



## **Evolution of atmospheric biomarkers over Earth's history and the search for extrasolar planets**

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The search for life on extrasolar planets is based on the assumption that one can screen extrasolar planets for habitability spectroscopically. The first space born instruments able to detect as well as characterize extrasolar planets, Darwin and terrestrial planet finder (TPF-I and TPF-C) are scheduled to launch before the end of the next decade. The composition of the planetary surface, atmosphere, and its temperature-pressure profile influence a detectable spectroscopic signal considerably. For future space-based missions it will be crucial to know this influence to interpret the observed signals and detect signatures of life in remotely observed atmospheres. We give an overview of biomarkers in the visible and IR range, corresponding to the TPF-C and TPF-I/DARWIN concepts, respectively. We also give an overview of the evolution of atmospheric and surface biomarkers over time and its implication for the search for life on extrasolar Earth-like planets. We show that atmospheric features on Earth can provide clues of biological activities for at least 2 billion years.