

## **Is the Leszczyniec Unit a vestige of lower Paleozoic oceanic crust in the West Sudetes?**

The Variscan Belt of Europe extends from Cornwall to south-western Poland joining countries with different history and culture. For this reason, geological research on the Variscides is a favourable theme for international collaboration and makes it possible to bring a Polish contribution to the general knowledge about the natural environment of Europe. The Variscan basement was consolidated c. 350 Ma ago shortly, in geological terms, before the beginning of the “coal-bearing” period of Earth’s history. During this time, several small fragments of continental crust so called ‘terrane’ collided and merged with one another in a process similar to that which today is observed in Southeast Asia. The final effect of these developments was the rise of the great continent, Pangea, and the mountain chain of the Variscides the foreland of which was the site where the Carboniferous forests grew.

There are so called ‘tectonic sutures’ preserved until present between the former terranes that may contain vestiges of oceans separating them in the geological past, which subsequently disappeared in the once active subduction zones. The sutures also comprise rocks from the adjacent terranes that have been strongly deformed and metamorphosed in the process of continental collision. Fragments of such sutures are also present in the Sudetes, although their existence was not recognised until recently. Therefore, the history and structure of the Sudetic tectonic sutures still requires further research to better correlate the area of south-western Poland with the rest of Variscan Europe.

The subject of this project is the Leszczyniec Unit in the East Karkonosze, forming the uppermost part of the tectonic suture between two Variscan terranes: Saxothuringian in the west and Teplá-Barrandian in the east. The goal of the project is find out whether the Leszczyniec Unit is a vestige of the ocean separating the two aforementioned terranes or a fragment of a magmatic complex emplaced during rifting prior to the opening of the ocean. In both cases, the resulting outcome will have an innovative character. If the Leszczyniec Unit corresponds to a preserved fragment of oceanic crust it would mean that the oceans between Variscan terranes began to form about 30 million years earlier (in the late Cambrian) than previously thought. If the Leszczyniec Unit is part of the lower crust underplated to the Teplá-Barrandian Terrane in the course of rifting it would be the first such a complex identified in the Polish Sudetes. Although the presence of Teplá-Barrandian basement was hypothetically assumed underneath the nearby Intra-Sudetic Basin, but there was no evidence to support this thesis.

The project is planned to comprise both fieldwork - sampling, measurements of tectonic structures and documenting exposures - as well as advanced laboratory analysis. The latter will include microscopic examination of rocks and minerals, chemical analysis, quantitative modelling of the pressure and temperature conditions of metamorphism and dating the age of magmatic protolith and its subsequent metamorphism. All these studies will be carried out by means of specialized equipment available in Polish and foreign laboratories including optical microscopes and electron and ion micro-probes to determine the chemical composition of rocks and minerals as well as the proportions between the different isotopes of selected elements.

The results of the project will contribute to the widening of general knowledge about the history and evolution of the Variscan basement in south-western Poland. They will also have social and economic aspects – they will contribute to popularization of the region, geotourism and potential future prospection of base and precious metals.