

Birth place of life on the Hadean Earth: The role of primordial continent

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Where on the Earth is the birth place of life? It is remaining shrouded in mystery. For the beginning of life, several critical conditions must be met. For example there must be enough supply of necessary elements to form body of living organisms such as clean water, nitrogen, hydrogen and nutrients with constant energy/material circulation. Where did such place locate on Hadean Earth?

The answer is on the primordial continent. After the giant impact, whole Earth was melted as well as Moon. As the planet cooled down gradually, heavy metal components sank down into the core and residual components which remained in the mantle floated on the primordial continent.

There are 2 important roles for primordial continent. One is to be the place to form lakes, and the other is to be a source of nutrients. In the Hadean, chemical composition of ocean was significantly different from that of modern Earth, which was too toxic (high salinity, ultra-high acidity, and ultra-enriched in heavy metal) and impossible for life to live. Therefore, to bear life, the appearance of lakes filled with clean water is necessary, and primordial continent provided nutrients for the birth place in the Hadean. On this point, hydrothermal system at deep sea floor cannot be the birth place of life.

Another critical role of primordial continent is being supplier of nutrients to bear life. Without supply of nutrients, life body cannot be formed and organic radical reaction such as metabolism does not proceed. There is no direct evidence of primordial continent on modern Earth, however it is inferable from lunar geology of modern Moon. KREEP basalt enriched in both phosphorous and potassium which is exposed on the Moon surface had appeared on primordial continent on the Earth and must have played the key role to create life.

A lake with clean water formed on the primordial continent was abundant with nutrients, which established Habitable Trinity under the Sun to provide suitable place for the beginning of life for the first time on the Earth.

Key words: Hadean eon, primordial continent, anorthosite + KREEP, lake, origin of life

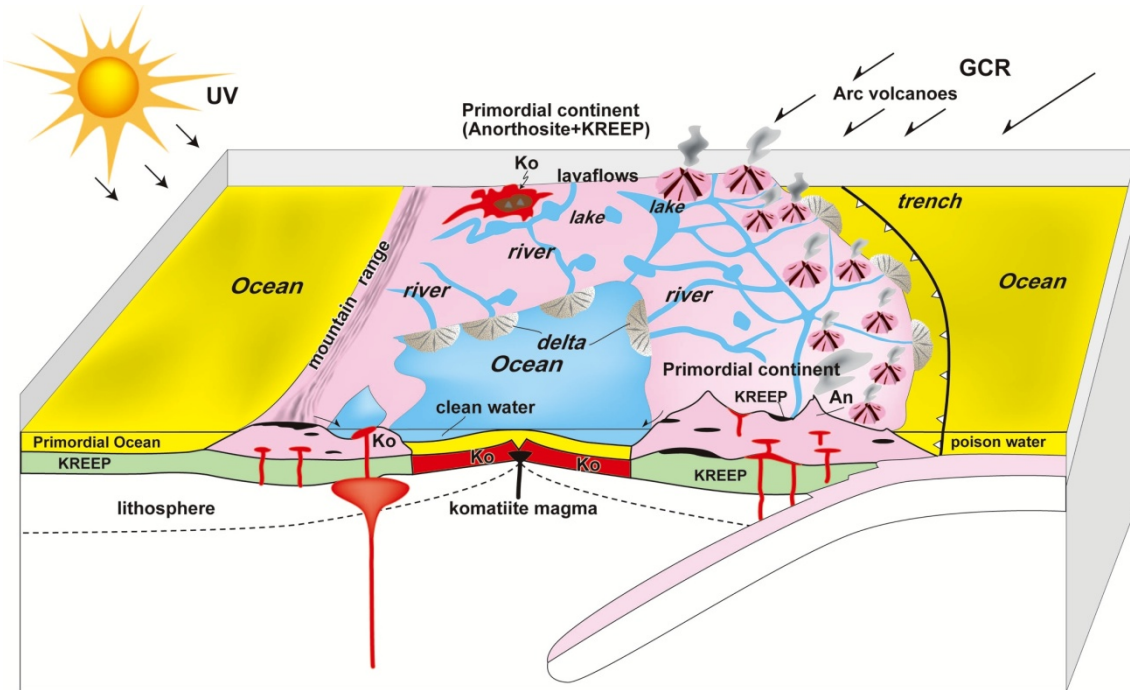


Figure: Model of the birth place on Hadean Earth.

Life emerged on surface environment on Hadean Earth where Habitable Trinity environment was maintained under the driving force, the Sun.

Need landmass (oversaturated P for membrane),

Need lakes (primordial ocean is toxic; ultra-acidic, high salinity, ultra-rich in heavy metals),

Need continuous supply of nutrients (P-ore etc)