

# The Framework of the Geo-history in Seventeenth-Century Theories of the Earth and Its Implication

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I have published the book *Transformation of the Conception of Geocosmos: From Descartes to Leibniz*, which dealt with the development of the theories of Earth during the seventeenth century (Yamada, 2017). Unfortunately, however, I could not explain adequately the framework for description of earth history that emerged in the period and contributed to the geological thinking. First, Descartes presented a visual model of the cosmogony, in which Earth evolved into layered structure. But without the interpretation of fossils Descartes' model lacked a 'history'. On the other hand, Steno's methodology of analyzing the solids within solids revealed the principles for reconstructing the earth history. Steno admitted three kinds of rocks which consisted of mountains, hills and plains respectively. The method was succeeded by Italian scholars as 'Stenonian heritage' and made a tradition of stratigraphy. For example, Giovanni Arduino surveyed northern Italy and established four units *ordini*, though he did not use *Quaternary* (Vaccari, 2006). Lastly, Leibniz synthesized the idea of Descartes and that of Steno, recognizing the distinction between proto-earth (*incunabula*) and geological time. He also suggested that plant fossils indicated changes of environment, claiming that the history of nature compensated the history of human. Thus, although the long 'deep time' was not yet emerged, we recognize the fundamental framework for describing earth history, including human history and its environments, around the end of the seventeenth century.

## Reference:

Vaccari, Ezio, "The "classification" of mountains in eighteenth century Italy and the lithostratigraphic theory of Giovanni Arduino (1714-1795)," *Geological Society of America Special Paper* 411 (2006), 156-177.

Yamada, Toshihiro, *Jiokosumosu no henyo: Dekaruto kara Raipunittsu made no chikyu-ron* [*Transformation of the Conception of Geocosmos: From Descartes to Leibniz*] (Keiso Syobo, 2017).

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