



Periodic behavior and stochastic fluctuations of solar activity: Proper Orthogonal Decomposition analysis

A. Vecchio (1), L. Primavera(2), L. Sorriso Valvo (3), V. Carbone(2)

(1) Osservatorio Astrofisico di Arcetri (2) Dipartimento di Fisica, Università della Calabria (3) Liquid Crystal Laboratory - INFN/CNR

We use the Proper Orthogonal Decomposition (POD) to investigate the spatio-temporal features of the solar activity. Daily observation in the period 1949–1996 of the green coronal emission line at 530.3 nm are used as indicator of the activity behaviour. We show that few POD modes suffice in describing both the space and time main periodicities. In particular, being affected by a strongly energetic stochastic behaviour, daily data are described by five POD modes, while two POD modes are enough to describe the butterfly diagram in monthly averaged data. Apart for the basic period $T_0 = 11$ years, using daily data we found evidences for inter-cycle temporal periodicities