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## The Boulingand-Minkowski dimension of background solar magnetic fields and solar flare activity.

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The large-scale background magnetic field of the Sun governs the overall development of activity in course of an 11-yr cycle. Up to the sign the field is presented by so called synoptic charts. Contour lines of the synoptic charts characterize the form and connectivity of magnetic structures averaged over a Carrington rotation, thus the sequence of the maps describes an averaged dynamics of the background fields. To estimate fractal features of the unipolar magnetic regions we have applied Minkowski covering adapted to digital representation of data. The Boulingand-Minkowski dimension was determined as a rate of cover area changing in the dilatation process and was obtained for 21-23 solar cycles. It was found that Minkowski dimension varied according to the phase of solar activity. We have compared the dimensions and monthly solar flare indexes (FI). FI summarized daily contributions of solar flares with their power weights and quantifies flare activity of the Sun for 1976-2000. Using the nonlinear methods, such as Kaplan test, post-event histogram test and cross recurrence plot we have found significant relation between FI and Minkowski dimension. Maximal correlation is observed while the curve of Minkowski dimension is shifted on 12 Carrington rotations forward. Consequently, changes of the geometry of background magnetic field, namely, neutral lines of polarity, may betoken flare activity variations.