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The distribution of sunspots over the sun

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The distribution of the sunspots for the 11yr period 1970–1980 is presented here. We have separately studied the distribution of the sunspots for weak (100–1000 G) and strong fields (1100–3000 G). We find that mostly ±11–12° latitude belt is most prolific for occurrence of various spot types (viz. AP, AF, B, BP, Y, and D) for weak and strong magnetic field ranges. Further, longitudinally sunspots occur most prolifically at six or more places on the sun. Spatially eight zones are present in each hemisphere (north or south) of the sun where about 50% sunspots occur. This indicates that there may be 12 or more active zones on the sun. The existing models cannot explain these active zones on the sun.

Solar rotation rate from Ca$^+$ K-index of the sun as star

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Daily measurements at Tucson of Ca$^+$ K-index of integrated sun have been used to derive solar rotation rate. Power spectral analysis shows that one can obtain the value of solar rotation rate from the sufficiently regular data of six months period. Thus, it is possible to study the variation of solar rotation rate with time. For comparison we have used the Ca$^+$ K-index measured at Sacrominto Peak and 10830 Å data of Kitt Peak.

Fabry-Perot line profiles in λ 5303Å and λ 6374Å coronal lines obtained during the 1983 eclipse.

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During the total eclipse of 1983 June 11 an imaging dual channel Fabry-Perot interferometer was used to obtain line profiles simultaneously in the green (λ5303 Å Fexiv) and the red (λ6374 Å, Fex) coronal lines at various points in the corona. Extensive microdensitometry followed by multi-Gaussian curve fitting analysis has resulted in the determination of coronal temperatures, velocity, separation between multi-Gaussian components in a profile and relative intensities in the two lines for many points in the emission corona.