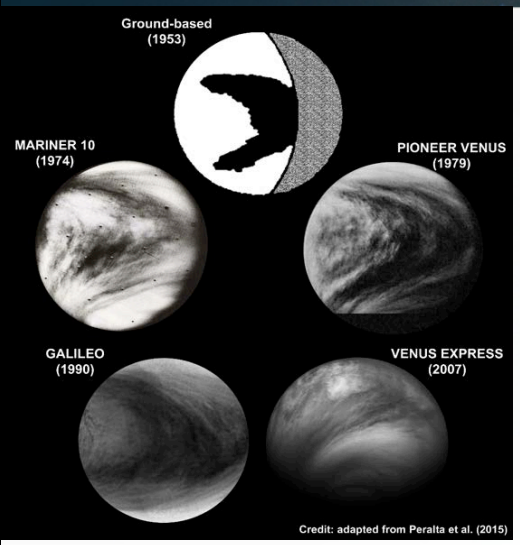
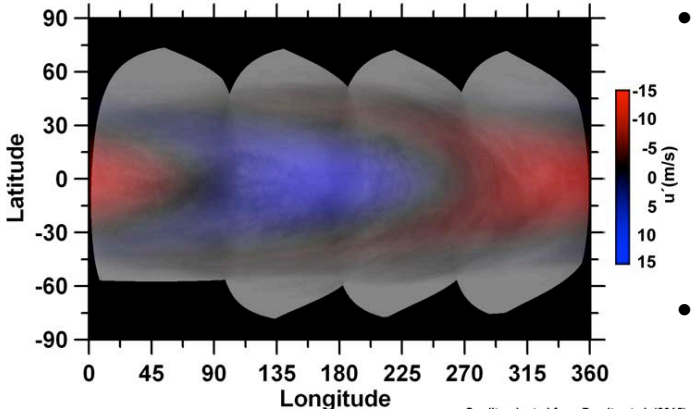
Unique Cloud Structure at Venus Explained

06-11-15

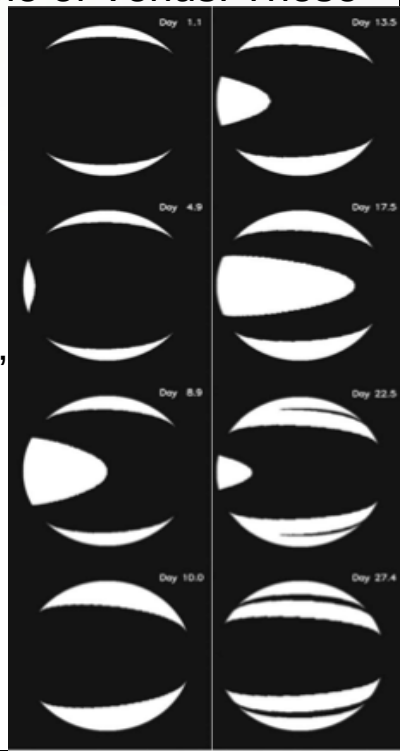


In the 1960s, a dark forked cloud structure was observed on Venus in ultraviolet images. This planetary-scale feature has been observed by many missions over the subsequent decades. New models indicate that this feature is a wave.

- The Earth rotates every 24 hours, and while Venus is much slower, its atmosphere rotates very quickly. As a result, the atmospheric circulation on both planets is very different.
- A new model, combined with data from Venus Express, is the first to explain equatorial waves in the atmospheric regime of Venus. These waves bring up an unknown aerosol that absorbs ultraviolet light, thought to exist at depth in the atmosphere, and concentrates it in the clouds, producing the dark feature.
- Over a 30 day period, the wave becomes trapped by the superrotating east-west winds and is gradually distorted until it adopts the characteristic “Y” shape, which circles the planet every 4-5 days.



- It has been recently discovered that where the “Y” is dark this wave “pushes” Venus winds to the west (red color at left), and where the cloud is bright the wave pushes the wind in the opposite sense (blue).
- This model could also be used to understand slowly rotating exoplanets with superrotating atmospheres.



Peralta et al. (2015) *Geophysical Research Letters.*