Space-based observation of possible electromagnetic interactions between distant thunderstorms

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Abstract:

Space-based observations of lightning, conducted during the Mediterranean Israeli Dust Experiment (MEIDEX) sprite-campaign [Yair et al., 2004], reveal a semi-cyclic pattern where distant thunderstorm cells \"ignite\" lightning flashes in each other in a sequence. Lightning occurring in one cell are followed by lightning in other cells, separated by tens or hundreds of kilometers. The time delay of the onset of a visible flash in one thunderstorm from that of the following flash in a distant cell varies from several milliseconds to seconds. Although this phenomenon has been reported by many astronauts and other observers, it has not been systematically studied yet, and was discarded as a biased artifact of human-based observations. The current research studies the parameters of this phenomenon in a rigorous and systematic manner. It is based on a statistical analysis that addresses the possibility that the postulated interaction is a stochastic random process. Video images of thunderstorms occurring in various parts of the world (Brazil, central Africa, Asia, and the Pacific Ocean) that were recorded from the space shuttle Columbia in its STS-107 mission in January 2003 were analyzed. Data from previous shuttle missions (STS-75, February 1996) was obtained from the University of California in Berkeley and NASA, and will enable the study of additional thunderstorms. Several mechanisms for the possible tele-influence of the lightningemitted electromagnetic radiation on the breakdown process within a distant thundercloud, leading to a new flash, will be discussed.