

Volcanic and geochemical evolution of the Carboniferous Teplice Rhyolite, Central-European Variscides (Germany and Czech Republic)

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The Altenberg-Teplice Volcanic Complex (ATVC; ~325 Ma) represents one of the earliest magmatic centers of the Late- to Post-tectonic period of the Variscan orogeny in Central Europe. The ca. 35×18 km ATVC is located in the Erzgebirge/Krušné hory (Germany/Czech Republic) and hosts two principal extrusive units: (1) an initial volcanosedimentary succession preserved in the Schönfeld-Altenberg Depression Complex (Walther et al., in press) and (2) a thick volcanic pile produced during the peak eruptive stage, known as the Teplice Rhyolite (TR). The TR represents mainly a caldera-fill sequence (Benek, 1991), whose volcanic and geochemical evolution has not been fully defined. Seven petrotypes have been mapped in the TR on the Czech side (Jiránek et al., 1987). To the north, on German territory, Lobin (1986) distinguished eight petrotypes. The TR is dominated by thick sheets of welded and non-welded crystal clast-rich (< 45 %) ignimbrites, which are intercalated with rhyolitic lava-dome complexes. The ATVC has been intruded by late high-volume granite porphyritic melts and several plutons associated, in parts, with Sn-, Li mineralization.

Two important drillings expose over 600 m of TR volcanics. Samples from (1) the Mi-4 borehole (Mikulov, Czech Republic) have been geochemically evaluated and a vertical reverse chemical zoning (Zr, Rb) was identified and interpreted in terms of a continuous eruption (Breiter et al., 2001). In (2) the well 2112-87 near Schmiedeberg in Germany, ignimbrites are separated by two rhyolitic, lithophysae-bearing lava units, suggesting a multistage caldera evolution. In the South of the ATVC out- and subcrops reveal a caldera outflow facies. In Czech Republic, ignimbrites prevail with a single belt of late-stage rhyolitic lavas on the eastern margin. We present sixty new whole-rock and mineral chemical data (biotite) to define the geochemical evolution, the composition and the chemical character of the TR rocks. Currently, Nd-Sr isotopes are being measured on whole-rock samples; U/Pb dating and chemical composition of TR zircons are planned. In this binational project, for the first time detailed facies and geochemical analyses are being combined in order to reconstruct the volcanic evolution and magma genesis of the ATVC.

References

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