From Suns to Life: a chronological approach to the history of life on Earth

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The aim of this poster is to present, in a synthetic chronological frieze, the various events considered by the authors as relevant to the origins of life on Earth. These events have been tentatively ordered chronologically in accordance with actual knowledge within all the scientific disciplines involved in astrobiology.

This frieze will be published in September 2006 in a topical issue of Earth, Moon and Planets gathering 9 articles written by 25 scientists (astronomers, geologists, biologists, chemists) who have attempted to share their specialized knowledge around a common question: how did life emerge on Earth? Their ultimate goal was to provide a first answer as a prerequisite to an even more demanding question: is life universal?

The resulting state-of-the-art articles were written with the purpose to highlight problems, gaps, and controversies and not at all to tell a linear, comfortable story.

By adopting a chronological approach to the question of the emergence of life on Earth (the only place where we know for sure that life exists, even though nobody agrees on the general definition of "life"), it was possible to break down this question into several sub-questions that can be addressed by different disciplines. After an introduction (1), the main chapters of this review are: the formation and evolution of the solar system (3); the building of an habitable planet (4); prebiotic chemistry, biochemistry, and the emergence of life (5); the environmental context of the early Earth (6); the ancient fossil record and early evolution (7). The concluding chapter (9) summarizes the highlights of the review and discusses the different points of view about the universality of life. Two pedagogical chapters are also included, one on chronometers (2), another in the form of a "frieze" (8) summarizing in graphical form the present state of knowledge about the chronology of the emergence of life on Earth, before the Cambrian explosion.