

Modeling of paleo-solar-climate for the last millennium

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The relationship between solar activity and terrestrial environment is a crucially important issue for space climate study. In particular, the last millennium is unique period to study the variability of climatologic sun-earth connection, because the record of cosmogenic isotope indicated that grand maxima and grand minima of solar activity have well correlated to the variation of warm periods and little ice age, respectively. In this paper, first we review the modeling studies, which have been done for understanding the transition mechanism between the phases of grand maxima and grand minima. In particular, we like to emphasize the possible connection between the equatorial symmetry and the stability of spherical shell dynamos. Second, we discuss about the mechanism whereby solar activity may affect the terrestrial environment. Particularly, we will propose a new modeling frame-work in order to clarify the effects of galactic cosmic ray modulation due to solar activity. Finally, we will also review the modeling studies of the largest ever solar storm event of 1859, and will discuss what we have to do in order to reconstruct paleo-solar-activity.

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