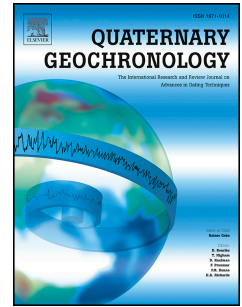


Accepted Manuscript

Testing the accuracy of feldspar single grains to date late Holocene cyclone and tsunami deposits

Dominik Brill, Tony Reimann, Jakob Wallinga, Simon Matthias May, Max Engel, Svenja Riedesel, Helmut Brückner



PII: S1871-1014(17)30185-1

DOI: [10.1016/j.quageo.2018.09.001](https://doi.org/10.1016/j.quageo.2018.09.001)

Reference: QUAGEO 962

To appear in: *Quaternary Geochronology*

Received Date: 24 November 2017

Revised Date: 17 August 2018

Accepted Date: 7 September 2018

Please cite this article as: Brill, D., Reimann, T., Wallinga, J., May, S.M., Engel, M., Riedesel, S., Brückner, H., Testing the accuracy of feldspar single grains to date late Holocene cyclone and tsunami deposits, *Quaternary Geochronology* (2018), doi: 10.1016/j.quageo.2018.09.001.

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1 **Testing the accuracy of feldspar single grains to date late Holocene cyclone and tsunami**
2 **deposits**

3

4 *Dominik Brill¹, Tony Reimann², Jakob Wallinga², Simon Matthias May¹, Max Engel³, Svenja Riedesel^{1,4},*
5 *Helmut Brückner¹*

6

7 ¹ *Institute of Geography, Universität zu Köln, Köln, Germany*

8 ² *Netherlands Centre for Luminescence Dating & Soil Geography and Landscape group, Wageningen University,*
9 *Wageningen, The Netherlands*

10 ³ *Geological Survey of Belgium, Royal Belgian Institute of Natural Sciences, Brussels, Belgium*

11 ⁴ *Aberystwyth Luminescence Research Laboratory, Department of Geography and Earth Sciences, Aberystwyth*
12 *University, United Kingdom*

13 ** Corresponding author: brill@d@uni-koeln.de*

14

15 **Abstract:** Quartz is the preferred dosimeter for luminescence dating of Holocene sediments as
16 optically stimulated luminescence (OSL) signals reset rapidly upon light exposure, and are stable over
17 time. However, feldspar is required where quartz luminescence properties are inappropriate for
18 dating, as is often the case in geologically young mountain ranges and areas with young volcanism.
19 Here we aim to evaluate the potential of single grain feldspar luminescence dating applied to late
20 Holocene cyclone and tsunami deposits, for which complete signal resetting can *a priori* not be
21 guaranteed. To address potential problems of feldspar dating of such deposits associated with
22 heterogeneous bleaching, remnant doses and anomalous fading, we use a low-temperature post
23 infrared infrared stimulated luminescence protocol (pIRIR₁₅₀) on single grains.

24 For most samples, good agreement between fading corrected IR₅₀ and non-fading corrected pIRIR₁₅₀
25 ages is observed. Both feldspar ages generally also show good agreement with age control provided
26 by historical data and quartz luminescence ages. pIRIR₁₅₀ remnant ages in modern analogue samples
27 are shown to be <50 years, indicating that dating accuracy might be negatively affected by
28 insufficient signal zeroing only for sediments younger than ~500 years. As these minor remnant ages
29 are interpreted as being caused by unbleachable luminescence residuals, slight age overestimation
30 for young samples can be overcome by subtracting the remnant ages.

31 The good agreement between pIRIR₁₅₀, IR₅₀ and quartz ages, indicates that a significant number of
32 grains must have experienced relatively complete signal resetting during or immediately prior to
33 transport, as the three signals are known to bleach at different rates. Since light exposure during the

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