Maps of the Dynamic Venus Sub-Cloud Atmosphere

The first ground-based maps of Venus’ sub-cloud atmosphere measured simultaneously over 1-2.5 μm reveal the interrelationship of multiple chemical species – and a lower atmosphere as dynamic as that above the clouds

- Strong banding patterns in water vapor are seen near the bottom of the cloud deck (~45 km) that may be indicative of cloud rainout

- Inexplicably, CO, OCS, H₂O, H₂SO₄, and SO₂ are more abundant in one hemisphere than the other, and some of these dichotomies shift hemispheres over a year

- Many species display correlation or anticorrelation with each other indicative of linked chemical and physical processes: e.g. CO and OCS, and H₂O, H₂SO₄, and cloud opacity

- Venus is a likely end state for terrestrial planet evolution, and hazy exo-Venuses may be common. Understanding our sister planet can help us understand similar planets elsewhere.