CONFIRMATION OF A METEORITIC COMPONENT IN LIBYAN DESERT GLASS FROM OSMIUM ISOTOPE DATA. C. Koeberl, Institute of Geochemistry, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria (christian.koeberl@univie.ac.at).

Libyan Desert Glass (LDG) is an enigmatic type of natural glass, which occurs in a 6500 km^2 strewn field located between sand dunes of the southwestern corner of the Great Sand Sea in western Egypt. The glass is very silica-rich at about 96.5–99 wt% SiO_2, and shows a limited variation in major and trace element abundances (e.g., [1]). Some cristobalite inclusions occur, but otherwise the LDG, which has an age of about 28 Ma, is perfectly glassy. Although the origin of LDG is still debated by some workers, an origin by impact seems most likely. There are, however, some differences to "classical" impact glasses, which occur in most cases directly at or within an impact crater. Evidence for an impact origin includes the presence of schlieren and partly digested mineral phases, lechatelierite (a high-temperature mineral melt of quartz), baddeleyite, a high temperature breakdown product of zircon.

The rare earth element abundance patterns are indicative of a sedimentary precursor rock, and the trace element abundances and ratios are in agreement with a upper crustal source. There is a similarity between LDG major and trace element abundances and Sr- and Nd-isotopic compositions, and the respective values for rocks from the B.P. and Oasis impact structures in eastern Libya [2], but lack of age information for the two Libyan structures precludes a definitive conclusion.

There have also been suggestions that Tunguska-like atmospheric explosions could have melted surface sands and rocks, forming LDG in this way [3]. However, there are some good indications for the presence of a meteoritic component in LDG [e.g., 1,4]. Rare dark layers and streaks within LDG samples show enrichments in the siderophile elements, including Ir, indicating about 0.5% of a chondritic component [e.g., 1]. To confirm the presence of a meteoritic component, the Os isotopic composition of dark LDG layers was analyzed by NTIMS (see [5] for details and background). The analyses were difficult, because of the small size of the brown schlieren and problems to isolate mainly schlieren-rich material. The best sample, with the highest Os content, was found to contain 0.626 ppb Os, 0.0237 ppb Re, and a $^{188}Os/^{187}Os$-isotopic ratio of 0.1276. Samples with lower Os abundances have higher isotopic ratios. Crustal Sr and Nd isotopic values exclude a significant mantle component; thus, the Os abundances and isotopic values conform the presence of a meteoritic component in LDG. This observation is difficult to reconcile with an airburst model, because it requires physical mixing between meteoritic and crustal matter in liquid form.

References: [1] Koeberl C. (1997) in *Proc. Silica '96 Meeting on Libyan Desert Glass and Related Desert Events*, pp. 121–131, Pyramids, Segrate, Milano. [2] Abate B. et al. (1999) *GSA Spec. Paper 339*, 177–192. [3] Wasson J. T. and Moore K. (1998) *MAPS, 33*, A163–A164. [4] Barrat J. A. et al. (1997) *GCA, 61*, 1953–1959. [5] Koeberl C. and Shirey S. B. (1997) *PPP, 132*, 25–46.