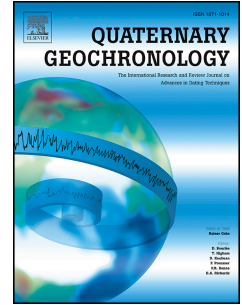


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Getting a grip on soil reworking - Single-grain feldspar luminescence as a novel tool to quantify soil reworking rates

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1 Getting a grip on soil reworking - single- 2 grain feldspar luminescence as a novel tool 3 to quantify soil reworking rates

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13 **Abstract**

14 Soil reworking, e.g. due to bioturbation, is an important aspect of soil and landscape
15 evolution. Yet, rates of soil mixing are poorly constrained, especially on pedological and
16 geomorphological relevant time scales of decades to millennia. This study presents a
17 novel method to reconstruct soil reworking rates on such timescales by utilising
18 luminescence signals from individual sand-sized feldspar grains as soil reworking tracers.
19 We propose a post-IR IRSL procedure to harvest two luminescence signals from
20 individual feldspar grains. We applied this method to four soil samples from a single soil
21 profile in Spain, and compared our results to those derived through a more conventional
22 approach based on single-grain quartz luminescence analysis. We also propose novel
23 ways of deriving effective soil reworking rates from luminescence data, using not only

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