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Badenian planktonic foraminifera as climate proxies at the southern margin of the Central Paratethys (Ugljevik, Bosnia and Herzegovina)

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Badenian transgression is well exposed in the open coal pit Bogutovo Selo near Ugljevik in NE Bosnia and Herzegovina, located at the southern margin of the Pannonian Basin. Middle Miocene marine sediments superpose Late Oligocene lignite bearing lacustrine deposits. The studied succession is about 62 m thick and includes the uppermost part of the lake deposits, comprising clays, sands and coal seams, followed by marine sediments. These consist mainly of gray marls, which show some intercalations of thin, dark clay layers, volcanic ash layers and fossiliferous beds as well as carbonate bodies of different thicknesses. The presence of *Orbulina suturalis* allows a biostratigraphic correlation of the marine transgression horizon with the upper part of the Lower Badenian.

28 planktonic foraminiferal assemblages were investigated using quantitative analysis to evaluate the climate development during the initial marine flooding by the Paratethys Sea. Further on the samples were statistically treated to find out if there are significant differences in assemblages from the marine sediments deposited before and after the initial Serravallian cooling event coinciding with the onset of the Middle Badenian (Wielician) Salinity Crisis. 17 planktonic foraminiferal species were grouped by their palaeoclimatic significance into cool (*Globigerina bulloides, G. praebulloides, G. diplostoma, G. concinna, G. tarchanensis, G. falconensis, Turborotalita quinqueloba*), temperate (*Globorotalia bykovae, G. transsylvanica, G. peripheroronda, Globoturborotalita woodi*), warm-temperate (*Globigerinella regularis, Tenuitellinata angustiumbilicata*) and warm indicators (*Globigerinoides trilobus, G. quadrilobatus, Orbulina suturalis, Globoquadrina* cf. *altispira*). The counts were performed mainly on generic level.

Upper Lower Badenian (Upper Lagenidae Zone) is represented in the marly succession in the lower part of the section, where the foraminiferal assemblages indicate warmer conditions with high percentages of warm water indicators. A distinct cooling is shown in the uppermost passage of the lower part, which is followed by a 13 m thick carbonate platform of Wielician age. This transition corresponds to the gradual shift from Greenhouse into Icehouse climate after the late Middle Miocene Climatic Optimum. The superposing marly deposits of the late Wielician age (Earliest Serravallian) contain planktonic foraminiferal assemblages that indicate cooler conditions. The general percentage of cool water indicators is much higher than in the lower Badenian sediments.