

RMS-SEPM Happy Hour Talk, June 9th, 2015

Colorado's stratigraphy re-charted, reveals patterns in deposition and erosion

Authors: Robert G. Reynolds and James W. Hagadorn, Denver Museum of Nature and Science

Speaker: Robert Reynolds,

ABSTRACT: We have revised Richard Pearl's 1974 Colorado Stratigraphy Chart and placed it in a web accessible format. The reformatted chart reveals regional patterns of sediment accumulation and erosion through the past 2 billion years. This chart's linear timescale depicts depositional patterns, regionally extensive unconformities, lags, and karst surfaces. It also plots age-calibrated volcanoclastic units and illustrates stratigraphic gaps linked to major uplifts. Unlike its precursor, this chart is a dynamic resource that the community can utilize, change, and contribute to. The chart is multi-layered, with links to additional information such as Ron Blakey's and other paleogeographic maps, to the DMNS' ancient landscape paintings of Colorado, to outcrop photographs, electric log cross sections, structural cross sections, and planned ties to measured surface sections.



We use the new chart to illustrate large-scale patterns in Colorado's geologic history. The chart can be interpreted to reveal eight depositional chapters or 'deposodes', each represented by distinct stratigraphic packages.

Colorado's earliest sediments are clastic dikes in the Front Range crystalline rocks. These dikes are interpreted as Neoproterozoic relicts of strata that are completely eroded today. The oldest stratified sediments are in the Uinta Mountains, representing Precambrian aulocogen sedimentation tied to the rifted western margin of Laurentia.

Lower Paleozoic strata are widespread and directly mantle much of Colorado's basement. Deposited in shallow marine to near-shore conditions, they preserve a set of western thickening wedges interpreted to represent Sloss' Sauk, Tippecanoe, and Kaskaskian sequences.

The Pennsylvanian-Permian Ancestral Rockies orogeny fostered deposition of thick marine, evaporite, and molasse deposits in narrow troughs and on the flanks of uptilted basement massifs. During the latest Paleozoic and early Mesozoic this orogenic terrain gave way to a landscape that, by the late Jurassic, was a low relief plain on which the Morrison Formation accumulated.

During the Cretaceous Sevier Orogeny, marine strata documenting the advent of the Western Interior Seaway are bracketed by transgressive mid Cretaceous Dakota Group and regressive Late Cretaceous Fox Hills Sandstone complexes. The regressive strata are overlain by the non-marine Williams Fork, Lance, and Laramie formations.

The Laramide Orogeny shattered Colorado's landscape, producing a series of basement-cored uplifts that still define our topography. Thick synorogenic strata accumulated in basins between, and on mountain flanks adjacent to the uplifts. This orogenic landscape was again beveled by erosion, such that by Oligocene time high areas had been smoothed and basins filled to their brims with sediment.

During the Miocene, the region was uplifted and rivers draining Colorado eroded headward into the low relief terrain, sculpting the dramatic landscapes we enjoy today. This erosion continues to the present day.

The chart is anchored in the knowledge of you, our colleagues. We thank you and your organizations for sharing your data and feedback with us.

Speaker Biography: Bob and James are part of the DMNS Earth Sciences team, and have deep interests in earth history and stratigraphy. Bob has spent decades examining sedimentary rocks of Colorado, while also helping lead the museum's Denver Basin project, training future geologists at CSM, and shepherding public appreciation of geology through local venues such as the Friends of Dinosaur Ridge. James is newer to the Colorado stratigraphy scene, but is learning local stratigraphy and mining geology as fast as he can, while trying to promote understanding of geologic resources to the public



Colorado's Siccar Point?: The Devonian Elbert Formation rests in profound angular unconformity atop the Paleoproterozoic Uncompahgre Formation, Box Canyon, Ouray, Colorado. Photo by Ronald L. Parker

[RMS-SEPM Main Page](#)

[RMS-SEPM Luncheon Page](#)

[RMS-SEPM Luncheon Abstract Archive](#)