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## Long-term Changes in the Residual Modulation of the Galactic Cosmic Radiation

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### Abstract content

The residual modulation refers to the invariant level of modulation (modulation potential approximately 450 MV) observed at sunspot minimum since the commencement of the neutron monitor record in 1951. Satellite measurements of the heliomagnetic field show that it exhibited a similar invariance ( $\sim 5.2$  nT) between the sunspot minima of 1965 and 1996. The cosmic ray record since 1428 shows that the residual modulation has increased steadily since the Spörer solar minimum in the 15th century. Three independent reconstructions of the heliomagnetic field (HMF) (two since the middle ages) show that it also exhibited step-like changes. The relative importance of diffusion-convection processes, and drift processes are discussed as a function of the strength of the HMF. It is proposed that the drift processes are more pronounced at times of low HMF strength, explaining the more pronounced 22-year variation of the galactic cosmic radiation at earlier times, compared to during the neutron monitor epoch. The paper concludes with speculation that the solar magnetic fields exhibit an  $\sim 2300$  year periodicity, and that solar activity modulates that field at the frequencies of 11, 22,  $\sim 80$ ,  $\sim 230$  years, leading to the intensity variations observed in the cosmogenic records.

**If this papers is presented for a collaboration, please specify the collaboration**

### Summary

### Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Oliveo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 1 (SH), pages 545-548

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