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Bone microstructure and relative age of the holotype specimen of the diplodocoid sauropod dinosaur *Suuwassea emilieae*

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We present the first study of bone microstructure in *Suuwassea emilieae*, a diplodocoid sauropod from the Morrison
Formation. Although the holotype of *Suuwassea* was recently identified as a subadult, bone histology demonstrates that this individual had reached sexual maturity at approximately 75–80% of maximum adult size. The smaller size of the holotype of *Suuwassea* relative to contemporary sauropods is due to ontogeny rather than a true reflection of adult size. A fully adult individual would have likely been similar in size to a fully adult specimen of *Apatosaurus*. *Suuwassea* has a number of plesiomorphic characters that might have been explained by its supposed early ontogenetic status, and would then have called the validity of the taxon into question. However, our demonstration that it was an adult confirms that these features represent retention of plesiomorphic character states or evolutionary reversals in a derived animal. Additionally, the specimen shows extensive cortical drift and secondary osteon formation related to skeletal loading, which is often obscured by complete remodeling of Haversian systems in sauropod taxa. There are substantial differences in the microstructure across the bone, which could make histologic samples not based upon complete cross sections problematic. *Suuwassea* is one of four currently recognized dicraeosaurid taxa, and this study contributes potential taxonomic characters in sauropod bone microstructure.

Key words: Dinosauria, Sauropoda, *Suuwassea*, histology, Jurassic, Morrison Formation, Montana, USA.

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