Major Space Weather Events during the Weak Solar Cycle 24

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We report on the level of solar activity during cycles 23 and 24 as the cycles build toward the corresponding solar maxima. The prolonged minimum period that followed solar cycle 23 and the weaker magnetic field at the poles seem to have resulted in a weaker level of activity during cycle 24. The double speak structure often observed in the maximum phases seems to be present during cycle 24, with the first peak having a sunspot number of only ~90. Large solar energetic particle (SEP) events, major geomagnetic storms, and radio-emitting interplanetary shocks have been observed in relatively smaller numbers. While the number of large SEP events during the rise phase of cycles 24 is not too different from that of cycle 23, they are generally less intense. Five ground level enhancement (GLE) events occurred up to the first activity peak in cycle 23, while a lone GLE event has been observed during the corresponding phase in cycle 24. There were 35 large (Dst ≤ -100 nT) geomagnetic storms during the first 4.5 years of cycle 23, while only 5 occurred during cycle 24. The subdued activity during cycle 23 is consistent with the low numbers of type II radio bursts, full halo CMEs, and interplanetary shocks.