

High precision X-ray CT morphometry of microfossils for scientific validations

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Recent three dimensional (3D) morphometrics bring tremendous contributions for natural sciences. In the field of earth sciences, the acquisition of 3D morphometrics is rapidly increasing for the purpose of precise analysis of morphology of geological materials, especially for microfossils. In this study, we are trying to acquire the high resolution microtomography of microfossils by using the Microfocus X-ray Computed Tomography (MXCT). The combination of MXCT technique and high-precision X-ray detectors realize submicron-scaled morphology of microfossils without destruction on both the outer and the inner structures, therefore it is useful for classification, evolutions and functional morphology on microfossils.

The materials used in this study were microfossils from deep-sea sediments collected by the Deep Sea Drilling Project (DSDP) and Ocean Drilling Project (ODP) and other materials in modern ocean. So far, we already achieved the 3D microtomography for some species on foraminifers, radiolarians, diatoms and pteropods from each geological ages. In this presentation, we will show the reconstructed 3D images of the above specimens and discuss about the essentials for scientific validation on micropaleontological studies. In addition, we will discuss about 3D printing models by using the above 3D data for educational purposes.

Keywords: Microfossils, Microfocus X-ray CT, 3D morphometry, Three dimensional models