Project to digitize ancient fossils could clarify influence of climate change

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(Phys.org) -- For hundreds of years, paleontologists have added fossils to museums around the world, amassing meticulous records of ancient biology, such as the invertebrate paleontology collection at the University of Kansas Natural History Museum and Biodiversity Institute.

There, thousands of drawers hold a record of ancient life that could be especially useful today in predicting how climate change could alter our planet's biodiversity and distribution of species.

Alas, for years, such collections have come to be known as "dark data" — information that can prove difficult for far-flung researchers and non-academics to access and use.

"When I was in graduate school, if you wanted to track down material at an institution, well, maybe you got lucky and found it," said Bruce Lieberman, KU professor of ecology and evolutionary biology and senior curator with the division of invertebrate paleontology at the museum. "But to get access to the data, you'd have to contact the collections manager there, and if you wanted to gather data, it would require that a researcher there gather it for you — or you'd have to secure funds to travel yourself sometimes. So when data is hidden like that, it's like there's no data at all."

Now, Lieberman is heading a $600,000 effort funded by the National Science Foundation's Advancing Digitization of Biological Collections program to digitize thousands of fossils collected over hundreds of years

and housed at the KU institute.

Soon, valuable information about fossils' temporal and geographic distribution in deep time will be available to anyone on the Internet, accessible with a few keystrokes.

Lieberman said that partnerships with other institutions under the NSF grant would allow scientists to complete a fossil record that will more accurately show how climate change could impact species on Earth going forward.

"We know there are certain issues facing the biosphere today and we can sort of measure in ecological time what's going to happen to the flora and fauna today," he said. "But if we want a deeper time scale perspective, these fossil data will allow us to look at analogous time periods and analogous climate changes so that we can predict with more accuracy what may happen to life on the planet."

The digitization process, which will employ undergraduate and graduate students, postdoctoral researchers and a biodiversity informatics developer, will focus on three important time periods — the Ordovician, Pennsylvanian and Neogene — from three major paleobiogeographic regions: the Cincinnati region, American mid-continent and Gulf/Atlantic Coastal Plains.

"I'm focused on invertebrate fossils," Lieberman said. "Those are species that don't have a backbone, like snails, clams and their relatives. We have very strong holdings in the Carboniferous period, the time about 290 million years ago. Much of the rock you'd see around this part of Kansas comes from that period. Our deposits are centered on the entire American mid-continent. We have so much information about where those species were found and their distribution through time."

The endeavor will expand “Specify,” a database program, as well as make the fossil data available online and via portable device digital atlases aimed at amateur paleontologists and K-12 students for use in the field.

Provided by University of Kansas