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Observation of the gradual increases and bursts of energetic radiation associated with the activity of the winter thunderstorm

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Abstract content

The increase of the gamma-ray dose-rate in association with the activity of the thunderstorm was observed by the detectors located at the ground level in the winter of Japan. To investigate the particle acceleration mechanism during winter thunderstorms, the four sets of radiation detectors were used which consist of four long proportional counters (PRCs). These PRCs have a different response characteristic for the energy of incident particles by mounting shield covers. The results were also compared with the data measured at the same time by the environmental radiation monitors using an NaI scintillator / ionization chamber. Electric field was also measured by using a field mill. As a result, it was observed that the radiation intensity began to increase from before several 10 seconds in which the radiation burst is generated. In addition, the simultaneous radiation burst and a rapid increase of the electric field indicate that the discharge by lightning was generated. From the observed results of the PRCs with different responses to the energy of incident particles, the gradual increase of counting rate is caused mainly by the irradiation of photons with energy of several MeV. Moreover, it was considered that the burst of the radiation was attributed to in the injection of high energy photons with the energy over 10MeV.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 1 (SH), pages 677-680

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