North-Central Section - 54th Annual Meeting - 2020

Paper No. 18-7
Presentation Time: 3:30 PM

ENHANCING MORPHOMETRIC ANALYSIS AND STUDENT ACCESSIBILITY IN PALEONTOLOGICAL RESEARCH THROUGH STRUCTURE-FROM-MOTION 3D MODELING: TESTING HYPOTHESES ABOUT MESOZOIC PREDATOR-PREY INTERACTIONS

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The use of photogrammetry and structure-from-motion techniques are making 3D digital models of fossils more available to paleontologists, students, and the public. Morphometrics, quantitative form analysis, has long been used in paleontology to differentiate species and track evolutionary changes in organisms. Structure-from-motion provides an affordable and accessible means to create 3D models of fossil specimens which can be more comprehensively analyzed for morphological changes. This technique was applied to a collection of *Monotis* bivalve fossils from the Late Triassic of New Zealand to track potential predator-prey interactions. *Monotis* species are widely utilized as biostratigraphic index fossils; however, in New Zealand *Monotis* exhibit exceptional morphological diversity among five subgenera, including a wide range of size, inflation, and shell thickness. 3D models, for relatively complete specimens, were made from photos using structure-from-motion applications in Agisoft Metashape followed by morphometric analysis using landmarks and semilandmarks. Generally, *Monotis* genera during this interval became smaller and exhibited a more distinctly inflated left valve. These morphological trends are potentially influenced by the increased presence of vertebrate shell-crushing predators in the same Late Triassic interval. In addition to quantitative analysis in paleontology using photogrammetry, teaching and research collections can be made more accessible to students and the public. Using 3D models of fossils in labs, alongside physical specimens, gives students an interactive reference in the lab setting and outside the classroom where access to specimens is limited.
Session No. 18

D2. Geophysics, Magnetism, and Remote Sensing
Monday, 18 May 2020: 1:30 PM-5:30 PM
French River Room 2 (Duluth Entertainment Convention Center)
Geological Society of America *Abstracts with Programs.* Vol. 52, No. 5
doi: 10.1130/abs/2020NC-348227