Lightning and airglow observation by LAC onboard PLANET-C

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It was reported that the magnetometer onboard Venus Express detected whistler mode waves whose source can be considered to coming from well below the spacecraft orbit. However, there still remain some uncertainties to conclude such waves are originated by lightning discharge in the atmosphere. On the other hand, night airglow is expected to provide an essential information on the atmospheric circulation in the upper atmosphere of Venus. But consecutive imaging of airglow is limited and even the detail variations of most enhanced location is still unknown.

In order to identify the discharge phenomena in the atmosphere of Venus without any doubt and to know the daily variation of airglow distribution in nightside, we plan to observe the lightning and airglow emissions with high-speed and high-sensitivity optical detector onboard Planet-C. We are now developing and testing the flight model of lightning and airglow detector, LAC (Lightning and Airglow Camera). Main difference from other equipments which have provided evidences of lightning existence in Venus is the high-speed sampling rate at 50kHz for each pixel, enabling us to distinguish the optical lightning flash from other pulsing noises. On the other hand, spatial resolution is not first priority as the first detector of Venus lightning. New type of APD (avalanche photo diode) array with a format of 8 x 8 is used and a narrow band interference filter at wavelength of 777.4 nm (OI) is selected for lightning measurement. In this presentation, the observation strategies, such as algorithm for self-triggering of lightning event, are shown and discussed.