A COMPARATIVE STUDY OF THE COSMIC RAY RECOVERY PROCESS IN THE INNER AND OUTER HELIOSPHERE

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The cosmic ray recovery of galactic and anomalous cosmic rays for cycle 22 over the 1991-1997 time period is strongly affected by the intense solar activity of March/June 1991. This results in a recovery that differs from that of cycle 20 and both in turn differs significantly from the cycle 21 recovery (1981-1987) in a qA<0 epoch. For cycle 22 it is found that the recovery time constants for 265 MeV/n GCR He are the same at 1 and 44 AU (t = 1.9 years) which is much longer than the 0.95 year time constant measured for ACR 0^+ at 1 and 44 AU. This has previously been interpreted as evidence for cosmic ray modulation in the heliosheath. There is no evidence for similar effects in cycle 21 following the large outburst of solar activity in mid 1982. What is most puzzling about the cycle 22 recovery is that the net increase in 150-380 MeV/n He between 1990 and 1997 is the same at 1 AU and at 44 AU. However, for ACR 0^+ the net increase at 44 AU is appreciably larger than at 1 AU. Furthermore this analysis suggests that after 1993.2 (i.e., following the passage of the global merged interaction region produced by the March/June activity) the continuing recovery of galactic cosmic rays proceeds from the outer into the inner heliosphere. Again, this is different from the 1982 – 1987 recovery which appeared to be strongly controlled by changes in the inclination of the heliospheric neutral current sheet.