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Common biogenicity markers in Precambrian cherts

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The origin of the organic matter in Archean cherts (2.8 to 3.8 By old sedimentary rocks) can be controversial [1-4] and associated biogenicity markers (biomarkers) are essential to its correct interpretation.
This study focussed on the insoluble fraction (kerogen) of the organic matter assumed to be the same age as the host rock since its structure is based on covalent bonds. Derenne et al [2] identified a biomarker based on odd-over-even carbon number predominance in aliphatic hydrocarbons released upon pyrolysis of the kerogen isolated from a chert from Warrawoona, Australia [5].
To determine the general usefulness of this type of biomarker, we made the same investigation on a suite of Precambrian cherts of various ages and localities (Early Archaean Onverwacht Group, South Africa, [4]) and the Proterozoïc Gunflint Chert, Canada). 13C NMR and EPR spectroscopy and HRTEM microscopy investigations were also made. The same odd-over-even carbon number predominance was found in the aliphatic chains, although the carbon range exhibited slight variations. This study emphasises the usefulness of this type of biomarker in future exobiology studies.

[1] Brasier et al. (2002), Nature 416, 76-81. [2] Derenne et al. (2008), Earth and Planetary Science Letters 272, 476-480; [3] Westall, F. (2009) Science, 232, 471-472. [4] Westall, et al,(2006) Phil. Trans. Roy. Soc. Lond. B., 361, 1857–1875. [5] Schopf et al. (2002), Nature 416, 73-76.