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Cyclicity of forest fire occurrence at Kola Peninsula (North-Western Russia) in connection to meteorological and solar activity

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The cyclicity of forest fire number for the period 1958-2007 at Kola Peninsula was investigated. We used the data of regular aerial surveying. The frequency of forest fires was compared with regional meteorological and dendrochronological records. Spectral analysis with help of MEM and wavelet revealed a clear cyclic character of fire occurrence with two main maxima. The main one occurred at frequencies around 18-20 years and the other in the band 2.8-4 year. Detailed analysis showed that fire occurrence at Kola Peninsula was a result of a complicated mixture of both anthropogenic and climatic forcings (temperature and precipitation). Climatic forcing is influenced by variations of solar activity (solar radiation, cosmic rays, cosmic dust etc.). Two maxima in the fire occurrence spectrum seem to be connected to one of the main cycles of solar activity (22 y) and NAO oscillation (3-4 y). As it is well known the NAO variations are rather tightly connected to cyclonic activity in the North Atlantic region. The enhanced numbers of fires were observed close to minima of solar activity. These results may be applied for fire forecasting at Kola Peninsula.

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