NORTH AMERICAN MICROTEKTITES IN THE INDIAN OCEAN? B. P. Glass[1] and C. Koeberl[2], [1]Geology Department, University of Delaware, Newark, DE 19716, USA (Billy.Glass@mvs.udel.edu). [2]Institute of Geochemistry, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria.

Introduction: Microtektites thought to belong to the North American (N.A.) strewn field have recently been found associated with clinopyroxene-bearing (cpx) spherules in Ocean Drilling Project Hole 689B in the Atlantic sector of the Southern Ocean [1,2]. While studying the composition of upper Eocene spherules, we found some rare, transparent, colorless microtektites in a cpx spherule layer from Deep Sea Drilling Project Site 216 in the eastern Indian Ocean that are similar in appearance, petrography, and composition to the microtektites from Hole 689B. Darker colored microtektites are also found in the cpx spherule layer at Site 216; but in the remainder of the abstract when we refer to microtektites from Site 216, we only mean the transparent colorless ones.

Description and Petrography: The microtektites at Site 216 are generally spherical in shape (up to 450 μm diameter), but disc-shaped and teardrop-shaped microtektites are also present. Some of the microtektites are highly vesicular, but others contain few or no vesicles. The vesicles are usually spherical in shape. Lechatelierite particles are generally absent; but when present they are ribbon-like and contorted.

Composition: The major oxide and trace element contents of nine of the microtektites from Site 216 were determined by energy dispersive x-ray analysis and instrumental neutron activation analysis, respectively. Like the Hole 689B microtektites, the Site 216 microtektites have relatively high SiO_2 (73.1 - 87.6 wt.%); low MgO (0.44 - 1.37 wt.%), CaO (0.30 - 1.85 wt.%), and Na_2O (0.09 - 0.79 wt.%); and highly variable Al_2O_3 (7.63 - 15.1 wt.%) and FeO (0.41 - 6.83 wt.%) contents. The trace element compositions of the Site 216 microtektites are also similar to those of the Hole 689B microtektites; the rare earth element contents of the Site 216 microtektites are essentially indistinguishable from those of the Hole 689B microtektites and both groups have chondrite-normalized REE patterns similar to average post-Archean sediments. The biggest difference is in the Sb and Au contents; the Site 216 microtektites have higher and Au (5–2 vs. 0.36–0.18 ppm) and lower Sb (0.19–0.15 vs. 1.56–0.07 ppm).

Discussion: The stratigraphic age, association with cpx spherules, petrography, and composition of the Site 216 microtektites suggest that they belong to the same strewn field as the microtektites at Hole 689B and, therefore, may belong to the N.A. strewn field. However, similar microtektites have not been found associated with the cpx spherule layer in any of the Pacific Ocean sites [3,4]. Keller et al. [4] proposed that the cpx layer at Site 216 (and Site 292 in the Philippine Sea) is older than the cpx spherule layer found at other sites. This would mean that the similarity in composition between the Site 216 (and Hole 689B) microtektites and the N.A. microtektites would be merely a coincidence. The stratigraphic relationship between the cpx spherule and microtektite layers at Site 216 is not evident, but at Hole 689B the cpx spherules appear to be slightly older than the microtektites [2]. Thus, if the microtektites at Site 216 are part of the same layer as those at Hole 689B and they are older than the N.A. microtektite layer, then it would mean that there were four impact events in the late Eocene and that the last two produced cpx spherules and microtektites in the same sequence and with petrographies and compositions similar to those produced in the first two impacts. We find this scenario highly unlikely and, therefore, favor the hypothesis that the upper Eocene cpx spherule and microtektite layers are the result of just two impacts.

References: [1] Vonhof H. B. (1998) Ph.D. thesis, Vrije Universiteit, Amsterdam, The Netherlands, 138pp. [2] Glass B. P. and Koeberl C. (1999) *Meteorit. Planet. Sci., 34*, 197. [3] Glass B. P. et al. (1985) *Proc. LPSC 16th*, D175. [4] Keller G. et al. (1987) *Meteoritics*, *22*, 25.