The Nordic Laboratory for Luminescence Dating: who are we and what do we do?

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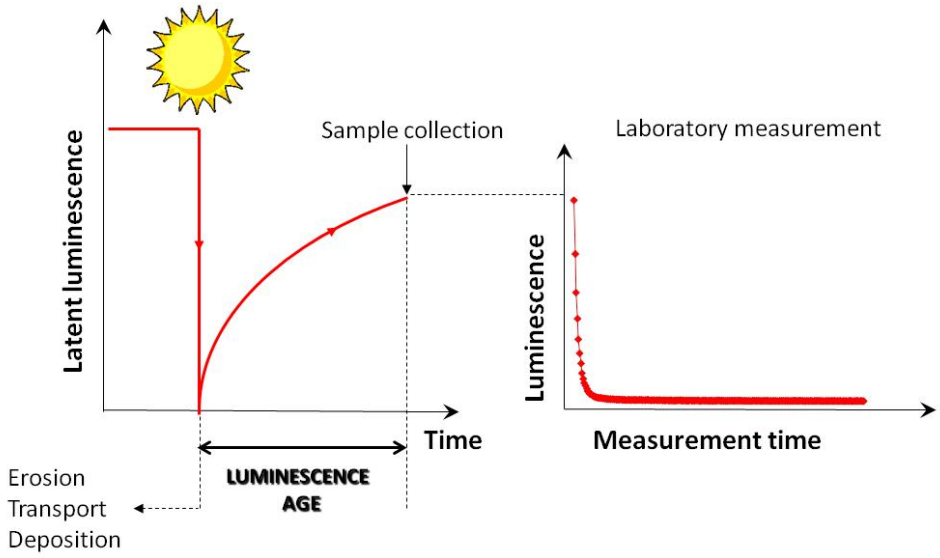
Luminescence dating is a widely applicable trapped charge dating method used extensively in Quaternary research to establish absolute chronologies for sediment records. The Nordic Laboratory for Luminescence Dating (NLL) has been part of the Geological Institute for more than 20 years and was awarded a Nordic Centre of Excellence title from 2003-2007. Physically, the laboratory is based at the Risø campus of Denmarks Technical University (DTU) about 6 km north of Roskilde. This talk will introduce our research facilities to the staff, students and guests of the Geological Institute with a short introduction to the staff members, facilities and overall operation of the laboratory, and to the close research link between the NLL and DTU's Centre for Nuclear Technology.

In the main part of the talk, the principles behind luminescence dating will be outlined and the main tests used to identify whether or not a luminescence age is likely to be reliable will be discussed. In particular, using real examples it will be shown how signal stability (problem for feldspars), incomplete signal resetting (bleaching) by daylight during sediment transport (problem in some water-laid sediments) and signal saturation (problem for old samples) can affect the reliability of a luminescence age. The intention is to give the audience some of the tools needed to enable them to better interpret the quality of luminescence ages in the literature.



Our research focus over the last ~7 years has been particularly aimed at extending the age range. A new feldspar signal has been identified and tested on known-age material. This opens up the possibility of dating older samples, for which the conventional quartz OSL signal is in saturation, and of establishing luminescence chronologies for sediments containing quartz grains with unsuitable luminescence characteristics (such as sediments derived from volcanic bedrock). The usefulness of this new approach will be illustrated with two examples: a luminescence chronology of the Potrok Aike maar lake (Argentina), and loess ages from Europe and Asia beyond the Last Interglacial.