Possibility of Microorganisms being the Missing Absorbers of Solar Radiation in the Clouds of Venus and their Detection

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Since the inference [1] and subsequent conformation that the Venus cloud particles are composed primarily of concentrated sulfuric acid [2], the causes of the absorption of solar radiation in the clouds has been a puzzle [3, 4]. Many substances have been proposed [5] but none can be confirmed due to observational difficulties as well as due to lack of detection of any processes that can create them. FeCl3 is favored as the most likely absorber [6, 7], but its lifetime is limited by the presence of sulfuric acid and requires a constant re-supply from somewhere, either from within the clouds or from surface. In light of the suggestion that Venus may have been the first habitable planet and could have harbored liquid water on the surface for as long as two billions years and the realization that some terrestrial microorganisms exhibit spectral absorption characteristics similar to those of Venus clouds [8, 9], the possibility of their existence in the clouds of Venus in the habitable zone cannot be ignored. Recent discovery that life has been detected in the extremely hot conditions (on Earth surface) in concentrated acid found in the Danakil depression in Eritrea bolsters the need to undertake efforts to detect the possible existence of micro-organisms in the clouds of Venus with a life detection imaging microscope and/or Raman LIDAR in case life evolved in its early history and migrated to the clouds. Microorganisms are common in Earth clouds even at altitudes as high as 41 km.

A long lived aerial platform capable of sampling different altitudes in the Venus clouds is needed to sample the cloud particles, trace species, solar spectrum and the ambient meteorological conditions towards identifying the absorbers, whether particulate, gaseous or organic.

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