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Investigating an association between sunspot numbers and summer-monsoon rainfall in India

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The sunspot number (SN) is well correlated with 10.7 cm solar flux, a quantity measured by remote sensing techniques. Quite a handful of research works are available where remote sensing technique has been used to investigate various aspects of sunspot. The SN time series provides the longest existing record of solar activity, and is thus the best available data set for studying the long-term evolution of solar activity and, in particular, of the 11-year activity cycle. The present study reports an investigation on the association between the mean annual sunspot numbers and the summer-monsoon rainfall in India by the implementation of artificial neural network. We have studied cross correlations. After Box-Cox transformation, the time spectral analysis has been executed and it has been found that both of the time series have an important spectrum at the fifth harmonic. An artificial neural network (ANN) model has been developed on the data series averaged continuously by five years and the neural network could establish a predictor-predict and relationship between the sunspot numbers and the mean yearly summer-monsoon rainfall in India. Hence, the study revealed that by the implementation of artificial neural network average of five years sunspot numbers can give a good estimate for five years averaged summer-monsoon rainfall in India. In future, further studies may be carried out to make a yearly prediction of summer-monsoon rainfall based on yearly mean sunspot numbers.

Biography

Surajit Chattopadhyay completed his PhD in Mathematics from Indian Institute of Engineering Science & Technology (IIEST), Shibpur in 2010. He is an Associate Professor of Mathematics in Pailan College of Management and Technology, Kolkata and a Visiting Associate of IUCAA, Pune and IMSc, Chennai. His research area encompasses cosmology and statistical modeling of complex geophysical processes. Till date, he has 31 papers in geophysical processes and 58 papers in cosmology. He has published in journals like Theoretical and Appl. Climatology, Meteorological Applications, Journal of Hydroinformatics, Pure and Applied Geophysics, Acta Geophysica etc. His Google-scholar H-index is 14.

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