

# GEOLOGICAL HISTORY OF VOLCANIC ACTIVITY IN THE TERRITORY OF POLAND

## Summary

Volcanoes and the potentially devastating effects of their eruption have not occurred in historical times in Poland, since the country is located in the middle of the stable Eurasian plate. However, various indications of ancient volcanism are found within each of the main geological regions of Poland: in the north-eastern region, connected with the Precambrian East European Craton, in the south-western area related to the Variscan units of the Sudetes, and in the southernmost part related to the Western Carpathians. Volcanism reflected various episodes of increased tectonic activity and plate tectonic processes during the last two billion years. The oldest evidence of volcanism is found in the Podlasie and Mazowsze regions, where buried and metamorphosed lavas erupted from Paleoproterozoic (1.84-1.80 Ga) volcanoes related to an ancient volcanic arc and subduction zone have been documented by drilling to a depth of about 1 km. The next event took place at the end of the Precambrian at 0.552 Ga. At that time, large volume flood basalts and pyroclastic rocks were extruded in an extensive system of rift basins related to the opening of the eastern part of the Iapetus Ocean. These volcanic formations extend from eastern Poland through Volhyn at the Ukrainian territory, to the present day Moldova and Belarus and represent the lowermost, flat-lying and unmetamorphosed sedimentary cover of the crystalline basement. Evidence of younger volcanism is found in rocks of south-western Poland,

in particular in the Sudetes. Old Palaeozoic volcanism was related to the development of continental rift zones and, later, oceanic basins. The record of these processes is provided by, for example, basaltic pillow lavas of the Kaczawa Mts. and Foreland and by the Sudetic ophiolites, including the Ślęza Ophiolite. Near the end of the Palaeozoic, the final stages of the Variscan orogeny and the collision of the Laurasia and Gondwana palaeocontinents included widespread volcanism at ca. 300 Ma. Abundant relics of relatively small volcanoes composed of lavas and tuffs of rhyolitic and trachyandesitic composition occur in Carboniferous and Permian successions near Świerzawa, Wałbrzych and Nowa Ruda. The youngest, Cenozoic volcanism can be linked to the development of small, continental intraplate rift zones in the northwestern foreland of the Alps. In Lower Silesia, e.g. near Złotoryja, several volcanic fields with basaltic lavas and cones developed at that time, between 31 and 4 Ma. Andesites of the Pieniny range in southern Poland are of similar age, although genetically different and related to post-orogenic processes in the Western Carpathians. Volcanic eruptions in close proximity to Poland are unlikely in the near future. However, the recent eruption of the Eyjafjallajökull volcano in Iceland in 2010 shows that even relatively small eruptions in more distant areas may seriously affect the modern economy and everyday life in Poland.