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Low Background and Close Proximity Sensors of Atmospheric Gamma Radiation Following Lightning M. GREENFIELD, M. ISHIGAKI, N. ITO, A. IWATA, K. KUBO, Intn'l Christian U, K. KOMURA, Kanzawa U, P. RUSCHER, W. COTTRILL, Fla St. U., G. AUSTIN, D. KROFCHECK, M. PEACE, P. BARKER, Auckland U. — Atmospheric γ radiation following lightning, 10-80% more than normal background, in excess of radon progeny attached to precipitation, which decays with a half-life of about 50 min, has been observed in Japan and at the Lightning Research Lab in Starke, Florida. This excess γ radiation may be from the decay of radioactive ejectiles from nuclear reactions initiated by protons or photons resulting from the high potential gradients during thunderstorms. The most likely candidates for 10-100 min γ activity resulting from reactions on atmospheric elements are ^{39}Cl or ^{38}Cl and/or annihilation γ rays from positron emitters. Using a high resolution Ge detector the 1.267 MeV peak from ^{39}Cl and excesses of the 511 MeV annihilation peak, as well as anomalous increases in the ratio of ^{214}Bi to ^{214}Pb (radon progeny), have been observed following thunderstorms but all with poor signal to noise ratios. Delayed activity in condensates from 10 liters of rain water with extremely low background at the underground LLRL in Ogoya, Japan is underway and activity in shielded detectors from nearby triggered lightning at the Lightning Research Lab is being planned in order to improve statistics and signal to noise ratios.

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