

The Early Devonian is a special moment in the evolution of the biosphere. Fundamental changes that would permanently affect the functioning of the biosphere occurred at this time. It was the moment when land plants began to dominate on a massive scale on lands (e.g. Taylor et al., 2009). Data extracted from the scattered, fragmentary preserved organics are also a valuable source of information on this topic. These are dealt with by palynology, the study of the microscopic organic remains (e.g. Wellman and Ball., 2021). The results of these studies can be used in various aspects, e.g., for palynostratigraphy, palaeoenvironmental characterisation, evolutionism or palaeotemperature determination.

The planned research will be carried out on samples from 6 archival drill cores (Korczmin IG-1, Krowie Bagno IG-1, Łopiennik IG-1, Maciejowice IG-1, Terebin IG-4 and Terebin IG-5), located in the area of one geological unit, the Lublin Basin. Early Devonian sediments are developed here in clastic facies of coastal or alluvial character (Narkiewicz, 2011). Such formations are very difficult for biostratigraphy due to the poverty of marine fauna. In contrast, in such conditions, palynostratigraphy that uses the terrestrial and aquatic palynomorphs is very effective for age establishment. Moreover, the coastal sediments and alluvial sediments are rich in taxonomically diverse organic remains. The organic residuum composition, the frequency relation between particular palynomorph groups, or the state of preservation allow for a description of the environment of deposition of these sediments. The quality and composition of the organic matter will show the dominant groups of organisms that made up the ecosystem at the time.

Palynofacies studies will also support the identification of the global Daleje event (House, 1985; Tonarová et al., 2017) in the area of Poland. The palynological record of this eustatic event in Poland has never been confirmed. With the increased resolution of palynological analyses (e.g. Korczmin IG-1 and Cow Swamp IG-1), signals related to this event can be expected.

Up for now, the palynological analyses of Lower Devonian formations from the Lublin Basin have focused only on the dating of these sediments. They were carried out on a small scale (e.g. Turnau et al., 2005; Turanu, 2011). Conducting comprehensive palynological studies will significantly contribute to a complete knowledge of the geological structure of the Lublin Basin and the recognition of a section of the biosphere from this area.

**The scientific goals of the planned research are:**

- 1. to establish the biostratigraphy of the Lower Devonian based on the recognition of microfloral levels**
- 2. description of paleoenvironmental conditions based on palynofacies analysis**
- 3. recognition and description of all organic matter components**
- 4. an attempt to recognise the global Daleje Event associated with the Early Devonian transgression.**

Thanks to the similar comprehend palynological analyses, it was possible to analogously develop Lower Devonian sediments in the Świętokrzyskie Mountains and the Malopolska Block in order to meticulously determine the age, paleoenvironmental conditions of these sediments and to characterize the components of organic matter (Filipiak, 2011; Filipiak, Zatoń, 2011; Filipiak et al., 2021, 2022).

The already conducted recognition of the preservation status of most of the selected cores and the historical residual palynological data (e.g. Turnau, 2011; Kruszyna, 2018) are promising for the expected results.