



## LIFE HISTORY OF FORAMINIFERA: STABLE ISOTOPIC AND ELEMENTAL PROXIES\*

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### ABSTRACT

Foraminifera are morphologically and ecologically a most diverse group of single-celled organisms. They have been major constituents of the marine biomass as observed in the modern seas and in the marine rock records of the Phanerozoic times. For practical reasons, the biology and life history of foraminifera is not known in detail, particularly for a vast number of extinct species that have no living representatives for comparison. Coincidentally, the mineralized shells of foraminifera preserve the records of life conditions and life history of the organism. The incorporation of stable isotopes and trace elements in foraminiferal shells is known to be dependent on physical and chemical conditions of the ambient environment and biological processes of the organism. These geochemical data may therefore act as proxy of life conditions and life history including temperature of the habitat, temperature tolerance, reproduction, depth distribution, life span, calcification and photosymbiosis. It must be emphasized that the stable isotopes and trace elements in foraminiferal carbonate should be first understood well in modern foraminiferal taxa before using them as proxy data in palaeobiology. Improvements in analytical techniques, higher sampling resolution and better understanding of biomineralization processes are opening new possibilities in palaeobiological research in foraminifera.

**Keywords:** Foraminifera, Life history, stable isotopes, Mg/Ca ratio