

Section 5. Atmospheric Radio Noise

So far, the study of atmospheric noise has been made, both theoretically and experimentally, on the property and level of atmospheric noise in terms of the following parameters :

- (1) Amplitude probability distribution,
- (2) Crossing rate distribution,
- (3) Pulse-width distribution,
- (4) Distribution of the spacing between pulses,
- (5) Field strength of integrated atmospherics.

It is well known that remarkable progress has been made in the study of the detailed structure of atmospheric noise in VLF through SF bands, by introducing the statistical method. Accordingly, we are convinced that some contribution can be expected in the field of atmospherics other than the atmospheric noise, by the method. A few examples are the phenomena in ELF electromagnetic wave, VLF emission, and the discharges in the source.

We have various plans in the near future. The following, especially, will be carried out before long.

- (A) Measurement of the amplitude-probability distribution in VLF through LF bands to examine the agreement between the measured and theoretical distributions.
- (B) Establishment of a relation between the amplitude probability distribution and crossing rate distribution.
- (C) Measurement of the frequency spectrum of the crossing rate in the high range of threshold field strength.
- (D) Measurement of the statistical parameters of the ELF noise.

The present state of study is as follows. The observation of the crossing rate in the range of high threshold field strength made during IQSY period displayed an interesting result, especially in relation with the SEA's.⁽³⁾

We started a preliminary observation of the complete crossing rate distribution at 4 different frequencies from VLF to LF band, December 1966. In addition, the field strength of integrated atmospherics with a time constant of 80 seconds is being measured continuously at 50 and 100 kc/s. The apparatus for measuring the ELF electromagnetic wave is being prepared now.

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Publications (1966-1967)

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- (2) Nakai, T. : Statistical Study of the Atmospheric Noise, Proc. Res. Inst. Atmospherics, Nagoya Univ., **16**, 1 (1966) (in Japanese).
- (3) Nakai, T., Nagatani, M., Yamaguchi, T. and Sawakata, K. : On the Crossing Rates of Atmospherics in the Range of High Threshold, this volume.