

*Variation of the Atmospheric Carbon-14  
in Recent Years at Tokyo*

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(Received September 25, 1961)

This note presents the results of measurements made in recent years of the atmospheric carbon-14. The data are expected to furnish informations about the circulation problems of geophysics as well as to contribute to the evaluation on the hazard from the man-made radionuclides. The atmospheric carbon dioxide was collected in Tokyo by means of the absorption in the sodium hydroxide solution. The radioactivities were measured by an acetylene filled proportional counter as described in the previous paper<sup>1)</sup>.

The results obtained are shown in Table I. The unit of the values of the carbon-14 concentration listed in the table is a concentration of atmospheric carbon-14 at eighteenth century

1) K. Kigoshi and Y. Tomikura, This Bulletin, 33, 1576 (1960).

TABLE I. ATMOSPHERIC CARBON-14  
CONCENTRATION

Collection date	Measured concentration of carbon-14*
1959	
20 Oct.	$1.240 \pm 0.016$
20 Nov.	$1.250 \pm 0.013$
4—5 Dec.	$1.172 \pm 0.014$
1960	
20 Jan.	$1.149 \pm 0.017$
1—5 Feb.	$1.113 \pm 0.013$
22—24 Feb.	$1.240 \pm 0.027$
2 April } 9 May }	$1.121 \pm 0.011$
25—26 May	$1.105 \pm 0.010$
24—25 June	$1.105 \pm 0.010$
27—29 July	$1.140 \pm 0.005$
5—7 Sept.	$1.105 \pm 0.014$
25—27 Sept.	$1.172 \pm 0.009$
24—26 Oct.	$1.121 \pm 0.009$
24—26 Nov.	$1.021 \pm 0.009$
22—24 Dec.	$1.219 \pm 0.018$
1961	
25—27 Jan.	$1.010 \pm 0.014$
21—23 Feb.	$1.072 \pm 0.011$
21—22 April	$1.265 \pm 0.016$
24—26 May	$1.112 \pm 0.009$

\* The unit is a concentration of the atmospheric carbon-14 at eighteenth century.

the annual variation of the cosmic ray intensity measured by using the tree ring samples.

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calculated from the measured concentration of carbon-14 in the tree rings growing at that time.

Rafter and Fergusson<sup>2)</sup> reported the carbon-14 concentrations in the atmosphere in New Zealand which showed regular increase of atmospheric carbon-14 concentration between December 1955 and December 1957 by nuclear tests. Compared to these data, Table I shows large fluctuation which might be due to the nature of the air mass at the collection date in Tokyo. The air mass into which carbon-14 from the stratosphere has been supplied at the latest time must have a high concentration of carbon-14. The exchange of carbon dioxide between the air and the surface ocean water may play an important role to suppress the atmospheric carbon-14 concentration. It has been observed by several authors<sup>2-4)</sup> that the carbon-14 concentration in the surface ocean water showed large fluctuation due to the mixing of the surface water with the deep sea water. If this fluctuation has strong influence on the atmospheric carbon-14 concentration, the consideration on this line has to be taken for the evaluation of the Suess Effect and of

2) T. A. Rafter and C. J. Fergusson, U. N. Con. on the Peaceful Uses of Atomic Energy, 18, 526 (1958).

3) S. Fonselius and C. Östlund, *Tellus*, 11, 77 (1959).

4) W. S. Broecker, R. Gerard, M. Ewing and B. C. Heezen, *J. Geophys. Res.*, 65, 2903 (1960).