Results and Discussion

The aragonite-clayey sediments from all studied sections possess laminated structure. The lamination is well visible, because of a multiple alteration of white and gray to green-gray laminae. The thickness of the laminae varies from a few tenths of a millimeter to 1–2 mm. Among the laminated sediments in the section Florentin were recognized a fine gypsum seam and some coal lenses (Koleva-Rekalova, 1998).

According to XRD data it is evidenced that white laminae are composed of aragonite, and rarely contain clastic components as clay minerals, quartz and plagioclases as well as organic matter. In darker laminae the aragonite content decreases at the expense of the clay minerals and organic matter. The oxide percentages also vary depending on the aragonite amount. Sr content is elevated (in some cases up to 1%) both in Serbian and Bulgarian samples rich in aragonite.

SEM photomicrographs show shape of the needle-like aragonite crystals. The same needle-like aragonite is the main component in the modern aragonite muds widespread in the Great Bahama Bank (Milliman et al., 1993), Persian Gulf, Red Sea, etc.

All data available display that the aragonite-clayey sediments from Eastern Serbia and Northwestern Bulgaria were formed under identical environments, but in different time span – during Chersonian (Sarmatian) for Bulgarian examples (Kojumdgieva, Popov, 1988), and during Maeotian for Serbian section (Petrović, Tančić, 1998). Principally, the aragonite muds can be formed at any time, if appropriate conditions for their inorganic precipitation exist as elevated temperature and salinity, abundance of Sr and Mg, exclusion of clastic components, etc. However, more difficult is their preservation in the geological record.

Due to the fine-laminated character of the aragonite-clayey sediments (resemble varve structure) it can be supposed that sedimentation took place in a seasonal climate. The aragonite was precipitated during summer seasons, when the temperatures were higher, humidity reduced and evaporitic condition existed (in some Bulgarian sections were recognized gypsum crystals and seams). Conversely, during winters humidity increased and clastic components (mainly clay minerals, rarely quartz and plagioclases) were supplied into the basin. Thus, clayey laminae were formed. Most probably the rivers transported plant fragments that later were transformed into coals (coal lenses in the section Florentin). Palynological data testified seasonal climate as well (Ivanov et al., 2002).

As a conclusion, the clay minerals in gray laminae contribute aragonite preservation in the case studied. On the other hand, the lag of bioturbation and stagnant bottom conditions are responsible for conservation of laminated character of the sediments.

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