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Long-term Variations in Cosmogenic Be-7 Concentrations with the 11-year Cycle of Solar Activity

Abstract content

Be-7 radionuclide (half life 53.3 days) is produced from cosmic ray interactions with atmospheric nuclei. We analyzed long-term (1983-2006) variations in surface Be-7 concentrations in Japan (geomagnetic latitude $\sim 25^{\circ}\text{N}$ and cutoff rigidity 10 GV) to study an influence of the solar activity. The measured Be-7 concentrations in surface air depend on not only a production rate of Be-7 but also a transport process in the atmosphere. The measurements indicated that a ratio of Be-7 concentration in the solar minimum to that in the solar maximum is 1.3-1.4. It is reasonably explained from the variations in cosmic ray fluxes between the solar minimum and maximum. We concluded that the long-term variations in Be-7 concentrations is mainly caused by the 11-year cycle of solar activity and the transport process due to air mass motions does not much contribute to the variations in Be-7 concentrations.

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Summary

Reference

Primary author(s) : Prof. YOSHIMORI, Masato (Rikkyo University)

Presenter(s) : Prof. YOSHIMORI, Masato (Rikkyo University)

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