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CARBON AT THE PERMIAN-TRIASSIC EXTINCTION BOUNDARY

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Wolbach *et al.* (1985, 1989) discovered an increased abundance of inorganic carbon with the morphology of soot across the Cretaceous-Tertiary (K-T) boundary, presumably from major wildfires. Their evidence supported the theory that a giant meteorite impacted with the Earth causing the world-wide mass extinction at the K-T boundary and triggering the fires. The K-T extinction has been investigated in order to explain the disappearance of the dinosaurs and other major species living at that time, but the paleontological record suggests the *largest* mass extinction occurred at the Permian-Triassic (P-Tr) boundary 245 million years ago.

Recent evidence supports large-scale volcanism as the cause of the P-Tr extinction. Elemental analysis of sedimentary rocks from the boundary indicates an enrichment of certain elements and depletion of others relative to average baseline values consistent with the rock being derived from volcanic ash. In addition, the Siberian traps have been dated, within experimental error, to coincide with the P-Tr extinction. It is hoped that further chemical evidence will reveal a possible connection between volcanism and the extinction event.

The procedures used by Wolbach *et al.* have been used to isolate elemental and organic carbon residue from twelve sedimentary rock samples in the Changxing Formation (Zhejiang Province) of eastern China dated to the P-Tr boundary. The carbonate and silicate components of the sample were removed through alternating treatments with HCl and HF. After drying the residue, consisting of a mixture of elemental and organic carbon, a fraction was removed for measurement of the isotopic carbon ($^{13}C/^{12}C$) composition and mass abundance. The remaining residue was isothermally oxidized with dichromate for >500 hours while mass loss was monitored. This procedure is necessary to destroy the more reactive organic carbon (kerogen), leaving the less reactive elemental carbon. The isotopic composition of any remaining elemental carbon will be determined. In addition, the morphology of the carbon will be studied using a scanning electron microscope to determine whether the carbon has the morphology of soot and thus might have resulted from major fires relating to the extinction event. Even in the absence of soot, abundance and isotopic data might still yield important clues indicating either a possible cause of the mass extinction at this boundary or the environmental changes occurring at the time.