GEOLOGY OF SAN JUAN MOUNTAINS
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INTRODUCTION

• Overview of geologic history
• Key geomorphic features and processes
• Why the San Juan Mountains are geologically interesting
Building the Rockies

Photo by Peter Runyon, from Mountain Sights Inc.
PRECAMBRIAN

- **t**: 540-1,800 Ma
- **p**: granite, diorite, gabbro, gneiss, quartzite, slate
- **r**: island arc, coastal plain, marine
- **cl**: hot, CO$_2$, CH$_4$, H$_2$O, N$_2$, NH$_3$ and later cooler, N$_2$, Ar, O$_2$, CO$_2$, H$_2$O
- **o**: evolution of procaryotes (bacteria) and later eucaryotes
PALEOZOIC

- **t**: 250-540 Ma
- **p**: shale, limestone, sandstone, conglomerate
- **r**: coastal, plains, lowlands, mountains
- **cl**: maritime to warm & dry, cool alpine
- **o**: bacteria dominant, fish, brachiopods, reptiles, ferns and other woody plants
MESOZOIC

• **t**: 66-250 Ma, Triassic, Jurassic, Cretaceous
• **p**: eolian and coastal sandstones, marine shale, coal
• **r**: interior lowlands and seaways
• **cl**: hot and dry to hot and humid
• **o**: bacteria dominant, evolution of dinosaurs, early mammals, flowering plants
Mesa Verde
Photo by R. Blair
CENOZOIC

- **t**: 66 Ma to present, Tertiary, Quaternary
- **p**: sandstones, conglomerates, volcanic rocks
- **r**: floodplains, mountains
- **cl**: Mediterranean to glacial environments
- **o**: bacteria dominant, age of mammals, evolution of grass
Ophir
Photo by R. Blair
Au, Ag, Zn, Cu, Fe

Red Mountain 1 & 2, Ironton Park
Photo by R. Blair
ENERGY RESOURCES

- Geothermal
- Uranium
- Coal
- Oil
- Natural gas
- Coalbed methane
- Helium
- Carbon dioxide
East Greenland
Photo by Peter Knight

Mineral Creek and Bear Mountain

After Atwood & Mather, 1932
SAN JUAN MOUNTAINS

- Extraordinary geologic record (PC-Holocene)
- Repository of Au, Ag, Zn, Cu, Fe
- Outliers of coal, oil, natural gas, U, He, CO₂
- Geothermal resources
- Extensive glacial history
- Outstanding scenery