The puzzling cloud cover of Venus

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The global images returned by the four imaging cameras on Akatsuki orbiter of the day and night side of Venus reveal a very dynamic cloud cover with contrast patterns across wavelengths. It has been known for some time that in reflected light the contrasts peak at about 370 nm and decrease to barely discernible at shorter and longer wavelengths. Sulfur dioxide has been identified as one of the species that is likely responsible for contrasts observed in the 283 nm images from Akatsuki, but other species are required to produce contrasts at wavelengths longer than 330 nm. On the night side cloud features seen in the Akatsuki images at 1.74, 2.26 and 2.32 μm are visible due to the spatially variable transmission of the radiation emitted by the lower atmosphere as it escapes to space. What causes these opacity differences is not clear. The morphology of the night side features suggests some influence of local circulation, but given the ubiquitousness of the primary cloud particles (~ 1 μm radius) it is not easy to understand why contrasts exist at all on the day and night sides. More than a dozen species have been proposed for explaining the absorption of sunlight, but the identity of the absorber(s) and their nature are still a mystery.

Recently Limaye et al. have revisited the possibility of life in the clouds of Venus explored whether microorganisms may contribute to the contrasts seen on both day and night side of Venus.

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