Studying of fossil invertebrates for example brachiopods by using of the x-ray micro-CT Skyscan 1172

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Researches of some fossil remains by x-ray micro-CT Skyscan 1172 have been carried out in the Paleontological Institute of RAS for more than one year. Fossil remains of echinoderms, brachiopods, bryozoans, insects, the bones of reptiles, amphibians, birds, mammals, the borings in the bivalve and cephalopod shells have been investigated. The Recent brachiopods (*Macandrevia cranium*, *Terebratulina retusa septentrionalis*, *Hemithyris psittacea*, *Eucalathis murrayi*, *Dallina septigera*, *Diestothyris frontalis*) and fossil ones (*Orthis calligramma*, *Cyrtospirifer sp.*, *Composita ambigua*, *Carneithyris carnea*, *Titanaria africana*, *Semiplanus semiplanus*, *Ivanoviella alemanica*, *Microsphaeridiorhynchus sp.*, *Atrypa reticularis*, *Kozlowskia sp*.) were studied. For research into the brachiopods by traditional methods it is necessary to produce the sections. In this case the shell material is destroyed. Using of the x-ray micro-CT allows to preserve specimens. X-ray micro-CT is very useful for studying the Recent brachiopods: age series, fragile and typical specimens. Studying fossil shells we meet with some difficulties. The difference of the density of a shell matter and carbonate sediment inside the shell isn't great. Sometimes micro-CT doesn't recognizes shell matter as in *S. semiplanus*. Sometimes micro-CT distinguishes only the boundaries of the valves, for example in *T. africana*. Silicate sediment (sand) inside the shell of *C. carnea* retouches the valves of a shell in the virtual sections weakly. The cavities and canals are seen best of all, for example in *I. alemanica* and *Kozlowskia sp*. It affords an opportunity to research the internal structure of the shells using partially x-ray scan that was done in the case of *Kozlowskia sp*. Using the x-ray micro-CT some internal shell structures were found in the shells of *O. calligramma*, *Cyrtospirifer sp.*, *C. ambigua*, *C. carnea*, *Microsphaeridiorhynchus sp.*, *Kozlowskia sp*. Creating 3D-models of a part of internal structures which are covered with sediment complicates the process of reconstruction. So using of the x-ray micro-CT Skyscan 1172 allows research into internal structures of the brachiopod shells without destroying the samples. But some problems have to be solved in the future.