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The Kelvin-Helmholtz instability in the solar wind interaction with Venus

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In this investigation we conduct parameter studies in order to address the question whether the Kelvin-Helmholtz instability is able to develop for different conditions. We study this instability by assuming a boundary layer of finite thickness across which the plasma parameters change. Very important for the application of theoretical results to the situation at Venus is the change in the plasma density, which covers some orders of magnitude from the solar wind density to the ionospheric density. Thus, we assume an appropriate density profile in order to discuss the occurrence of the Kelvin-Helmholtz instability due to the solar wind interaction with Venus. Growth rates and corresponding wavelengths are presented. By comparing the instability growth time with the Kelvin-Helmholtz wave propagation time, we can find if the instability can evolve in the vicinity of Venus. The instability is thought to lead to detached plasma clouds through which ionospheric particles are able to escape.