ON THE CONNECTION BETWEEN N–S AND E–W
SOLAR ASYMMETRIES

(Research Note)

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In a previous paper (Godoli and Poletto, 1969) it has been pointed out that an influence on the solar activity of the motion of the sun towards the solar Apex would result in

1. a variation with heliographic latitude of the N–S asymmetry;
2. a variation during the year of the E–W asymmetry.

As far as point (1) is concerned we have examined sunspot group numbers and equatorial photospheric facula areas for the period 1944–1964 (Waldmeier, 1968); polar photospheric facula numbers for the period 1960–1967 (Waldmeier, 1961–1968); numbers of the prominences on disc for the period 1932–1949 (Righini and Godoli, 1950); numbers of the prominences at limb for the period 1933–1960 (Godoli, 1961; Noci and Rigutti, 1961 and 1962); numbers of the surges at limb for the period 1957–1964 (Godoli and Mazzucconi, 1967).

Figure 1 shows the variation with heliographic latitude of the N–S/N + S asymmetry index for the phenomena taken into account. \( \chi^2 \) test showed that the probability of the existence of the asymmetries are generally greater than 90%. Values with probabilities smaller than 90% are indicated with dashed lines.

From this figure it seems reasonable to deduce the existence of the expected variation.

As far as point (2) is concerned we have examined prominence numbers for the period 1933–1961 (Godoli, 1961). Sunspots and coronal line intensities were already examined by Trellis (1960, 1967).

Figure 2 shows the variation during the year of the E – W/E + W asymmetry index for prominence numbers. Also in this case \( \chi^2 \) test showed that the probabilities of the existence of the asymmetries are generally greater than 90%. Values with probabilities smaller than 90% are indicated as previously with dashed lines.

Figure 2 does not confirm Trellis’ (1960, 1967) results.
Fig. 1. Variation with heliographic latitude of the N−S/N+S asymmetry index for the solar phenomena taken into account. $\chi^2$ test was not calculated for photospheric faculae.