

“Standards of Evidence” for Life Detection

From the 2021 “White Paper Report from the Biosignatures Standards of Evidence Community Workshop” produced by the NFOLD Network for Life Detection

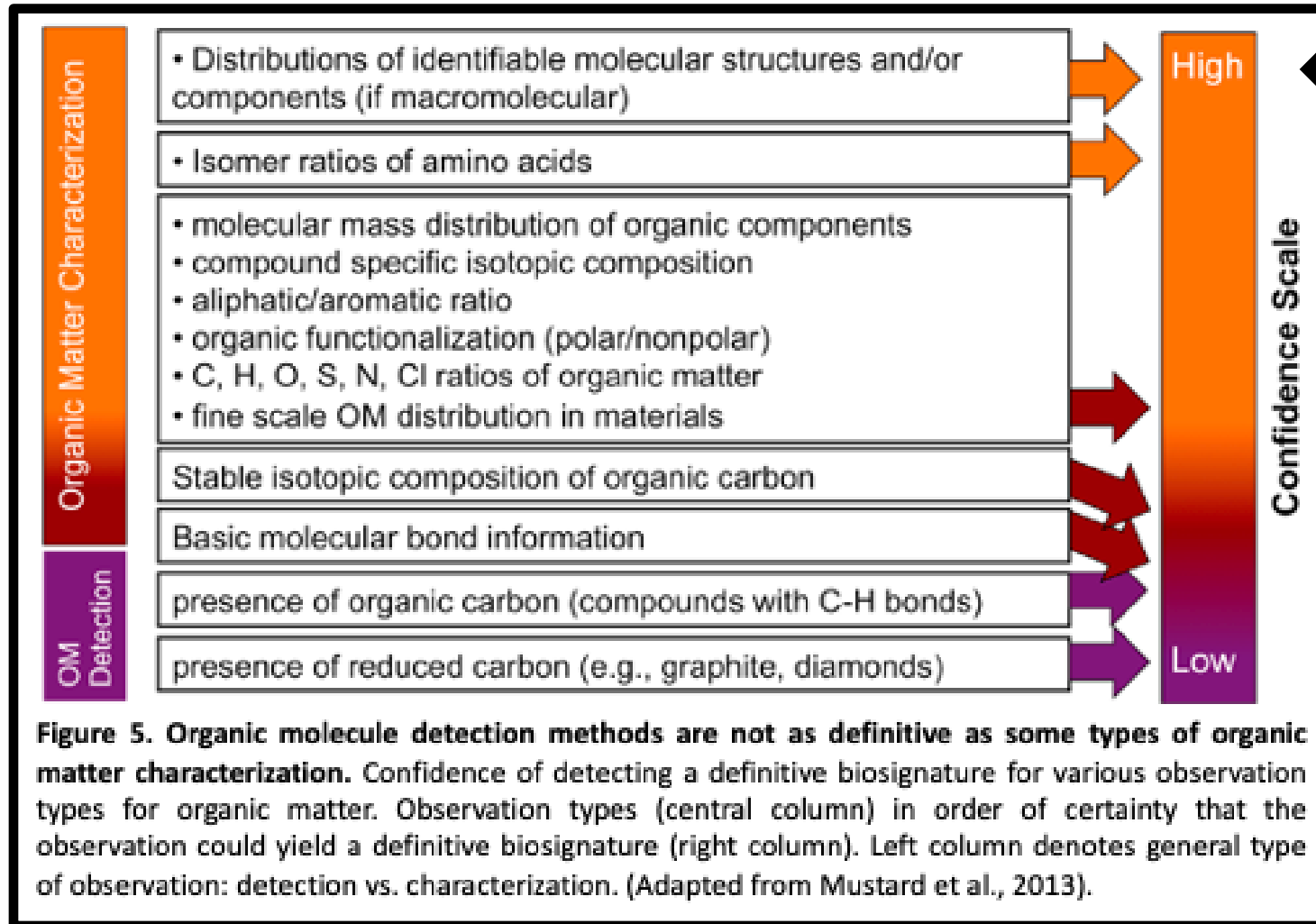
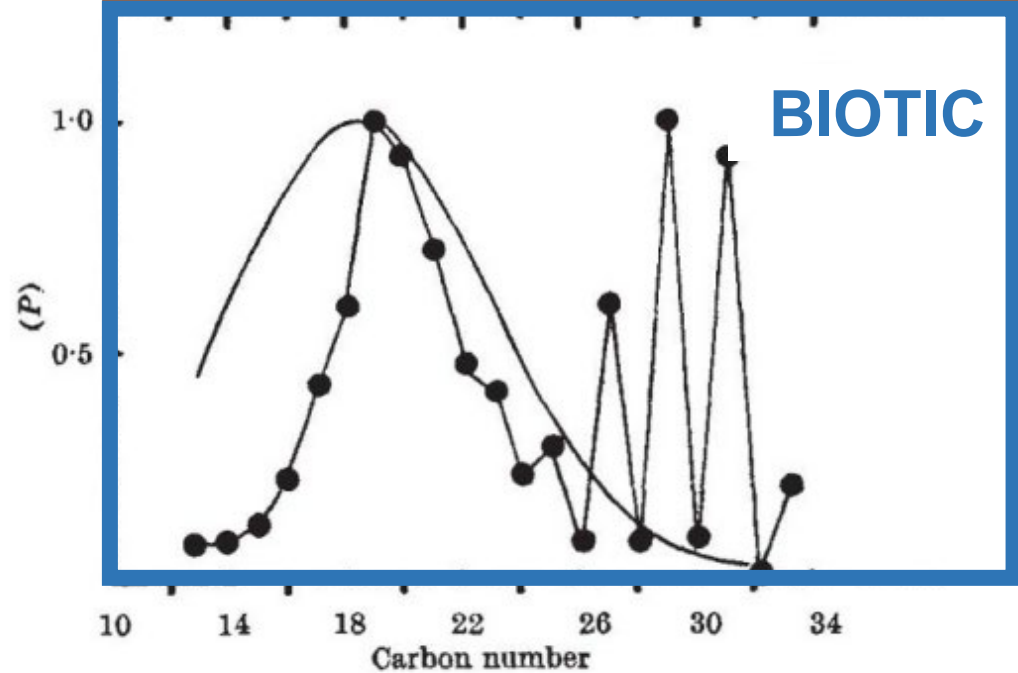
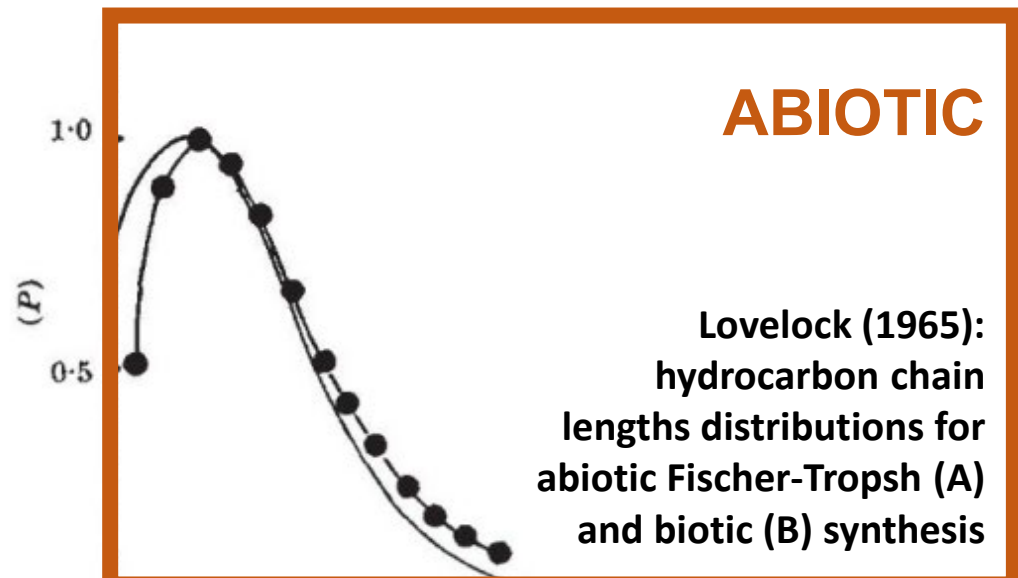


Figure 5. Organic molecule detection methods are not as definitive as some types of organic matter characterization. Confidence of detecting a definitive biosignature for various observation types for organic matter. Observation types (central column) in order of certainty that the observation could yield a definitive biosignature (right column). Left column denotes general type of observation: detection vs. characterization. (Adapted from Mustard et al., 2013).

Ideally, we want to make measurements across this spectrum, prioritizing the highest-confidence measurements.

Origin-diagnostic distributions & features



Lipid biomarker structures are well-known within a terrestrial context

Meteoritic lipid profiles also well-constrained

Molecular form reflects biological function

Biosignature Measurements are Additive!



14 diagnostic molecular patterns & features found in acyclic lipids are represented in this principal component analysis

Buckner et al., 2024
Graphic credit: Walt Alvarado