A COSMIC MATTER ACCRETION EVENT AROUND 660,000 YEARS BEFORE PRESENT FOUND IN TWO DATED, CENTRAL PACIFIC CORES

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ABSTRACT In order to study large-scaled cosmic matter accretion events in the past, Ir enriched layers at C-T and other geological boundaries and dated sedimental cores have been searched by many scientists. In this work, Iridium contents and the ratios of (Co/Fe) in two dated, respective layers of the cores are determined. These samples were dated fortunately with the paleo-magnetic and also with the cosmogenic Be-10 methods. Ir enrichments are found at (0.660 ± 0.030) My before present.

1.Introduction

The origin and evolution of the cosmic meteoroids in the solar system are important problems. It is well known, siderophile elements including noble metals, such as Pt, Os, Ir and so on, are contained much in cosmic meteoroids, which are fallen onto the Earth recently. Of course, it is not so clear, chemica l compositions of cosmic meteoroids were also the same as those of the recent ones in the past.

A.C. Levasseur-Regourd and H. Hasegawa (eds.), Origin and Evolution of Interplanetary Dust, 53–56.

Ir anomalies at the C-T and other geological boundaries have been studied by many scientists for the studies of relationships between accidental accretion events of meteoroids and geo-and biological disturbances. In sedimental cores also enrichments of the siderophile elements have been investigated.
In this work, the assumption: enrichments of siderophile elements are a good indication for meteoroids, is applied, so that the siderophile elements are measured with INAA in the whole length of the cores covered for a few million years in the past.

2. Sample Description and Experimental

In this work, two core samples were examined, which were collected by a piston corer on board R/V Hakuho-Maru, Ocean Research Institute, Univ.Tokyo.
The collection sites of the used cores were located on the longitude of 160°W and and the Sample A [KH-68-4,St-15] was obtained at 12°00'N(depth; 5775 and also the Sample B [KH-68-4,St-18] at 1°59'N (depth; 5360 m).
These two cores are dated fortunately by paleomagnetic (Kobayashi and Kitazawa 1971) and also Be-10 (Tanaka and Inoue 1979) method. Ir contents and the ratios of (Co/Fe) in the respective layers of the cores, which are shown in Fig.1 and Fig.2 (Yamakoshi 1988). Each sample was analyzed with INAA in non-destructive forms. The detection limits for Ir inthis work are $\sim$ 1 ppb for Sample A and $\sim$ 0.5 ppb for Sample B.
The neutron irradiations were carried out by a TRIGA II reactor, whose neutron flux was 0.7x10E11 (n/sec.cm^2).The irradiation times were 10 hours for Sample A and 18 hours for Sample B. The processed Canyon Diablo and JB-1 were used as the reference samples of the chemical component determinations. A few layers of the sample A and B were lost, thus their compositions could not determined.

In this work, the detailed profiles around the Ir anomalies are obtained with additional samples, which are divided for shorter intervals. These are shown in Fig.3. The time of the meteoroid accretion was revised as (0.660 $\pm$ 0.030) My.

3.Discussion

[^{3}He/^{4}He] ratios in deep sea sediments are found to be abnormaly high. [^{3}He/^{4}He] ratios were measured in the same core, [KH-68-4, St-18], specially around the time of the Ir enrichment the ratio looks as increased.

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The higher value of [^{3}He/^{4}He] is interpreted as sudden increase of accreted meteoroids and/or increase of ^{3}He particle implantation due to the solar activity (Takayanagi and Ojima 1987).

The event found in this work might be local and not so large-scaled ones. No mass extinction, biological disturbance was reported. However, systematic surveys of dated core samples from shallow and deep sea sediments will give us fruitful information on the evolution of the solar system.

Fig.1 Ir and (Co/Fe) ratios in the core sample A.

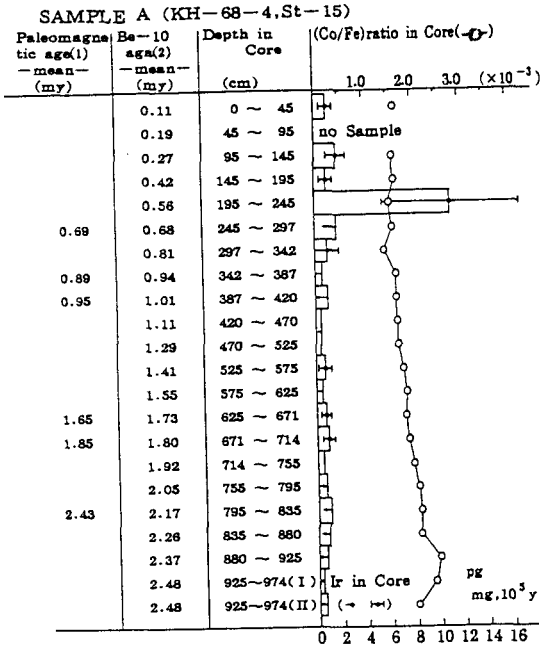

Fig.2 Ir and (Co/Fe) ratios in the core sample B.

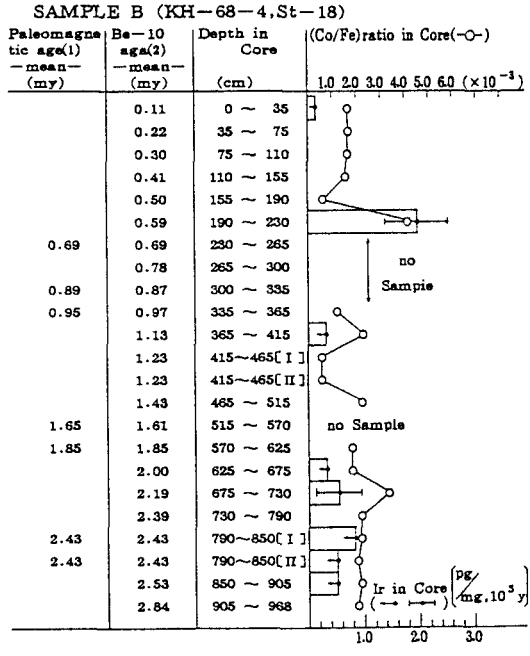

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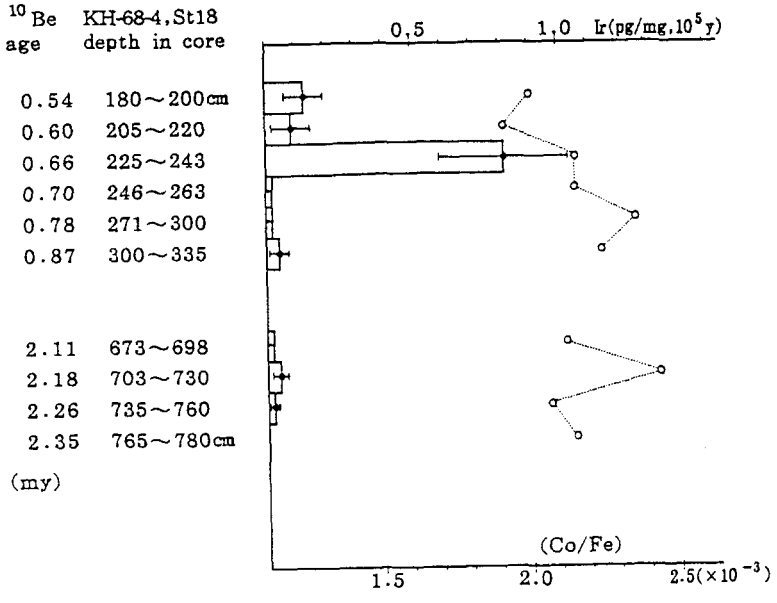
Fig.3 Ir and (Co/Fe) ratios in the core B (in detail).



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