ISUAL recorded halos brightness and their parent lightning emission

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Halo, another type of transient luminous event, is a bright disk at altitude 80-85 km above the thunderstorm. Unlike the fact that almost exclusively +CG triggered sprites, most of halos were induced by -CG that occurred exclusively over the open water [Frey et al., 2007]. In this presentation, we analyzed total 185 ISUAL recorded pure halo events from July 2004 to Dec 2007. Using 1PN2-filter Imager, the average brightness of halos is ~ 0.25 MR. We also derived the current moment using the 777.4 lighting emission of their parent lightning to [Adachi et al., 2009]. It is found that a relatively strong linear relationship between lightning peak current and lightning-induced halo emission. In total recognized 121 events by ELF radio emission at Nagycenk Observatory (NCK), Hungary, the polarities of their parent lightning for 23 halos are identified as +CG while 98 halos are for -CG associated with NCK recorded ELF data. From NCK estimating CMC, we found a relatively weak correlation between NCK CMC and halo brightness. Furthermore, the extremely brightest halos over ocean were also found, and their lightning polarities were dominated by -CG. The finding reflects the nature of intense peak current for oceanic lightning [Fullekrug et al., 2002]. It seems that lighting current may have more important effect on halos generation than charge moment.

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