太陽活動の長期変動にともなう太陽11年周期の変化について

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Variation of solar cycle length associated with long-term solar variations

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In this paper, we report the variation of solar cycle length since the 9th century revealed by the measurements of radiocarbon content in tree-rings, and discuss the possibility of space climate forecast.

Radiocarbon is one of the cosmogenic nuclides, which enable us to reconstruct solar variations in the past. Cosmogenic isotopes are produced in the earth's atmosphere mainly by the galactic cosmic rays, which are modulated by solar wind and the interplanetary magnetic field. Generally, intense solar activity results in a decrease of the production rate of radiocarbon, while weakening of solar activity brings an increase.

We have measured the radiocarbon content in Japanese cedar tree-rings with annual time resolution and have studied on the variation of solar cycle length since the 9th century. As a result, drastic changes of solar cycles associated with long-term solar variations were confirmed. Based on the results, we will discuss the possibility and the issues of space climate forecast.