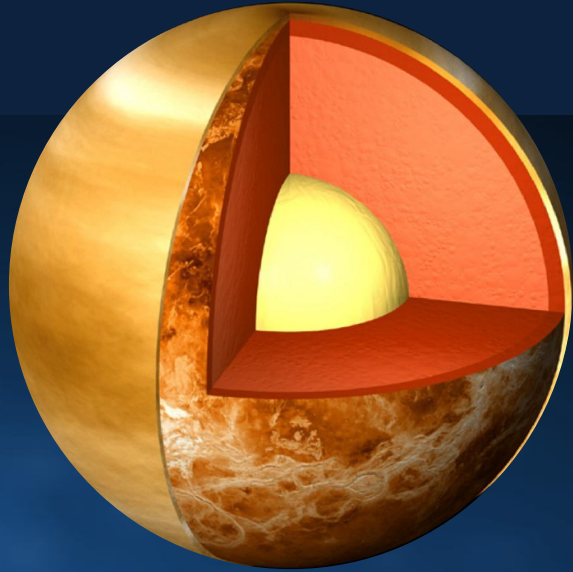


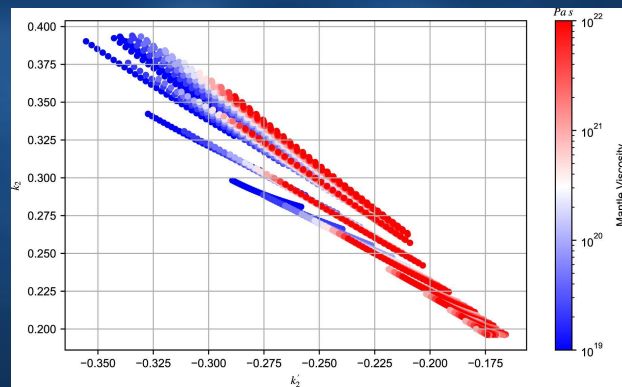
Constraining the Interior Structure of Venus



Venus interior structure.
Credit: C.J. Hamilton

In the next decade, NASA's mission VERITAS will explore Venus to reveal why the planet evolved so differently from the Earth. A recent work investigated the possibility of studying the interior structure and the thermal evolution of Venus by measuring the deformations of the planet induced by the atmospheric pressure loading on the surface.

- The redistribution of mass associated with the atmospheric dynamics deforms the surface of Venus and induces variations in the planetary gravity field, which can be measured to provide fundamental information on the interior of Venus.
- Numerical simulations of the atmospheric dynamics coupled with modeling of the planet's interior structure show that the observation of this gravitational effect can reveal the state and the size of Venus' core, and the thermal state of its mantle (bottom figure).
- VERITAS will accurately map Venus' gravity field, providing the first opportunity of measuring the gravity response to atmospheric loading. This observation, combined with measurements of gravitational tides, can be used to infer the thermal state of the core and mantle, leading to a better understanding of the striking differences in the evolution paths of the Earth and Venus.



Tides and atmospheric loading parameters constrain the thermal state of the mantle