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BENTONITES OF LOWER CARBONIFEROUS FROM BARDO MTS. UNIT (WESTERN SUDETES) – PRELIMINARY DATA

INTRODUCTION

The first time identified bentonite layers from the Upper Viséan Paprotnia series exposed in the western part of the Bardo Mts. unit are presented. Reconstruction of primary stratigraphical succession of different Lower Carboniferous lithofacies occuring in the Bardo unit is still difficult because of its complicated tectonic framework (Oberc 1972). It seems that the detailed correlation of bentonites within the region is possible. Because the bentonite layers were deposited in a geologic instant and represent nearly isochronous horizons they are useful in precise intra- and interbasins stratigraphic correlations. They are also can serve a diverse geological information.

GEOLOGICAL SETTING

The Góry Bardzkie Mts. form a separate structural unit within the Western Sudetes (Fig. 1A). This complex structure consist sedimentary and part slightly metamorphosed rocks from Late Ordovician to earliest Late Carboniferous. The lithological column does not represent any single nor continuous stratigraphic sequence. According to Wajsprych (1995) two main successions can be distinguished within the Upper Ordovician - Lower Carboniferous rocks:

- allochthonous, completely exotic succesion assigned to the Upper Ordovician-Devonian composed of no less than three different flysches,

- autochthonous (parautochthonous) Famennian - Lower Carboniferous succesion in general composed of carbonates and several facially differentiated series. The upper part of this succession is represented by flysch and wildflysch with olistoliths of Ordovician to Devonian rocks.

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The identified bentonite layers occur within the Upper Viséan Paprotnia series. This series is regarding as a temporalelly equivalent of the *crenistria* Limestone (Wajsprych 1995), which is widespread in the Kulm facies of Variscan Europe. It is composed of claystone and mudstone shales, greywackes and subordinately of carbonates deposited in offshore to onshore environments (Haydukiewicz and Muszer 2002).

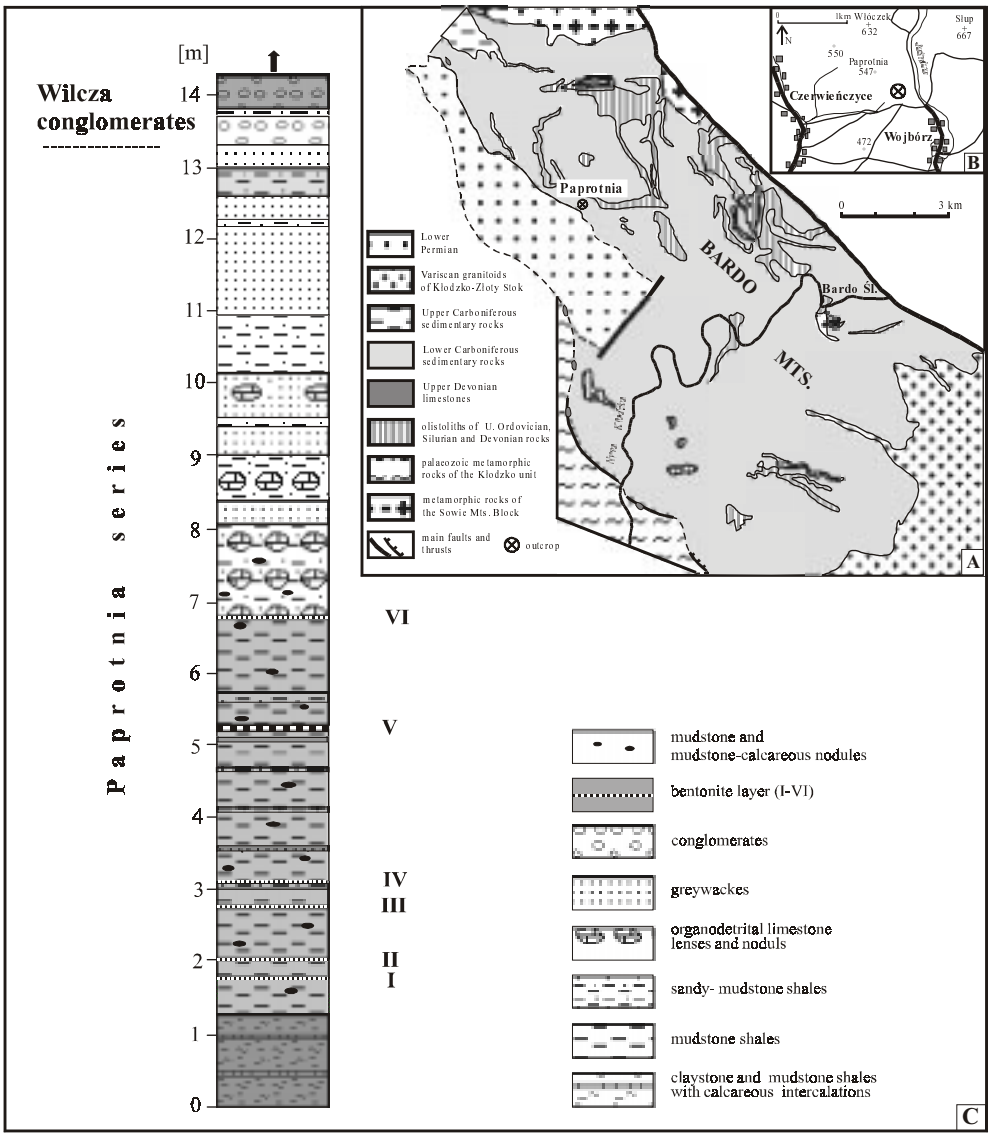

Fig. 1. A – geological map of the Bardo Mts. unit. B - location of the studied outcrop. C - the lithology and succession of bentonite layers (I-VI) in the Paprotnia section.

The studied section of the Paprotnia series is situated of the eastern end of Czerwieńczyce village (Fig. 1B). The light yellow and grey-brown bentonite layers occur only in the lower part of the section represented dominantly by mudstone and claystone shales (Fig.1C). These layers (I-VI) are from 2 cm to 10 cm thick.

METHODS AND RESULTS

The samples were taken from each bentonite layer of the Paprotnia section and studied using the x-ray diffraction (SIEMENS 5005) and Derivatograph 1500Q for thermal analysis. The XRD measurements are presented in figure 2.

In all samples kaolinite and I-S mixed-layer were presented. In four bentonite layers (II-V) smectite was recognized. The thermal analyses indicated that kaolinite and smectite packets occur in similar proportions in all samples.

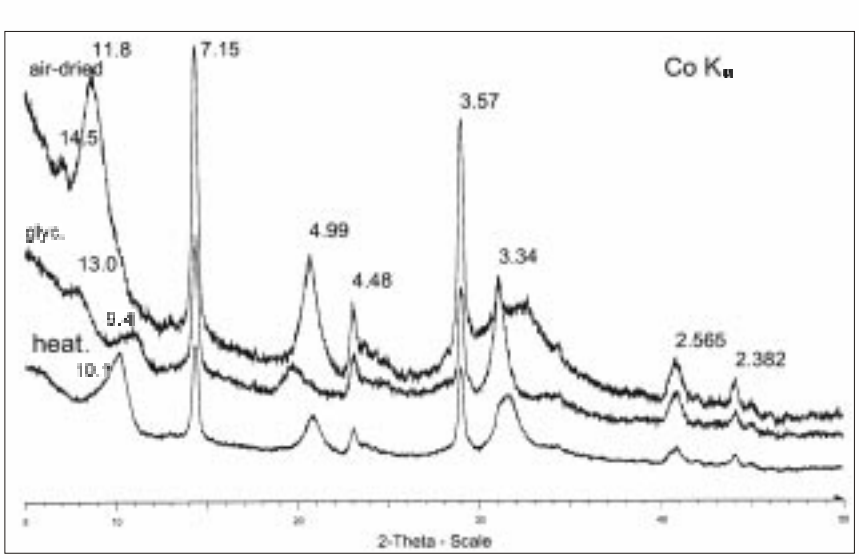

Fig.2. XRD patterns of selected sample of bentonite from the Paprotnia section.

Calcite dispersed in bentonite is present in substantial quantities (up to 8%). The fibrous calcite crystals in some cases form thin (up to 0,4 cm thick) laminae covering the upper surface of the bentonite layers. Although the chemical composition of the volcanic ash has been altered during the formation of bentonites the elongated idiomorphic zircon crystals have been identified.

The bentonite from the Paprotnia section contain similar clay minerals as the obtained from the Lower Palaeozoic bentonites (e.g. Środoń and Clauer 2001).

Their mineral character may indicate the intermediate type of volcanic magma. It seems that their volcanic source could occur in Intra-Sudetic depression where the presence of Lower Carboniferous andesites and rhyodacites are known (see Awdankiewicz 1999).

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