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PRELIMINARY STUDY ON REMOTE SENSING THE RELATIONSHIP BETWEEN THE BRIGHTNESS TEMPERATURE PULSES OBSERVED WITH A GROUND-BASED MICROWAVE RADIOMETER AND THE LIGHTNING ACTION INTEGRAL

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The integral of lightning current squared over time, named as the "lightning action integral", is an indicator of Joule heat generated by lightning discharge. The temperature of air molecules is thus increased, which can be observed by a ground-based microwave radiometer for atmospheric temperature remote sensing. Observational experiments were performed in early summer in 2017 with a ground-based, MWP967KV type microwave radiometer, which is commonly used for atmospheric temperature profile remote sensing but has been properly-configured this study in order to observe the artificially triggered lightning events at Guangzhou field experiment site for lightning research and test (GFESL). Data from the radiometer and the instrument for recording lightning current have been analyzed and the results from seven effective events show that a relationship like TB=exp (aX) may exist between the brightness temperature increment, TB, in unit of K, observed in 30-50GHz band and the lightning action integral, X, in unit of A2s, calculated from high temporal resolution lightning current records. The correlation coefficient is as high as 0.8863 while the coefficient, a is equal to 6.25381*10-5 (sample size =7).

BIOGRAPHY

Wang Zhenhui was graduated in 1978 from Department of Atmospheric Sounding of Nanjing University of Information Science and Technology, China and engaged in Atmospheric sounding and remote sensing research. He is currently a Professor at School of Atmospheric Physics in Nanjing University of Information Science and Technology and his research interests include atmospheric parameter inversions from meteorological satellites, ground-based radiometers and radar systems.

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