Supplement of

Short communication: Synchrotron-based elemental mapping of single grains to investigate variable infrared-radiofluorescence emissions for luminescence dating

Mariana Sontag-González et al.

Correspondence to: Mariana Sontag-González (mariana.sontag-gonzalez@geogr.uni-giessen.de) and Raju Kumar (raju.kumar@arch.ox.ac.uk)

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**Figure S1:** Grains mounted for μXRF/μXANES measurements. Grains are attached with carbon tape to avoid movement.

**Figure S2:** Workflow of the X-ray flux ($I_0$) normalisation, taking the Fe map of grain #17 (sample X7368) as an example. The (a) raw counts obtained by fitting the XRF spectra are divided by (b) $I_0$ to yield (c) a normalised map corrected for flux fluctuations.
Figure S3: μXRF spectra of all grains, separated by IR-RF signal categories. The spectra are normalised to the Compton energy peaks. The characteristic energies of the strongest emissions of the main identified elements are shown as dashed lines.