NEW LOCALITY OF THE K/T BOUNDARY IN BYALA FM. NEAR GORITSA, E BULGARIA

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Introduction and geological setting

The Cretaceous/Tertiary (K/T) boundary and involved with this boundary events have been discussed in a series of papers since 1992 (Stoykova, Ivanov, 1992; Preisinger et al., 1993a, b; Ivanov, Stoykova, 1994; Rogl et al., 1996; Стойкова и др., 2000; Adatte et al., 2002; Stoykova, Ivanov, 2004).

The occurrence of several slices in Byala Fm. as a result of Alpine thrusting was first pointed out by Juranov, when studying some well-sections around the village of Goritsa (Juranov, 1983; Джуранов, 1989). He found a complete set of planctic foraminiferal zones of the Paleocene series in several slices – some in normal, others – in reverse order (Джуранов, 1989). During the 1:25000 geological mapping, all surface outcrops around Goritsa were assigned to the Upper Cretaceous, Campanian and Maastrichtian (Джуранов и др., 1994ф). So far, the K/T boundary has been identified neither in the outcrops, nor in the well-sections around Goritsa.

Our interest towards this region was provoked by the fact that around Goritsa crop out the north-westernmost exposures of Byala Fm., giving us the opportunity to study a relatively more complete Paleocene sequence (if compared with already known ones around Byala).

Field observations of the sedimentary sequences in the ravine W of Goritsa, as well as the first field tests for nannofossils, proved the presence of Paleocene rocks there (apart from Upper Cretaceous). Macrofossil finds (ammonites and inoceramids) revealed two superimposed overthrust slices of Byala Fm. Additional searching in the field located precisely the K/T boundary interval and fixed the characteristic boundary clay bed. This bed was taken as a reference point, marked with 0 m, whereas the distance below and above was denoted respectively with (-) and (+) m.

We present here a brief description of this new locality of the K/T boundary near the village of Goritsa, as well as preliminary results of the parallel zoning of the Paleocene interval (calcareous nannofossils and planktic forams).

Results

The new locality of the K/T boundary is documented along the ravine West of Goritsa, where the north-westernmost exposures of the Byala Fm. are cropping out (Fig. 1). The studied portion of the section comprises 18 m below the K/T boundary (Upper Cretaceous, Upper Maastrichtian) and 50 m above it (Paleocene, Danian and Selandian). In the uppermost part, about 50 m above the K/T, Upper Cretaceous sediments occur again (thrust over the Middle Paleocene). Byala Fm. consists of marls, interbedded by marly limestones; marls are dominating in the Upper Maastrichtian and marly limestones – in the Upper Selandian. The section is subdivided into calcareous nannofossils (NP zones, Martini, 1971) and planktonic foraminifera (P zones, Berggren and Miller 1988) biostratigraphic zones. The zonal boundaries are drawn at the crucial bio-events – first and last appearance datum (FAD, LAD) of characteristic calcareous nannofossil and planktic forams taxa. The thicknesses of the zones recognized, as well as some important bio-events are shown on Fig. 2.

Fig. 1.

Generally, both microfossils assemblages display a very good preservation, high abundance and rich species diversity along the studied interval.

The K/T boundary is lithologically marked by a 2-3 cm thick dark-grey clay bed. Immediately above it, a bloom of survivor-species, as well as many "reworked" Cretaceous taxa occur. Therefore, the new locality exhibits all well-known features of the other Bulgarian K/T boundary sections.

Conclusion

As a result of the present study, a new locality of the K/T boundary near Goritsa has been found and documented. The Paleocene sediments (Danian and Selandian stage) occur in the surface outcrops of Byala Fm. Biostratigraphic subdivision is made, based on two planktonic microfossil groups: calcareous nannofossils and planktonic foraminifers; thus their zones are directly correlated. Besides, the presence of at least two slices in the section, overthrusting each other, is witnessed.

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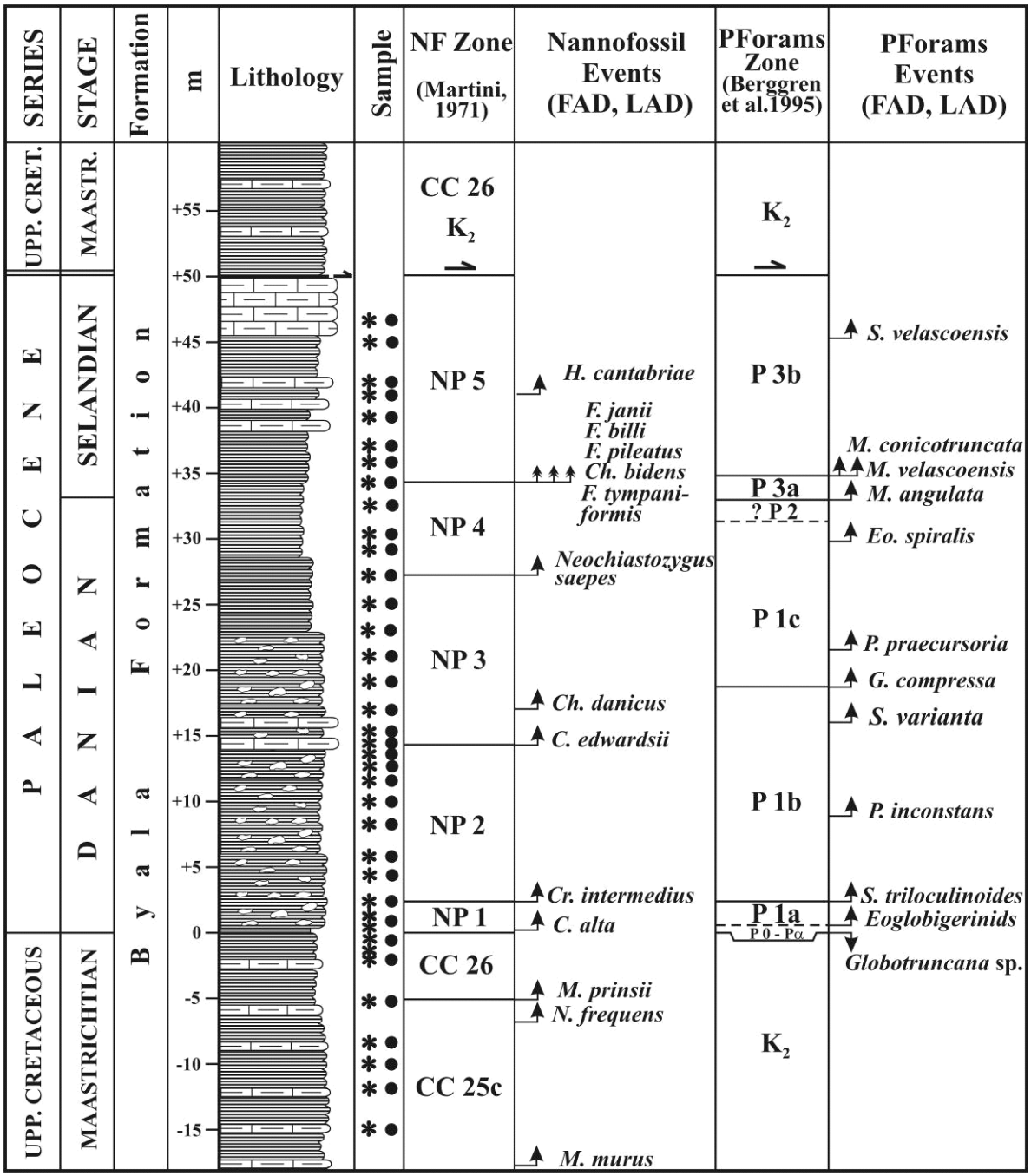

Fig. 2. Biostratigraphic subdivision of the Section Goritsa: calcareous nannofossils and planktonic foraminiferal zones.

References

Adatte, T., Keller, G., Burns, S., Stoykova, K., Ivanov, M., Vangelov, D., Kramar, U., Stьben, D., 2002. Paleoenvironment across the Cretaceous-Tertiary transition in eastern Bulgaria. In: Adatte, T., Koeberl, C., and MacLeod, K.G., (Eds.) Catastrophic Events and Mass Extinctions: Impact and Beyond. Boulder, Colorado, *Geological Society of America Spec. Paper 356*, 231–251.

Martini, E., 1971. Standard Tertiary and Quaternary calcareous nannoplankton zonation. In: Farinacci A. (Ed.) Proceedings 2nd Planktonic Conference, Tecnoscienza, Roma, 1970. Tecnoscienza, Rome**,** 739**–**785.

Ivanov, M., K. Stoykova. 1994. Cretaceous/Tertiary boundary in the area of Bjala, Eastern Bulgaria - biostratigraphical results. *Geologica Balcanica 24,* 6, 3**–**23.

Juranov, S. 1983. Planctonic foramiferal zonation of the Paleocene and the Lower Eocene in part of East Balkan Mountains. *Geologica Balcanica 13*, 2, 59–73.

Preisinger, A., Aslanian, S., Stoykova**,** K., Grass, F., Mauritsch, H., Scholger, R., 1993a. Cretaceous/Tertiary boundaries on the coast of the Black Sea near Bjala (Bulgaria). *Palaeogeogr., Palaeoclimatol., Palaeoecol. 104,* 219-228.

Preisinger, A., Aslanian, S., Stoykova**,** K., Grass, F., Mauritsch, H., Scholger, R., 1993b. Cretaceous/Tertiary boundary sections in the East Balkan area, Bulgaria. *Geologica Balcanica 23,* 5, 3–13.

Rцgl, F., von Salis, K., Preisinger, A., Aslanian, S., Summesberger, H., 1996. Stratigraphy across the Cretaceous/Paleogene boundary near Bjala, Bulgaria. *Bull. Centre Rech. Explor.-Prod. Elf Aquitaine, Mem. 16,* 673-683.

Stoykova, K., Ivanov, M., 1992. An uninterrupted section across the Cretaceous/Tertiary boundary at the town of Bjala, Black Sea coast (Bulgaria). *C. R. Acad. bulg. Sci. 45*, 7, 61–64.

Stoykova, K., M. Ivanov. 2004. Stratigraphy of the Cretaceous/Tertiary transition in Bulgaria. *J. Nannoplankton Res., 26,* 1, 47**–**61.

Джуранов, С. 1989. Данни за геоложкия строеж на Беленска площ. *Год. ВМГИ 30*, 1, 7-18.

Джуранов, С., Антонов, М., Балтаков, Г., Вангелов, Д., Желев, В., Пимпирев, Х., Синьовски, Д.,. Чолеев, И. 1994ф. Доклад за резултатите от изпълнението на геоложка задача: "Геоложко и геоморфоложко картиране в М 1:25000 на част от Източния Балкан между нос Емине и с. Старо Оряхово". Геофонд КГМР, IV.

Стойкова, К., Иванов, М., Костов, Р., Беливанова, В., Цанкарска, Р., Илиева, Т.. 2000. Интегрирани стратиграфски, седиментоложки и минералого-геохимични изследвания на границата Креда/Терциер в България. *Сп. Бълг. геол. д-во 61,* 1-3, 61-75.