

過去 1200 年間における太陽活動および 宇宙線変動と気候変動との関わり

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Variations of Solar Activity and Climate during the Past 1200 Years

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Abstract

The relationship between solar activity and climate change in the past can be examined using proxy records. Variations of solar activity can be reconstructed based on carbon-14 in tree rings, which are produced by galactic cosmic rays modulated by the solar wind, while climate change can be reconstructed from changes of tree-ring growth rate or content of stable isotopes in ice cores from the polar region. A comparison of solar activity and climate change at the Maunder Minimum in the 17th century and the Early Medieval Maximum Period in the 9-10th century suggests that the sun plays an important role in climate change even on a decadal time scale. The characteristic variations detected in climate change suggest the mechanism of solar influence on climate involves galactic cosmic rays. Variable features of eleven-year and twenty-two year cycles of solar activity and consequent variations of cosmic rays are possible origins of complex variations of climate change on decadal to multi-decadal time scales. We summarize variations of solar activity and cosmic rays during the past 1200 years and their possible influence on climate change.

Key words : solar activity, cosmic rays, climate change, the Maunder Minimum, the Medieval Maximum Period

キーワード : 太陽活動, 宇宙線, 気候変動, マウンダー極小期, 中世極大期

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