



Consistency challenges between correlative and luminescence age models for the last ~150 ka in the Lower Danube Basin loess-paleosol sequences

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Eolian deposits such as loess-paleosol sequences are being used intensively for paleoenvironmental studies. In order to accurately interpret proxy data variability through time, reliable age models are essential. Age models are transferring stratigraphical thickness to geological time, and represent the basis of most studies investigating the timing and/or rate of changes in Earth's history. As such, age models are based on different methods. For last glacial terrestrial deposits, luminescence dating is often the most useful radiometric method, especially beyond the time range of radiocarbon dating. Although widely applicable, luminescence age estimates are often not precise, but age models can be improved by correlating clearly identifiable features in proxy data. This often increases the resolution of the age model, but statistical aspects are debated (see e.g. Hilgen et al., 2014).

Different age models were created for the upper 16 m of the loess-paleosol sequence of Urluia in the Lower Danube Basin (cf. Obreht et al., 2017). One age model is based on luminescence dating of polymineral fine grain samples using the pIRIR290 protocol (Thiel et al., 2011); another one uses a correlative stratigraphy based on paleoenvironmental proxy data. While the performance of the luminescence data speaks for a reliable chronology, radiometric ages for the oldest samples do not fit the correlative age model. In a depth between 7.7-8.7 m there is a steep increase in equivalent doses by ~260 Gy (ca. 60 ka). In the lower part of the profile, only a minor increase in equivalent doses was observed, which might suggest field saturation of these samples. As there are no sedimentological indicators of erosion in the sequence, the reason for the sudden increase and a corresponding overestimation of ages with regards to the expected stratigraphy remains elusive.

Here we present a case study of the Urluia loess-paleosol sequence where age models based on luminescence dating and correlative methods are contrasted, and are challenging to bring into agreement.

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