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Lightning and airglow observation in Venus with spacecraft and ground-based telescope

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Lightning is potentially a good proxy of atmospheric circulation in planets, including Venus and Jupiter, where very limited in-situ measurements can be made. Recently it is 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, night airglow is expected to provide an essential information on the atmospheric circulation in the upper atmosphere of Venus. But the number of consecutive images 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 ambiguity and to know the daily variation of airglow distribution in night-side disk, we sent a optical sensor to Venus, the lightning and airglow camera, LAC onboard Akatsuki. Though, unfortunately, its arrival will be delayed by several years, before the spacecraft measurement we plan to make a ground-based observation using 1.6 m telescope installed at Nayoro, Hokkaido, by Hokkaido University. In this presentation the strategies for investigation both for lightning and airglow, both with ground-based telescope and spacecrafts.

Keywords: Venus, lightning, airglow, spacecraft, telescope