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Stratigraphy and paleoecology of Middle Jurassic dinocyst assemblages from the Dnieper-Donets Basin of central Ukraine

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Dinocysts are an important ecological group due to their abundance and rapid evolution and are widely used in biostratigraphy. In addition, dinocysts are highly sensitive to environmental fluctuations and are an important tool for paleoenvironmental and paleogeographical reconstructions [1, 2, 3]. In this study, sediment samples from three boreholes (wells) cutting through Mid-Jurassic, Bajocian, Bathonian, Callovian successions (c. 170–163 Ma) of central Ukraine in the western region of Dnieper-Donets Basin [4, 5], were analysed palynologically. Over 20 genera of dinocysts were identified and they represent a wide range of forms; planktonic marine, planktonic coastal, benthic coastal, and freshwater specimens.

The taxonomic identification of the dinoflagellate cysts and their vertical distribution enables recognition of six, distinct Middle Jurassic dinoflagellate assemblages. The assemblages are recognized mainly on the basis of first appearance datums (FADs), last appearance datums (LADs) and relative abundance of particular species. The assemblages (in ascending order) are as follows: Assemblage I (upper Bajocian – presence of the dinocysts *Pareodinia* sp., *Pareodinia evitti*, *Gonyaulacysta helicoids*?); Assemblage II (uppermost Bajocian – Zona *Acanthaulax crispa*); Assemblage III (lower, middle Bathonian – succession hosting the dinocysts *Pareodinia* sp., *Gonyaulacysta* sp., *Ctenidodinium* spp., *Ctenidodinium combazii*, *Ctenidodinium sellwoodi*, *Nannoceratopsis pellucida*, *Nannoceratopsis ceratophora*, *Cleistosphaeridium* sp. – Zona *Ctenidodinium combazii*–*Ctenidodinium sellwoodii*); Assemblage IV (middle, upper Bathonian and lowermost Callovian – layers with the dinocysts *Pareodinia* spp., *Ctenidodinium* spp.); Assemblage V (the uppermost lower- and middle Callovian – *Ctenidodinium* spp., *Ctenidodinium ornatum*, *Ctenidodinium continuum*, *Xiphosperidium* sp., *Aldorfia* sp., *Apteodinium* sp., *Cassiculosphaeridia* sp., *Leberidocysta* sp., *Cordosphaeridium* sp., *Pareodinia* spp., *Pareodinia prolongata*, *Cleistosphaeridium* sp., *Chlamydophorella* sp., *Hystrichosphaeridium* sp., *Coronifera oceanica* – Zona *Ctenidodinium ornatum*–*Ctenidodinium continuum*); Assemblage VI (upper Callovian – strata with the dinocysts *Ctenidodinium* spp., *Ctenidodinium ornatum*, *Batiacasphaera* sp., *Chlamydophorella* sp., *Cleistosphaeridium* sp., *Sentusidinium* sp., *Epiplosphaera* sp., *Atopodinium* sp., *Occisucysta* sp., *Leptodinium* sp., *Cribroperidinium granulatum*, *Dapcodinium?* sp., *Nannoceratopsis?* sp.). These assemblages facilitate intra- and interbasinal correlations and are applicable to dating of the Middle Jurassic strata in the coastal basins of Ukraine and correlation of such strata with coeval strata elsewhere.

During the Bajocian the north-western part of Dnieper-Donets basin was land (sand, sandstone) and the south-western part was sea (brown carbonaceous clays with rare dinocysts, in the upper part - diverse-grained quartz sand). During the Bathonian a transgression led to marine sedimentation in these territories. Among the described fossils there are the marine micro-phytoplankton *Pareodinia*, *Nannoceratopsis* etc. Dinocysts *Gonyaulax* indicate coastal areas of the basin. Finally, during the Callovian, the slow subsidence of the seabed occurred, connected to the Dnieper-Donets basin deflection. The presence of Callovian sand and clay successions indicates the continuation of the Bathonian sea regime. It should be noted that the sea shallowed, according to the presence of sand beds within the Callovian clay. The development of acritarchs (*Micrhystridium*) and prasinophytes (*Pterospermella*) is an indicator low salinity and sedimentation within the shelf zone of the basin. The lithological features, and the composition of the dinocyst assemblages indicate coastal and shallow water deposition for the Callovian.

References:

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