

## End-Permian catastrophe by a bolide impact: evidence of a gigantic release of sulfur from the oceanic crust or mantle

# Kunio Kaiho[1], Takanori Nakano[2], Yasunori Miura[3], hodaka kawahata[4], Kazue Tazaki[5], Masato Ueshima[6]

[1] Geol. and Paleontol., Tohoku Univ., [2] Life and Environmental Sci., Univ. Tsukuba, [3] Earth Sci., Yamaguchi Univ, [4] GSJ, [5] Dept. Earth Sci., Kanazawa Univ., [6] Inst. Biomat.& Bioengineer, Tokyo Medical and Dental Univ.

Our studies in southern China have revealed a remarkable sulfur and strontium isotope excursion at the end of the Permian along with a coincident concentration of impact metamorphosed grains and kaolinite and a significant decrease of manganese, phosphorous, calcium, and microfossils (foraminifera). These data suggest that an asteroid or comet of a <50 km diameter impacted the ocean at the end of the Permian and caused a rapid and massive release of sulfur from the oceanic crust or mantle to the ocean-atmosphere system leading to significant oxygen consumption, acid rain, and the most severe biotic crisis in the history of life on Earth.

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