

Testing single-grain quartz OSL methods using sediment samples with independent age control from the Bordes-Fitte rockshelter (Roches d'Abilly site, Central France) - DTU Orbit (09/11/2017)

Testing single-grain quartz OSL methods using sediment samples with independent age control from the Bordes-Fitte rockshelter (Roches d'Abilly site, Central France)

We present quartz single-grain dose distributions for four well-bleached and unmixed sediment samples with independent age control (22–48 ka), from the archaeologically important Bordes-Fitte rockshelter at Roches d'Abilly, France. This site has previously been dated using ^{14}C AMS dating and standard multi-grain OSL dating using both quartz and feldspar. The effect of rejection criteria usually employed in single-grain dating on dose and over-dispersion is tested using both laboratory irradiated samples and natural samples. It is shown that had these samples been analysed in the absence of other age control, standard modelling decisions based on the shape of single-grain dose distributions would have led to significant misinterpretation of results and a corresponding >40% underestimation in age. If we instead ignore this standard decision process and apply weighted average and mixing models then the most likely results deviate from the expected ages by >10%. Finally, we show that by careful consideration of the luminescence characteristics of individual grains, we are able to obtain good agreement with the independent age control by applying alternative rejection criteria but this is at the cost of reducing the accepted grain population by more than an order of magnitude, with the corresponding inevitable decrease in precision. [All rights reserved Elsevier].

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