# COMPARATIVE ATMOSPHERES OF EARTH-LIKE BODIES: TITAN, MARS AND VENUS

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Whereas the composition of Jupiter reflects the constitution of the primordial solar nebula, the same cannot be said of the terrestrial bodies. Unlike Jupiter, the most volatile of the gases, hydrogen, helium and neon are largely absent due to their rapid escape from these relatively light objects. On the other hand, quite massive atmospheres did form around Mars, Venus and Titan. However, in contrast with the giant planets, the present atmospheres of Titan, Mars and Venus are secondary. Nitrogen was derived from ammonia, but volcanism may have played a bigger role on Mars and Venus than Titan. Methane—a trace constituent of the Earth's atmosphere and possibly also of Mars—is only second to nitrogen on Titan. Considering its significance for life and habitability—methane is a potential biomarker—it is important to understand the origin and fate of this molecule. The aeolian processes on Mars may result in a unique electrochemistry that could impact the fate of surface organics and minor atmospheric constituents including methane if present. In this talk, I will discuss how comparative studies of the composition and chemistry of Titan, Mars and Venus systems can help address such fundamental questions as the formation of these bodies and the origin and evolution of their atmospheres.