

Study of the Oldest Animal Fossils with Computer Tomography
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Fossils represent biological information that has been turned into stone. Thus, methods that are capable of detecting information from inside opaque material have great potential for paleontology. We have applied X-ray Computer Tomography (XCT) for detection and analysis of Neoproterozoic microfossils that represent the most ancient fossils of animals on Earth, from the Doushantuo Formation (China). Presently, the primary method to search for internal morphological details of these fossils is through examination of thin sections. Using this approach, to understand three-dimensional internal structures, one might employ serial sectioning. However, because the fossils are usually less than a millimeter in size, obtaining more than one section from a fossil is almost impossible. Because of the importance of these fossils for understanding the early evolution of animal life, 3-dimensional reconstructions are necessary. In particular, this non-invasive XCT method has shown great promise.

We have developed a protocol for obtaining 3-dimensional images of these small animal fossils. As a result we have the capability to build a digital library of 3-dimensional images using this non-invasive XCT method, bringing the study of such important fossils to the next level.