

IX. SEA BOTTOM PHOTOGRAPHS FROM SHINKUROSE BANK AND ITS VICINITY

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Introduction

The Shinkurose Bank, which lies north-east of Hachijojima Island, and its vicinity are under the influence of the Kuroshio current, as is also the distribution of bottom materials. Sea bottom photography is very useful for understanding sea bottom environments.

We took 79 photographs in the area, using an undersea camera attached to a Smith-McIntyer grab sampler, and were able to perceive the influence of the Kuroshio current on the sedimentary distribution by analysing the photographs.

Method

The undersea camera system, consisting of a camera, a flash, a landing switch and a compass with a lead weight on the switch, is made by the Benthos Co. Ltd. The camera system was attached to the frame of the Smith-McIntyer grab sampler.

Focus and aperture are decided by the switch on the camera. The photographs were taken 1.5 m from the object, with an aperture of 5.6 and 2 m length of rope on the landing switch ($2 \div n = 1.5$; $n = 1.333$). Both colour and monochrome films were developed on board, and these helped in checking the bottom materials and the working of the grab sampler.

Results

Bottom features are grouped as follows from the results of sea bottom photographs. (Fig. IX-2, Plate IX)

1. Rocky bottoms

1-a. rock

H64

Flat rock, which may be limestone, is well exposed and joints can be seen. Corals can be seen on the bottom surface.

1-b. rock + organisms

H54. 74. 85. 99

Irregular rocks, which may be limestone with sea urchins, sea anemones and corals can also be observed.

1-c. rock + sediments

H53. 44. 75. 169

Rocks covered by sediments or sediments in the hollow of rocks can be observed.

2. Ripples

2-a. straight crested

H22. 66. 88

2-b. undulatory

H34. 41. 46

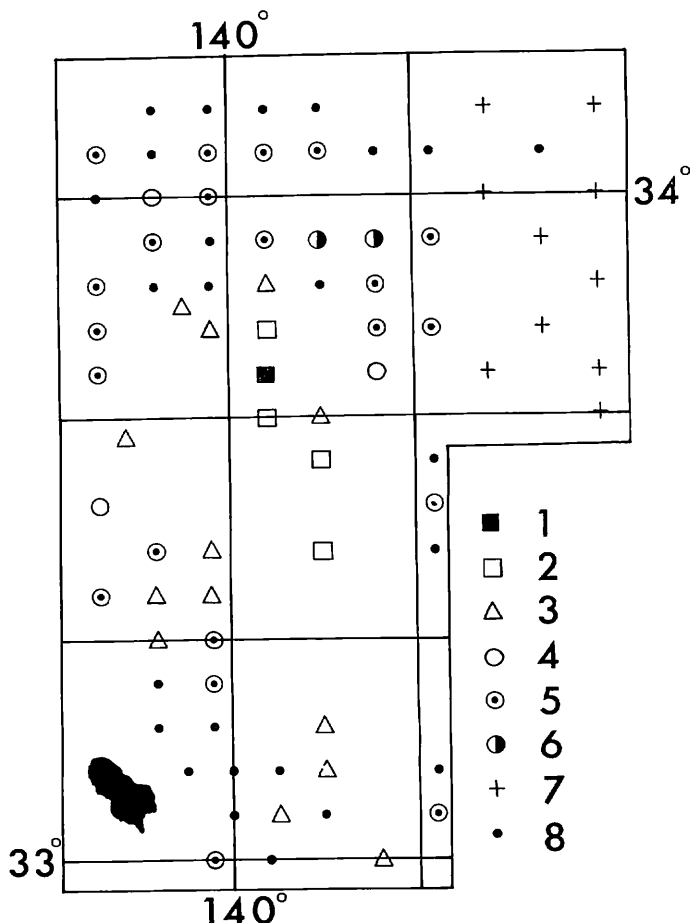


Fig. IX-2 Sea bottom photographic map. 1: rock, 2: rock and organisms, 3: rock and sediments, 4: straight crested ripples, 5: undulatory crested ripples, 6: strongly undulatory tending to lingoid, 7: mud, and 8: others.

corals.

Rocks (1-a, 1-b, 1-c) are distributed on and around the banks at depths of 200 to 720 m. Rock (1-a) was photographed at 475 m and rocks (1-b) at 200 to 300 m.

Ripples (2-a, 2-b, 2-c) were observed on the sea floor at depths between about 400 and 1300 m. Ripples (2-c) which develop under a relatively high velocity were found on the sea floor at depths of about 800 to 1000 m and all these ripples had developed in areas where there was a rocky bottom.

Ripples in the surveyed area were almost "small current ripples" and developed under current influence, not under the influence of wave or wind activity.

Judging the current direction from photographs of the ripples and from the

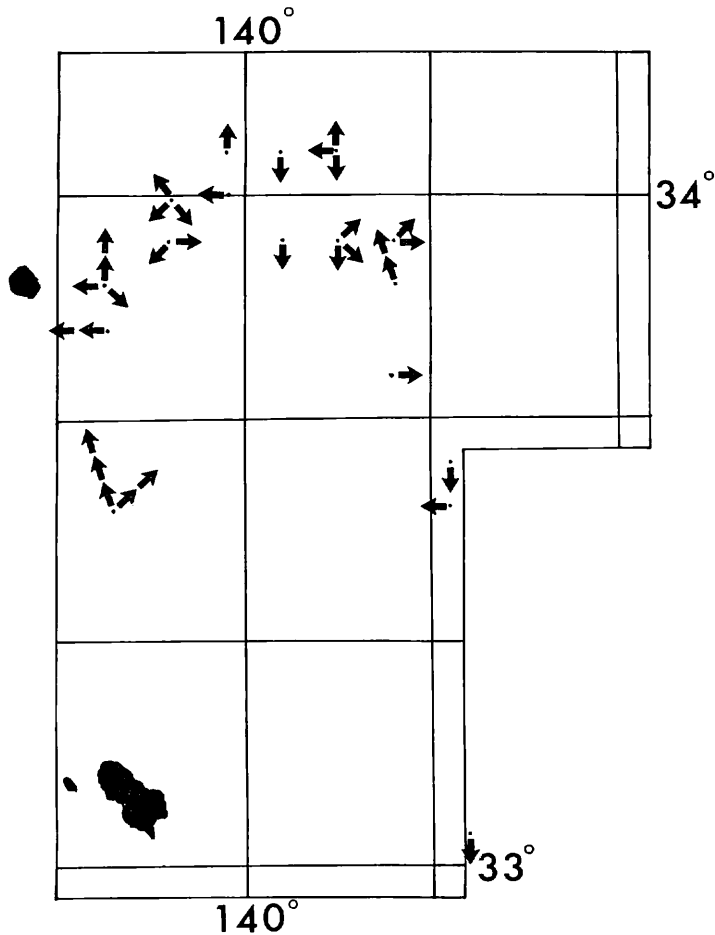


Fig. IX-3 Current directions determined by photographs.

compass, and supposing that the compass direction was correct, there seem to be several current directions (Fig. IX-3).

Discussion

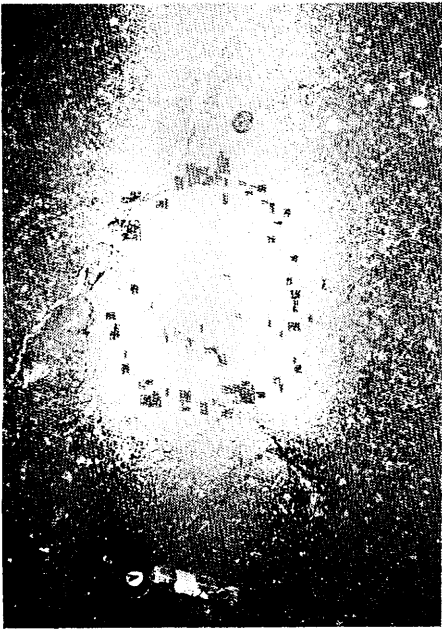
From the classification of ripples, the ripples in the survey area are almost small current ripples, so there must have been a current which made the ripples. Mud temperature analysis shows that a warm current is still active to a depth of 1000 m, and since the current flows everywhere in the surveyed area, it is reasonable to suppose that it is the Kuroshio current. The Kuroshio current is active to depths of about 1000 m, judging from distribution of ripples and mud.

There is very little suspended matter in this area, so the sedimentation rate may be very slow. The direction of the current as shown by ripple mark analysis

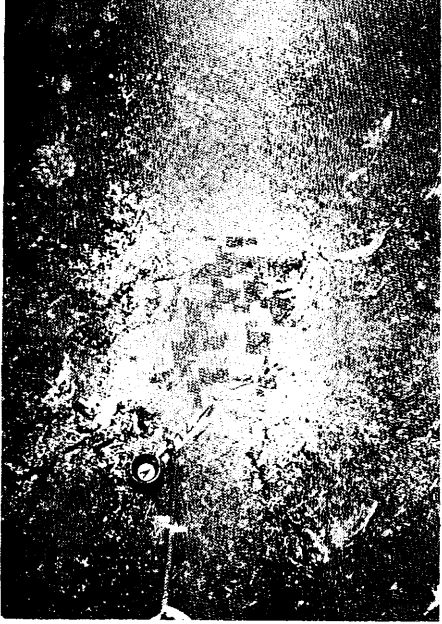
differs from that shown by mud temperature analysis. Further investigation is necessary to ascertain whether the compass functions correctly on reaching the sea floor.

Summary

Bottom sediments can be grouped on the basis of sea bottom photographs. Rocky bottoms and ripples develop on and around the banks. The distribution of rocky bottoms and ripples shows the influence of the Kuroshio current on sediment dispersal. The influence of Kuroshio current is slight at depths greater than 1000 m. The sedimentation rate in the area with a muddy bottom may be very slow.



H64



H74



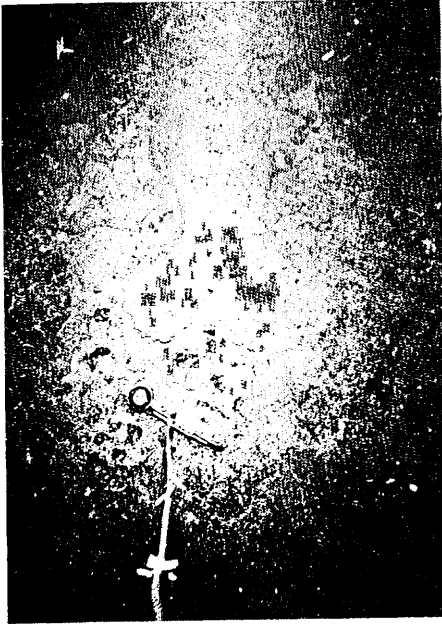
H54



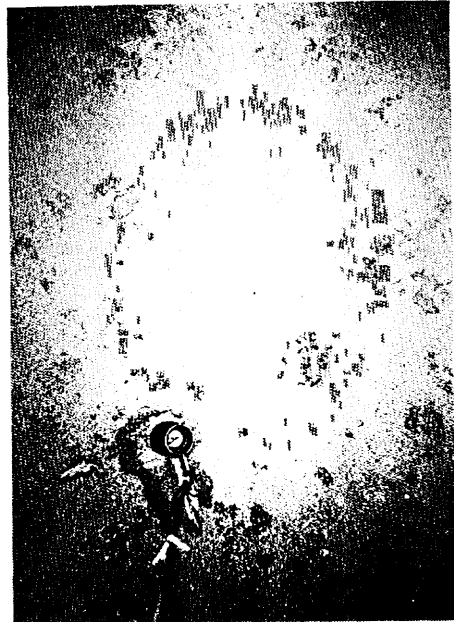
H85

Plate IX-1 Sea bottom photographs on the Shinkurose Bank and in its vicinity. H64 (475 m); rocky bottom cracked. H74 (278 m), 54 (300 m), 85 (195 m), and 99 (300 m); rocky bottom with organisms. H53 (495 m), 44 (450 m), 75 (340 m), and 169 (555 m); rocky bottoms covered by thin sediments. H174 (530 m); Gravelly bottom and a crab beneath artificial materials. H22 (1150 m), 66 (610 m), and 88 (615 m); straight crested ripples in sediments. H34 (855 m), 41 (1300 m), and 46 (860 m); undulatory ripples. H94 (532 m); muddy bottom. H35 (780 m), 36 (1020 m), and 10 (2700 m); lingoid ripples, H16 (1390 m), 3 (1230 m), 138 (450 m), 4 (1360 m), 30 (2480 m), 56 (697 m), 32 (1160 m), and 145 (410 m); various types of organisms on the sandy and muddy bottoms.

Note: () is the depth of water in meter.



H53



H75

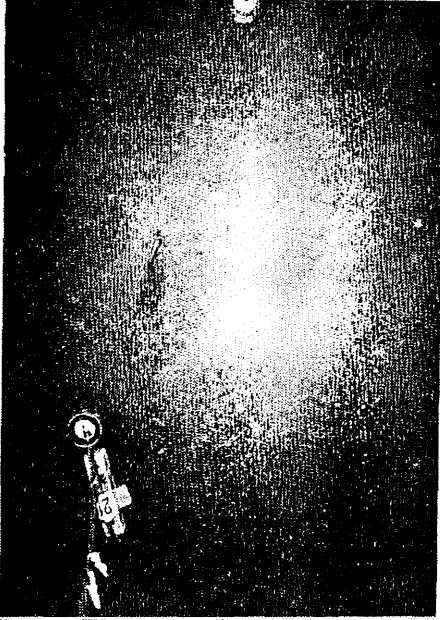


H99



H44

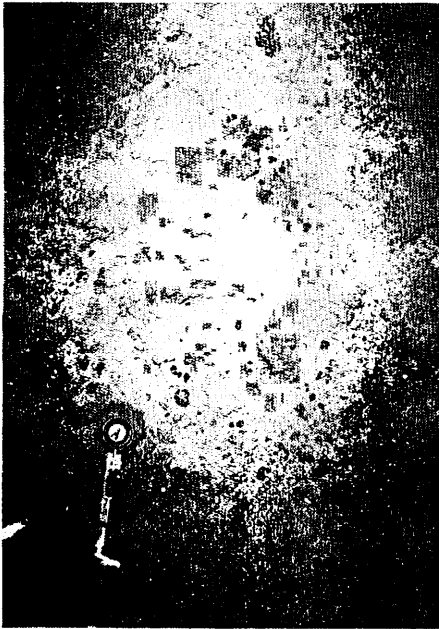
(ii)



H22



H66

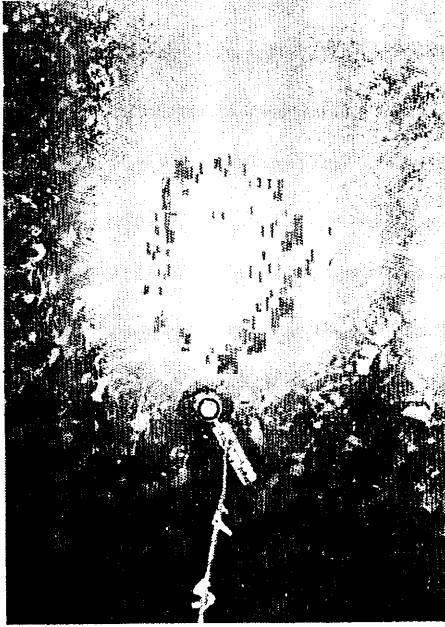


H169

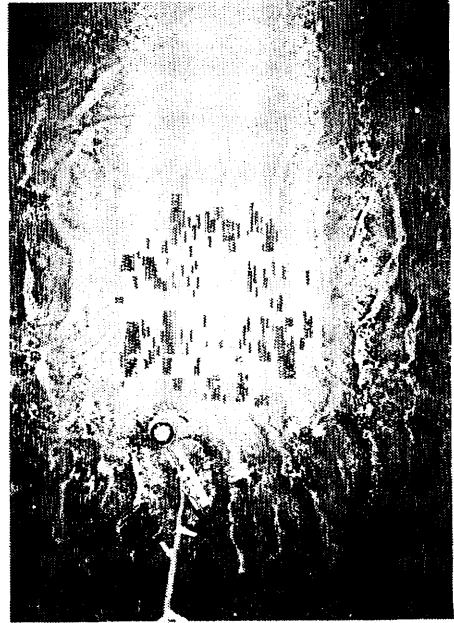


H174

(iii)



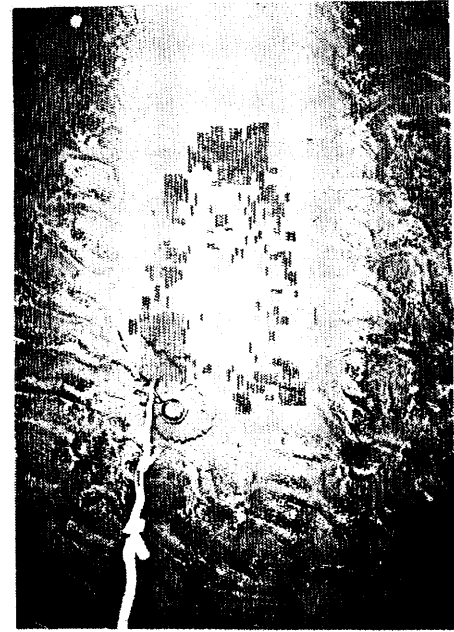
H41



H46



H88

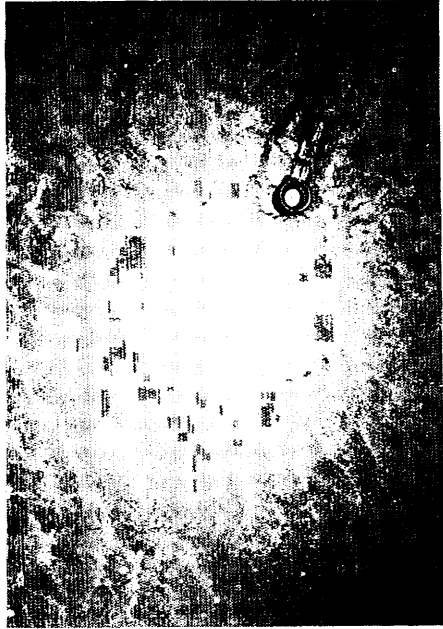


H34

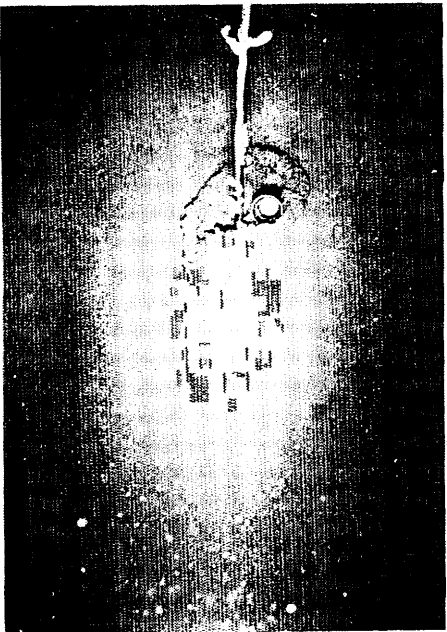
(iv)



H36



H10



H94

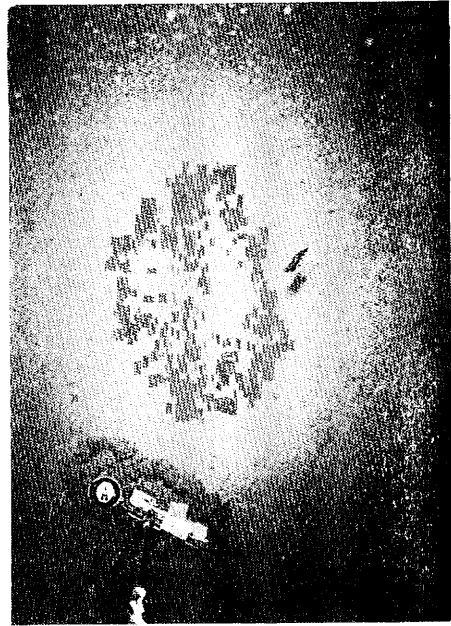


H35

(v)



H3



H4

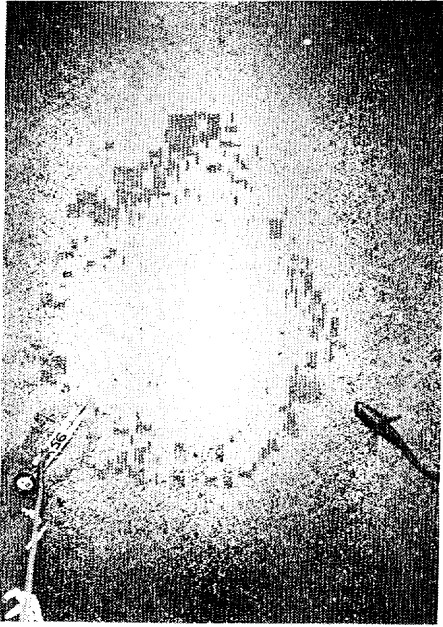


H16

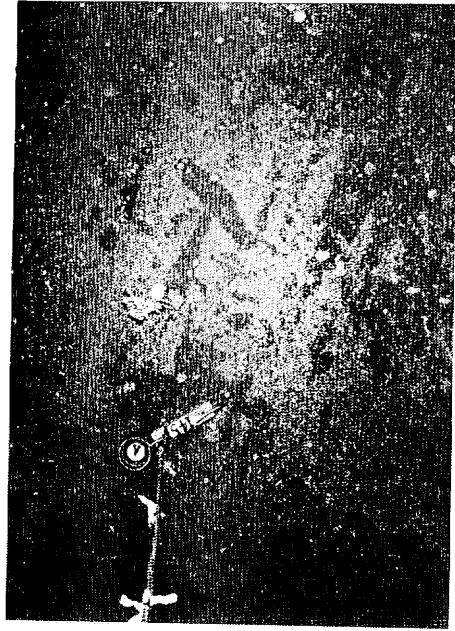


H138

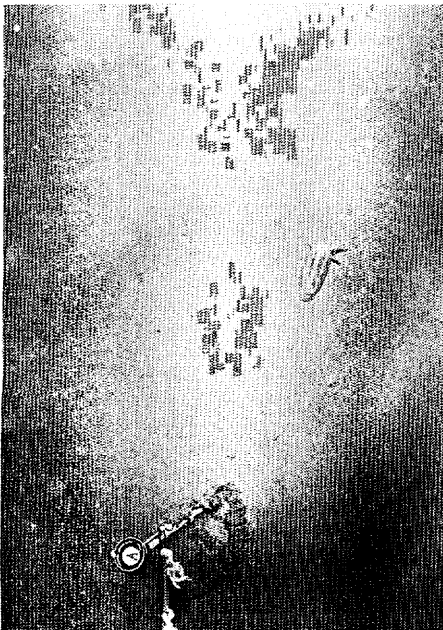
(vi)



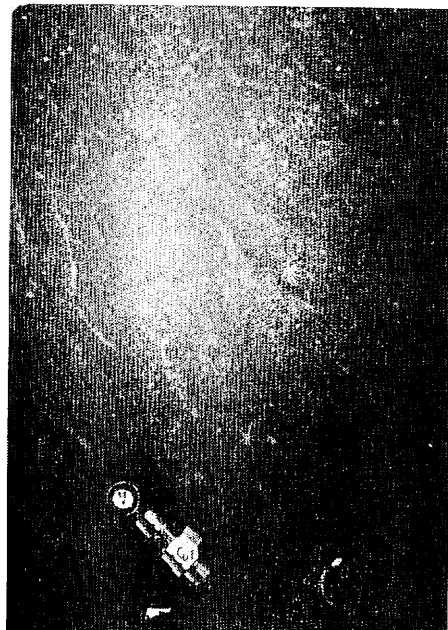
H56



H145



H30



H32

(vii)