



Atmospheric biosignatures of Earth-like planets orbiting cooler stars

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We summarise photochemical and climate responses from coupled numerical column models for processes influencing atmospheric biosignatures such as ozone and nitrous oxide in Earth-like planets orbiting in the Habitable Zone of cooler stars such as M-dwarfs. We consider thereby the influence of key input variables such as the spectral type of the central star, surface biomass emissions and atmospheric composition. We also discuss the influence of cosmic rays which can lead to air shower events producing photochemical loss of atmospheric biosignatures. Finally, the detectability of atmospheric biosignatures with planned future instruments such as the James Webb telescope (JWST) and the European Extra Large Telescope (E-ELT) are also discussed.