

A Long-Term Variation of the Cosmic Ray Flux in the Solar Cycle 24 and 25

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Abstract: *In this paper, we study long term variation of cosmic ray fluxes during solar cycles 24 and 25. We also report that solar cycle 25 will have slightly higher fluxes than 24, but overall it is still considered a weak cycle. This means that the cosmic ray flux will be relatively high during the minimum phases of each cycle due to low solar modulation. But the overall trend is that the flux will be lower than in previous, more active cycles. This research observed a major increase in cosmic ray flux during the transition between solar cycles 24 and 25. The minimum period between cycles saw significantly higher levels of galactic cosmic rays than the previous solar minimum. Where the Sun's overall activity is particularly low; this means that during the transition from cycle 24 to 25, the Earth experienced a higher flux of cosmic rays due to the reduced solar shielding effect. Our recent period of Solar Cycle 25 has reached a higher number of sunspots than Solar Cycle 24, which peaked in 2014. We would anticipate more flares with higher sunspot counts. When a higher level of solar activity during a cycle results in a lower cosmic ray flux due to the increased solar modulation effect, the available data indicates that the cosmic ray flux peak value generally decreased from Solar Cycle 20 to 24. Solar Cycle 21 showed the highest peak value, followed by Cycle 22, then 23 and finally the lowest peak in Cycle 24 but the solar cycle 25 maximum on July 2025. This research we are analyzing of solar cycle 24 and 25 with cosmic ray activities detection methods*

Keywords: Cosmic Ray Flux, Solar Cycle, Sunspot, Cosmic Ray, Solar Wind, IMF, GCR