Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

O03-01 Room:IC Time:May 19 09:45-10:20

Solar activity and Earth climate

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The number of sunspots on the Sun changes with period of approximately 11 years. There observed a prolonged minimum without sunspot at around the previous solar minimum (2008), and the cycle period turned out to be 12.6 year, which is the longest period in the past 210 years. Hinode has performed extensive observations on the solar polar region where seed magnetic field for sunspots is seen, and has discovered that both the north and south poles essentially have the same plus polarity.

According to David Hathaway of NASA,"the current prediction for Sunspot Cycle 24 gives a smoothed sunspot number maximum of about 69 in the Fall of 2013. The current predicted and observed size makes this the smallest sunspot cycle since Cycle 14 which had a maximum of 64.2 in February of 1906." Is the current sun anomalous?

We now know that the prolonged period without sunspot appears many times in the past 10,000 years, and that the cycle period tends to be longer in such low activity cycles. Furthermore, we begin to know that the Earth was cooler for low activity phase of the Sun. Do the observed signatures of the current sun indicate that the Maunder minimum like extreme low activity is about to begin? How would the Earth be affected in response to the inactive Sun? There are yet unknown missing link between the solar magnetic activity and the Earth climate. In this lecture, we discuss the possible intimate relationship between the magnetic field of the Sun and the temperature of the Earth.

Keywords: Sun, magnetic field, Hinode, Solar cycle, Dynamo, Maunder minimum