

**The Early Permian intra-plate
Wurzen caldera (Saxony, Germany):
Tracking the magmatic evolution of
a ‘monotonous intermediate’ by
ferromagnesian silicates**

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The ca. 289 Ma old Wurzen Volcanic System (WVS) covers an area of around 2111 km² in the east of Leipzig (Germany) and it contains large volume, crystal-rich, intracaldera ‘*monotonous intermediate*’ ignimbrites. The well-preserved primary mineralogy is outstanding for the Late Paleozoic volcanic centers in Central Europe and provides unique insights for investigation, from the early cumulates to the late magmatic stages and for the eruption of an ancient volcanic complex.

It is suggested that early ferromagnesian silicates (e.g. diopsidic clinopyroxene) grew from alkaline melts, while late-stage ferromagnesian silicates (e.g. augitic clinopyroxene and biotite) formed in tholeiitic and calc-alkaline melts influenced by crustal contamination. In general, a gain in minor elements like manganese has been observed in the evolution from the early cumulates to the late magmatic stages. This can be interpreted as crustal contamination during magmatic differentiation. Thermometry and barometry suggest depths from 39 km to 21 km for a deep-seated magma reservoir, which fed the shallow parts of the magma system. Fluctuating supply of underplating basaltic melt contributes to the heterogeneity of the ‘*monotonous intermediate*’.

On the base of pigeonite, augite and feldspar thermobarometers, we postulate a multi-temperature eruption in the WVS with ca. 800°C for hydrous and 1010°C for anhydrous magma batches contemporaneously tapped during fissure eruption.