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TRIASSIC-JURASSIC MASS EXTINCTION: EVIDENCE FOR BOLIDE IMPACT?

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The Triassic-Jurassic (TJ) mass extinction event is one of the most severe in geologic history and is one of the five largest in the Phanerozoic with as many as 80% of the species lost. It is also one of the most poorly understood. Only a few geologic sections have been identified for the TJ extinction and most of those are not well preserved. Previously, the paucity of suitable stratigraphic sections has prevented corroborative geochemical studies. Recently a well-preserved stratigraphic section spanning the Triassic-Jurassic boundary ($\sim$200 mya) was identified at Kennecott Point, Queen Charlotte, Islands, British Columbia. Initial studies have shown that the Kennecott Point sequence is one of the best preserved and contains one of the most complete radiolarian microfossil turnovers known. Analyses of stable isotopes have shown that a ^{13}C perturbation exits within the sequence and suggests a decline in organic productivity (Ward et al., 2001). Preliminary results of laser desorption mass spectrometry (LDMS) of selected Queen Charlotte samples suggest that fullerenes (C_{60} to C_{200}) may be present in the Kennecott Point stratigraphic sequence. Previous studies have shown that fullerenes are present in the mass extinction boundary of the Permian-Triassic ($\sim$251 mya) as well as the well-known "dinosaur" extinction event of the Cretaceous-Tertiary ($\sim$65 mya). Therefore, three of the big five extinction events appear to have associated fullerenes. The possible presence of fullerenes along with the productivity collapse (rapid environmental change) suggests that a cometary or asteroidal impact may have occurred. Although no known impact crater exists, we hope to present chemical evidence that an impact or multiple impacts may have been responsible for the TJ mass extinction.