limestone-marl alternations, each "elementary cycle" of 32 Ka duration.

The overlaying part of Salash Formation (Upper Berriasian, p. p., *Csis oblonga* Subzone) is an irregular alternation of micritic limestones, clayey limestones and marls representing a fast shift onto hemipelagical depositional environment. The bed thickness is normally 5-10 cm, exceptionally 20-30 cm. The thickness is 10 m and the time interval of deposition is 0.4 Ma. The number of limestone-marl alternations is 42. Each "elementary cycle" deposited during average time 10 Ka, and the rate of sedimentation dramatically increased to 25 mm/Ka compared to 6-7 mm/Ka for the Glozhene Formation.

The limestones represent mudstones, rarely wackstones, built up of recrystallised carbonate of micritic size and planktonic microfossils – calpionellids, calcareous dinoflagellates, globochaetes, radiolarians, as well as ammonite aptichi. In addition, less common benthic foraminifers, ostracods, bivalves, and

crinoids occur deriving from hemipelagic or platform areas.

The bedding pattern has been analysed in order to differentiate zones of maximum flooding, boundaries of T-R cycles and transgressive-regressive trends. These are directly correlated to the parallel abundance curves of calpionellids, calcareous dinoflagellates and nannofossils. The maxima of microfossil abundance approximately coincide with zones of thinner and more marly beds and are interpreted as maximal transgressions. The minima of the microfossils abundance correspond to thicker, pure limestone beds and are considered as regressive surfaces or sequence boundaries. The elementary cycles have been grouped into seven 3rd-order T-R cycles, covering a time interval of 5.4 Ma, and have been correlated to the sequences chart by Handerbol et al. (1998).

This study is a contribution to the Project NZ-1516 of the Bulgarian National Scientific Fund.

Iskra LAKOVA

Geological Institute
Bulgarian Academy of Sciences
1113 Sofia
Bulgaria
e-mail: lakova@geology.bas.bg

Elena-Koleva REKALOVA

Geological Institute
Bulgarian Academy of Sciences
Acad. G. Bonchev St., Bl. 24, 1113 Sofia
Bulgaria
e-mail: e_koleva@geology.bas.bg

Daria IVANOVA

Geological Institute
Bulgarian Academy of Sciences
Acad. G. Bonchev St., Bl. 24, 1113 Sofia
Bulgaria
e-mail: dariaiv@hotmail.com

References

- HANDERBOL, J., THIERRY, J., FARLEY, M.B., JACQUIN, T., DE GRACIANSKY, P.-C., VAIL, P.R. 1998. Cretaceous chronostratigraphy. In: *Mesozoic and Cenozoic Sequence Stratigraphy of European Basins* (De Graciansky, P.-C. Et al., eds). *Special Publication, Society of Sedimentary Geology*, 60.
- LAKOVA, I., STOYKOVA, K., IVANOVA, D. 1999. Calpionellid, nannofossil and calcareous dinocyst bioevents and integrated biochronology of the Tithonian to Valanginian in the Western Balkanides, Bulgaria. *Geologica Carpathica*, 50, 2, 151-168.
- PASQUIER, J.-B., STRASSER, A. 1997. Platform-to-basin correlation by high-resolution sequence stratigraphy and cyclostratigraphy (Berriasian, Switzerland and France). *Sedimentology*, 44, 1071-1092.

Lyubomir METODIEV

Geological Institute
Bulgarian Academy of Sciences
Acad. G. Bonchev St., Bl. 24, 1113 Sofia
Bulgaria
e-mail: lubo@geology.bas.bg

Silviya PETROVA

Geological Institute
Bulgarian Academy of Sciences
1113 Sofia
Bulgaria
e-mail: silviya_p@geology.bas.bg

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Berichte der Geologischen Bundesanstalt](#)

Jahr/Year: 2008

Band/Volume: [74](#)

Autor(en)/Author(s): Lakova I., Rekalova Elena-Koleva, Ivanova Daria, Metodiev Lyubomir, Petrova Silviya

Artikel/Article: [Transgressive-regressive Cycles in the Tithonian and Berriasian Pelagic Limestones of the West Balkan Unit, Bulgaria 47-48](#)