

The chronology of the Upper Pleistocene Volcanic Groups of Bad Bertrich and Wartgesberg (Eifel, FRG) – new attempts using luminescence dating

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The volcanic groups of Bad Bertrich and Wartgesberg are situated in the most southeastern part of the Quaternary West Eifel Volcanic Field (WEVF) and are, therefore, of major interest for understanding origin and timing of the WEVF. For geomorphological reasons the eruptions were placed within the last Glacial. Recent Ar/Ar-dating results suggest ages of 32 ± 11 ka and 31 ± 11 ka, respectively (MERTZ ET AL. 2015).

We used xenoliths from Lower Devonian country rock (slates and quarzitic slates) and a maar tephra to explore the feasibility of thermoluminescence (TL) to date the eruptions more accurately. Fine-grained (4-30 μ m) quartz was extracted from the samples by grinding and etching in H₂SiF₆. Because of their high saturation dose the red (620 nm) TL-emissions from quartz was measured using a SAR protocol. Dose-rates were computed based on analytical results from thick source alpha counting (U, Th), ICP-OES (K) and high resolution gamma spectrometry.

For the Wartgesberg volcanic group our preliminary results agree with the independent Ar/Ar-ages but can bracket the eruption age to 33 ± 3 ka. Furthermore, the suggestion by RICHTER ET AL. (2015) to avoid quartz extracted from crustal xenoliths having been heated too high is confirmed. For the Bad Bertrich volcanic group our preliminary results are ambiguous. The “Hardtmaar”-Tephra is dated to 27 ± 3 ka in agreement with the age of this group supposed by MERZ ET AL. (2015). Three xenoliths from the nearby “Facher Höhe” scoria cone, however, yielded consistent but significantly lower TL ages. From the view of volcanic stratigraphy there is so far no evidence of a significantly younger eruption phase. From one of these samples we so far found evidence of non-thermal fading as described by RICHTER ET AL. (2015) which needs further investigation.

Stimulated by results of PREUSSER ET AL. (2011) we aim at applying also OSL and IRSL dating of the xenoliths and the maar tephra to clarify the age of the “Facher Höhe” scoria and, thus, the probability of a two-phase Upper Pleistocene volcanic activity in the small Bad Bertrich volcanic area. This question may be of some relevance for the reasons of the Quaternary WEVF.

References

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