
The lower continental crust across Variscan domains: insights from xenoliths retrieved in Cenozoic volcanoes of Western and Central Germany

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Résumé

Due to its inaccessibility to direct sampling, our knowledge on the present-day lower continental crust remains fragmented. It is thought to be mainly formed or reworked from preexisting lithologies during orogenic phases *s.l.*. Yet, lower crustal rocks and units exposed in orogenic domains are frequently at odds with rocks retrieved in subsequently exhumed continental crust or as xenoliths in more recent volcanic systems: they diverge by their nature, composition, metamorphic history and age.

Here, we focus on the lower continental crust across the former Variscan orogen, encompassing the internal Moldanubian, the Saxothuringian, and the external Rhenohercynian domains. High-grade rocks sampled by Cenozoic volcanoes and sourced from the lower continental crust are never strict equivalents to the mostly felsic granulitic massifs documented in the Moldanubian domain. We exemplify this relation with a review and new results obtained on xenoliths collected in the several Cenozoic volcanoes from Germany.

In general, lower crustal xenoliths are exceptionally well preserved and suffered from very minor interaction/contamination with the host magmatic rocks. The Bad Urach volcanic field (VF, over the Moldanubian zone), shows mostly metasedimentary granulite made of Crd-Sil-Grt±Bt indicative of a LP-HT metamorphism that can be correlated with the syn-orogenic variscan HT metamorphism. By contrast, the other examples are systematically characterized by mafic granulites made of Grt-Cpx-Opx-Pl±Hbl for the Eifel VF (over the Saxothuringian zone), and Cpx-Opx-Pl±Hbl for the Northern Hessian Depression VF (over the Rhenohercynian zone) and the Heldburg VF. We will present new bulk rock and mineral compositions as well as P-T estimates that, together with newly acquired U-Pb ages on zircon help to refine the origin and history of the construction of the Western European lower crust.

Mots-Clés: Xenoliths, Lower crust, Variscan orogen, Granulite

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