

The Emptiness of the Stratigraphic Record: A Preliminary Evaluation of Missing Time in the Mesaverde Group, Book Cliffs, Utah

Andrew D. Miall

Department of Earth Sciences, University of Toronto, Toronto, Ontario M5S 3B1

miall@es.utoronto.ca

Abstract

Observations of modern sedimentation rates in nonmarine and shallow-marine clastic environments indicate that deposits formed in comparable settings in the ancient record could accumulate in a fraction of the time that would appear to be available according to conventional chronostratigraphic dating methods. Typically as little as 10% of elapsed time is represented by sediment, the remainder by breaks in sedimentation, many of which are inconspicuous. In the Book Cliffs of eastern Utah, ravinement surfaces may each account for up to 105-years of missing time. Coastal deltaic and nonmarine successions are considered to be particularly fragmentary. In the sedimentary record of shallow-marine and nonmarine deposits stratigraphic continuity is not to be expected, and calculation of time-related issues, such as mass-balance transport rates and the trajectories of shoreline transgression and regression must take this into account.