



The Geological Society of New Hampshire

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## “New CA-TIMS Dates of Late Jurassic Volcanic Eruptions Reduce the ‘Time of Dinosaurs’ in Western Colorado”



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<https://www.puritanbackroom.com>

Lecture for the Geological Society of New Hampshire on April 12, 2018

**New CA-TIMS Dates from the Brushy Basin Member, Morrison Formation, Western Colorado, USA:  
Implications for Dinosaur Evolution**

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**Abstract**

Two new CA-TIMS U/Pb dates establish the age of the top of the Brushy Basin Member, Morrison Formation, at Flat Top (aka, Terrace Hill), north of the Fruita Paleontological Research Natural Area (FPA) and of the lower part of the Brushy Basin Member in the region of the Trail Through Time (TTT) and Mygatt-Moore Dinosaur Quarry in westernmost Colorado. Strata at both locations preserve a fossil record of large dinosaurs, including bones, dinosaur nests and trace fossils, as well as fossils of unionid bivalves, fish, turtles, crocodylians, microvertebrates, logs and other plant material. We report here a new weighted mean  $^{206}\text{Pb}/^{238}\text{U}$  date of  $149.43 \pm 0.059$  Ma for three zircon grains sampled from a stratigraphic level 99 m above the base of a 101-m thick Brushy Basin Member FP section and a new weighted mean  $^{206}\text{Pb}/^{238}\text{U}$  date of  $150.208 \pm 0.094$  Ma for three zircon grains sampled from a stratigraphic level 39 m above the base of a 79-m thick Brushy Basin Member TT section. These dates place the Brushy Basin strata in the Tithonian Stage of the Upper Jurassic Series. The 149.43 Ma date from Fruita is the youngest reliable date from near the top of the formation, which lends support to the idea that the eastward migration of a tectonic forebulge caused the westward tectonic beveling of the top of the Morrison Formation. The new dates also indicate a relatively short interval of deposition of the upper Brushy Basin Member of less than 1 Ma. Thus, two-thirds of the dinosaur and other vertebrate fossils known from the Morrison Formation represent a biota that existed for only 1 Ma.