

Venus surface exploration from ISRO's Venus Orbiter Mission (VOM)

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In exploring the stark differences between Venus and Earth, despite their similar initial conditions, ISRO's Venus orbiter mission (VOM) is being realized as a significant step in Venus research. While Venus should have been more Earth-like, it underwent a catastrophic runaway greenhouse effect, leading to its current inhospitable conditions. VOM aims to understand this divergence by studying Venus's geological activity and its connection with the atmosphere. The mission utilizes cutting-edge technology, including a polarimetric synthetic aperture radar (SAR) to capture high-resolution images and measure topography through the stereo mapping technique. VOM also carries a subsurface radar sounder that will explore the vertical structure and stratigraphy of a wide variety of geological units. By characterizing surface properties, weathering, and shallow subsurface structures, VOM seeks to unravel the mysteries of Venus's unique evolution and contribute valuable insights into the broader understanding of terrestrial planets. This mission builds on the success of ISRO's Chandrayaan and Mars Orbiter missions, and addresses critical questions about Venus's geological dynamics and the factors influencing planetary evolution.