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Solar activity variation in grand solar minima deduced from cosmogenic radiocarbon

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Abstract content

The sun is variable in its magnetic activity with 11-year Schwabe cycle. This cyclic variation of solar activity modulates the energy spectrum of galactic cosmic rays entering the heliosphere and therefore the terrestrial radiocarbon production rate in the atmosphere changes with the same periodicity. Since the radiocarbon is taken into tree rings after the carbon cycle, the radiocarbon content in annual tree rings can be used to reconstruct the past solar activity in spite of much reduced amplitude of its cyclic variation. In the Maunder Minimum (1645-1715 AD), one of grand solar minima when sunspots were almost absent and the solar activity was considered to be very weak, the cycle length of radiocarbon content was much longer than 11-year (Maunder-type minima). The Spoerer Minimum (1416-1534 AD) is considered to be another grand solar minimum. However, the cycle length during this minimum was almost 11-year (Spoerer-type minima). In order to confirm this variability of cycle length in grand solar minima, we have measured annual radiocarbon content in extended period of Spoerer Minimum, especially very beginning of the Minimum. Based on the result, we will discuss the difference in solar cycle length for Maunder-type minima and that for Spoerer-type minima.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 1 (SH), pages 525-528

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