

## Solar and galactic cosmic ray in epoch of "lowered" solar activity: the first half of XXI century

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The statistics of reliable solar cycles (SC) leads to the scenario of the regular changes in generation regime of the magnetic field in the solar convection zone from the epoch of "increased" ( $<8 - 10$  and  $18 - 22$  SC) to the epoch of "lowered" ( $12 - 16$ ,  $24 >$ ) solar activity (SA) and vice versa – from the epoch of "lowered" to the epoch of "increased" SA. These epochs significantly differ from each other in parameters, evolution characteristics and manifestations of sunspot-forming activity. From the current 24 SC, the Sun entered into second epoch of "lowered" SA, which, taking into account the steady nature of a sunspot reliable series, must be prolonged 5 solar cycles ( $\sim 55$  of years). The consequence of the low values of the background solar magnetic field became the significant drop the value of interplanetary magnetic field, which in turn led to the significant increase (approximately on 20%) the fluxes of galactic cosmic rays in the internal heliosphere in comparison with the epoch of "increased" SA (1944-1996). It is important to note that in the "lowered" SA epochs there are not observed high solar cycles and in the "increased" SA epochs are forbidden the low solar cycles. In the current 24 SC the picture of solar proton activity principally changed: significantly reduce the amount of solar proton events in the whole energy range, including GLE- events and there were no events with extreme proton flux (104 pfu). This facts shows that in the first half of the 21st century, we will have a high background of galactic cosmic rays, while the fluxes of solar protons and their number will be significantly less. It follows that manned space flights in the free space will become very problematic and probably should be postponed for the second half of the 21st century.

**Primary author(s) :** Dr. ISHKOV, Vitaly (leading scientific research)

**Presenter(s) :** Dr. ISHKOV, Vitaly (leading scientific research)

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