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Search for solar and lunar rhythms in suicides in European Arctic (Northwest of Russia and Finnish Lapland)

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Short-term geomagnetic disturbances are determined by states of space weather and solar activity (sunspots, solar flares, coronal mass ejections, coronal holes etc.) and as well by tidal influence of the Moon and the Sun. The effects of these actions on the environment (the Earth's climate and human health) are mostly expressed at high (polar) latitudes. Earlier we have shown that in the seasonal distribution of suicide occurrence in Kirovsk (Murmansk region, Russia) there were three peaks (March-May ($p<0.001$), July ($p<0.001$) and October ($p<0.05$)) coinciding with maxima in the distribution of the more intensive (Ap>150 nT) geomagnetic storms (Shumilov et al., GRA, V. 10, EGU2008-A-02867, 2008). It has been also shown that socioeconomic factors do not essentially affect the dynamics of suicides. These results are completely supported on a new base (time interval until 2010). Here the occurrence of suicides in Kirovsk from 1948 until 2010 has been studied. A total of 926 episodes of suicide were recorded. Suicide is determined by three factors: state of organism, status of agents and state of the environment. MTM spectral analysis was used for the search of periodicities. The results evidenced two cycles which may be related to solar activity and (or) lunar tidal influences (10 years and 16-21.3 years respectively). In addition, the risk of suicide was associated with the lunar cycle. Our results showed that the phase of a new moon was associated with decreased risk of suicide for females. But this result seemed to be not significant (totally 201 events). A comparative analysis of suicide rates in Kirovsk, Archangelsk region and Finland showed a significant decreasing trend (in Finland and Archangelsk region) and a similar, bur weak, trend in Kirovsk during the last two decades. Moreover, the suicide rate in Kirovsk increased periodically three times over the period (in 1994, 2003 and 2007). The results obtained seems to demand the further studies in the field taking into account the recent increase of economic activity in this region.
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