Ground-based observation of the Venus dayside with a 60-cm telescope : Detection of the cloud pattern

Shin Ishikawa [1]; Yukihiro Takahashi[1]; Hiroshi Fukunishi[2]

[1] Dept. Geophysics, Tohoku University; [2] Department of Geophysics, Tohoku Univ.

In order to detect the cloud pattern in the dayside region of Venus, We have carried out imaging observations at wavelengths of 410 nm and 1000 nm using the 60-cm telescope at Iitate observatory, Fukushima. The patterns in the 410 nm images represent the features of the upper clouds at about 70 km altitude, while the 1000 nm images represent the features of the lower clouds at about 50 km altitude. Note that there has been no observation at 1000 nm expect for the Galileo's observation [Belton,1991].Our goal is to monitor these patterns continuously and the global dynamics of the Venusian atmosphere.

To reduce the effect of atmospheric scintillation on the seeing, we adopted fast imaging technique. A high-speed CCD camera with an exposure time of 60 ms and an interval of about 200 ms was used for this purpose. Furthermore we have selected frames with the sharp outlines and composited these frames. We can, therefore, obtain images with high signal to noise ratio from the observations.

Since the Galileo data show that the contrast of the cloud pattern to the background brightness is about 3 % at a wavelength of 986 nm, it is essential to remove the brightness gradient at the dayside from the composeited frame. We have calculated the brightness gradient of Venus dayside and subtracted from the composite frame as a background. We have succeeded at derivation of the cloud patterns in the dayside region of Venus at 1000 nm wavelength from the above method. The pattern represent the lower cloud feature and have important information about the atmospheric dynamics of Venus.