

Evidences on Impact Events of Cenozoic

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Based on geological and geochemical records in the impact boundary layers, the authors suggest that there exist at least six huge bolide-impact events in Cenozoic (65, 34, 15, 2.4, 1.1, 0.73 Ma B.P.).

Ir anomalies and many magnetic microspherules were detected in boundary clays in three marine K/T sections in Gangba, Tibet and the highest Ir contents are 7.3ppb, 2.5ppb and 2.9ppb respectively. Considering the effect of carbonate rock the Ir anomalies in these three sections are 8.6ppb, 8.3ppb and 16.1ppb respectively. $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ of whole rock carbonate had synchronous catastrophic change trends across the Ir anomaly-bearing boundary layer.

An Ir anomaly and microspherules associated with impact were found in the upper part of S37 Palaeosoil, aged 2.42-2.47MaB.P., in the Duanjiapo loess section, Shanxi and in the upper part of a red clay bed and lower part of the Wucheng loess in Haimugou section, Shanxi. Meanwhile, microtektites were also found in sediments of core M14 in the North Pacific ocean with the palaeomagnetic age of Reunion sub-epoch. Australia-Asian microtektite layer which associated with Ir anomalies: 47ppt, higher than the average Ir contents of 12ppt of loess and was consistent with B/M boundary was firstly found by our research group in the Haimugou loess section, Shanxi, and later 1.1 and 0.73 Ma.B.P. impact-origin microspherule layers were found in Duanjiapo loess section, which extended the scales of Australia-Asian tektite and Ivory Coast tektite impact events. $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ values had catastrophic change across microtektite layer in the Haimugou loess section. In addition to these findings in China, Kyte et al.(1981) had reported Ir and Au anomalies in sediments of USNS Eltanin-3 drillcore in the subantarctic South Pacific Ocean from near the Gauss/Matuyama palaeomagnetic boundary, and results of those researches

indicated that the impactor was a mesosiderite with a diameter of impactor of at least 0.5km.

Although Tertiary laterite was widely developed in China the reliable 34 Ma B.P. and 15 Ma B.P.bolide-impact evidence has not found until now. According to our research results of six huge bolide-impact events in Cenozoic, there exist catastrophic and synchronous ^{18}O and ^{13}C change, obvious drop of surface and seawater temperature, formation of new glacial period and difficult degrees of mass extinction during the bolide-impact time.