

OBSERVATION OF TWECKS

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Tweck is a kind of atmospheric, which is observed at night and has a characteristic of descending tone continuing for several to few tens of msec. The spectrogram of tweck shows the trace like a sled, having a limiting frequency of about 1.8 KHz. It is well known that the limiting frequency is determined the reflecting layer at night and the distance from the source of tweck. Therefore, twecks have been used to estimate reflecting layer at VLF band.

Simultaneous observation of twecks and direction finding was made at Sakushima Observatory from Aug. to Oct. in 1969. Sufficient data for discussing the nature of twecks have not yet been obtained, so that merely a summary of the preliminary result is presented below.

Twecks begin to occur from about sunset and increase thereon until about three hours after the sunset, then, they are kept nearly constant and decrease from about three hours before the sunrise. It is difficult to observe the twecks after the sunrise. Fig. 1 shows the diurnal variation of occurrence number per minute of the twecks. Fig. 2 shows the distribution of arriving directions of twecks observed for five minutes

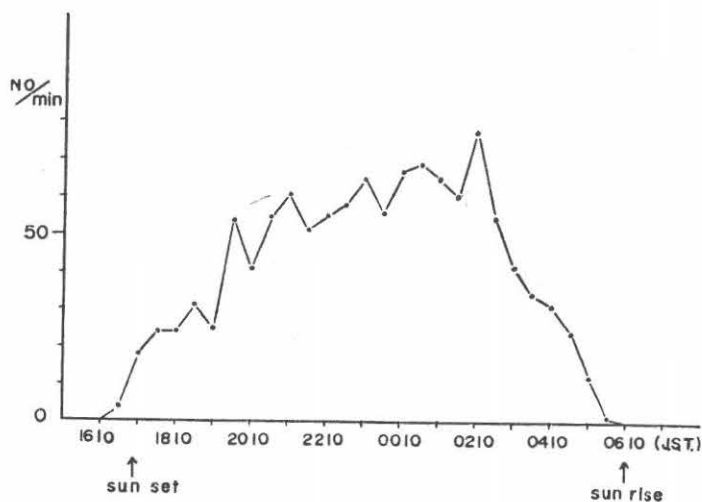


Fig. 1. Diurnal variation of the occurrence number of twecks observed at Sakushima twice one minute every hour from 16 h 10 m, Oct. 22 to 07 h 10 m, Oct, 23, 1969.

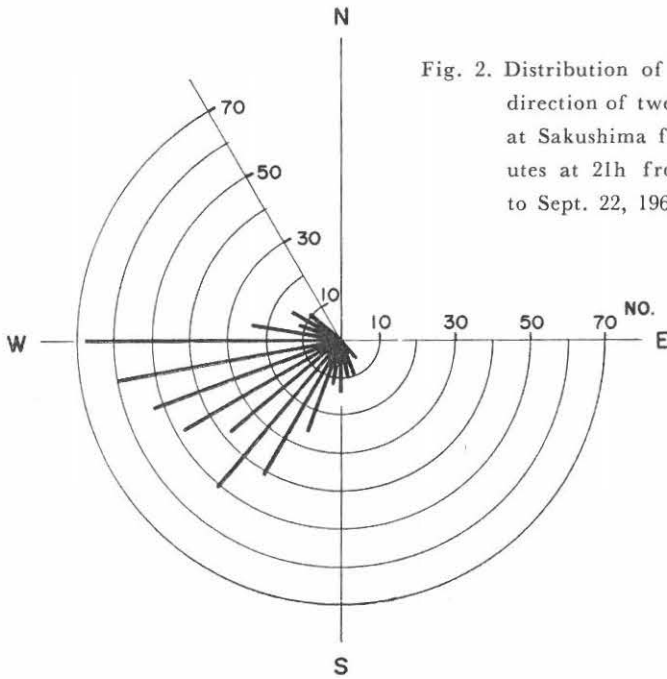


Fig. 2. Distribution of the arriving direction of twecks observed at Sakushima for five minutes at 21h from Sept. 17 to Sept. 22, 1969.

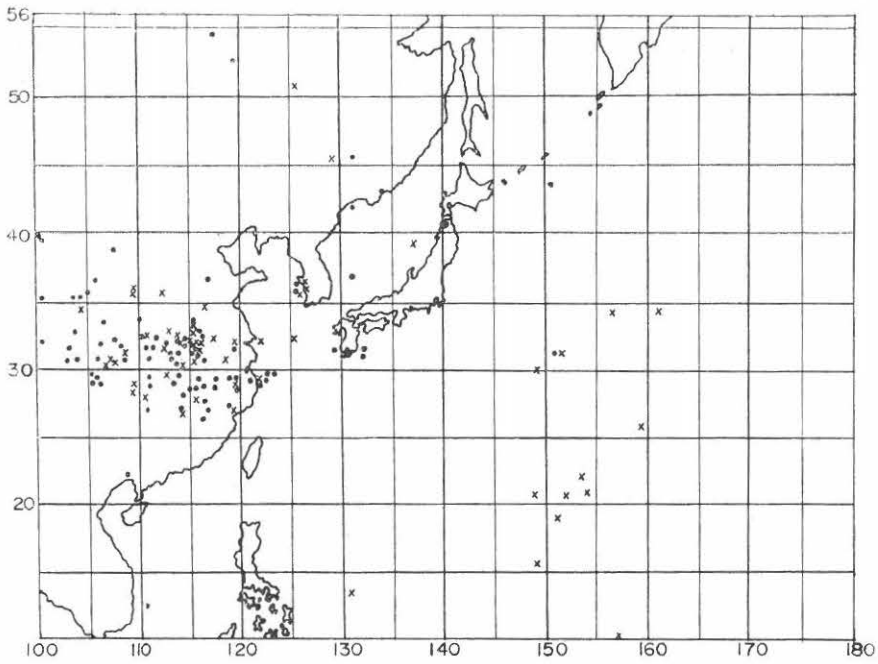


Fig. 3. Location of atmospheric sources observed for three minutes every hour from 19 h 10 m, Aug. 9 to 00 h 10 m, Aug. 10, 1969.

× shows the source of tweck.

● shows the source of atmospheric.

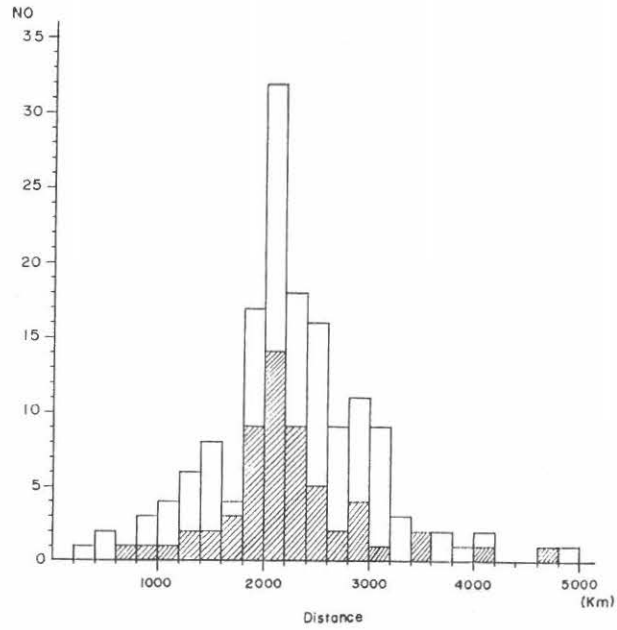


Fig. 4. Distribution of the occurrence number against distance from the source of atmospheric or tweek, observed for three minutes every $\frac{1}{4}$ hour from 19 h 10 m, Aug. 9 to 00 h 10 m, Aug. 10, 1969.
 ■ shows the occurrence number of tweeks.

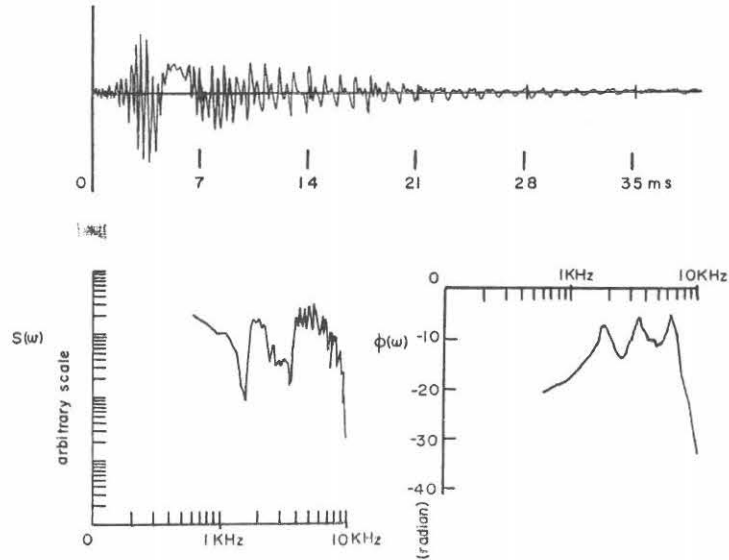


Fig. 5. Wave form and frequency spectrum of a tweek observed at 19 h 10m 26.5s 9 Aug. 1969 (J.S.T.) at Sakushima and traveled distance of tweek is 1900 km.

at 21 h. In Fig. 2 shown is the evidence that most of the tweeks received in the evening come from the directions distributing from south-west to west.

Fig. 3 shows the locations of atmospheric sources occurred during this observation period. They are fixed using the data obtained by the simultaneous use of direction finding network.

Shown in Fig. 4 is the histogram of tweek occurrences with respect to distances from the sources. It is clear that the histogram has a peak at 2000 km.

An example of frequency spectrum of a tweek is shown in Fig. 5, and is obtained by means of Fourier analysis using an electronic computer. The process is very useful to know the limiting frequency and the height of reflecting layer.

As a summary, in the evening hours most of the tweeks are found to come from south-west to west directions, while before the sunrise a few tweeks are found to come from south-east directions. It is found that about 37 % of the atmospheric fixes obtained with the direction finding network at night are characteristics of tweeks. But, unfortunately, the result may not be sufficiently confirmed, because the observation period is too short to confirm this result, investigations on the topics are going to do in near future and the result to be obtained will be reported elsewhere in further publications.