

Preliminary mineralogical and paleoenvironmental study of the diatomites from Adamclisi, South Dobrogea, Romania

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Diatomite samples taken from the Urluia – Adamclisi localities, South Dobrogea region (Romania) have been studied by X-ray fluorescence, wet-chemical analysis, scanning electron microscopy (SEM), FTIR and X-ray powder diffraction. The diatomaceous earth from Adamclisi occurs as beds and lenses in alternance with bentonitic clays and limestones. The diatomite levels are chalk-like, soft, friable, earthy, very fine-grained, and have a white - yellow color. The mineralogy of all but one sample is characterized by the presence of quartz, amorphous silica, feldspars and clay minerals. Based on the broad hump registered between 15 and 20° 2 theta on XRD patterns and on the characters and intensities of the bands centered around 3350 and 1630 cm⁻¹ in the FTIR spectra, the amorphous silica from the diagenesis-affected diatom frustules was identified as opal-A. The associated mineral species are quartz (up to 5 wt.%), opal-Ct (up to 15 wt%), clay minerals (up to 60 wt.%), and minor feldspar (up to 20 wt.%).

The micro-paleontological study shows that benthic pennate diatoms prevail (more than 60%), with a low rate of species diversity. Large chain-forming centric diatoms also occur together with other microfossils (dinoflagellates, phytolites, sponge spicules, different types of fish teeth) assemblages common for the Sarmatian (middle Miocene) marine deposits of Eastern Paratethys. The diatomaceous formation afforded exceptional fossilization. The diatom assemblages characterize a shallow marine basin environment, with littoral or freshwater contributions. Both at the basis and on the top of the profile, the marine diatoms prevail. At the basis of profile, the marine species (e.g., *Actinocyclus ehrenbergii*, *Amphora crassa*, *Amphora crassa-punctata*, *Caloneis liber*, *Camylodiscus kutzingii*, *Grammatophora stricta*, etc.) form up to 80 % of the rock volume, being associated with marine-brackish species such as *Achnanthes brevipes* and *Cocconeis scutelum* (up to 25 %) and with brackish species such as *Diploneis ovalis* (up to 5 %). On the top, the marine species (up to 70%) also prevail over the marine-brackish and brackish (e.g., *Rhopalodia gibberula*) ones (up to 25 %). On the middle of the profile, a biozona with more brackish species can be identified.

In order to reconstruct past conditions we can identify and measure seasonal variations in climate for the Eastern Paratethys area and evaluate relationships between inferred changes in the aquatic and terrestrial environments. The monotone development of diatom communities was controlled by stable water level (stratified and relatively stagnant water periods) in contrast with blooms periods (with variable salinity) linked to possible upwelling currents provoked by freshwater inputs. Considerable amount of fresh water probably come into the basin as an input carried on by the river streams.