



Challenge of lightning detection with LAC on board Akatsuki spacecraft

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Even after extensive investigations with spacecraft and ground-based observations, there is still no consensus on the existence of lightning in Venus. It has been reported that the magnetometer on board Venus Express detected whistler mode waves whose source could be lightning discharge occurring well below the spacecraft. On the other hand, with an infrared sensor, VIRTIS of Venus Express, does not show the positive indication of lightning flashes. In order to identify the optical flashes caused by electrical discharge in the atmosphere of Venus, at least, with an optical intensity of 1/10 of the average lightning in the Earth, we built a high-speed optical detector, LAC (Lightning and Airglow Camera), on board Akatsuki spacecraft. The unique performance of the LAC compared to other instruments is the high-speed sampling rate at 32 us interval for all 32 pixels, enabling us to distinguish the optical lightning flash from other pulsing noises. Though, unfortunately, the first attempt of the insertion of Akatsuki into the orbit around Venus failed in December 2010, the second one carried out in December 7 in 2015 was quite successful. We checked out the condition of the LAC on January 5, 2016, and it is healthy as in 2010. Due to some elongated orbit than that planned originally, we have umbra for ~30 min to observe the lightning flash in the night side of Venus every ~10 days, starting on April 2016. Here we would report the instrumental status of LAC and the preliminary results of the first attempt to observe optical lightning emissions.