

## **Wringing the last drop of optically stimulated luminescence response for accurate dating of glacial sediments**

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BRITICE-CHRONO is a NERC-funded consortium project of more than 40 researchers aiming to establish the retreat patterns of the last British and Irish Ice Sheet. For this purpose, optically stimulated luminescence (OSL) dating, among other dating techniques, has been used in order to establish accurate chronology. More than 150 samples from glacial environments have been dated and provide key information for modelling of the ice retreat. Nevertheless, luminescence dating of glacial sediments has proven to be challenging: first, glacial sediments were often affected by incomplete bleaching and secondly, quartz grains within the sediments sampled were often characterized by complex luminescence behaviour; characterized by dim signal and low reproducibility. Specific statistical approaches have been used to overcome the former to enable the estimated ages to be based on grain populations most likely to have been well bleached. This latest work presents how issues surrounding complex luminescence behaviour were overcome in order to obtain accurate OSL ages.

This study has been performed on two samples of bedded sand originated on an ice walled lake plain, in Lincolnshire, UK. Quartz extracts from each sample were artificially bleached and irradiated to known doses. Dose recovery tests have been carried out under different conditions to study the effect of: preheat temperature, thermal quenching, contribution of slow components, hot bleach after a measuring cycles and IR stimulation. Measurements have been performed on different luminescence readers to study the possible contribution of instrument reproducibility. These have shown that a great variability can be observed not only among the studied samples but also within a specific site and even a specific sample. In order to determine an accurate chronology and realistic uncertainties to the estimated ages, this variability must be taken into account. Tight acceptance criteria to measured doses from natural, not exposed, aliquots have been applied. These derived on reproducible dose distributions from which accurate ages could be estimated.