



## 4-years lightning hunt in Venus

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For more than 3 decades the existence of lightning discharge in Venus has been controversial, which might be caused by insufficient observational methods optimized for such purpose. There had been no satellite payload intentionally designed for the detection of lightning phenomena using radio waves or optical sensors. LAC, lightning and airglow camera, onboard Akatsuki spacecraft developed by Hokkaido University together with JAXA, is the first sensor made for the lightning optical flash detection in planets other than the Earth. A unique performance of LAC compared to other equipment used in the previous exploration of Venus is the high-speed sampling rate at 20 kHz with 32 pixels of Avalanche Photo Diode (APD) matrix, enabling us to distinguish the natural optical lightning flash from other pulsing noises, including artificial electrical noise and cosmic rays. We selected OI 777 nm line for lightning detection, which is expected to be the most prominent emission in the CO<sub>2</sub>-dominant atmosphere based on the laboratory discharge experiments carried out by some researchers. We have been conducting lightning hunt since October 2016 with LAC onboard Akatsuki, selecting triggering parameter sets optimized for the light curve similar to the normal lightning and also for sprite type in the Earth, which has a slower variation of optical intensity. The total coverage of the LAC lightning hunt became approximately 100 [million km<sup>2</sup>-hr], meaning 86 percent detectability of previous results with a ground-based telescope by Hansell et al. (1995). Here we report the update of the detailed examination of recorded data by LAC for these almost 4 years and discuss their possible interpretation, considering all kinds of candidates of optical and other sources. Also, the future observation strategy including ground observation with a high-speed photometer installed at the ground telescope and radio observation will be introduced.