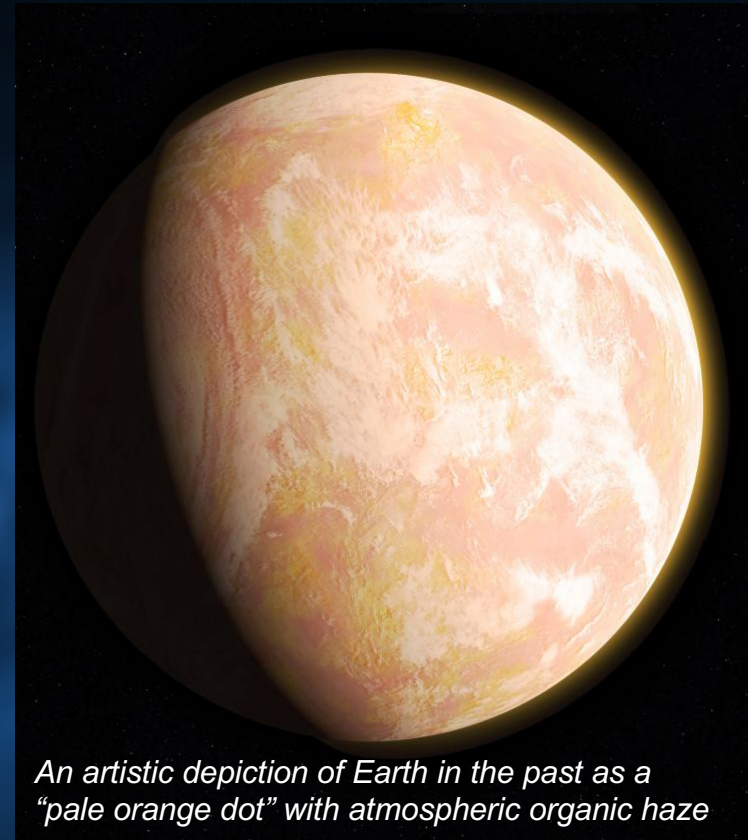


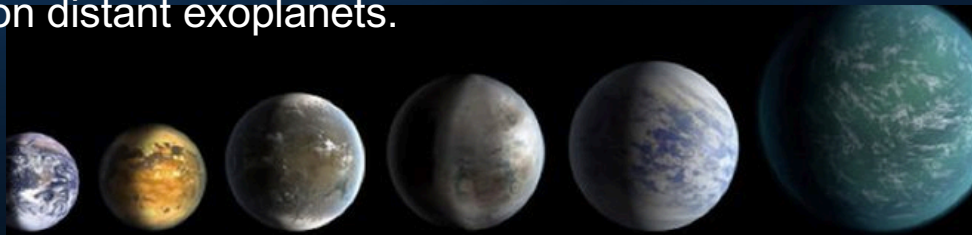
Pale Orange Dots: Organic Haze as a Biosignature on Other Earths

Remotely detectable biosignatures of habitable, methane-rich exoplanet atmospheres have been identified for potential use in future searches for life on distant planets.

- Organic haze, a type of orange-colored “smog”, can indicate high methane production rates on exoplanets with atmospheres that contain carbon dioxide. Additionally, since organic haze requires less methane to form in the presence of biogenic organic sulfur gases, the presence of organic haze at unexpectedly low methane concentrations can also suggest the influence of these gases and imply biological activity on the exoplanet.
- Because the chemistry of these atmospheres is different from modern Earth, the prominent, remotely-detectable features in the UV-blue and near infrared wavelengths from the organic haze could be used as indirect evidence for life in biospheres different than our own, and would be detectable even on distant exoplanets.



An artistic depiction of Earth in the past as a “pale orange dot” with atmospheric organic haze



Arney et al. (2018),
Astrobiology.