

Venus: The Making of an Uninhabitable World

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A fundamental aspect of understanding the limits of habitable environments and detectable signatures is the study of where the boundaries of such environments can occur, and the conditions under which a planet is rendered into a hostile environment. The archetype of such a planet is Earth's sister planet, Venus, and provides a unique opportunity to explore the processes that created a completely uninhabitable world and thus define the conditions that can rule out bio-related signatures. In this talk I will describe the gaps in our knowledge regarding Venus and how this is impacting our ability to model exoplanet atmospheres and interiors. I will outline the premise behind the "Venus Zone" and how testing the conditions of runaway greenhouse is an essential component of understanding the development of habitable conditions. I will present several detected potential Venus analogs including climate simulations that constraint their surface environments. Finally, I will summarize the need for a return mission to Venus and the primary questions that need to be addressed.