

Geochemical cycles of bio-essential elements on the early Earth and their relationships to origin of life

Takeshi Kakegawa[1]

[1] IMPE., Tohoku Univ.

The input flux of phosphorous in pre-biotic oceans was probably dominated by submarine hydrothermal activities associated with carbonatized oceanic crusts. Such input flux by submarine hydrothermal activities is not known in the present-day oceans, and probably a unique flux in the pre-biotic oceans. Boron chemistry of pre-biotic oceans was also controlled by submarine hydrothermal input flux. The Mo exchange between the pre-biotic ocean and lithosphere may have restricted only at the submarine hydrothermal areas. These geochemical constraints suggest that the submarine hydrothermal discharging areas were only locations to obtain bio-essential elements for the earliest life. This model is consistent with the previously proposed model for hydrothermal origin of life.