COLORADO CENOZOIC STRATIGRAPHY CHART DOI: https://doi.org/10.58783/cgs.ms55.tagn9188

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North Upper Arkansas, Piceance Basin, Denver-**American Front Range** Eagle NW San Juan Sand Wash Middle-North South Park Southeast Raton San Juan San Luis 🔁 Epoch Land Julesburg Park Basin Basin Basin Outcrops Basin Colorado **Paradox Basins** Basin Mammal Valleys Volcanics Basin Age Raton-Clayton volcanic field Dotsero Volcano, Rocky Flats Alluvium Nussbaum Alluvium Clayton volcanic field Irvingtonian Pleistocene deed Willow Peak, Triangle Peak Blancan Pliocene mafic rocks of the Yampa ---boulder cgl o Gravel Mtn* volcanic field Hemphillian deed deed misc dikes **Basalt of Grand Mesa** Ogallala Fm 10-Clarendonian ••• Ogallala Fm Treasure Mtn Grp volcanic field Miocene - Wagontongu Barstovian Apishapa dikes * Browns Park Fm Martin Canyon fm Hemingfordian gravel at Divide * rouble-North Park de 20some Spanish Peaks Cedar Mtn basalt * Arikaree Fm intrusives * Arikareear Deer Creek vol field Oligocene Telluride Cgl 30--30 O granite of Mt Cumulus Cripple Creek Whitneyan granodiorite of Mt Richthofen diatreme complex * West Elk Breccia Orellan White River Grp Mt Sopris granodiorite stock Two Buttes White River Fm bath.* Florissant Chadronian Devils Hole Fm Tallahassee Ck Cgl
Wall Mtn Tuff

Castle Rock Cgl intrusive complex Apishapa dikes 📥 Larkspur cgl * Duchesnean interior paleosol 7 Montezuma Monzogranite stock 40 -Rocky Mountain Erosion Uintan Eocene Washakie Fm/Bridger Farisita Fm ho Park Alluviun North Table Mtn laccolith Basin Fm Bridgerian Blanco Basin Fm 50-San Jose Fm Wasatchian Elkhorn thrust cgl * Dawson Arkose Coalmont Fm Wasatch Fm Wasatch Fm Paleocene-Eocene boundary aleocene-Eocene boundary D2 sequence* Clarkforkian Molina Mbr Atwell Gulch Mbr Tiffanian ink Springs Tuff Mbr 60--60 Ü lacimiento Fm/Animas Fm **Paleocene** Ft Union Fm South Park Fm Torrejonian Ft Union Fm Raton Fm Ohio Ck Cgl Puercan Ojo Alamo Fm einecker Ridge K-Pg boundary mafic dikes of the Granby Valley K-Pg boundary olcanic Mbr basal cgl of Raton Fm sub-Moffat unconformity sub-Ohio Ck unconformity sub-Ojo Alamo unconformity Con City Average lava flow of Pole Creek sub-Windy Gap unconformity ance Fm/Williams Fork Fn Laramie Fm Pando Porphyry Villiams Fork Fm Pierre Shale Kirtland Fm Pando sills * Pierre Shale arimer and Rocky Ridge Ss Mbrs Terry Ss Mbr Pierre Mancos Shale **Campanian** Drafting by Larry Scott, CGS NALMA ages from Barnosky et al., 2014 Acknowledgments: Donna Anderson, Andres Aslan, Peter Barkmann, Richard Bottjer, Rex Cole, Steve Cumella, Additional information about formal units can be found at Geolex https://ngmdb.usgs.gov/Geolex

Colorado's stratigraphy is dominated by gaps. The distribution of strata reflects the tectonic and climatic evolution of each of the region's basin areas. To foster comparison of these patterns, we have organized the stratigraphy using a linear timescale and illustrated where orogenic uplift has led to removal of strata or nondeposition. Some orogenic features are not illustrated on the chart. In the past ~10 Ma, regional uplift has raised Colorado and ensuing erosion has influenced modern landscape formation. The color scheme for stratigraphic units gives a sense of dominant lithologies and depositional environments across basins.

Updates to this chart, as well as additional resources, such as stratigraphic and structural cross-sections, can be found at https://coloradostratigraphy.org. To learn more about the unit names on this chart, resources are available at the U.S. Geological Survey's Geolex site https://ngmdb.usgs.gov/Geolex.

This chart scaffolds on the work of Richard H. Pearl's 1977 compilation (Rocky Mountain Association of Geologists, Special Publication 2). This data has been recast against the International Commission on Stratigraphy's chrono-stratigraphic chart v. 2015/01, updated at: https://stratigraphy.org.

The Cenozoic stratigraphy of Colorado builds on the waning stages of the Cretaceous Interior Seaway coastal plains.

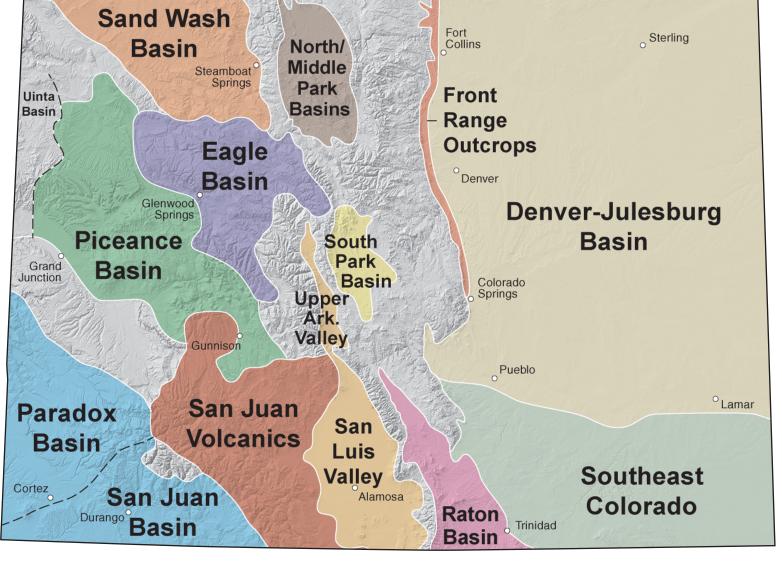
In latest Cretaceous and early Paleogene time, the advent of the Laramide Orogeny set the stage for the accumulation of synorogenic sediments in a series of down-dropped basins bounded by basement uplifts.

The synorogenic packages often start with widespread basal conglomerates that herald the exhumation of peripheral uplifts during a time of low accommodation. Increased subsidence rates promote the accumulation of fluvial strata and, in closed basins, lacustrine beds.

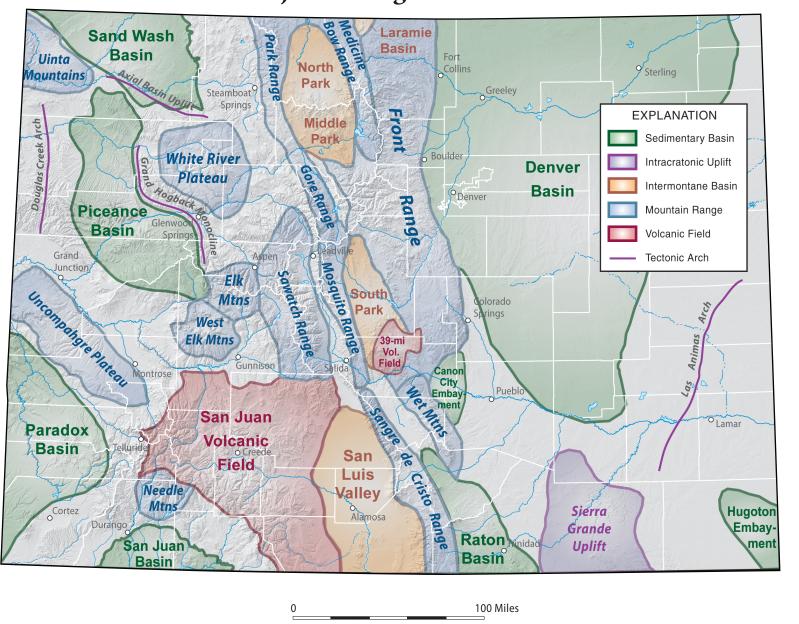
As the Laramide Orogeny faded in the Eocene, a period of stability promoted the development of the Rocky Mountain erosion surface as the uplands were peneplained and the

During the Oligocene, igneous activity to the west and in Colorado covered the region in volcanic debris and airfall materials. In early Miocene the development of the Rio Grande Rift in the San Luis and Upper Arkansas valleys was accompanied by flank uplift of the Sangre de Cristo and Collegiate ranges. These uplifts, coupled with regional epiorogenic uplift in the Miocene, led to the eastward dispersal of clastic aprons including the Ogallala Formation and to headward erosion and incision of the river systems spawned from the Colorado Rocky Mountains. Our present landscape thus reflects the interplay between the forces of erosion and the resistance of the rocks shown on this chart.

Stratigraphic Chart Basin Boundaries







Additional Resources: Colorado Stratigraphy Chart of Colorado, 2016, Map Series 53, by Robert G. Raynolds and James W. Hagadorn Cretaceous Stratigraphy of Colorado, 2021, Map Series 54, by Robert G. Raynolds 1 Robert G. Raynolds, Denver Museum of Nature & Science, Denver CO

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Informal nomenclature is indicated by asteriks (*) and is listed below. These terms are in local usage. granite of Mt Cumulus 39 Mile volcanic field granite of Mt Princeton batholith Apishapa dikes

basal conglomerate of Raton Fm boulder conglomerate of Gravel Mtn boulder conglomerate of Independence Mtn Cedar Mountain basalt Cripple Creek diatreme complex D1 sequence Denver Basin paleosol Elkhorn thrust cgl Goodenough fm

gravel at Divide

granodiorite of Mt Richthofen interior paleosol lava flow of Pole Creek Larkspur conglomerate mafic dikes of the Granby Valley Martin Canyon fm Moffat conglomerate Montezuma Monzogranite stock Mount Sopris granodiorite stock Ohio Creek zone Pando sills Spanish Peak intrusives

Legend

Laramide mountain building event with associated shed and erosion

Eolian strata Coastal/near-shore sandstone

Volcanic rocks Non-marine sandstone, mudstone

Marine shale

——— Coal seam • • Conglomerate Volcanics Granite, chert,

