



Difference in periodicity of cosmic ray intensity during epochs of alternate solar magnetic polarity

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Cosmic ray intensity has the anti-correlation with the sunspot number such that the intensity maximum occurs approximately at solar minimum. This study examines the differences in periodicity of cosmic ray intensity variation at epochs of alternate solar magnetic polarity, specifically focusing on the period of solar rotation. We examine cosmic ray data from 43 neutron monitors at solar minimum years since 1954. We find that the periodicity at 27 days is stronger in positive than in negative magnetic epochs except for 2008 when it is stronger in northern neutron monitors (but not in southern monitors). Different effects of drift and diffusion could explain the different periodicity at 27 days in solar minimum years of both solar magnetic polarities and the shapes of cosmic ray intensity maximum. The most probable explanation for the difference in periodicity during epochs of differing magnetic polarity is the solar polarity dependence of the cosmic ray latitude gradient.