

WEAKENING SOLAR ACTIVITY: END OF AN EXCEPTIONALLY ACTIVE PERIOD?

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The Sun has been very active during most of the previous century since the 1920s. It is known from long-term records of cosmogenic isotopes that solar magnetic evolution consists of activity peaks that last typically 70-80 years. It is also known that the maximum of the previous century has been exceptionally high for more than one thousand years, maybe even for several thousand years.

However, the ending solar cycle 23 and the ongoing solar minimum give evidence that profound changes are currently taking place in the Sun that may dramatically change this evolution. Recent satellite observations show that the intensity of the heliospheric magnetic field has rapidly decreased to an all-time minimum level. This is verified by the ground-based solar observations of exceptionally weak solar polar fields. As a response to these changes, cosmic ray intensity has recently reached its 50-year record maximum. Also, the total solar irradiance has weakened to its 30-year minimum. Moreover, the mutual relationship of several solar/heliospheric parameters has changed recently, indicating fundamental changes in the operation of the solar magnetic dynamo. It is possible and in accordance with the above mentioned statistics of long-term solar activity, that the 80-year long interval of exceptionally active Sun is now ending and that an essentially weaker period of solar activity will follow in the near future. We will review these developments.

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