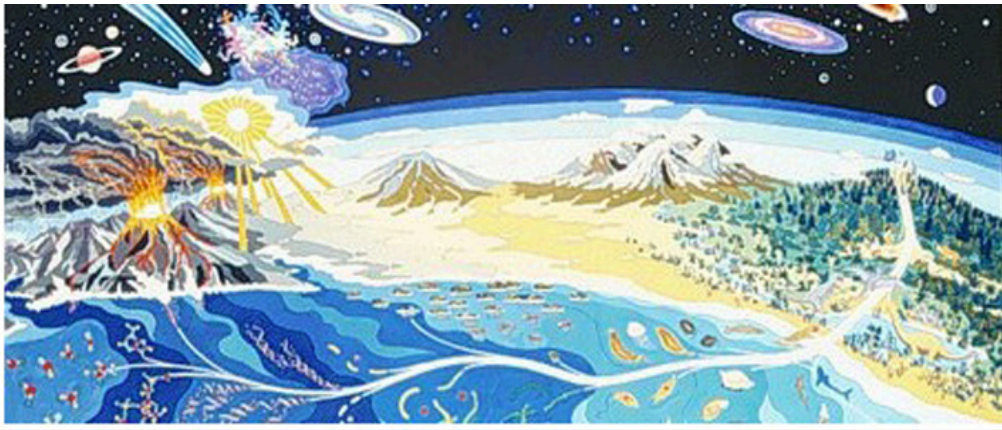




Early Life Had Limited Raw Materials At Its Disposal

On the early Earth, the suite of minerals present may have been severely limited relative to the minerals scientists are familiar with today.

Astrobiologists have shown that no more than 420 mineral species were present at or near the surface of the Earth in its first 550 million years, the Hadean Eon. This represents only 8% of the nearly 5000 mineral species present today. As life originated through natural processes that made use of these minerals, origin of life models must take these limited inputs into account.



The origin of life occurred through natural processes that made use of mineral species available on the early Earth. Image Credit: NASA



Magma erupting from a volcano. On the Hadean Earth, minerals were formed through the crystallization of magma, and the interaction of magma with hot water. Image Credit: Wikimedia Commons

Minerals on ancient Earth were formed only by cooling molten rock (magma), and the alteration of this rock by hot water. Today, there are many more processes for forming minerals – many of them directly tied to the biosphere.

The study also helps narrow down which minerals may be required for life as we know it to originate on other planets, such as Mars.

Hazen, R. (2013). *American Journal of Science*.