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Evolution of tooth morphology in Mylagaulidae

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1. Introduction 3. 3D Slicer Program 4. Summary Mylagaulidae: Below is a good summary of the process used in Enables us to make 3D models of x-ray micromaking a single 3D model. computed NRRD files. - Characteristic of Miocene faunas - We use these 3D models to view the entire tooth - Burrowing rodents 1 Acquire CT data from source and see the shape. - Hypsodont (high-crowned) - Shown below is a view of a 3D image in slicer. The teeth like horses 2. Import tor aphic dataset into Fiji images on the bottom are images of the scans - Include the only horned rodents Optional data preperation steps in Fiji, see Figure used to make the 3D model. These scans are edited to allow us to improve the quality of the 3D - Wear of the teeth leads to enamel ic dataset as NRRD forma National Museum of Nature lakes on the surface model. and Science.Tokvo 5. Load NBBD volume into 3D Slice 6. Optimize density threshold 7. Optional data analysis steps in 3D Slicer, see Figure 1 Hypothesis: 8. Save and/or export We will see changes in tooth morphology, in particular increased amounts of enamel with drier environments. 9. Example analyses 2. Materials and Methods (Buser et al. 2020) X-ray micro-computed tomography: 5. Preliminary Results - Used to view changes in tooth morphology. With the given research so - Can view the entire tooth without damaging it. far, evidence shows that an increase in the number of lakes as well as volume, thickness, and complexity of enamel are consistent with an increasingly open 6. Acknowledgments and References NRRD Files: This research was mentored by Jonathan Calede. We would like to thank the museums who provided the specimens for research: UCMP University of California Museum of Paleontology, UWBM University of Washington, Burke Museum of Natural History, UOMNH University of Oregon Museum of Natural and Cultural - Use the x-ray micro-computed tomography images in History, FMNH Field Museum of Natural History, SDSM South Dakota School of Mines Museum of Geology. This research is part of a collaboration with Samantha Hopkins. Funding was provided by The Ohio State University. a program called Fiji to make NRRD Files. Scanning was performed at the Center for Electronic Microscopy and Analysis with the help of Carley Goodwi - A total of 53 NRRD files made so far. Buser, T.J., Boyd, O.F., Cortes, A., Donatelli, C.M., Kolmann, M.A., Luparell, L.J., Pfeiffenberger, J.A., Sidlauska B.L., Summers, A.P. (2020) The Natural Historian's Guide to the CT Galaxy: Step-by-Step Instructions for Preparing and Analyzing Computed Tomographic (CT) Data Using Cross-Platform, Open Access Software. Integrative Organismal Biology, 1-28