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Current characteristics of NBE as inferred from narrow bipolar pulse

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Narrow bipolar event(NBE) refers to a distinct type of intra-cloud discharge characterized by most powerful radio frequency(RF) emissions and energetic/temporally isolated narrow bipolar pulses in very low frequency(VLF) /low frequency(LF) bands. This discharge is also referred to as compact intra-cloud discharge(CID). Narrow bipolar pulse was produced by the current flow along the conducting channel and the current waveform would be influenced by the conducting state of channel. A two-parameter current model was proposed which can enable us to derive these two parameters by finding a perfect fit between model-predicted field waveform and observed narrow bipolar pulse. The current waveform of NBE, as characterized by two parameters which was inferred from observed narrow bipolar pulses, tended to be bipolar with a small oscillation tail, with an initial rise and an initial half peak width of about 2-3us and 4-5us respectively. The channel length of NBE as inferred from inferred current parameters would be as less as several hundreds of meters, therefore we estimate that the current magnitude of NBE would be as much as 20kA or more.