Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00329, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00329
EGU General Assembly 2008

A lithofacies-based approach to OSL dating of ice-proximal sandar on the margins of the Irish Sea ice-stream

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The optical dating technique provides an opportunity to date glaciofluvial sediments which often suffer from a scarcity of organic remains and so limiting the applicability of radiocarbon dating techniques. Recent advances in optical dating such as the SAR protocol (Murray and Wintle, 2000), the use of very small aliquots ($\sim$30 grains), together with statistical models such as the Minimum Age Model (MAM) (Galbraith and Laslett, 1993), have allowed problems concerning heterogeneous bleaching to be overcome.

Based on results from extensive sedimentological and stratigraphic studies of former ice marginal sandar at Orrisdale, Isle of Man (Thomas, et al., 2004), Wexford, S.E. Ireland (Thomas and Kerr, 1987) and Nefyn, N.W. Wales (Thomas and Chiverrell, in Press), a suite of lithofacies were identified and sampled for OSL analysis. Different grain size fractions of quartz were extracted and the SAR protocol applied using very small aliquots ($\sim$30-40 grains) to identify which depositional environments are best suited for optical dating.

A variety of tests have been undertaken to identify the luminescence properties of this quartz including preheat, thermal transfer, dose recovery and LM-OSL tests, which aim to find the most applicable SAR protocol, isolate the 'fast' component and ultimately to achieve the most accurate palaeodose possible.

D_e distributions have been obtained for Wexford, Orrisdale and Nefyn samples, all

of which show wide and positively skewed distributions indicative of heterogeneous bleaching. There are numerous 'age' models which can be used upon heterogeneously bleached D_e distributions to extract the 'correct' D_e, these include the MAMs (both 3 and 4 parameter versions), the lowest 5% method (Olley, et al., 1998) and the Finite Mixture Model (FMM) (Galbraith and Green, 1990) but difficulties are faced in deciding which model is most appropriate for the dataset. A comprehensive decision-making protocol has been defined by Bailey and Arnold (2006) and a modified version of this decision-making procedure has been applied to the dataset to enable the appropriate statistical approach for D_e determination to be used.

Preliminary ages in the range of 13-15 ka have been obtained for Orrisdale samples, perhaps coincident with Heinrich Event 1, whereas, ages of $\sim$18-22 ka have been obtained for Wexford, coincident with retreat of ice from Last Glacial Maximum. The ages calculated are presented and compared in terms of lithofacies and grain size.

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