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## Venus and Earth as analog environments for the characterization of terrestrial exoplanets looking at HWO in the context of the AVENGERS initiative

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Several missions have been recently selected to explore Venus, that during the next decade will focus on the analysis of its atmosphere, surface and interiors. Additionally, missions have been selected to search for and characterize terrestrial exoplanets and potentially habitable worlds, with the Habitable Worlds Observatory being the next generation space telescope devoted to this type of analysis. With the explosion of terrestrial exoplanets discoveries, the current available data seem to show how some of them may be characterized by very dense and very likely CO<sub>2</sub>-rich atmospheres. In this context, Venus (and Earth) can be used a natural laboratory to constrain the models for potentially habitable environments. One possibility is that terrestrial planets evolving toward Venus-like conditions at some point in their geologic history, may be a common stage of planetary evolution. Venus could have been like Earth in the past, including potentially hosting liquid bodies of water on its surface before developing into its current caustic state. Understanding why Venus and Earth at some point of their geologic history took completely different evolutionary paths is one key science question for a better understanding of the evolution of potentially habitable exoplanetary environments. To this regard, studying the interior, surface, and atmosphere of Venus and Earth assumes an even broader perspective, as these planets in particular may be considered as suitable analogs for many terrestrial exoplanets. During the upcoming years, the “Analogues for VENus’ GEologically Recent Surfaces” (AVENGERS) initiative will provide useful insights into these key science questions by investigating terrestrial analogs of features found on Venus, and therefore applicable to similar exoplanets.

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