

# THE CORRELATION OF OCCURRENCES OF WHISTLERS WITH GEOMAGNETIC ACTIVITIES

ATSUSHI KIMPARA

*Department of Electrical Engineering*

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In order to study the correlation of geomagnetic activities with the frequency of occurrences of whistlers, the author investigated the IGY and IGC Data for 2 years, *i.e.* 1st July 1957 to 30 June 1959, in our station—Toyokawa (Geogr. coord. N 34° 50', E 137° 22'; Geomag. coord. 24.5°, 203.5°) and Wakkanai (Geogr. coord. N 45° 22', E 141° 41'; Geomag. coord. 35.3°, 206.0°)—and the 3-hour-range K indices of Kakioka Magnetic Observatory.

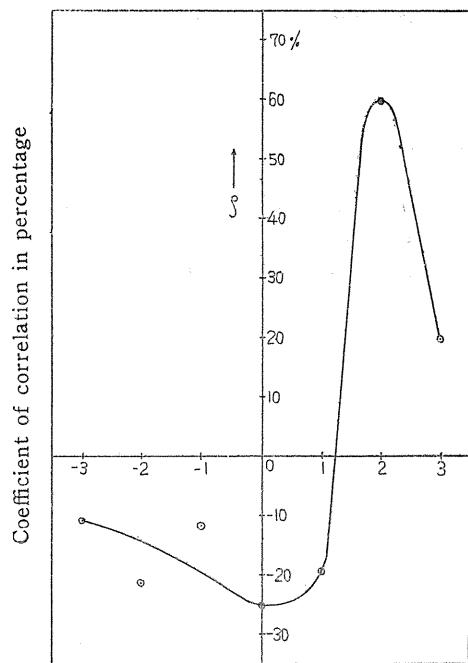
To show most efficiently the geomagnetic disturbed days, he defined as "Effective-K-Index" the sum of products of the K-indices "5, 6.5 (for 6 or 7) and 8 (for >8)" and their number of occurrences per day; the indices 5, 6 or 7 and >8 mean moderate storm, moderate severe storm and severe storm respectively. At first he made a diagram showing the correlation between his "Effective K-Index" and the number of occurrences of whistlers, and found that they can be classified rather distinctly into 2 groups; one belongs to the winter group from October or November to March or April where many whistlers are found every month; the other to the summer one from May to September where smaller numbers are found. It is difficult to find a single low applicable both to winter and summer groups.

The author deduce that the frequency of occurrences of whistlers has a definite seasonal variation depending on thunderstorm activities, distributions of electron density and geomagnetic intensity in the exosphere and in the ionosphere due to solar activities and other yet unknown cosmic phenomena; daily variations due to effective K-index are superposed upon this general seasonal variation. Thereupon intended to investigate the correlation of the effective K-index with the frequency of occurrences of whistlers observed at Wakkanai in the most frequent periods, *i.e.*, in September, December 1957, January, February, March, December 1958, January, February and March 1959; Wakkanai was taken due to remarkable occurrences of whistlers there.

Taking disturbed days where effective K-indices are more than 6 as reference, the author investigated its correlation with the frequency of occurrences of whistlers, and found that the correlation was most remarkable on the 2nd day after geomagnetic disturbances; really the correlation coefficient on the 2nd day was +0.60 as shown on the Table 1, and in Fig. 1 from which he concluded that whistlers occur most frequently on the day which lags two days after geomagnetic disturbances. In the summer group the same correlation was not found.

TABLE 1. Correlation between Lag of Occurrences of Whistlers and Geomagnetic Disturbances

Lag of days of occurrences of whistlers behind geomagnetic disturbances	-3	-2	-1	0	1	2	3
Coefficient of correlation	-0.11	-0.21	-0.12	-0.25	-0.19	+0.60	+0.20



Lag of days of occurrence of whistlers behind geomagnetic disturbances

FIG. 1. Correlation between lag of occurrences of whistlers and geomagnetic disturbances.