

Light curve recorded in Venus by LAC onboard Akatsuki

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The existence of lightning discharge in Venus has been controversial for about four decades. In order to conclude this subject, we developed a lightning and airglow camera, LAC, onboard Akatsuki spacecraft, a Venus orbiter. LAC has a high-speed sampling rate at 20 kHz with 32 pixels of Avalanche Photo Diode (APD) matrix, and 777 nm narrow-band filter to detect lightning emission line of OI, which is expected by laboratory experiment in the CO₂-dominant atmosphere. We have been conducting a lightning search in over 40 passes of AKATSUKI around Venus with triggering parameter sets optimized for the light curve similar to the normal lightning and also to sprite type with a longer time constant in the Earth. On March 1, 2020, LAC recorded a signal, which seems like a kind of optical flash. The total coverage of the LAC lightning hunt up to now was about 100 [million km²-hr]. If the flash is originated from lightning discharge, the occurrence rate could be equivalent to that with a ground-based telescope reported by Hansell et al. (1995). On the other hand, we are also examining the possibility of a bolide. If it's bolide, the magnitude observed on the ground might be 10 times brighter than a full moon on the ground of Earth. Here we discuss the possibilities of both cases based on the latest knowledge on the small object near the Venus orbit. Also, we explore the possibility and strategy for the investigation of small objects around Venus and other solar system planets.

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