Violet stimulated luminescence: geo- or thermochronometer? - DTU Orbit (28/12/2018)

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The method of quartz optically stimulated luminescence (OSL) dating is widely used, but generally limited to the past ~0.1 million years (Ma) due to early saturation of the desired signal. Violet stimulated luminescence (VSL) of quartz has previously been shown as a promising alternative, with a dose saturation level ~20 times higher compared to that of OSL, excellent thermal stability on the 1011 year time scale, and agreement between VSL and OSL ages up to ~0.3 Ma. Here we explore the usability of the VSL signal to date older quartz samples from palaeosols, whose ages are bracketed by KeAr ages and palaeomagnetic data of the interbedded basalts, emplaced between 1.6 and 0.7 Ma. VSL ages from three palaeosols largely underestimate the independent ages of their overlying basalts. This can be explained either by a low-temperature thermal anomaly resetting the VSL signal in nature, and/or by an insufficient measurement protocol, unable to correctly translate the natural signal into the equivalent laboratory dose. © 2015 Elsevier Ltd. All rights reserved.