

SPACE EXPLORATION SYMPOSIUM (A3)  
Solar System Exploration (5)

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## THE FIRST JAPAN'S PLANETARY ORBITER AKATSUKI AND ITS SCIENTIFIC RESULTS

### Abstract

Japan's Venus Climate Orbiter Akatsuki was proposed to ISAS (Institute of Space and Astronautical Science) in 2001 as an interplanetary mission. We made 5 cameras with narrow-band filters to image Venus at different wavelengths to track the cloud and minor components distribution at different heights to study the Venusian atmospheric dynamics in 3 dimension.

It was launched on May 21st, 2010 and reached Venus on December 7th, 2010. With the thrust by the orbital maneuver engine, Akatsuki tried to go into the westward equatorial orbit around Venus with the 30 hours' orbital period, however it failed by the malfunction of the propulsion system. Later the spacecraft has been orbiting the sun for 5 years. On December 7th, 2015 Akatsuki met Venus again after the orbit control and Akatsuki was put into the westward equatorial orbit whose apoapsis is about 0.44 million km and orbital period of 14 days.

Its main target is to shed light on the mechanism of the fast atmospheric circulation of Venus. The systematic imaging sequence by Akatsuki is advantageous for detecting meteorological phenomena with various temporal and spatial scales. We have five photometric sensors as mission instruments for imaging, which are 1 m-infrared camera (IR1), 2 m- infrared camera (IR2), ultra-violet imager (UVI), long-wave infrared camera (LIR), and lightning and airglow camera (LAC). These photometers except LIR have changeable filters in the optics to image in certain wavelengths. Akatsuki's long elliptical orbit around Venus is suitable for obtaining cloud-tracked wind vectors over a wide area continuously from high altitudes. With the observation, the characterizations of the meridional circulation, mid-latitude jets, and various wave activities are anticipated.

The technical issues of Venus orbit insertion in 2015 and the scientific new results will be given in this paper.