

Analysis of the polar oval of Venus using Venus Express/VMC images

K. Muto¹, T. Imamura²

¹Department of Earth and Planetary Physics, The University of Tokyo, ²ISAS, JAXA

Polar oval is a circular structure observed at least near the South Pole in visible and ultraviolet wavelengths. Since the oval is visible only on the dayside, its whole shape has been unknown. The mechanism producing the oval is not understood. We reconstruct the whole shape of the oval and study its variability using images taken by VMC onboard Venus Express.

We revealed the whole shape of the oval for the first time by connecting images taken on different days after shifting the images in zonal direction based on the estimated zonal advection velocity. The shape of the Polar oval is changing over time. We choose maximum (r_{\max}) and minimum (r_{\min}) distances between the oval and the Pole in each image as the parameters characterizing the oval shape. The ratio r_{\max}/r_{\min} represents the index the oblateness.

The shape of the oval was found to be changing over time between elongated shape and near-circular shape. The dominant period of this variation changes with time in the range 100-350 Earth days, and does not seem to coincide with the orbital period, the rotation period the length of the day. This suggests that the variation of the oval shape is driven by some internal nonlinear process.