ELF Observation in China and Its initial Analysis in Lightning SR Band
Lightning Detection Technologies

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In China, the first ELF observation station was built in Weihai (37.5°N,122.1°E)，Shandong province, and another four ELF observation stations were built in Qiaojia (26.9°N,102.9°E), Yongsheng (26.7°N,102.9°E), Mangshi (24.42°N,98.59°E) and Tonghai (24.1°N, 102.8°E), Yunnan province from 2010 to 2011. The five stations are related to short-term earthquake prediction, and each station has two horizontal magnetic induction coils for receiving the magnetic field in the north-south direction (H_{ns}) and the east-west direction (H_{ew}). In this paper, we have analyzed the ELF data recorded in the five stations, and found that the data is valuable for analyzing the lightning SR characteristics. The SR are made up of the background signal resulting from global lightning activity and ELF transients resulting from particularly intense lightning discharge. The distribution of ELF background amplitude is the normal characteristics where its estimated mean parameter and variance are -1×10^{-2}-1.5×10^{-2}pT and 3×10^{-3}-1.2×10^{-2}pT respectively. Diurnal variation of ELF background signal in H_{ns} is different from that in H_{ew}, which is related to the different global lightning activity centers. The relative variance value of the three SR modes peak frequencies is 0.3Hz, 0.55Hz, and 0.65Hz, respectively. We also simulate the measured ELF background signal by using the Optical Transient Detector (OTD), and find that the lightning most active center reflected from ELF measurements is different from the simulated results. In the following work we will analyze the difference carefully.