

VOLCANOLOGICAL RECONSTRUCTION OF THE POLYCYCLIC LAUSCHE VOLCANO IN THE LAUSITZ VOLCANIC FIELD (GERMANY / CZECH REPUBLIC)

E. Wenger, J. Büchner, O. Tietz

Senckenberg Museum of Natural History Görlitz; Am Museum 1; 02826 Görlitz; Germany;
olaf.tietz@senckenberg.de

The Tertiary Lausitz Volcanic Field covers a transboundary area encompassing parts of Eastern Saxony (Germany), Lower Silesia (Poland) and Northern Bohemia (Czech Republic). Volcanism in this region culminated in the Lower Oligocene (32–29 Ma). A petrographic bimodality of the lavas within the Lausitz Volcanic Field is revealed by the appearance of “primitive” basaltoids (nephelinites, basanites, tephrites) as well as slightly younger and geochemically more differentiated volcanics (trachytes, phonolites). The majority of the volcanoes in this area are monogenetic with a rather simple eruptive evolution.

In contrast, the highest volcano, Lausche Hill (Fig. 1), reflects a substantially more complex development. Bedrock outcrops are very limited at this mountain and its geological subsurface is covered by dense vegetation, soil and often mantled by debris. To cope with this unfavourable field situation, the following complementing mapping methods were used: (1) The distribution of loose bedrock fragments was recorded with GPS. (2) A few exploratory excavations were dug and several hand drillings up to 2 m depth were also performed. (3) Data on rock internal structures were collected by flow fabric measurements at outcropping cliffs. (4) Clear morphological features related to geological boundaries were evaluated applying DEM analyses. (5) Previously determined $^{40}\text{Ar}/^{39}\text{Ar}$ ages provided temporal information on the volcano’s evolution.

The final gathering of the individually ascertained data enabled not only to create a precise geological map of the Lausche Hill, but also to reconstruct its volcanological history. The volcanic edifice consists of two monogenetic volcanoes of different ages which erupted at the same place: A basaltic scoria cone sitting on its initial maar-diatreme volcano was filled by a tephritic lava lake with a lava flow (30.75 ± 0.56 Ma), which overflow the geological framework of Cretaceous sandstones. After a distinct time gap, a phonolithic lava dome extruded (29.05 ± 0.12 Ma). This was accompanied by explosive activity with a collapse breccia and a late-stage magma supply when phonotephrite dykes penetrated the lava dome. According to this evolution, the Lausche Volcano can be defined as small-volume polycyclic volcano.

The study shows that prolonged field mapping in difficult terrain can lead to convincing and valid re-

sults, if additional methods are involved and the scientific problem is investigated patiently. Beside the briefly sketched volcanological results, the mapping provides also results for the neotectonic evolution since the volcanic time. The low erosion amounts of the volcanic edifice allow to postulate a very young (neotectonic) uplift event for the Lausche Volcano and the Lausitz Mountains with a culmination by 320 ka (for more details see [1]).



Fig. 1: Lausche Hill (792.6 m a.s.l.) seen from Dolní Světlá/Czech Republic (view to northwest).

References: [1] Wenger E. et al. (2017) *Geomorphology* **147**, 193-210