

Perspectives of ELSI Projects: the Origin of the Earth and the Origin of Life

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Earth-Life Science Institute (ELSI) has been recently established at the Tokyo Institute of Technology based on the World Premier International Research Initiatives (WPI) program and is going to study the origins of the Earth and life. These two topics are indeed inseparable because life is a phenomenon that can exist only through the exchange of energies and matter with the surrounding environment. We will therefore integrate research on the Earth and life, and explore “how our life can originate and continue on this planet” through a detailed study focused on the early Earth. We will answer the following scientific questions: (A) How was the Earth formed within the solar system? (B) How was the earth's first ecosystem established, and (C) How can the earth and life evolve after the first state. Through the study of the Earth, we clarify universality and uniqueness of the planet Earth harboring life. Further, we utilize the outcomes of the research (D) to provide guidance for the search for life on other planets and moons. Each of those themes is performed under an interdisciplinary fusion of different fields such as astronomy, planetary physics, geology, solid-Earth science, environmental biology, and microbial genome science.