Variation of solar cycle during the Maunder and Spoerer minima

Hiroko Miyahara(1), Kimiaki Masuda(1), Yasushi Muraki(1), Hiroyuki Kitagawa(2), Toshio Nakamura(3)

(1) Solar-Terrestrial Environment Laboratory, Nagoya University, Japan.
(2) Graduate School of Earth and Environmental Sciences, Nagoya University, Japan.
(3) Center for Chronological Research, Nagoya University, Japan.

Poster

We report the variation of solar cycle length during the prolonged sunspot minima called the Maunder Minimum (1645-1715 AD) and the Spoerer Minimum (1415-1534 AD) deduced from the carbon-14 content of tree-rings.

Variation of the production rate of carbon-14 content reflects the state of solar wind and the interplanetary magnetic field. We have measured the carbon-14 content of annual tree-rings for the Spoerer and Maunder minima in order to clarify the characteristics of solar activity during the prolonged sunspot minima.

The results of the frequency analyses of the carbon-14 contents show that the length of the eleven-year solar cycle is lengthened by several years only during the Maunder Minimum. The eleven-year cycle during the Spoerer Minimum is almost constant and modulated only around 1460 AD and 1500 AD.

Our results suggest that the features of the eleven-year solar cycle might differ between the Maunder-type minima and the Spoerer-type minima, both of which have occurred several times in the past.