Geophysical Research Abstracts
Vol. 19, EGU2017-13901, 2017
EGU General Assembly 2017

IR-RF dating on K-feldspar: tracing environmental changes in the Middle Pleistocene?

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In Quaternary sciences, luminescence dating (OSL, TL, RF) yielded paramount importance due to its capability to trace the geomorphological process itself. However, every method has its own limitation and, e.g., the choice of a mineral depends on its local availability and mineral specific characteristic. Since quartz has been proved as reliable dosimeter, but its usual dose saturation level of ca. 150 Gy might be not sufficient in particular cases, feldspar grains are preferred for dating events where higher saturation limits are desired or quartz is not available. However, feldspar suffers from anomalous fading and the efforts undertaken during the last decades to overcome this challenge varied in their success. By contrast, infrared radiofluorescence (IR-RF) of K-feldspar (Trautmann et al., 1999) seems to offer a promising alternative, but until date it has been rarely applied. Likely reasons for this lack of attention are a shortage of commercially available measurement equipment until the recent past and serious methodological doubts that had been raised in the literature (e.g., Buyleart et al., 2012).

At the IRAMAT-CRP2A the formerly proposed IR-RF single aliquot regenerative dose (SAR) protocol approach (IRSAR, Erfurt et al., 2003) for K-feldspar grains have been adapted and enhanced (Frouin et al., 2015; Huot et al., 2015; Frouin et al., 2017) using (a) sample adapted bleaching settings and (b) a stimulation at higher temperatures. Together with more recent methodological findings, we present the advantage and the limitations of using the IR-RF dating approach for establishing reliable chronologies on believed Middle Pleistocene sediments.

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