Approx. dates	Sierra Nevada	N. & Cent. Rockies	Austrian Alps
500 b.p.	Matthes	Gannett Peak	Modern/Fernau Mid. Ages Warm Period
00-1900 b.p.	unnamed	Audubon	---" " " "
00-4500 b.p	Recess Peak	"Temple Lake"	Subatlantic Yngr. Postgl. W.P.
00-6400 b.p	----	----	Larstig? Oldr. Postgl. W.P.
00 b.p.	----	unnamed	----" " " "
00-9600 b.p	----	----	unnamed
-11,000 b.p	----	type Temple Lake	Egesen? Daun?
2,000 b.p.	Hilgard	moraine at Big Sandy Lake?	Allerød Gschnitz?
4,000 b.p.	Hilgard	moraine at Big Sandy campground	Bølling Steinach?

PRIMARY LAMINAR FLOW STRUCTURES IN THE RHYOLITE ASH-FLOW TUFF OF L. PEAK, SAN MATEO MOUNTAINS, NEW MEXICO

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A rhyolite ash-flow tuff from a cauldron in the San Mateo Mountain area exhibits structures indicative of late-stage laminar flow. Shards and pumice fragments are highly flattened and lineated. Microfolds in the matrix are common around rigid objects such as phenocrysts and lithic inclusions. Less commonly, ramp structures and mesoscopic folds are also found.

Megascopically, pumice fragments have a pronounced lineation in the horizontal plane (mean ratios of axial lengths range from 2.5 to 6) and, in three dimensions, are drawn out in the shape of laths. Pumice lineation is uniform over large areas, parallel to the movement direction of the ash flow. Asymmetrical microfolds around rigid objects are similar to those seen in silicic lava flows and indicate that these objects have been rotated because of differential movement in the tuff. The direction of movement of the tuff is uniquely indicated by the pumice lineation and rotation of rigid objects.

These structures are interpreted as resulting from primary laminar flow of the tuff, contemporaneous with incipient welding and initial compaction. Subsequent deformation by static compaction further flattened shards and pumice but did not destroy the earlier fabric of the rock.

165

GEOTHERMAL STUDIES IN THE SOUTHERN ROCKY MOUNTAIN REGION, 1971-73

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Geothermal measurements in Colorado, New Mexico and adjacent states are summarized on maps of surface heat flow and values reduced by flux from bedrock radioactivity. In the Southern Rocky Mountains high surface- and reduced-values (1.6-3.7 HFU; 1.5±.3 HFU) extend from northern New Mexico to northern Colorado. Surface flux of 1.1 to 1.6 HFU occurs in the Piceance Basin and Wyoming Basin. Reduced flux of 1 HFU is found in the northern Front Range in Wyoming. High reduced values (1.4 HFU)

may be characteristic of the Black Hills in Wyoming and South Dakota. The best surface values in the central Colorado Plateau average 1.8 HFU, and two reduced values of 1.2 to 1.4 HFU occur in the Plateau. Contrary to previous assumptions, these data imply that the Plateau is not a continuous zone of normal heat flow. Surface- and reduced-flux ranges from 1.0 to 3.1 HFU and 1.4 to 2.0 HFU, respectively, in southern New Mexico and western Texas. The Basin and Range-Great Plains heat flow transition is 50-100 km wide and characterized by above average surface- and reduced-flux (2.7-3.1 HFU; 1.7-2.0 HFU) in the Rio Grande Rift.

Analysis of shallow temperatures indicate recent climatic warming (1-2°C) in the Southern Rocky Mountains. The heat flow data provide a framework for evaluating the geothermal resources of the Southern Rockies and the Rio Grande Rift. It is difficult to completely explain the complex heat flow pattern in the Southern Rocky Mountain region by simple subduction systems in the late Mesozoic and early Cenozoic. Related discussion focuses on crustal radioactivity, the origin of magmas, and the interrelationships of heat flow, geomagnetic and seismic studies.

SEDIMENTARY STRUCTURES AND DEPOSITIONAL ENVIRONMENT OF PALEOCHANNELS IN THE JURASSIC MORRISON FORMATION NEAR GREEN RIVER, UTAH

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The Morrison Formation near Green River, Utah contains excellent exhumed fluvial channel segments which provide a unique opportunity to map their geometry and associated sedimentary structures in both horizontal and vertical planes. Detailed cross-sections and maps of sedimentary structures are used to construct a model of the fluvial environment in the area during Morrison time. Three major channel segments are present in the study area. They range from 200 to 550 meters in length and from 20 to more than 100 meters in width. Two are broad, gently curving, and near parallel. They contain clastic sediments ranging from silt to cobbles in size. The third, a narrow, sinuous channel, consists of finer clastics ranging in size from silt to pebbles. The geometry of the channels, and the size and shape of the sedimentary structures suggests two types of channel preservation. The channel pair appears to be a part of a meander complex, while the third segment appears to be preserved as a result of distributary cutoff. Most cross-beds present appear to be depositional features due to sand wave migration downstream. Sediment size suggests close proximity to a major source area. Channel geometry suggests that they formed near base level, and it is probable that they supplied sediments to a lacustrine environment. A study of sand grain morphology using electron microscopy is now in progress.

EVOLUTION OF ARKOSIC SEDIMENTS IN A PLEISTOCENE-HOLOCENE ARID-SEMIARID CLIMATE AND FAULT-BLOCK MOUNTAIN TECTONIC SETTING, CENTRAL NEW MEXICO

Dickson, John R., Leon E. Esparza, Dale G. Armstrong, and Charles T. Siemers, Department of Geology, University of New Mexico, Albuquerque, New Mexico 87106

Pleistocene-Holocene arkosic sediments mantle the 10-12 mile wide piedmont surface which slopes westward away from the Sandia Mountain fault-

ock uplift of central New Mexico.
om the uniformly granitic core of
eathering and transport in an arid
d chemical weathering are of signi
the outcrop; however, physical we
ranular rock disintegration. The S
coalescent alluvial fans; stabili
pproximately 90% of the piedmont su
arroyos (10% of the area). Two m
ecognized—young active arroyo, poor
oarse sands (M_z=-0.70ϕ;σ_I=1.60ϕ), a
ery poorly sorted, slightly pebbly
=2.50ϕ).

Sediments from both facies were
els along a ten mile transport dis
ransport distance were noted: 1)
ize and slight increase in degree
ngular grains show no appreciable
par ratio (similar to that of gran
lightly, 4) biotite gradually decr
nd outcrop gruss to less than 1% o
lteration of sodium-rich plagiocla
lase is 3 times more weathered tha
omposition relationships were note
increase in biotite and opaque grai
) increase in quartz/feldspar rati
ine-sand fraction, 3) no change in

The biotite disintegration is si
hemically but is mechanically dis
apidly. Sediment coloration range
3/4) to moderate-dark yellowish br
resence of fine-grained biotite a
ilmenite to a red hematite(?) pig
sediment and greater in interarroy
rock.

AND-USE MAPPING OF THE FRONT RANG

Driscoll, Linda B., Research Ass
Colorado 80210

his project is the first to map l
Corridor, an area which for mappi
inute quadrangles, with Fort Coll
outh. The land-use classificati
Anderson, Hardy, and Roach (1972)
Geological Survey. It consists o
a more detailed second digit deve
ing. Interpretations from color
1:121,000, flown in 1972, are bei
Survey quadrangles and ground tru
to State and regional agencies co
land-use planning of this area, s
whole region.