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Hysteresis loops of CR intensity decreases versus solar parameters.

The long-term variation (modulation) of CR intensity is not exactly anti-parallel to sunspot activity. In odd cycles, there is a large hysteresis loop (difference in the evolution during the rising and falling phase of solar activity). In even cycles, the loop is narrow. So far, only data for two odd cycles (cycle 19 and 21) and two even cycles (20 and 22) were available and the above pattern was noticed. For the cycle 23, there was a curiosity whether the odd cycle pattern would be seen. This aspect is examined in this paper. In general, the hysteresis pattern of cycle 23 was broad as in cycles 19 and 21. However, when the loops were compared using different solar parameters (sunspots Rz, 2800 MHz flux F10, coronal index CI, open magnetic fluxes), the patterns were not exactly similar. All these are just different solar indices and it is not clear what effects these should have individually on the interplanetary space where CR modulation occurs. Thus, these differences could have some implication for deciding the role of these indices in affecting the interplanetary space, whose electromagnetic structure is affected mostly by the dissipation of CMEs and cororating streams.

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