

Short-term periodicities of solar differential rotation

J. Javaraiah

Indian Institute of Astrophysics, Bangalore 560 034, India

Recently, from the analysis of Greenwich data on sunspot groups during 1879-1976 we detected in the ratio B/A (of the coefficients of differential rotation), several periodicities >2 yr. Within their uncertainties, the dominant periodicities agree with the known periodicities in the surface magnetic field (Javaraiah & Gokhale 1995). In the present paper we compute FFT and MEM analysis B/A , using the values of A and B determined from Mt. Wilson full disc velocity data (Howard et al. 1983). Figure 1 shows the computed power spectra of B/A .

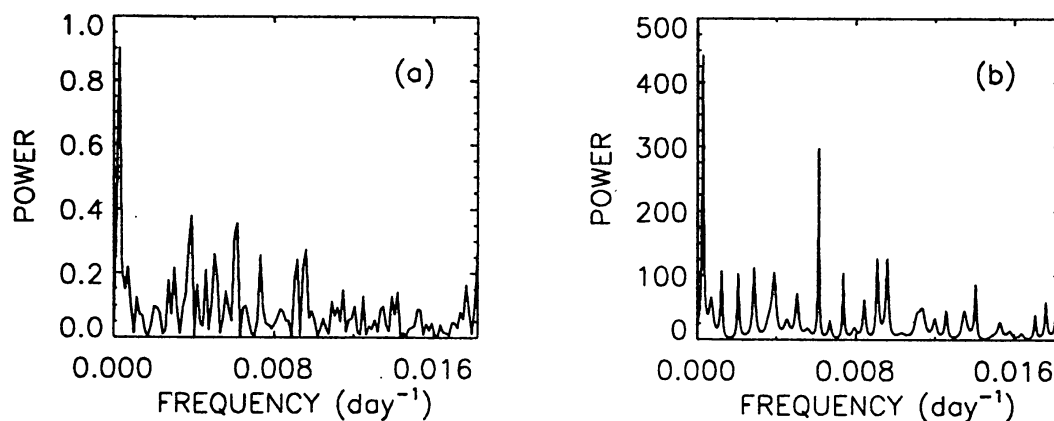


Figure 1. Power spectra of B/A obtained from (a) FFT and (b) MEM analyses.

The FFT spectrum shows, in addition to the known ~ 11 yr periodicity, the existence of periodicities in B/A at '258.6 day' and '162.4 day' with $>95\%$ confidence. The MEM spectrum also shows existence of the same periodicities in B/A .

The '162 day' periodicity of B/A fairly agrees with the 155-158 day periodicity known to exist in several solar activity indices. This suggests that the 155-158 day periodicity of solar activity (including flare activity) may be of the global origin.

References

- Howard R., Adkins J.M., Boyden J.E., Cragg T.A., Gregory T.S., LaBonte B.J., Padilla S.P., Webster L., 1983, *Solar Phys.*, 83, 321.
 Javaraiah J., Gokhale M.H., 1995, *Solar Phys.*, 158,173.