

Low solar activity around minimum of Cycle 23 and expected amplitude of Cycle 24

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Abstract. Solar activity of the minimum of Cycle 23 is low comparing with that of past solar cycles. No-sunspot condition continued 32 days between July and August, 2009 and continued 31 days between July and August, 2009. It is known that solar activity during the minimum is a good indicator of amplitude of next solar cycle. We made a statistical analysis using the sunspot number from SIDC-team, World Data Center for the Sunspot Index, Royal Observatory of Belgium. There is a negative correlation between occurrence number of no-sunspot days around solar minimum and maximum sunspot number of next cycle. There is a positive correlation between occurrence number of no-sunspot days around solar minimum and rise time of next cycle. We made the least square fitting for the data and obtained the equation. There is 265 no-sunspot days in 2008. This is the fourth record since 1849. Past records of the large yearly occurrence numbers of no-sunspot days since 1849 are 311 days/year in 1913, 287 days/year in 1901, and 280 days/year in 1878. We got the maximum sunspot number 89 in March, 2013 for 265 no-sunspot days. Geomagnetic activity of the minimum of Cycle 23 is low comparing with that of the minimum of recent several cycles. It is known that geomagnetic activity during the minimum has a positive correlation with solar activity of next cycle and has a negative correlation with rise time of next cycle. The lower geomagnetic activity also suggests lower activity level of Cycle 24.