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Detection of gamma-rays from winter thunderclouds along the coast of Japan Sea

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Abstract content

The increasing number of reports on the gamma-ray detection from thunder clouds and lightenings indicate that charged particles are accelerated by the strong electric fields associated with the thunder phenomena. In order to search for high-energy radiation from winter thunder clouds in the Japan sea coast areas, we have set up an autonomous radiation detection system at Kashiwasaki, Niigata prefecture, Japan. The system comprises several different types of radiation detectors, including NaI and CsI scintillators, NaI/BGO phoswitch detectors, and plastic scintillators. In addition, some auxiliary sensors for visible light, sound, and electric field are installed. We started the observation in December 2006, and successfully detected at least one significant radiation increase associated with a heavy thunder activity on January 7, 2007. The event lasted for 100 sec, preceding a possible thunder strike. The signals were detected by all the inorganic scintillators, but by none of the plastic scintillators, suggesting that the radiation is predominantly energetic gamma-rays. The energy spectrum extends up to 10 MeV, and the singal arrival direction is consistent with general sky direction.

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 745-748

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