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SUNSPOTS: RADIO, OPTICAL AND GEOMAGNETIC FEATURES

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Noise storms on metre wave-lengths originate high in the corona over particular sunspots. Generally, the enhanced radiation comes to a maximum when these sunspots cross the central meridian. If the radiation exceeds a fixed intensity, the sunspots are called noisy (R sunspots); the others are called quiet (Q sunspots). Unfortunately until now only a few interferometer measurements enabled us to know these 'noisy sunspots', but the strong directivity of this emission can be used to determine these sunspots in a statistical manner. We have done this for the sunspots having an average area bigger than 100 millionths of the sun, from 1947 to the middle of 1951. We have thus studied the statistical features for 350 sunspots, 160 of which are noisy and 190 quiet.

1. OPTICAL FEATURES

One research aim was to see if there is some correlation between radio and optical features. A sunspot has a better chance to be noisy the bigger it is, but of the biggest spots one-quarter are quiet. In the Zürich evolution types, the F sunspots are significantly more often noisy than quiet. Strangely enough, the spots with the most important flares or the ones with an abnormal number of flares are not particularly liable to be noisy. In conclusion we think there is no special correlation between radio and optical features.

2. GEOMAGNETIC FEATURES

Another research aim was to find the correlation between the central meridian passage of the sunspots and the geomagnetic activity. The method of superimposed epochs was applied to the K_P figures. The results were:

(a) The central meridian passage of the noisy or R sunspots is correlated with an increase of geomagnetic activity during the first days following this

passage; the central meridian passage of the quiet or Q sunspots is correlated with a decrease of geomagnetic activity.

(*b*) As far as the central meridian passage of the spots with the most important flares or of the ones with an abnormal or subnormal number of flares is concerned, we detected that the geomagnetic activity is more closely correlated with the radio features than with the optical features.

Studying the solar enhanced radiation appears to be a new and very interesting method of investigating solar terrestrial relations. The solar radio observations during the next years, especially during the International Geophysical Year, will be very useful in making these relations more explicit, particularly those between the solar activity and the geomagnetic activity or ionospheric disturbances.

A detailed account of this investigation has been published [1].

REFERENCE

[1] Simon, P., *Ann. d'Astrophys.* **19**, 122 (no. 3), 1956.