

BRACHIOPODS AND OXYGEN LEVELS DURING THE SURVIVAL
INTERVAL OF THE LATE DEVONIAN MASS EXTINCTION
RECOVERY IN THE GREAT BASIN, WESTERN U.S.A.

BRATTON, John F., Dept. of Geology & Geophysics, 301 McCone Hall,
University of California at Berkeley, Berkeley, CA 94720, U.S.A.

The Late Devonian Frasnian-Famennian (F-F) boundary mass extinction had a tremendous impact on benthic communities of the time. It ended dominance of stromatoporoids and rugose corals as the major reef builders of the mid-Paleozoic. Up to 85 percent of Late Devonian brachiopod species were also eliminated. The cause of this cataclysm appears to have been related to the Kellwasser oceanic anoxic events that produced widespread black shale deposits and subsequent positive carbon isotope ($\delta^{13}\text{C}$) anomalies. Biotic recovery took several million years.

Detailed work on this extinction-recovery interval in the Lower Pilot Shale in the Confusion Range of western Utah has provided greater insight into its dynamics. Paleo-oxygenation has been determined at one locality by X-ray fluorescence analyses of trace metals (iron, manganese, and vanadium) in samples spanning the F-F boundary. Results show a sharp peak in vanadium concentrations and a simultaneous drop in manganese concentrations indicative of an anoxic event approximately correlative with the previous stratigraphic placement of the F-F boundary in the study area by conodont biostratigraphers. However, the period following the event shows rapid re-ventilation of the Pilot Basin and return to normal oxic conditions (lower vanadium, higher manganese).

Macrofaunal response to the F-F anoxic event is poorly known in the Great Basin due to a paucity of fossils. Discovery of a few well-preserved brachiopods in a Confusion Range exposure has permitted limited work on earliest Famennian taxa. Disarticulated brachiopods, including *Cyrtospirifer* sp. and *Syringothyris* sp., have been found in turbidites near the extinction horizon and approximately 20 meters above. Preliminary results indicate that shallow water brachiopods may have preferentially survived this extinction event, and that anoxia was possibly limited to deeper waters in this locality.