

A system for automatic collection of specific microfossil species using a deep learning classification

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For geochemical analysis such as stable isotope ratio, radiocarbon age and minor elements for a single species of microfossils, a large number of their skeletons is required to pick up one by one with enormous time and effort by a person under a microscope. In this study, we have developed a device that automates these efforts. Even if experts are absent, microfossils are accurately classified their taxonomic species level using deep learning which is one of the learning methods of artificial intelligence, and they are picked up using a micromanipulator installed in the microscope with motorized X-Y stage. It is possible to collect a large number of particles with speed and accuracy that could not be achieved with human hands. This technology to accumulate only specific species of microfossils contributes not only to greatly reduce hand work of picking up, but also to be enable chemical analysis such as isotope ratios and minor elements for small microfossil species that hitherto difficult because the necessary measurement amount cannot be collected. In addition to microfossils, it can be applied to various particles, and it is also expected to be utilized in various fields such as medical, food, horticulture and materials.

Keywords: Microfossil, AI, Automatic classification