

Solar-cycle variation of oscillation frequency and surface magnetic field coefficients

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Summer 2011

Abstract

In this project I investigate the relationship between solar oscillation frequencies and surface magnetic fields over the course of the last solar cycle. Using MDI and GONG data, I study the variation in the even frequency-splitting coefficients a_k (describing solar asphericity and effects of the magnetic field), and the variation in the coefficients B_k of the latitudinal Legendre decomposition of the surface magnetic field, during the period 1996 - 2010. I find a strong linear correlation between the a and B coefficients, during both the rising and declining phases of the solar cycle, consistent with results published in 2001 (Antia et al. [1]). I also investigated different ways to handle the magnetic field decomposition at the poles, and find that the linear correlation persists, though with varying slopes and intercepts. The variation of slope with coefficient index that I find is non-monotonic, which disagrees with the previous study by Antia et al.

References

- [1] H. M. Antia, S. Basu, F. Hill, R. Howe, R. W. Komm and J. Schou, *Solar-cycle variation of the sound-speed asphericity from GONG and MDI data 1995-2000*, Monthly Notices of the Royal Astronomical Society **327** (2001), pp. 1029 – 1040