EVIDENCE FOR A MAJOR ASTEROID IMPACT ON THE EARTH 2.14 MILLION YEARS AGO: IMPLICATION FOR TERTIARY EXTINCTIONS AND ORIGIN OF TEKTITE*; Peng Hanchang[1], Cong Youzi[1], Liu Zhenkun[2], Zhuang Shijie[3], Chai Zhifang[4] and Mao Xueying[4]

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A microtektite layer was found at 270 cm in core M_{14} collected from the North Pacific(8°00.15'N, 176°10.65'W)(1). The newest research results suggests that this microtectite layer is probably associated with the asteroid impact. The following is the main evidences:

1. The microtektite layer is apparently associated with the geomagnetic event and reversal. In the Figure 1, can seen the diclination and inclination at 270 cm in core are extremly decreased, diclination from about 170° down to 0°, and inclination from about +7° down to -15°. The geomagnetic polarity time is just 2.14 million years. The ending of the Reunion event is just occured at 270 cm site in core, and the Earth's magnetic field varies gradually from the Matuyama revarsal to the Gauss normal.

2. The abundances of platium group elements and siderophile elements in five microtektites are identical with extraterrestral materials. The iridium and osmium were determinated from each microtektites by INAA. The maximum content of iridium reached 0.026 ppm, of osmium reached 22.5 ppm, which are great higher than the crustal rock(2).

3. The abundances of rare earth elements in five the same microtektites are identical with the crustal rock. For example, element La content ranges from 40.5 ppm to 69.0 ppm; Ce content ranges 80.5 ppm to 123 ppm; Sm content ranges from 6.15 ppm to 11.1 ppm; Eu content ranges fro <1.8 ppm to 4.95 ppm; etc., which are identical with some microtektites and the Paleogene silty clay(3).

We also suggest that the both of iridium and osmium anomaly are apparently associated with the Quaternary/ Tertiary boundary, as iridium anomaly apparently associated with the Cretaceous/Tertiary boundary(4), which is concerned with that a major asteroid impact on the Earth 2.14 million years ago.

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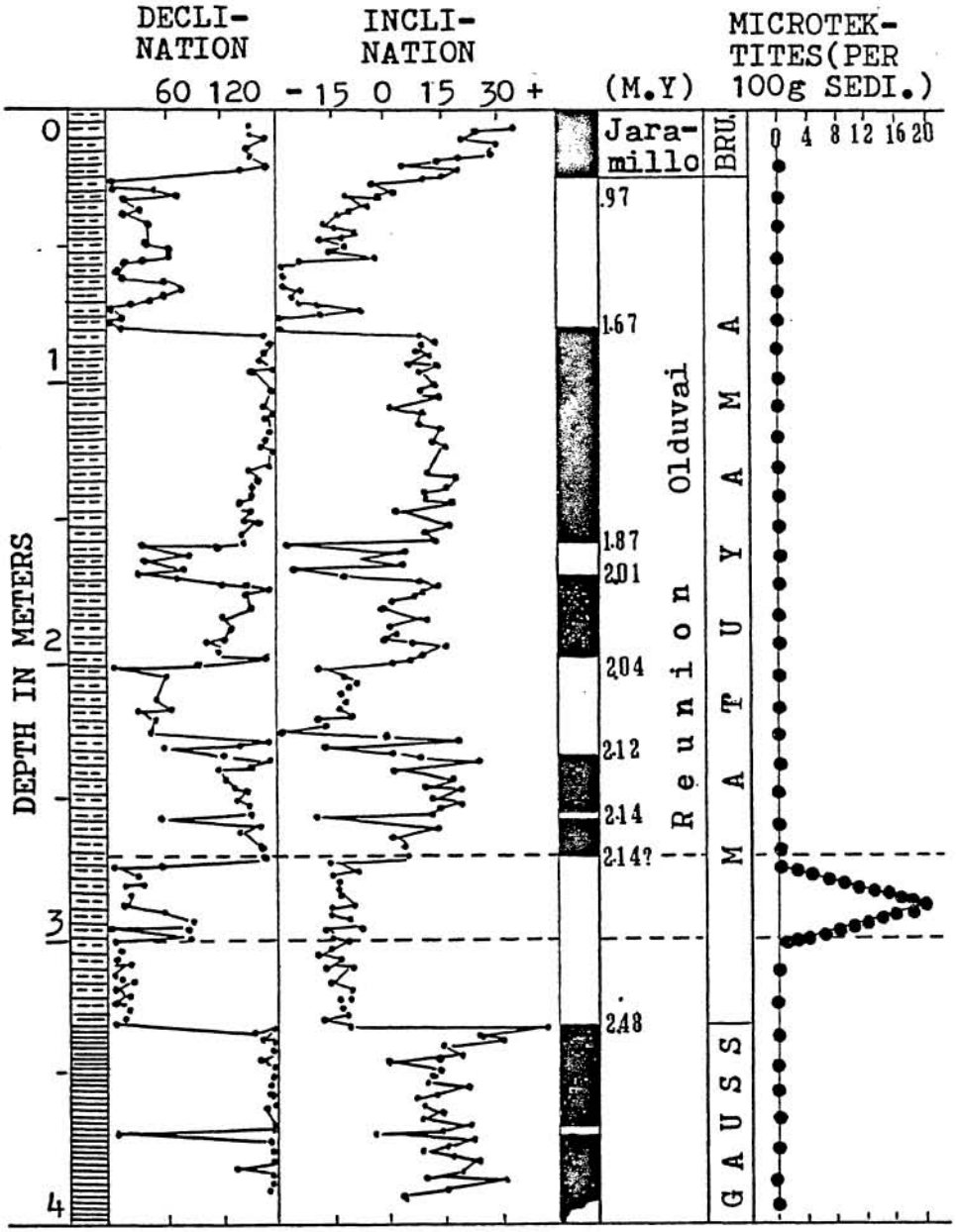

Fig.1 Correlation between the Microtektite Layer and Paleomagnetic Stratigraphy in the Core M_{14} Collected from the North Pacific.

References: (1)Liu Zhenkun (1989), In Lunar and Planetary Science XX, pp.580-581. (2)Chai Zhifang et al (1987), SCIENTIA SINICA(Series B), Vol.XXX No.9, pp.996-1008. (3)Koeberl, C. (1985), Chem. Erde 44, pp. 107-121. (4)Gamapathy, R. (1982), Science, Vol.216, pp.885-888.