ANALYZING CRETACEOUS AMMONOID CEPHALOPOD SUTURE PATTERN COMPLEXITY USING AUTOCAD SOFTWARE

Gabriel E. Soto and Margaret M. Yacobucci, School of Earth, Environment, and Society, Bowling Green State University, Bowling Green, OH 43403, gsoto@bgsu.edu, mmyacob@bgsu.edu

Abstract

The complexity of ammonoid cephalopod sutures has made them useful as a characteristic for distinguishing taxa and may also reflect variations in modes of life. Sutural complexity is due to the unique pattern of saddles and lobes that vary in size, amplitude, and wavelength. These patterns are characterized as having various degrees of complexity that can be assigned numerical values. Two of the most used quantitative sutural complexity metrics are fractal dimension (FD) and sinuosity index (SI). Our research goal was to document differences between suture complexities of various taxa of two Cretaceous ammonoid superfamilies, Desmoceratoidea and Acanthoceratoidea, and assess how these complexities changed over time. Previous workers have used various procedures to quantify suture complexity, including measuring the suture lines by hand or using software such as ImageJ to take measurements. While these methods can provide accurate results, they are time consuming and therefore restrict the realistic sample size. We have developed a semi-automated method using AutoCAD (2023) engineering software to quantify both FD and SI of suture patterns. Using Adobe Illustrator, drawings of suture patterns taken from the literature were first converted from raster images to vector files in order for AutoCAD to read them. AutoCAD then automatically scaled and measured each suture pattern in a short amount of time, which allowed for a large sample of 78 suture patterns to be quickly analyzed. Preliminary results show that desmoceratoids had significantly more complex suture patterns than most acanthoceratoids, and that acanthoceratoid suture complexity may have increased through the Late Cenomanian stage before dropping after the Cenomanian-Turonian mass extinction. Using this new method of quantifying suture pattern complexity will expedite the measuring process and allow larger sample sizes in future analyses.

Geological Society of America Abstracts with Programs. Vol. 55, No. 6, 2023.
doi: 10.1130/abs/2023AM-393335