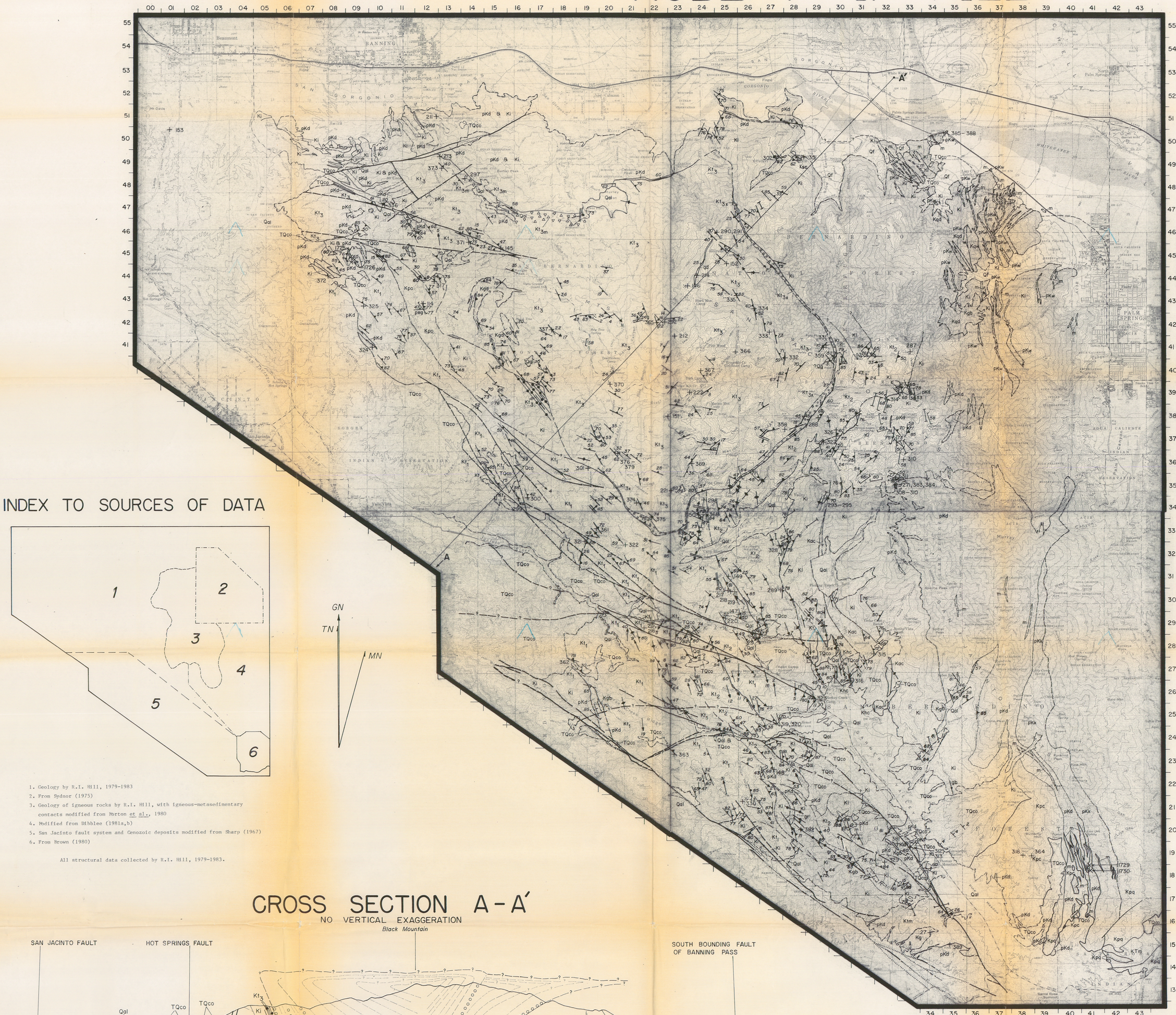
PLATE 1

GEOLOGY OF THE SAN JACINTO MOUNTAINS

ROBERT I. HILL



INDEX TO SOURCES OF DATA

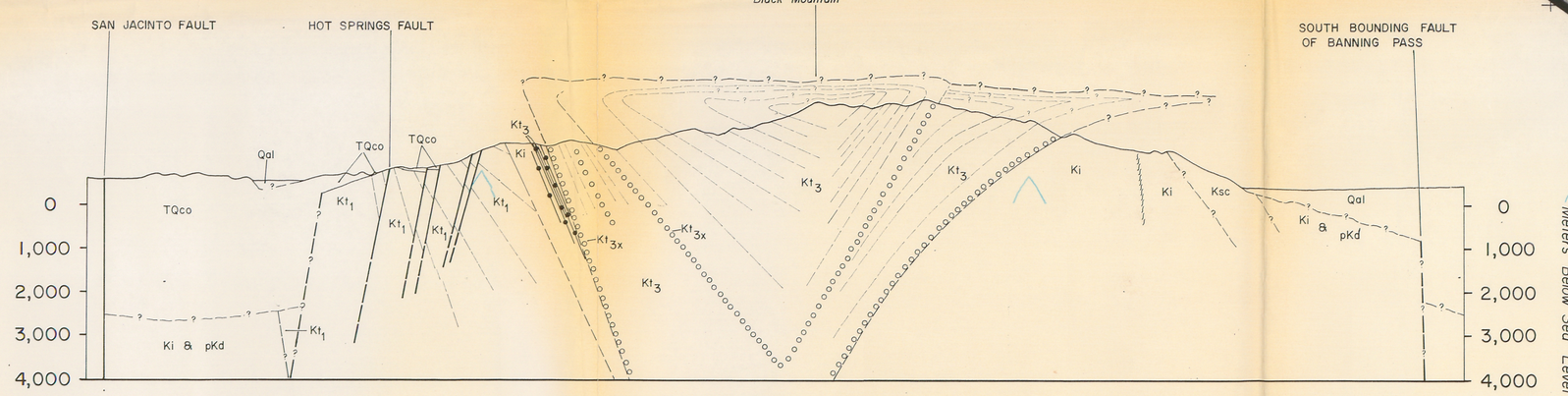
1. Geology by R.I. Hill, 1979-1983
2. From Sydnor (1975)
3. Geology of igneous rocks by R.I. Hill, with igneous-metasedimentary contacts modified from Morton et al., 1980
4. Modified from Dibblee (1981a,b)
5. San Jacinto fault system and Cenozoic deposits modified from Sharp (1967)
6. From Brown (1980)

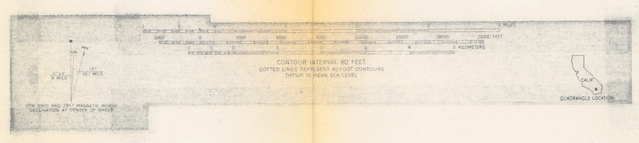
All structural data collected by R.I. Hill, 1979-1983.

GN
TN
MN

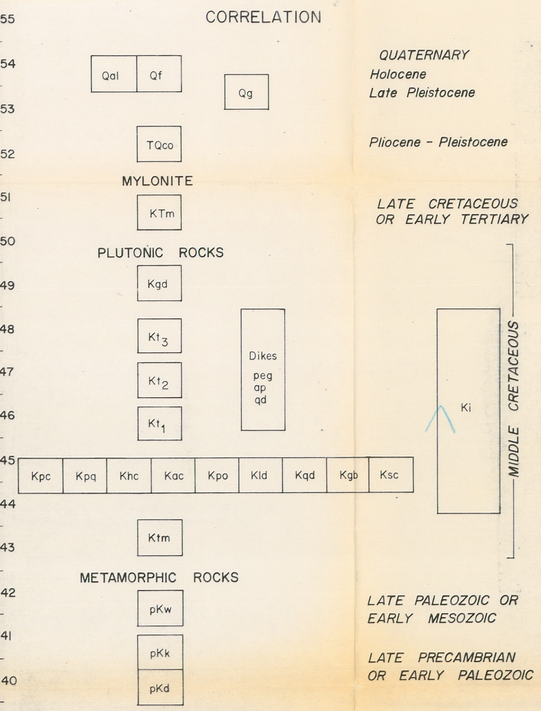
CROSS SECTION A-A'

NO VERTICAL EXAGGERATION





CORRELATION



SURFICIAL DEPOSITS

Qal — STREAM AND VALLEY-FILL ALLUVIUM – Includes alluvium associated with active and abandoned channels, low terraces, and the upper parts of fans. In places gradational into reworked TQco.

Qf — ALLUVIAL FAN DEPOSITS – Active and recently active deposits of conglomerates, boulder conglomerates and sands.

Qg — DEPOSITS OF PROBABLE GLACIAL ORIGIN – Small lobate deposit of randomly oriented blocks (to several meter size) of tonalite south of San Jacinto Peak. May be of periglacial origin (Sharp et al., 1957).

TQco — BAUTISTA BEDS AND OLDER ALLUVIUM – Includes small areas of Mount Eden and San Timoteo Formations around San Jacinto Potrero. Terrestrial sediments, often poorly sorted, coarse-grained, and poorly indurated. Range in age from Pliocene to probable Late Pleistocene (e.g., Sharp, 1981).

MYLONITE

KTm — CATACLASTIC TONALITE, AND MYLONITE – Variously deformed plutonic (predominantly tonalitic) and metasedimentary rocks of the eastern Peninsular Ranges mylonite zone of Sharp (1967, 1979). Probably of earliest Tertiary age.

PLUTONIC ROCKS

DIKES

peg — PEGMATITE – Coarse-grained pegmatite, most commonly in dikes to a meter thick and up to a few tens of meters wide.

ap — APLITE – Fine- to medium-grained aplite, usually in tabular masses a few meters wide and a few tens of meters long.

gr — GRANITE – Coarse-grained granite dikes on Little Thomas Mountain.

qd — QUARTZ DIORITE – Dike of plagioclase-phenocrystic hornblende-biotite quartz diorite cutting Kt_1 northeast of Black Mountain. Dikes of similar material are widespread throughout Kt_3, and are abundant in and around Chino Canyon.

gb — GABBRO – Coarse-grained gabbro north of Garner Valley.

LARGER INTRUSIVE MASSES

Kgd — PORPHYRITIC GRANODIORITE – Small irregular bodies of commonly deeply weathered granodiorite that intrude Kt_3. Contain large aligned pink K-feldspar tablets.

MAJOR TONALITES

Kt_3 — MAJOR TONALITE UNIT III – Gray medium-grained seriate-porphyritic biotite-hornblende-titanite tonalite; gradational to low-K granodiorite around Black Mtn. Zircon U-Th-Pb age about 97 1 m.y.

Kt_{3x} — Kt_{3x} – marginal xenolith-rich tonalite.

Kt_{3m} — Kt_{3m} hybrid rocks along northern margin that contain abundant screens and inclusions of metasedimentary rocks.

Kt_2 — MAJOR TONALITE UNIT II – Gray medium-grained seriate-porphyritic biotite-hornblende-titanite tonalite. Zircon U-Th-Pb age about 97±1 m.y.

Kt_1 — MAJOR TONALITE UNIT I – Gray medium-grained seriate-porphyritic biotite-hornblende-titanite tonalite; is gradational to minor amounts of low-K granodiorite. Zircon U-Th-Pb age about 97±1 m.y.

EARLY INTRUSIVES

Listed in descending order from felsic to mafic. No age sequence is intended by this ordering.

Kpc — GRANITE OF PENROD CANYON – Weakly foliated medium-grained white biotite-and biotite-garnet granite.

Ktm — THOMAS MOUNTAIN SILL – Foliated biotite adamellite and inclusion-rich foliated biotite tonalite (Sharp, 1967). Intruded by Kt_2 and abundant gabbro and diorite dikes.

Kac — GRANODIORITE OF APPLE CANYON – Medium- to coarse-grained gray biotite-hornblende granodiorite that contains abundant aligned large pink K-feldspar tablets.

Kpo — GRANODIORITE OF POPPET CREEK – Commonly foliated medium-grained hornblende-biotite granodiorite. Characterized by generally strong imposed foliation and hornblende/biotite ratio ~1. Gradational southward from a K-feldspar-poor mafic granodiorite to a felsic granodiorite with aligned large pink K-feldspar tablets. Intruded by both Kt_1 and Kt_3. Zircon U-Th-Pb age about 97±1 m.y.

Khc — TONALITE OF HERSEY CREEK – Medium-grained, prominently seriate-porphyritic gray biotite-hornblende-titanite tonalite. Characterized by idiomorphic form of mafic minerals and plagioclase, and by large (to 1 cm) equant quartz crystals. Intruded by Kt_1.

Ksc — TONALITE OF SNOW CREEK – Weakly to strongly foliated, gray, medium-grained seriate-porphyritic biotite-hornblende-titanite tonalite. Apparently older than Kt_1; otherwise, age and field relations indeterminate. Zircon U-Th-Pb age about 97±1 m.y.

Kld — QUARTZ DIORITE OF LUCKY DEER MINE – Medium-grained prominently seriate-porphyritic gray biotite-hornblende quartz diorite or tonalite. Commonly shows moderate imposed foliation, and may be considerably shattered.

Kpc — QUARTZ DIORITE OF PALM CANYON – Light gray moderately to weakly foliated biotite-hornblende quartz diorite [Palm Canyon quartz diorite of Brown (1968, 1981)].

Kqd — QUARTZ DIORITE – Small bodies of quartz diorite cropping out in the Windy Point – Chino Canyon area.

Kgb — GABBRO AND DIORITE – Masses of undifferentiated mafic diorite and gabbro. The largest mass, at the southeastern end of Thomas Mountain, is of heterogeneous olivine-orthopyroxene-clinopyroxene gabbro, and contains areas of anorthosite, hornblende gabbro, and biotite gabbro. Most other masses are much smaller, but show similar compositional variation.

OTHER IGNEOUS ROCKS

Ki — UNDIFFERENTIATED IGNEOUS ROCKS – Generally small masses of undivided heterogeneous igneous rocks ranging in composition from diorite and quartz diorite to granite, aplite and pegmatite. Contains various-sized inclusions of metasedimentary rock.

METASEDIMENTARY ROCKS

pKw — WINDY POINT 'METAMORPHICS' – Interbedded schists and gneisses of the Windy Point – Chino Canyon area. Dominated by plagioclase amphibolite, quartz-biotite schist and quartz-plagioclase-biotite-hornblende-diopside schist. Sequence is of probable Mesozoic or Late Paleozoic age.

m — m – recrystallized carbonate.

DESERT DIVIDE GROUP

pKd — HULL CANYON FORMATION – Undifferentiated quartz-rich schists and gneisses of the Desert Divide of the southern San Jacinto Mountains. Dominated by quartz-biotite schist and quartz-biotite-K-feldspar-sillimanite gneiss, but also contains quartz-biotite-cordierite±sillimanite±K-feldspar±garnet±plagioclase±silimenite, muscovite-biotite-sillimanite-quartz schists and gneisses, and units of recrystallized quartzite. Similar rocks crop out on Thomas Mountain, in roof pendants to the south and east of San Jacinto Potrero, and along the north face of the mountain eastwards from Beaumont to the western Snow Creek drainage. Sequence is of possible Late Precambrian or Early Paleozoic age.

m — m – recrystallized carbonate (predominantly pure marble; Brown, 1980)

pKk — KEN QUARTZITE – Recrystallized coarse-grained clean quartzite

SYMBOLS

- 56 — Strike and dip of bedding
- Vertical bedding
- 24 — Strike and dip of dike orientation
- 53 — Strike and dip of flow foliation in igneous rocks
- Vertical flow foliation in igneous rocks
- Foliation not observed
- 17 — Trend and plunge of mineral lineation in igneous rocks
- 45 — Strike and dip of schlieren in igneous rocks
- Vertical schlieren
- 33 — Orientation of planar xenoliths in igneous rocks
- Vertically oriented xenoliths
- 71 — Strike and dip of imposed foliation
- Vertical imposed foliation
- 12 — Contact, showing dip; dashed where approximately located, dotted where concealed, queried where inferred
- 39 — Fault, showing dip; dashed where approximately located, dotted where concealed, queried where inferred
- +325 — Sample locality, with sample number (LTS series)
- ×1716 — Sample locality, with sample number (SCE series)

REFERENCES

Brown, A.R., 1968, Geology of a portion of the southeastern San Jacinto Mountains, Riverside County, California: Unpublished M.S. thesis, Univ. California Riverside.

Brown, A.R., 1980, Limestone deposits of the Desert Divide, San Jacinto Mountains, California: in Fife, D.L., and Brown, A.R., (eds.), Geology and Mineral Wealth of the California Desert: South Coast Geological Society, Santa Ana, California.

Brown, A.R., 1981, Structural history of the metamorphic, granitic and cataclastic rocks in the southeastern San Jacinto Mountains: in Brown, A.R., and Raft, R.W., (eds.), Geology of the San Jacinto Mountains: South Coast Geological Society Annual Field Trip Guidebook No. 9, 100-138.

Dibblee, T.W., Jr., 1981a, Geologic map of the Palm Springs (15-minute) quadrangle, California: : South Coast Geological Society, Geologic Map SCGS-3.

Dibblee, T.W., Jr., 1981b, Geologic map of the Idyllwild (15-minute) quadrangle, California: South Coast Geological Society, Geologic Map SCGS-5.

Morton, D.M., Mittl, J.C., and Cox, B.F., 1980, Geologic map of the San Jacinto wilderness, Riverside County, California: U.S. Geol. Surv. Map MF-1179-A.

Sharp, R.P., Allen, C.R., and Meier, M.F., 1957, Pleistocene glaciers on southern California mountains: Am. Jour. Sci., 257, 81-94.

Sharp, R.V., 1967, San Jacinto Fault Zone in the Peninsular Ranges of Southern California: Geol. Soc. Amer. Bull., 78, 705-730.

Sharp, R.V., 1979, Some Characteristics of the Eastern Peninsular Ranges Mylonite Zone: In Proceedings of Conference VIII – Analysis of Actual Fault Zones in Bedrock: U.S.G.S. Open-File Report 79-1239.

Sharp, R.V., 1981, Variable rates of strike slip on the San Jacinto fault zone: J. Geophys. Res., 86, 1754-1762.

Sydnor, R.H., 1975, Geology of the northeast border zone of the San Jacinto Pluton, Palm Springs, California: Unpublished M.S. thesis, Univ. California, Riverside.