

## Report of the Keiten-maru IGY Cruise, 1958

by

Masaaki CHAEN, Tomio HEMMI,  
and Tadao TAKAHASHI

### Abstract

Keiten-maru left Kagoshima harbour on July 9th, 1958 to complete the multiple ship survey in the western Equatorial Pacific, which was one of the IGY program, in cooperation with Takuyo and Satsuma. The radioactivity was determined on board Takuyo to be terribly high value at the northern side of the expected observing area. All the expected observations were given up with many regrets.

The Equatorial Currents in the western Pacific has not been widely investigated. Though the general features of the hydrographical conditions in the western Equatorial Pacific are discussed by T. Takahashi (1959, a) on the basis of materials obtained by Keiten-maru and Kagoshima-maru during 1952-1956, possible variations with time are disregarded in the discussion and the materials used are insufficient to find detailed structures of the Equatorial Currents. It is opportune that multiple ship surveys in the western Equatorial Pacific are taken into the Oceanographic Program of the International Geophysical Year of 1957-1958 in order to find the detailed structures of the Equatorial Currents, especially to determine the mass transport of the Equatorial Countercurrent and to find any proof in the area under consideration of such a Undercurrent as is reported by T. Cromwell, R. B. Montgomery, and E. D. Stroup (1954).

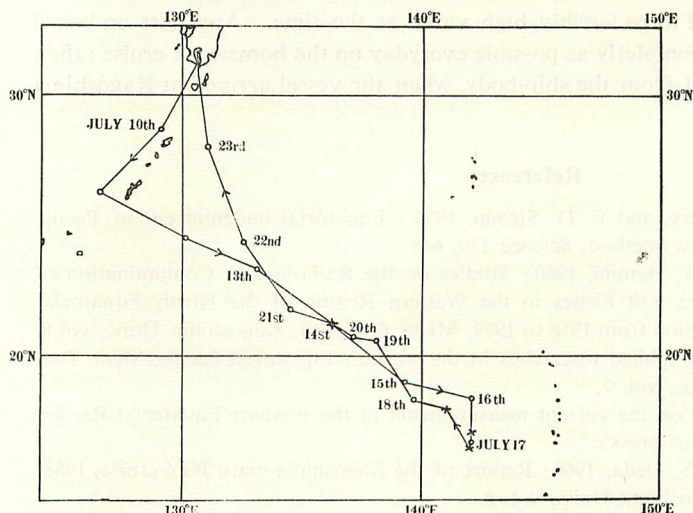


Figure. Map showing the track. Positions at noon of everyday are indicated by circles. Crosses indicate the points where water samples for radioactivity measurement are collected.

The multiple ship surveys with three vessels to be carried out in March and in August of 1958 were undertaken in the original schedule. In practice, because of many difficulties, the first survey with two vessels, Takuyo and Satsuma, was made in February (S. Yoshida, H. Nitani, and S. Suzuki, 1959), and the second one with single vessel, Kagoshima-maru, was made in April (T. Takahashi, 1959, b; T. Takahashi, M. Chaen, and S. Ueda, 1960). Thus, the cooperation of three vessels was eagerly



desired for the summer program.

Keiten-maru left Kagoshima harbour on July 9th to complete the summer program of the multiple ship survey with Takuyo and Satsuma which left Tokyo harbour on a few days before. The observations of temperature, salinity, and oxygen content, measurements of relative current with two current meters, repeated observations across the Equator between 2°N and 2°S, and current measurements by means of the parachute drogoue (G. Volkmann, J. Knauss, and A. Vine, 1956) were expected to be carried out.

Cruising towards an expected observing point at 13°N on 151°E, Keiten-maru received the telegram on July 15th at 19°N on 139°E from Takuyo saying that the radioactivity was determined to be 150 cpm from the sea surface water of 1 liter at 14°N on 153°E and to be 23,000 cpm from ship-body on board Takuyo. It was concluded on July 17th that all the expected observations with any of the three vessels should be given up to avoid possible disasters, on the basis of the rapidly increasing radioactivity determined on board Takuyo cruising towards south along the meridian of 153°E. Thus, Keiten-maru turned to home harbour on 17th with many regrets without carrying out the expected observations. The track is shown in the Figure. Water samples are collected at several points on the cruise and the radioactivity was determined by K. Saito (1960) in his laboratory after the end of the cruise to be as follows :

Collecting point		Radioactivity (cpm/l)	Date of	
Latitude	Longitude		collection	determination
16°47'N	142°04'E	22.8	July 17 th	July 30th
16 07	141 58	27.0	" "	" "
17 48	141 00	17.6	" 18	" "
21 11	136 13	trace	" 20	" "

These numerical values themselves are not so remarkable. It must be remembered, however, that Keiten-maru did not reach yet to the expected observing areas where the radioactivity was considered to be terribly high value at the time. Any part on board Keiten-maru was washed as completely as possible everyday on the homeward cruise ; then the radioactivity disappeared from the ship-body, when the vessel arrived at Kagoshima harbour on July 24 th.

### References

- Cromwell, T., R. B. Montgomery, and E. D. Stroup, 1954 ; Equatorial undercurrent in Pacific Ocean revealed by new method, *Science* 119, 648.
- Saito, K., M. Sameshima and T. Hemmi, 1960 ; Studies on the Radiological Contamination of Sea Water, Planktons and Fishes in the Western Region of the North Equatorial Current during the Period from 1958 to 1959, *Mem. Fac. Fish. Kagoshima Univ.*, vol 8.
- Takahashi, T., 1959, a ; Hydrographical researches in the western Equatorial Pacific, *Mem. Fac. Fish. Kagoshima Univ.*, vol. 7.
- Takahashi, T., 1959, b ; A note on the current measurements in the western Equatorial Pacific, *J. Ocea. Soc. Japan* (in press).
- Takahashi, T., M. Chaen, and S. Ueda, 1960 ; Report of the Kagoshima-maru IGY cruise, 1958, *Mem. Fac. Fish. Kagoshima Univ.*, vol. 8.
- Yoshida, S., H. Nitani, and N. Suzuki, 1959 ; Report of multiple ship survey in the Equatorial region (IGY), *Hydrog. Bull., Mar. Saf. B. Japan*, no. 59.
- Vokmann, G., J. Knauss, A. Vine, 1956 ; The use of parachute drogues in the measurement of subsurface ocean currents, *Trans. Amer. Geop. U.*, vol. 37, no. 5.