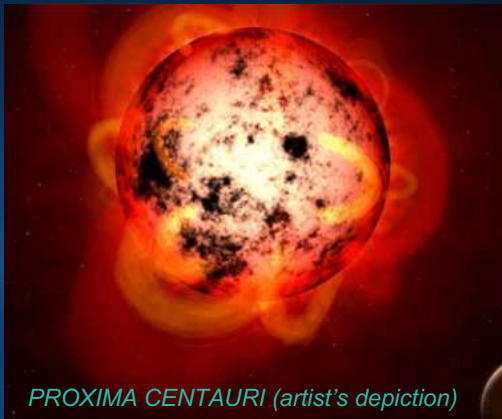
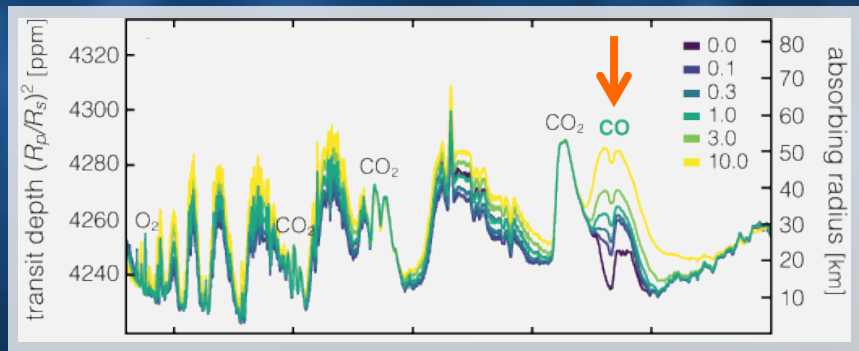


Carbon Monoxide May Not Rule Out the Presence of Life

For some exoplanets, remotely detectable carbon monoxide may be diagnostic of a robust microbial biosphere.



- Certain atmospheric gases such as carbon monoxide (CO) have been proposed as ‘antibiosignatures’—evidence that a planet is *not* inhabited. A new study uses 1-D ecosphere-atmosphere and photochemical models to quantify the extent to which CO could exist in the atmospheres of living planets.
- Reducing biospheres around sun-like stars, like the Archean Earth of three billion years ago, can maintain CO levels orders of magnitude greater than the traces of CO in the



CARBON MONOXIDE is a prominent feature in simulated transmission spectra for oxygen-rich atmospheres in the habitable zone of an M-dwarf star like Proxima Centauri. Colors correspond to the magnitude of the assumed surface molecular CO flux scaled to that of the modern Earth (e.g., modern = 1.0). Unlabeled features are from CH₄.

- atmosphere of modern Earth. The photochemistry around M-dwarf stars like Proxima Centauri would be considerably more favorable for the buildup of CO.
- Transit spectroscopy of rocky exoplanets with the JWST could detect CO that is compatible with the presence of life (see figure). Understanding the cause of this high CO would require a comprehensive planetary assessment.