On the Interpretation of Influence of Solar Activity on Mortality Statistics

Ibragim Suleimenov, Yerzhigit Tulebekov,Zhumabek Zhantaev

Institute of Ionosphere

Esenych@yandex.ru

The influence of space weather, in particular, solar activity on human health and mortality statistics are currently studying in biogeophysics and related branches of science in last few decades. Nevertheless, a number of important problems are not solved up-to now. In particular, the adequacy of mortality statistics demonstrating a pronounceable biosphere response on geomagnetic storms is still under discussion.In present paper it is shown that much more evident response of mortality on space weather may be emphasized when different parts of mortality histograms are considering separately. The mortality statistics in Kazakhstan during 1979-1991 years were investigated. The running one-year mortality histograms were employed. Namely, for the fixed date N the one-year data from N till N+365 were analyzed. Histograms represent the dependence of total number of days when the mortality in concrete town is equal to given number p on this number p itself. We investigate data for 3 Kazakhstan towns including the capital, Almaty. It was shown that obtained histograms often are non-Gauss. Namely, so-called "heavy tail" is registered in many cases. It means, that probability of simultaneous death of quite large number of people is sufficiently higher (in 100-300 times) that it is predicted by Gauss distribution. In present paper it is shown that the dependence of magnitude of "heavy tail" on time is directly determined by solar activity. Namely, we obtain the dependences of magnitudes of "heavy tails" calculating on the base of one-year histograms (the analogy with running averages method is used) on date. Such dependencies were obtained for the following pathologies and factors: cancer, apoplexy, infarct and suicides. It was obtained that the behavior of "heavy tails" of mortality statistics determined by all this factors is the same. A magnitude of «heavy tails» has a sharp maximum when the solar activity regime is changed from one to another. In other words, there is a strong correlation between «heavy tails» magnitude and first derivative of Wolf's numbers on time. Thus, the influence of space weather on mortality statistics is not direct. One can say that this influence is mainly connected with the increasing of probability of coincidence of some events, which are independent in undisturbed state. In particular, the probability of simultaneous death of quite large number of people is sharply increased in transition periods of solar activity.