lobes developed and prograded. These lenticular sandstone units, such as the Kassler sandstone are 20-40 ft deep and 1,500-2,800 ft wide. Active channel fill is 50 to 90%. Similar major channels are developed within the upper part and at the top of the South Platte ("J" sandstone interval). One channel at Turkey Creek is oil saturated.

Minor penecontemporaneous faulting within the South Platte Formation produced offsets of 0.5 to 7 ft, with reconstructed strikes of the faults being perpendicular to and parallel with major channel trends. The faults may have been caused by rapid sedimentation and compaction or by minor offsets above basement-fault systems.

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DEVELOPMENT AND ECONOMIC IMPLICATIONS OF PALEOKARST, MOLAS PASS AREA, SOUTHWESTERN COLORADO

With the emergence of the Mississippian Leadville Limestone, a climatically specific subaerial tower-karst surface developed in the Molas Pass area, with 80 ft of local relief. Much of this surface is buried under different thicknesses of the Early Pennsylvanian Molas Formation, in part a regolith of siltstone and residual clays from the limestone solution.

Rising like small peaked knobs from a plain are three examples of the tower karst found near Molas Pass, the Molas Lake tower, Waterfall tower, and Sultan Creek tower. These illustrate the relatively low limestone solubility, strong fracturing, both joint and fault, and high water-table variations conducive to both tower and the related Kegelkarst formation. Folding may produce adverse conditions for the karst tending to hasten cavern integration and limestone removal.

Tower karst and the predominance of kaolinite in the lower Molas, together with silica and hematite produced from soil ferralitization, suggest a subtropical to tropical climate with heavy rainfalls followed by rapid evaporation. The modern localization of this type of karst to areas below 30° of latitude implies a northward migration of the Molas Pass area since the Early Pennsylvanian.

The complex stratigraphic relations between the fine-grained Leadville Limestone and the underlying Ouray dolomitic grainstone have made their field separation difficult and may indicate which areas were above and below sea level during the karst formation. This suggests a relative elevation of 100-200 ft for the Leadville at the time of the maximum tower-karst formation.

The geologic controls on tower-karst development as observed in the Molas Pass area correlate well with the climate and geologic controls in a modern tower-karst analogue, central Jamaica.

An understanding of the mechanisms of tower-karst formation and burial is directly applicable to petroleum stratigraphic trap location as in the Elk Basin field of northern Wyoming-southern Montana, and the localization of base metal sulfide ore deposits as at Gilman, Colorado.

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EVIDENCE OF SUBSURFACE WATER IN EQUATORIAL REGION OF MARS

Possible stream channels in the equatorial region of Mars are associated with chaotic terrain boundaries. Scalloped edges and slump features at the edge of chaotic terrain in the Chryse region of Mars indicate that the relatively smooth "upland" areas have collapsed to form chaotic terrain that has been further modified in part by both eolian and fluvial processes.

Circular depressions near chaotic terrain could result either from impact or collapse (or both). Eolian infilling may have modified impact craters to the extent that they do not resemble terrestrial or lunar counterparts. However, the dominance of fractures originating within circular depressions may indicate an internal source of heat. Collapse of the surface because of local heating, either internal or external, would provide a mechanism for both the subsidence responsible for chaotic terrain and the release of subsurface water leading to channel formation.

Analyses of *Mariner 9* imagery and ERTS photographs show that drainage basins on Mars and earth have similar characteristics, but both sets of photographs have fewer small tributaries than are actually present in terrestrial drainage basins. On earth, small tributaries are not observed because of the resolution of ERTS cameras. On Mars, both resolution and eolian infilling may account for this characteristic. There is evidence of the effects of both surface and subsurface water on Mars, but erosional characteristics of Martian channels show a closer relation to formation by subsurface water than to formation by rainfall.

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DISCONFORMITIES IN ROCKS OF EARLY LATE CRETACEOUS AGE IN SOUTHEASTERN WYOMING AND NORTH-CENTRAL COLORADO

Upper Cretaceous strata of marine origin, which are commonly called the Frontier and Niobrara Formations in southeastern Wyoming and the main body of the Benton Shale and the Niobrara Formation in north-central Colorado, enclose two widespread disconformities. The position of these disconformities and the duration of the two corresponding hiatuses in this sequence are interpreted from lithologic logs of outcrops and invertebrate fossils collected in the region. The lower unconformity separates a dominantly shale unit of Belle Fourche and Greenhorn age from an overlying dominantly sandstone unit of Carlile age. The hiatus indicates progressively less erosion in a southeasterly direction. From central Natrona County, Wyoming, where the magnitude of the lower hiatus is greatest, to eastern Larimer County, Colorado, where the magnitude is least, the age of the rocks directly below the unconformity decreases and the age of the rocks directly above the unconformity increases. The upper unconformity is generally at the contact of the Frontier or Benton and the overlying calcareous shale and limestone of the Niobrara (between beds of Carlile and Niobrara ages, respectively). The corresponding hiatus indicates more erosion in the southeastern part of the region. In contrast to the lower hiatus, the upper hiatus may be absent in central Natrona County and northwestern Carbon County, Wyoming, and seems to be greatest in eastern Larimer County, Colorado. In Natrona and Carbon Counties, the beds underlying the Niobrara are much younger and the basal strata of the Niobrara are older than rocks below and above the unconformity in Larimer County. The variation in the