



Atmosphere Exchange & Signs of Life

Could the exchange of chemicals between two exoplanets be mistaken for signs of life when observing one of them?

- We modeled exoplanet atmospheres and simulated how they would look when observed with the James Webb Space Telescope (JWST) or next-generation space telescopes.
- We specifically simulated cases where oxygen atoms entered the top of the atmosphere, as this process is observed on Titan and could potentially lead to the accumulation of oxygen and ozone - potential biosignatures - in the atmosphere
- We found methane could survive this oxygen influx, but that oxygen and ozone could not build up to detectable levels. Thus, if a rocky planet is seeded with water or oxygen from external sources, it is unlikely that this could be mistaken for signs of life when observing with JWST and next-generation space telescopes.



Saturn's moon Enceladus with cryovolcano plumes spewing organic compounds out into space. Image credit: NASA/JPL-Caltech

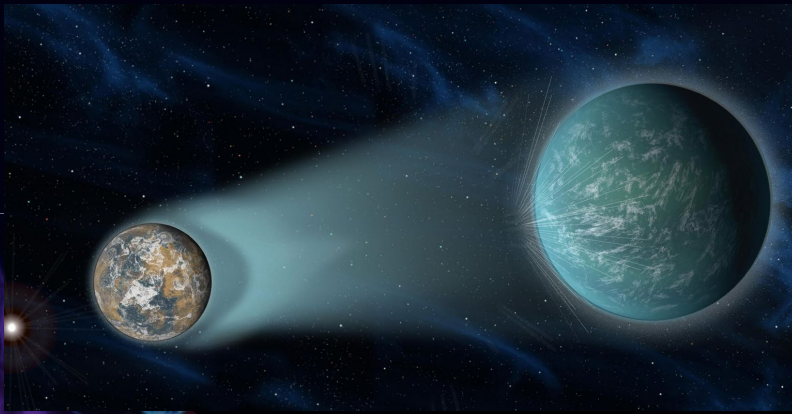


Illustration of TRAPPIST-1 d losing its atmosphere due to stellar activity and raining down onto TRAPPIST-1 e. Image credit: NASA/ESA, ESA, and ESA/ESA