Investigating cold light: The *R* package Luminescence - signal, statistics and dating of environmental dynamics -

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Earth surface processes decisively shape our planet. They are the primary mediators of environmental change and directly affect human societies. To decipher the timing and rates of Earth surface processes, throughout the last 250,000 years one numerical dating method has reached paramount importance: Luminescence dating. This method provides robust numerical data on environmental changes (a) due to the fact that the luminescence signal is reset by daylight exposure or heating and (b) the advantage of using nearly ubiquitously available mineral grains of quartz or feldspar.

During the last decades more and more ages based on luminescence dating have been requested and the method has been considerably enhanced. However, an increasing data complexity demands for a flexible and scalable software solution for data analysis. For more innovative measurements, existing software solutions (e.g. 'Analyst', Duller, 2007) are limited, especially regarding new experimental measurements.

Therefore, in 2012 the *R* package **Luminescence** has been introduced (Kreutzer et al., 2012, Dietze et al., 2013, Fuchs et al., subm.). The package is a toolbox intended to provide customised solutions for a variety of requirements (e.g. data import, statistical analysis, graphical output). The used algorithms and statistical treatments are always transparent and the user remains in control, of combining and adjusting algorithms by taking advantage of the wide range of functions available in *R*.

Our contribution (1) summarizes the concept of the *R* package **Luminescence** and focusses on some conceptional aspects and selected practical examples. (2) We present a sneak preview on a dynamic graphical user interface written in *Java* to make the functions of the package available to users who are not familiar with *R* but wants to access the package functionality.

References

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