ON THE DIRECTION OF ARRIVAL OF ATMOSPHERICS AT TOYOKAWA (I)

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In the long waves range, to record the direction of arrival of atmosperics continuously and automatically has been carried out in Europe, especially in France and in England, since about 1925 to use the narrow-sector direction finder and much useful information has been reported by Bureau or the other workers. This observation method is the useful one to consider the source of atmospherics as a group and also has a advantageous point that it needs only few observer and expense for observations. The results obtained would be useful for making the atmospherics noise distribution chart and to the loran navigation on long waves and to the weather forecasting too.

Hence, we have carried out this work again since July 1952 at the Research Institute of Atmospherics in Japan (137°22′ E, 34°50′ N). In this paper, we described some results obtained from July 1952 to December 1953.

The monthly averaged arrival frequency diagrams is shown from Fig. 1 to Fig. 17 to use the polar co-ordinates. An outstanding poing in these figures is that the predominant direction of atmospherics arriving at Toyokawa is almost limited in the direction between south and west through the year and assume an aspect of some regular circuration to month, which aspect is illustrated in Fig. 18.

July, 1952.

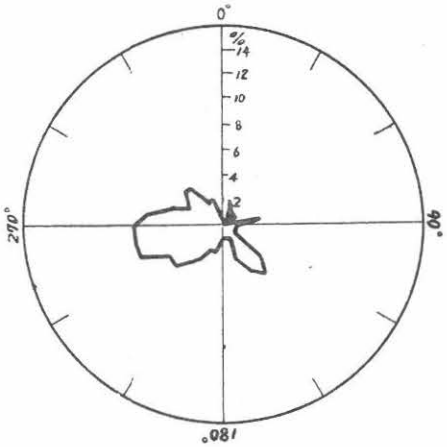


FIG. 1

August, 1952.

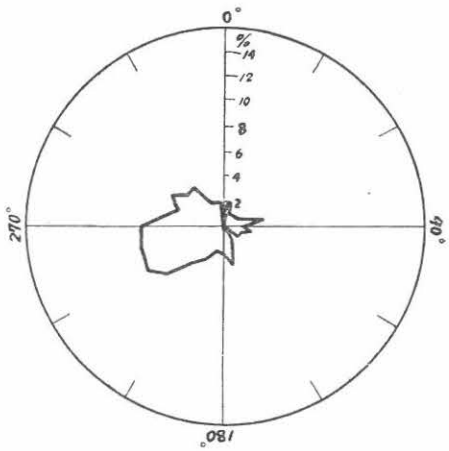


FIG. 2

September, 1952.

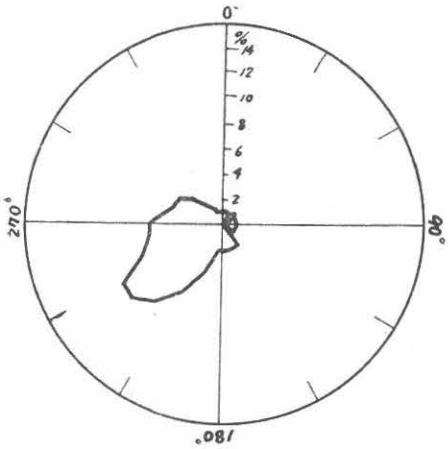


FIG. 3

October, 1952.

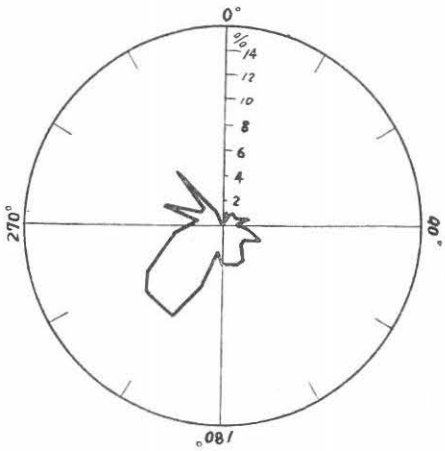


FIG. 4

November, 1952.

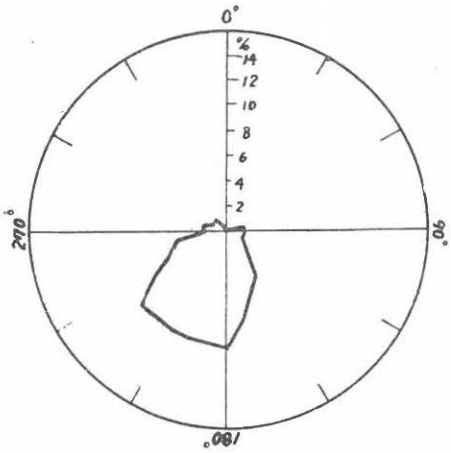


FIG. 5

December, 1952.

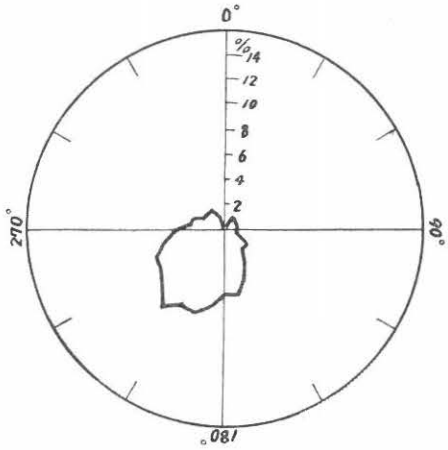


FIG. 6

January, 1953.

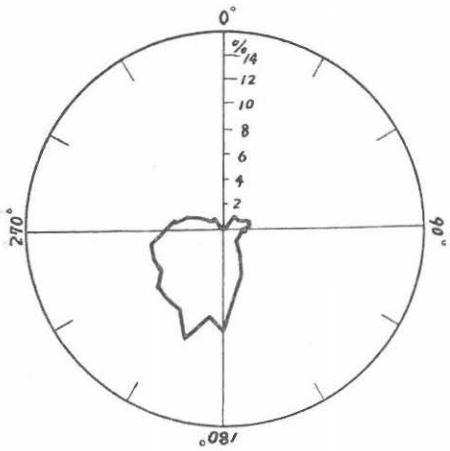


FIG. 7

Frbruary, 1953.

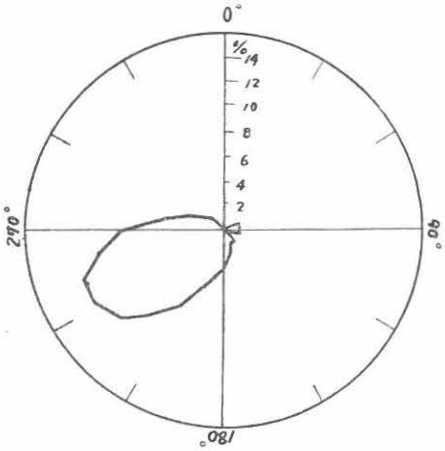


FIG. 8

March, 1953.

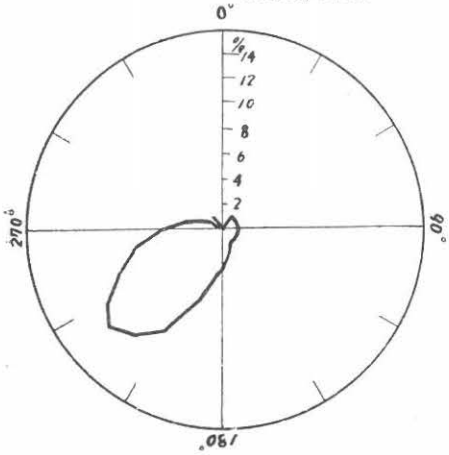


FIG. 9

April, 1953.

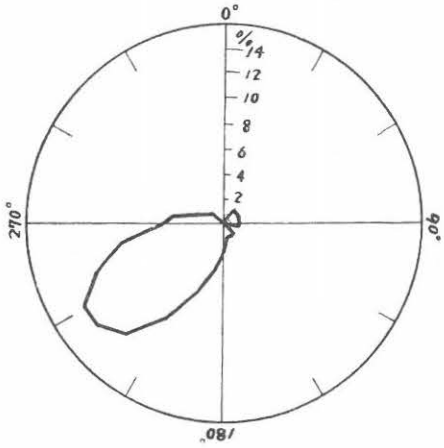


FIG. 10

May, 1953.

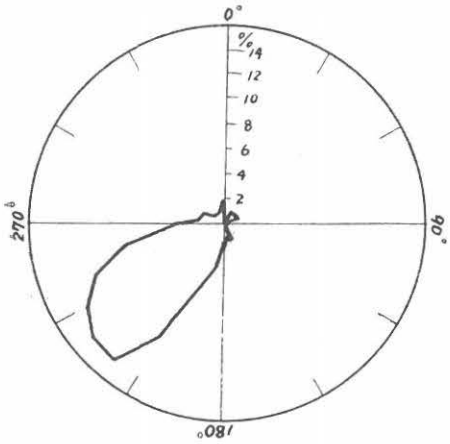


FIG. 11

June, 1953.

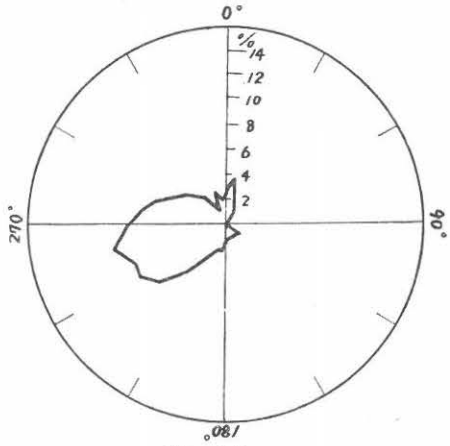


FIG. 12

July, 1953.

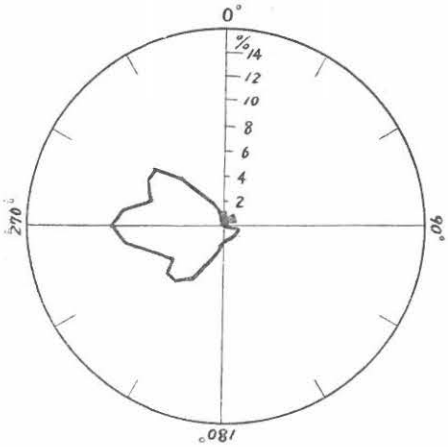


FIG. 13

September, 1953.

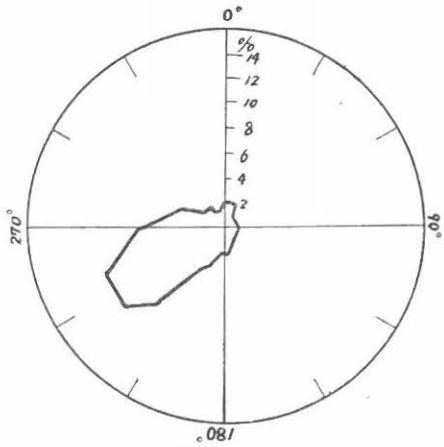


FIG. 14

October, 1953.

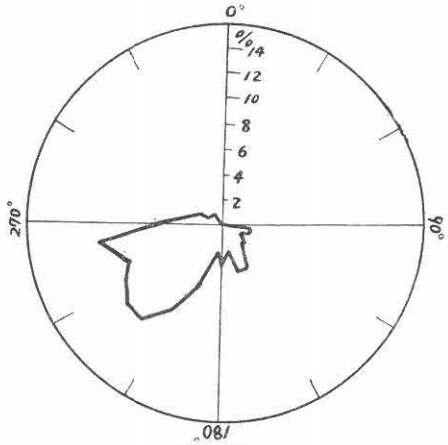


FIG. 15.

November, 1953.

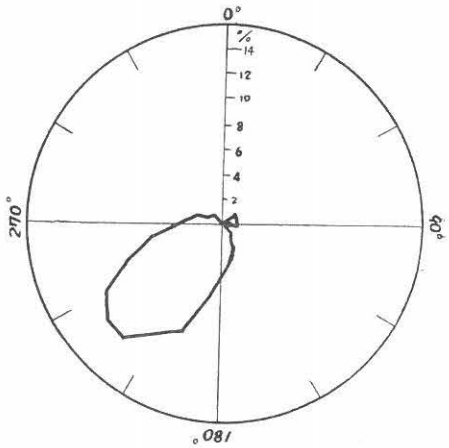


FIG. 16.

December, 1953.

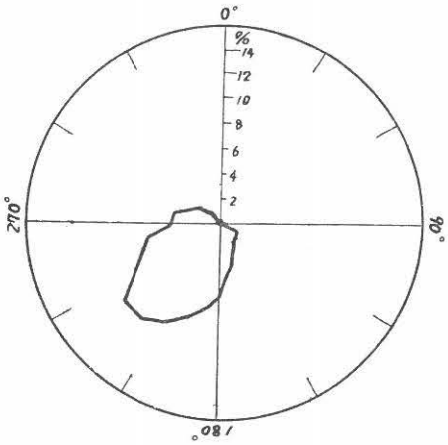


FIG. 17.

prodominant direction of atmospherics.

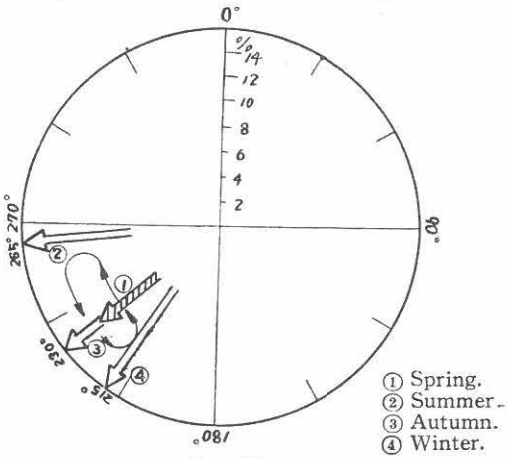


FIG. 18.

Among these predominant directions of months, we may recognize the months showing same tendency, *i.e.* March and April, June and July, September and October, December and January. From the point of the predominant direction, it may be said that the group of month mentioned above shows spring type, summer type, autumn type and winter type respectively. The seasonally averaged diagram of arrival direction is shown from Fig. 19 to Fig. 22.

The month lied between two seasons, *i.e.* like February, May, August and November, would show the same type which is belonged either the former or the latter month, according to the meteorological condition of the year. Considering that these four months are the turning point of the season, it would readily be imagined that the noncommital month exists in the predominant directions.

FIG. 19. Spring type of reception.

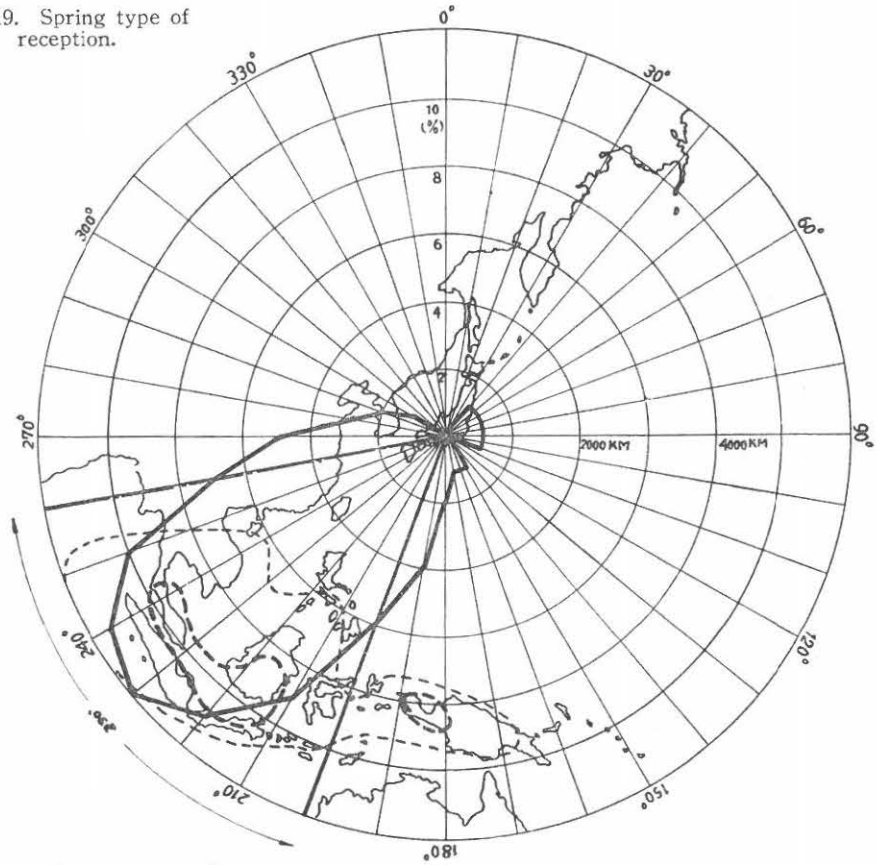


FIG. 20. Summer type of reception.

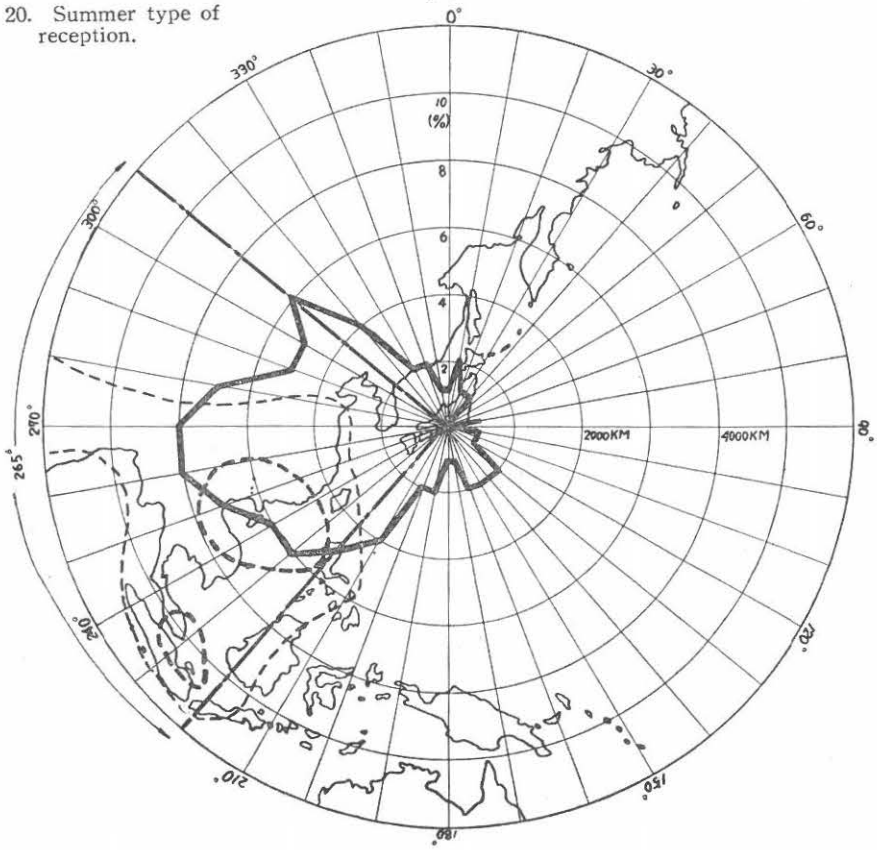


FIG. 21. Autumn type of reception.

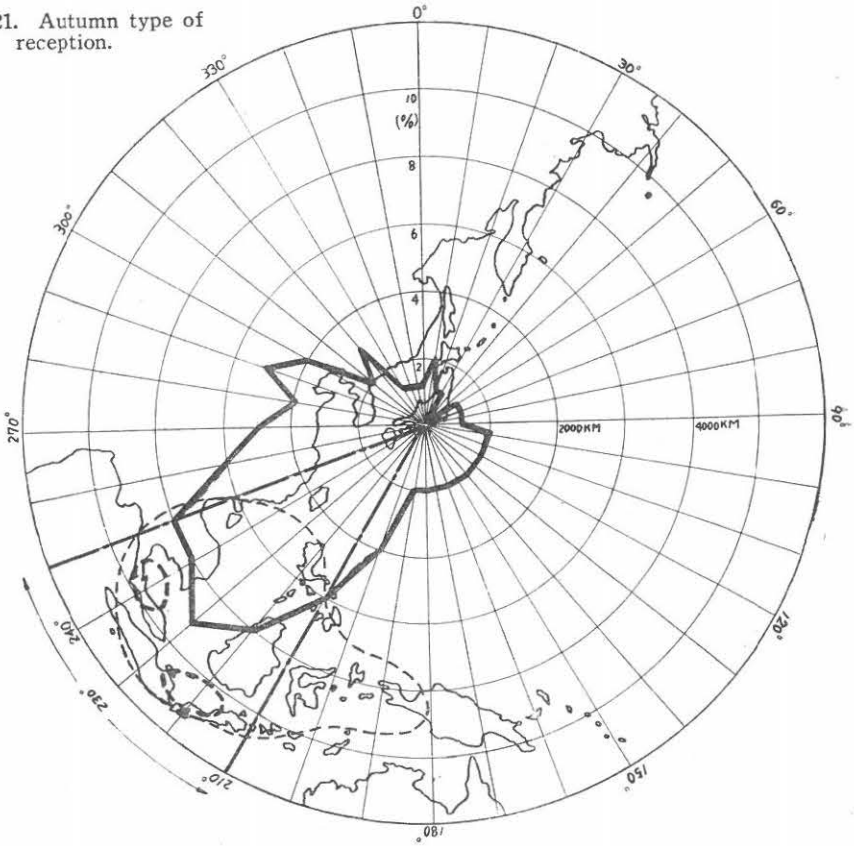
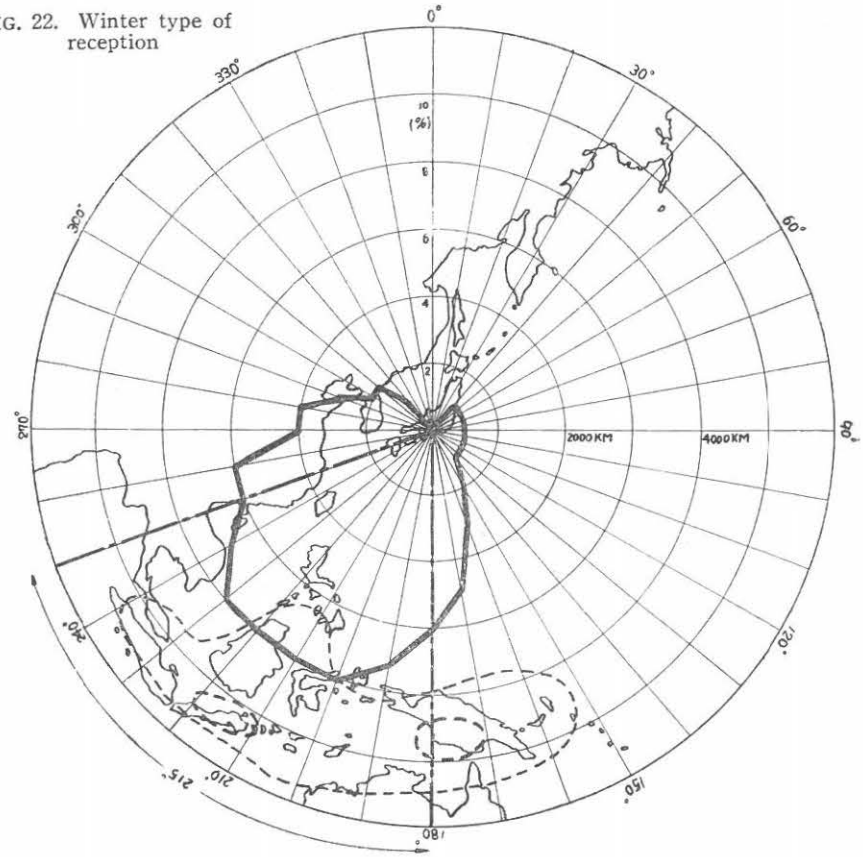


FIG. 22. Winter type of reception



The movement of the predominant direction is likely to depend mainly on the movement of the thunderstorm area in the tropical zone which is considered to the seasonal origins of atmospherics.

Some small peak of other direction in the diagrams seems to depend on a local thunderstorm, storm-centre or front which are considered to the unseasonal origins.

On the movement of the unseasonal origins, though this was the observation of only one point, the movements as a group has been recorded and it was especially clear in the direction which was rarely received the atmospherics.

References

1) A. Kimpara: Bull. Res. Inst. of Atmos. Nagoya Univ. Vol. **1**, No. 1 (1950).
2) R. Bureau: Les foyers d'atmosphériques, (1936).
3) T. Kamada: Bull. Res. Inst. of Atmos. Nagoga Univ. Vol. **2**, No. 2 (1952).