

## ***Venus early water inventory: Could life evolve?***

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There are indications from the Pioneer Venus Orbiter mission that Venus was more “wet” during its early evolutionary stages. Therefore, the questions arise if Venus may have had liquid water on its surface and if it was stable long enough, that simple life might have evolved. We review the present arguments, which are discussed in the scientific literature and study the possible conditions if liquid water or even a proto-ocean could exist on early Venus from the point of the atmospheric evolution. We present model calculations, where we investigate various solar and atmospheric conditions, for the estimation of the time periods where water could have been liquid on Venus surface. Under some situations, life may have had time to evolve until liquid water evaporated due to an increase in the solar luminosity leading to a runaway greenhouse effect. After the conditions on the surface of Venus became hostile, microorganisms may have found niches in the subsurface. Since the heat flow from the interior on Venus is relatively small, and water might be abundant in the subsurface in a supercritical state, such niches could be comparable to the deep hot biosphere found on Earth and may be more likely than recent speculations of life in Venesian clouds.