

A reassessment of prebiotic sources of carbon in the early earth

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A major reassessment of the sources of carbon is required to explain a range of anomalies associated with carbon distribution in the early earth and in post Hadean periods.

Among these we might list:-

A.The early earth crust whether sub-continental:-acidic or granitic, or sub-oceanic:-basic or basaltic contains a very small concentration of carbon, less than 100 ppm. The sedimentary rocks which are assumed to be directly or indirectly derived from these materials contain well over 5% of carbon.

B.The earliest sources of carbon can not be assumed to have been derived from living matter and a prebiotic source of carbon must have existed in realistic quantities. Even if the micro-structural and isotopic evidence for the existence of life around 3.8Ga is assumed, which is an open question, a source of carbon must be established.

C.The large deposits of methane hydrates as well as the more recent sources of methane (Lake Kivu) cannot be explained as purely to organic sources.

To explain the above anomalies we wish to propose the concept of 'reactive minerals'. We believe that a considerable number of reactive minerals exist well below the earth's surface. Such minerals would react with water, water vapour and/or oxygen when approaching the surface. We could cite carbides and sulphides as examples, more specifically calcium and aluminium carbide. It is well known that these compounds are stable at high temperatures but react if exposed to water or oxygen. In the former case they would initially yield methane or acetylene if confined to a neutral or reducing environment, or under oxidising conditions they would yield CO₂. This in turn would carbonate and at higher temperatures result in the formation of oxides and silicates.

The existence of such reactive minerals would explain how prebiotic sources existed from which living matter could have developed. It will also show that our present figures regarding the actual carbon content of the earth are low and true values would be in line with the carbon content of other planets and interstellar materials.