Geophysical Research Abstracts, Vol. 8, 10978, 2006
SRef-ID: 1607-7962/gra/EGU06-A-10978

OSL dating of plateau surface erosion and windblown sand resedimentation in the Highlands of Scotland

S. Morrocco (1), **J.Q.G. Spencer** (1,2), R.A.J. Robinson (1), C.K. Ballantyne (1)

(1) School of Geography and Geosciences, University of St Andrews, St Andrews KY16 9AL, UK, (2) Institut für Geologie und Paläontologie, Universität Innsbruck, 6020 Innsbruck, Austria (joel.spencer@uibk.ac.at)

Windblown sand deposits are common on high plateaux and valley heads on mountains in the Highlands of Scotland. However, widespread stripping of protective vegetation and sand cover has caused subsequent sand redeposition on many lee slopes. We hypothesise that erosion of the plateau sands was triggered either by unusually extreme storm events (for example during the Little Ice Age between the 16^{th} –19^{th} centuries) or by the introduction of sheep grazing on high plateaux during the period of Norse settlement in NW Scotland, or by much more recent overgrazing of plateau vegetation.

The age of plateau sand deposition is constrained here using optically stimulated luminescence (OSL) dating of samples from immediately above and below a contact between an upper fresh sand unit and a lower weathered sand unit on the lee slopes of the An Teallach, Fionn Bheinn, Red Cuillin and West Drumochter mountains. This approach provides an age bracket of the onset of sand reworking and the timing of associated plateau-surface erosion at these sites. Dating results have shown these processes to have occurred within the last ca. 400 years. The OSL ages of the upper sand units on An Teallach, Fionn Bheinn and the Red Cuillin place the onset of widespread erosion and associated redeposition of aeolian sediment between AD 1600-1800, and disturbance on West Drumochter before AD 1910-1930. The most likely cause of widespread sediment reworking by wind on An Teallach, Fionn Bheinn and the Red Cuillin appears to be stress associated with climatic deterioration during the Little Ice Age, possibly exacerbated by grazing pressures. The OSL evidence for more recent disturbance on West Drumochter is less easy to explain. Such disturbance may also have been triggered by a combination of climatic-induced stress and/or grazing

pressure, but could also reflect localised weakening of vegetation cover by, for example, air-borne pollutants or disease. The OSL dates imply that extensive disturbance in the form of aeolian sediment reworking is a relatively recent phenomenon. Most aeolian soils appear to have developed under relatively stable conditions throughout the Holocene, implying that widespread disruption is unusual, and has no parallel throughout the postglacial period.