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XIX. SIZE DEPENDENCE OF SIDEROPHILE ELEMENT CONCENTRATIONS IN BLACK MAGNETIC SPHERULES OF LARGER SIZES IN MARINE SEDIMENTS FROM GH80-1 CRUISE

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Introduction

The black magnetic spherules of larger than 400 μm in deep sea sediments sampled during the cruise of GH80–1 were analyzed. The largest one was 1340 μm in size. Their size dependences of siderophile element concentrations were studied. The black magnetic spherules in deep sea sediments were classified into three categories; (1) rough, brittle, black spherules with specific gravities lower than 4.0 (2) dull black spherules with smooth surfaces with specific gravities lower than 5.0 and (3) shinny metallic grey or shinny black spherules with occasional small vesicular cavities and their specific gravities exceed 5.0. The fractions of categories (1) and (2) did not exceed 10% of the total spherules.

All of the black magnetic spherules used in this work, which fall into category (3), were analyzed with instrumental neutron activation technique. And the size dependences of the siderophile element concentrations were investigated.

Experimental

The used sediments were sampled with the box-corer and the sample codes were B-37, B-40, B-43, B-44, B-49, B-53 and B-55. The detailed experimental procedures are described by NOGAMI *et al.* (1980). The results are shown in Fig. XIX-1; (Ir/Fe), Fig. XIX-2; (Au/Fe), and Fig. XIX-3; (Co/Fe). In the figures the points obtained by NOGAMI *et al.* (1980) and YAMAKOSHI *et al.* (1981) are also plotted. Those samples were also gathered at the Central Pacific Ocean with the R/V "Hakuho-Maru" during 1967–1972.

Results and Discussion

LAEVASTU and MELLIS (1955) reported no finding of spherules larger than 230 μm. They stated that the absence of spherules with a diameter larger than 230 μm was in agreement with theoretical considerations by OEPIK (1951). According to OEPIK's calculations, based on the collision theory of cosmic bodies and the POYNTING-ROBERTSON effect, essentially all cosmic bodies larger than 250 μm in size are intercepted by the Jupiter and therefore do not reach the earth. But lunar microcrater and meteor studies have since shown that meteoroids larger than 250 μm do exist at earth's position. And also we have discovered in this study spherules which are considerably larger than the OEPIK's cutoff. It is possible that larger dust grains are supplied from sources other than those considered by OEPIK (fragmentations of asteroidal belt or cometary supplies).

In Figs. XIX1–3, two phenomena can be seen; convergent (100–400 μm) and de-

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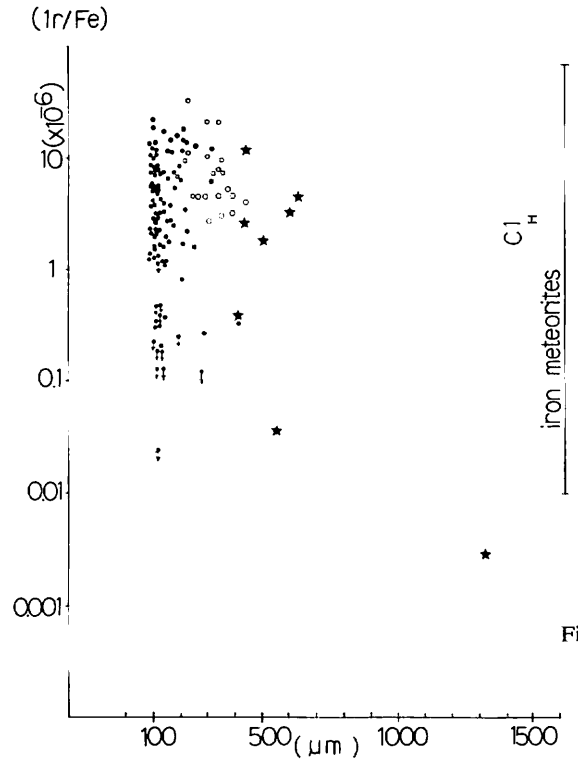

Fig. XIX-1 (Ir/Fe) ratios in black magnetic spherules from deep sea sediments sampled in GH80–1 cruise. open circle; NOGAMI *et al.* (1980), solid circle; YAMAKOSHI *et al.* (1981), and solid star; this work.

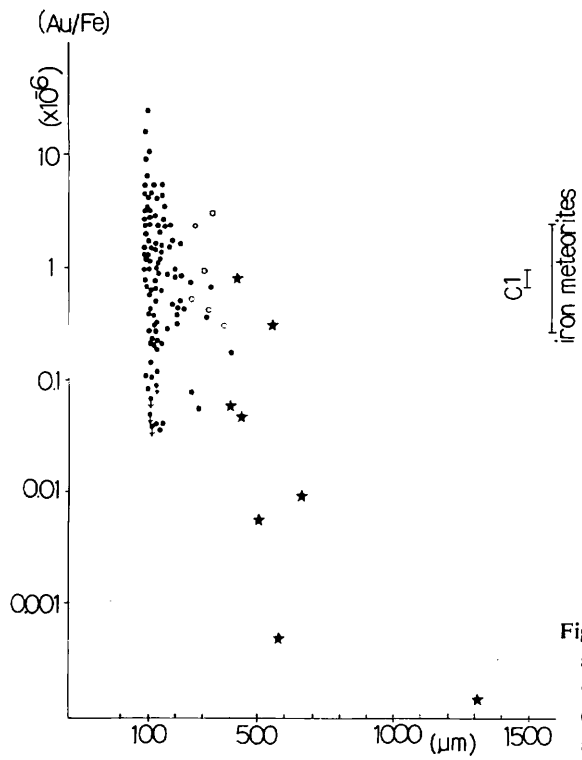

Fig. XIX-2 (Au/Fe) ratios in black magnetic spherules from deep sea sediments sampled in GH80–1 cruise. open circle; NOGAMI *et al.* (1980), solid circle; YAMAKOSHI *et al.* (1981), and solid star; this work.

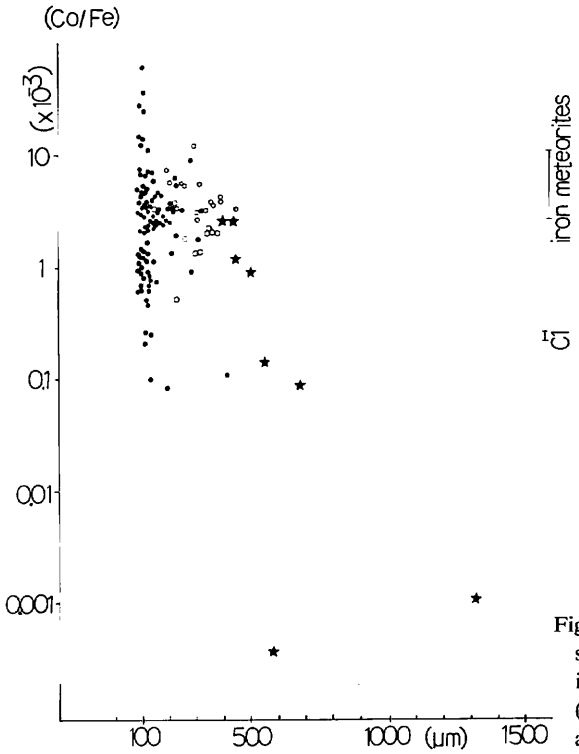

Fig. XIX-3 (Co/Fe) ratios in black magnetic spherules from deep sea sediments sampled in GH80–1 cruise. open circle; NOGAMI *et al.* (1980), solid circle; YAMAKOSHI *et al.* (1981), and solid star; this work.

creasing (>400 μm) tendencies with increasing size of the spherules.

Of course, an attention must be paid for decrease or loss of the dust grains by evaporation processes during the entry into the atmosphere. Experimental works of the original (pre-atmospheric) size estimations from various chemical element concentrations are in progress.

Origin of the two different distributions remains unsolved now.

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