

Mars' ionosphere as link between the atmosphere and space

The Martian atmosphere is a highly variable, complicated, and sensitive system in which the lower and upper parts are strongly coupled thanks to the ionosphere. This ionized layer is an active region of the thermosphere that is created mainly through EUV solar photoionization. The ionosphere is not static as several external and internal forcing processes produce large ionospheric variability, which in turn, also affect the rest of the atmospheric structure.

In this presentation, after a general introduction to the Martian ionosphere and its interaction with the solar wind, I will focus on the effect of two main sources of ionospheric variability that have an effect overall atmospheric structure. Starting from internal sources, I will show how lower atmosphere cycles, such as the seasonal CO₂ cycle, have an influence on the upper atmosphere, especially notable at spring when the polar caps sublime. Then, moving to external sources, I will show the effect of electron precipitation from large space weather events in the Martian atmosphere that are able to create lower-ionospheric absorption layers at ~60-80 km.

The work presented here is based on observations from Mars Express, Mars Reconnaissance Orbiter, and the Mars Atmosphere and Volatile Evolution (MAVEN) missions, as well as on ionospheric modelling.



Thursday, January 30th

4:00-5:00 p.m.

725 Commonwealth Ave | Room 502

Beatriz Sánchez-Cano

University of Leicester