Extending the area of investigation of fine versus coarse quartz optical ages from the Lower Danube to the Carpathian Basin

Despite the general satisfactory performance of quartz in the single aliquot regeneration protocol (SAR), previous optically stimulated luminescence (OSL) dating studies of key loess sections in Romania, Lower Danube region, revealed a disturbing disagreement among the ages obtained on fine (4e11 mm) grains and coarse (63e90 mm) grains respectively. The current study aims at expanding these investigations, both by extending the area of study from the Lower Danube Basin to the Carpathian Basin and by applying time-resolved optically stimulated luminescence (TR-OSL) on quartz, in order to gain further insights into the above mentioned behaviour. The samples from the Orlovat loess paleosol section (Vojvodina, Serbia) showed a similar behaviour to that previously reported on Romanian loess. A marked difference between the dose saturation characteristics of fine and coarse quartz OSL signals is observed for both continuous wave (CW-OSL) and pulsed OSL (POSL), where the dose response (up to 1000 Gy) is well described by a sum of two saturating exponential functions. TR-OSL measurements show one single, characteristic quartz lifetime for both natural as well as regenerative signals in the entire dose range investigated. A general disagreement between the ages obtained on the two grain sizes for samples with equivalent doses higher than about 100 Gy is reported as in the case of Romanian loess, inferring that the age discrepancy between the two grain sizes might be more widespread than previously thought.

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