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Erratum: Thesis Abstracts

Erratum: In the last issue we published an incorrect abstract for Sebastian Kreutzer's dissertation. The correct abstract is:

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Luminescence based chronologies on Late Pleistocene loess-palaeosol sequences: An applied-methodological study on quartz separates

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Understanding morphological processes that sculpt former terrestrial landscapes is one of the driving rationales in Quaternary research. Loess records have been found to be valuable archives for reconstructing palaeoenvironmental conditions. However, once identified, characterised and classified by fieldwork, the stratigraphic significance of such records has to be revealed by numerical dating. Luminescence dating, especially optically stimulated luminescence (OSL), is the leading dating approach for establishing chronologies on loess archives. Furthermore, the development of luminescence dating techniques on sediments is closely connected with the history of loess research and vice versa. As part of the European loess belt the Saxonian Loess Region is located in a transition zone between oceanic dominated western and continental dominated eastern climates. The Saxonian Loess Region comprises up to 20 m thick Weichselian loess accumulations, with intercalated palaeosols. For the first time, during the work on this thesis, high-resolution numerical chronologies were established in the Saxonian Loess Region on five loess sections using OSL dating on quartz separates. The dating was employed as a comparison of three quartz grain size fractions commonly used for luminescence dating: (1) coarse (90–200 μm), (2) middle (38–63 μm) and (3) fine grain (4–11 μm). As a survey on four loess sections, three from Germany (Saxony and Saxony-Anhalt) and one from the Czech Republic, these studies investigate the question whether the use of different grain size fractions from one sample yield consistent luminescence characteristics and age results. In summary seven studies are presented along with an extended summary. Four studies present numerical chronologies using OSL dating techniques on different grain size and (mineral) fractions. Two studies deal with technical issues that arose during the dating applications. Firstly, an **R** package for luminescence dating data analysis ('Luminescence') was developed and secondly, the cross-bleaching behaviour of IR-LEDs of Risø luminescence readers were quantified. One study treats the question whether the common practice of using an identical alpha-efficiency (a-value) for the conventional IR_{50} and $pIRIR_{225}$ dating is justified under theoretical and empirical viewpoints. It was found that for the established numerical chronologies on loess the fine grain quartz fraction results in reliable age estimates up to the Eemian (MIS 5e, 5d). The high-resolution dating in Saxony uncovered a prominent hiatus of ca. 30 ka between the early and the late Weichselian found in all investigated loess sections in Saxony. The fine grain quartz age results are confirmed by the polymineral fine grain dating. For lower dose ranges ($D_e < 100$ Gy) age results of all three grain size fractions agree within uncertainties. However, the coarse and middle grain fractions show highly scattered distributions. For higher doses ($D_e > 180$ Gy) the luminescence signals of the coarse and middle grain fractions are in saturation. In contrast, the luminescence signal of the fine grain fraction still grows and is reproducible as shown by test measurements. The results of a cross-bleaching survey on 10 luminescence readers revealed substantial cross-bleaching behaviour of the IR-LEDs (mean cross-bleaching: ca. 0.026 %), which is an order of magnitude higher than for blue LEDs. The investigation on the a-values of polymineral fine grain samples gave evidence for significant differences between the mean a-values obtained with the IR_{50} and the $pIRIR_{225}$ signals. The a-value obtained with the $pIRIR_{225}$ signal was found to be always higher, but further investigations are needed.

A PDF of this thesis can be downloaded from:
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