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**PETROLOGY OF UPPER JURASSIC AND EARLY CRETACEOUS
DEPOSITS
IN THE UNIEJÓW TROUGH, POLISH LOWLANDS**

Upper Jurassic and Early Cretaceous deposits have been explored by boreholes drilled by the Polish Geological Institute and Polish Oil and Gas Company. A composite profile represents the entire Upper Jurassic and Lower Cretaceous succession (K. Radlicz, 1997, K. Leszczyński, 2002).

An epicontinental marine basin existed in the Polish Lowlands during the Upper Jurassic. This sedimentary basin was successively shrinking to become more freshwater at the end of the Jurassic. In the Berriasian, the Early Cretaceous transgression inundated this area, which ended the deposition of thick sandstone series.

Upper Jurassic deposits of the Uniejów Trough show much thicknesses, locally exceeding 800 m. They are composed of dominant carbonate facies, mainly limestones, represented by mudstones, wackstones, packstones, floatstones, rudstones and boundstones. Siltstones and claystones are less frequent. Mudstones, in particular Oxfordian ones, are composed of micrite, occasionally of microsparite. They contain a small amount of fragments of foraminifers, ostracods, algae, sponges, fish, plants and other organisms, as well as pyrite (also framboidal), quartz, glauconite and muscovite. Kimmeridgian mudstones have been dolomitized to a various extent. Volgian mudstones locally contain anhydrite and fluorite crystals.

In wackstones are distinguished of sponge, bryozoan, belemnite, echinoderm bioclasts and stomiosphaeres. Volgian wackstones occasionally contain about 60% of gastropods. Some of bioclasts are silicified or pyritized. Micrite or microsparite cement is locally ferruginous and clayey. Occasionally it contains dolomite rhombohedrons and concentrations of late diagenetic carbonate cements. These rocks also contain stylolites.

Packstones are represented largely by oncolitic-bioclastic rocks, locally dolomitic with partly silicified sponge fragments and numerous foraminifers, brachiopods, gastropods, bivalves, ostracods, echinoids and other faunal representatives. These rocks also contain algae, peloids, ooids, intraclasts, quartz and glauconite, and they were encountered mainly in the Oxfordian section.

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Limestones locally show signs of diagenetic processes such as recrystallization, dissolution and cementation.

Floatstones and oncolitic-intraclastic rudstones encountered in the Oxfordian section are partly dolomitized and characterized by the occurrence of micrite and biomicrite intraclasts, as well as bioclasts of gastropods, foraminifers, bryozoans and crinoids. Sponge floatstones contain numerous fragments of sponges, their spiculae, and bioclasts of bivalves, brachiopods, foraminifers, echinoderms and algae.

Laminated pelmicrite boundstones with fragments of silicified sponges and foraminifers, brachiopods and gastropods are sporadically represented in the Oxfordian section.

The investigated deposits contain a small amount of dolomites. More common are dolomitic limestones in particular in the Kimmeridgian section. These rocks locally show effects of calcitization. Dolomudstones with anhydrite concentrations are also occasionally present.

Siliciclastic sediments are represented mainly by siltstones and claystones. Siltstones are mostly calcareous, composed of clay-ferruginous matrix, carbonate cement and subrounded and poorly sorted quartz grains, micas (mainly muscovite), bioclasts, with concentrations of pyrite (often framboidal) and glauconite. Claystones are clay-carbonate-ferruginous rocks containing quartz, carbonate, peloid and hematite clasts as well as phosphatic and carbonate bioclasts.

Early Cretaceous deposits are characterized by smaller thicknesses than Jurassic rocks, ranging from 100 to 370 m (S. Marek, 1977). This succession begins with carbonate-marly sediments, followed by siliciclastic rocks. Ferruginous deposits are also locally observed.

Berriasian limestones are represented by mudstones, wackestones and locally organodetrital grainstones and rudstones. Faunal remains are accompanied by peloids, intraclasts and in places more abundant silt- and sand-size grains of quartz. These deposits are cemented by carbonates or clay minerals.

Early Cretaceous siliciclastic sediments were dominated by siltstones, claystones, sandstones. These deposits interbed with one another, and they commonly occur as heteroliths. Conglomerates were sporadically noted.

Siltstones occur in a clayly, sandy, marly varieties, that contain detrital materials. Grains include quartz, lithoclasts, micas, glauconite, biotrite, and carbonaceous pelite. Claystones are locally enriched in coalified plant fragments and iron oxides and hydroxides. These rocks also contain detrital grains and faunal remains.

Sandstones are represented by wackes and arenites. Berriasian-Hauterivian deposits are dominated by fine-grained and very fine-grained quartz wackes, occasionally with admixture of goethite ooids, ferruginous clasts, carbonate rocks clasts and faunal fragments. The wackes are cemented mainly with organic matter-impregnated clay minerals, quartz and carbonates. Periodically occur quartz-glauconite wackes. Arenites are composed of quartz grains and cemented with quartz overgrowths and carbonates, as well as chlorite and kaolinite (M. Połńska,

1999). Post-Hauterivian deposits are dominated by porous quartz arenites showing various degrees of grain sorting and poor cementation.

Sandstones characterising varied mineral composition are observed rare. Subarkosic varieties contain potassium feldspar grains (orthoclase, microcline) and plagioclases. Sublithic sandstones are composed of fragments of quartzites and quartzite schists, as well as single pebbles of ferruginous sandstones and siltstones. The wackes occasionally contain abundant micas and chlorites.

Sublithic conglomerates are enriched in fragments of ferruginous rocks. The Barremian-Albian section contains lithic conglomerates. Psephitic grains include quartzites, cataclasites, quartzite schists and quartz, and they are cemented with vari-grained quartz wacke matrix.

Ferruginous deposits are represented by iron oolites and siderites. Oolitic rocks contain chamosite and limonite ooids, rarely pisoids, and detrital material cemented by clay minerals and chlorites. Siderites are composed of fine-crystalline or microcrystalline iron carbonate in which quartz grains concentrations, siderite and goethite ooids, fragments of ferruginous rocks and organic detritus are observed (M. Połowska, 2001).

The diverse petrographical composition of the investigated deposits is a result of both unstable depositional conditions in varied sedimentary environments, and diagenetic alterations.

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