

Galactic cosmic ray modulation in the heliosphere for cycle 23 (1998.0-2001.4)

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Abstract. The combination of Voyager 1 (77.9 AU, 34.4°N) and Voyager 2 (61.2 AU, 24.5°S) at moderate heliolatitudes in the distant heliosphere along with IMP 8 and other satellites at 1 AU constitute a network of observatories that are ideally suited to study the onset of solar activity and the long term (11 year) cosmic ray modulation of cycle 23. Through 2001.2 there have been four well-defined step decreases in the cosmic ray intensity at 1 AU with the cumulative effect being somewhat larger than the net decrease in cycle 21 at a comparable time in the solar cycle. In the distant heliosphere the first two decreases appear to be much smaller than those at 1 AU. However the largest step-decrease yet observed at 1 AU in cycle 23 began at ~ 1999.55 and reached V-2 (61 AU, 25°S) around 2000.34 and V-1 (78°, 34°N) about 2000.67.

This was the first significant durable decrease observed in the outer heliosphere for galactic cosmic rays (265 MeV/n He). As discussed in a separate paper at this meeting it was produced by a large scale global merged interaction region (GMIR) that was well-defined in the V-1 and V-2 interplanetary magnetic field data. The changes in the more modulation sensitive anomalous cosmic rays have been much larger at the Voyagers and reflect more closely the modulation pattern observed at 1 AU. The observed variation of these decreases with heliocentric distance will be compared with similar modulation events at smaller heliocentric distances for solar cycles 21 and 22.

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