

Thermal tides in the atmosphere of Venus

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A three-dimensional model is developed to examine thermal tides in the atmosphere of Venus with the basic field, on which the thermal tides are induced, constructed from observations so far made.

The structure of diurnal tide indicates an existence of circulation between the day and night sides in the upper cloud layer. The meridional wind near the cloud top is observed to be about 10 m/s at mid-latitude. Our result suggests a possibility that the magnitude of meridional circulation (Rossow et al., 1990) is overestimated.

By the momentum transport associated with the semidiurnal tide, the super-rotation is decelerated by 10 m/s/day in the layer of 80--100 km. This implies that the vertical shear of the zonal wind above the cloud top may be maintained by the effect of semidiurnal tide.