# FIELD TRIP GUIDE TO A PORTION OF THE WESTERN SAN GABRIEL MOUNTAINS, LOS ANGELES COUNTY, CALIFORNIA

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## INTRODUCTION

For a mountain range full of beautiful scenery, loaded with intriguing rock bodies and impressive structures, and accessible to a vast array of research geologists, the San Gabriel Mountains represent a curiously understudied area. On our trip, we will have an overview of the San Gabriel fault, discuss the concept of terranes and how they're manifested in the San Gabriel Mountains, and look in detail at two Mesozoic batholiths, the Late Triassic Mount Lowe Intrusion and the Late Cretaceous Josephine Mountain Intrusion. Our route (Fig. 1) will take Angeles Crest Highway (SR 2) north out of La Cañada Flintridge, follow Upper Big Tunjunga Canyon Road NW to Angeles Forest Highway (CR 3), and use the latter to return to Angeles Crest Highway and La Cañada Flintridge. A second option follows Big Tujunga Canyon Road to Sunland. Both options cover about 45 mi and can take 3-6 hrs depending on the detail of observation and discussion. Field trips into adjacent areas to the west of this trip have been described for the San Gabriel anorthosite-syenite complex by Carter (1980, 1982). Regional studies include Miller's (1934) general study of the western San Gabriel Mountains, Oakeshott's (1958) study of the San Fernando 15' Quadrangle and Ehlig's (e.g., 1981) long-term studies on the geology and petrology of the San Gabriel Mountains. Detailed petrologic studies on igneous rocks of the western San Gabriels include Carter's (e.g., 1982) work on the San Gabriel anorthosite-syenite body, Barth and Ehlig's (1988) study of the Mount Lowe Intrusion and Barth and Ehlig's (1989) work on the Mesozoic plutonic rocks that we'll examine on this field trip.

## IGNEOUS AND METAMORPHIC ROCKS

These rocks are described in detail in the accompanying paper by Barth and Ehlig (1989). The Mount Lowe Intrusion was first named by Miller (1934) as the Lowe granodiorite. Barth and Ehlig (1989) present evidence that this batholith crystallized in the range of 618-810°C at pressure of about 7 kb, which corresponds to a depth of about 25 km. The Josephine Peak Intrusion was first named by Carter and Silver (1971) as the Josephine granodiorite. Barth and Ehlig (1989) conclude that this batholith was emplaced at about 6 kb, corresponding to a depth of about 22 km. The Mendenhall gneiss was first named by Oakeshott (1958).

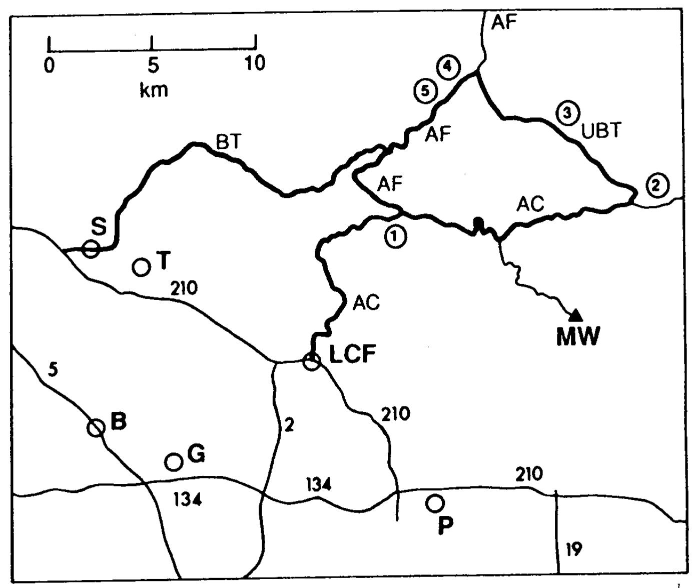
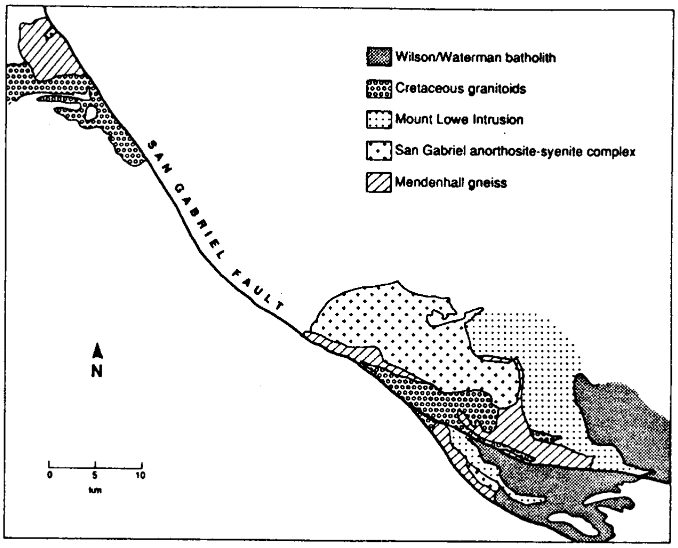



Figure 1. Field trip route, beginning in La Cañada Flintridge (LCF) and ending in either La Cañada Flintridge or Sunland (S). Other cities include B Burbank, G Glendale, P Pasadena and T Tujunga; MW is Mount Wilson. Lettered roads are AC Angeles Crest Highway, AF Angeles Forest Highway, BT Big Tujunga Canyon Road and UBT Upper Big Tujunga Canyon Road. Circled numbers represent trip stops.

## SAN GABRIEL FAULT

The San Gabriel fault is a high-angle right-lateral strike-slip fault which extends about 140 km northwestward across Los Angeles County (Fig. 2a). The western half consists of a single fault zone which is truncated by the San Andreas fault at Frazier Park. The eastern half consists of two branches that split near a few km NE of Big Tujunga Station. The north branch is truncated by the San Antonio fault at Mt. Baldy Village, and the south branch is truncated by, or merges with the Sierra Madre frontal fault zone.



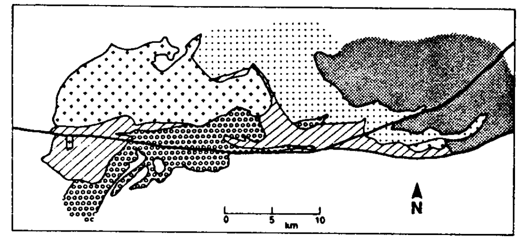




Figure 2A. Geological sketch map showing some igneous and metamorphic rock units used to establish offset on the San Gabriel fault. B. Paleogeographic reconstruction restoring about 23 km of right slip on the north branch and about 60 km of right slip on the main branch to the northwest.

Kew (1924) named the fault for exposures in the western San Gabriel Mountains, but expressed no opinion regarding the nature of displacement. Hill (1930), Miller (1934) and Eaton (1939) all found evidence for vertical displacement. The first solid evidence for strike-slip movement was presented by Crowell (1952), who found that an anorthosite-bearing conglomerate in the upper Miocene Modelo Formation west of the fault near Castaic was offset from its source in the western San Gabriel Mountains by 25-40 km of right slip. Although Paschoff and Off (1961) argued against strike slip of this magnitude, subsequent studies provide conclusive evidence for large strike-slip displacements on the order of about 60 km.

Outcrops of Mendenhall gneiss located about 8.5 km NW of Pyramid Lake, bordering Ridge Basin southwest of the fault, appear offset by about 60 km from outcrops centered around Mendenhall Peak in the western San Gabriel Mountains northeast of the fault (Ehlig and Crowell, 1982; Fig. 2). Within the central San Gabriel Mountains, the north branch of the fault has a net right slip of about 23 km as shown by the offset of the vertical western margin of the Mount Lowe Intrusion (Ehlig, 1973). Although no specific rock units can be correlated across the south branch, 37 km of right slip is indicated by the above offsets.

The youngest rocks that exhibit 60 km of offset by the fault are the Mint Canyon Formation exposed in the Soledad Basin and its displaced correlative, the Caliente Formation exposed in the Lockwood Valley area (Ehlig and others, 1973). The youngest parts of these units have an age of about 12-13 Ma, whereas some marine rocks that have an age of about 12-13 Ma are offset only 33 km (Crowell, 1952). Thus the date that the San Gabriel fault began to move was about 12 Ma. The youngest rocks to exhibit lateral offset by the fault are part of a Middle-to-Upper Pliocene conglomerate exposed east of Newhall which has been offset 7-20 km from its source (Ehlig, 1973), suggesting major strike-slip movement was over by 3 Ma.

The likelihood that a major earthquake will occur along the San Gabriel fault in the foreseeable future seems remote for several reasons. 1) There is no evidence of Holocene displacement. Fault scarps and other geomorphic evidence of recent faulting are completely absent, and upper Pliocene to upper Pleistocene sediments that cover the fault show no displacement. 2) The fault is locked at both ends by truncating faults that produce buttressing effects. 3) The reverse fault that moved during the 1971 San Fernando earthquake dips northward at about 45°, offsetting the San Gabriel fault at depth and significantly increasing frictional resistance. 4) The San Gabriel fault appears to be an ancient strand of the San Andreas fault system. The current strand of the San Andreas fault appears to be taking up the movement between the North American and Pacific plates, releasing stress before enough can accumulate to cause movement on the San Gabriel fault (1958).

## TERRANES

Southern California is composed of several distinct groups or packages of rocks called terranes. A tectono-stratigraphic terrane is defined as fault-bounded geologic entity of regional extent that is characterized by a specific stratigraphy and distinct structural history different from those of neighboring terranes (Coney and others, 1980). The concept of terranes began in the early 1970s from work carried out in Alaska, the Canadian Cordillera and northern California. Many of these diverse rock packages have undergone large translational and rotational displacements. Processes leading to the breakup or welding together of terranes and continental masses include 1) amalgamation, that occurs when two terranes collide, 2) accretion, that occurs when a terrane collides with a continental mass, and 3) dispersion, that occurs when a previously accreted or amalgamated terrane is faulted into smaller pieces.

Southern California can be divided into three superterranes, one that represents the North American craton and two that may have moved in from afar. The Santa Lucia-Orocopia superterrane is itself an amalgam of four terranes (Salinia, San Simeon, Tujunga and Stanley Mountain) that accreted to the craton around the Paleocene-Eocene boundary (60-52 Ma). The Tujunga terrane can be further subdivided into the Placerita, San Gabriel, San Antonio and Cucamonga terranes (May and Walker, 1989; Fig 3). The accretion of the Baja-borderland superterrane, an amalgam of six terranes (Patton, Nicolas, Malibu, Santa Ana and Cortez) occurred in the Miocene. Its accretion was accompanied by 90° clockwise rotation of an area now occupied by the western Transverse Range, and by translation associated with the San Andreas fault system that dissected the Santa Lucia-Orocopia superterrane (Howell and others, 1987).

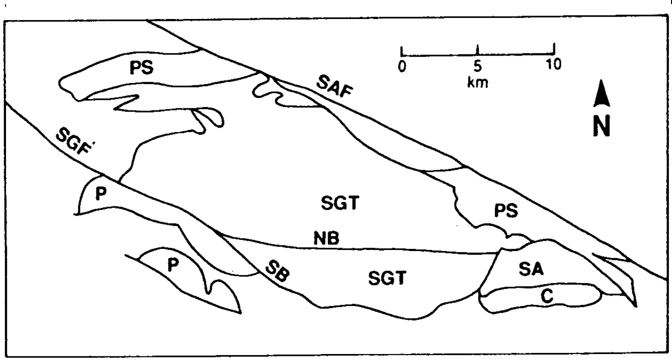



Figure 3. Terrane map of the San Gabriel Mountains, after May (1986). SAF = San Andreas fault, SGF = San Gabriel fault (NB = north branch, SB = south branch), C = Cucamonga terrane, P = Placerita terrane, PS = Pelona Schist, SA = San Antonio terrane and SGT = San Gabriel terrane.

In the Los Angeles area, the boundary between the Malibu and Tujunga terranes may be the Verdugo fault that forms the southwest boundary of the Verdugo Mountains. The boundary between the Placerita and San Gabriel terranes in the western San Gabriel Mountains may be approximately the San Gabriel fault and, where it splits, the southern branch of the San Gabriel fault.

Rocks that characterize the San Gabriel terrane include Precambrian Mendenhall Gneiss and San Gabriel anorthosite-syenite complex and a variety of Mesozoic plutonic rocks. The Placerita terrane is characterized by the Placerita Formation which includes graphite schist, quartzite, marble and diorite gneiss of uncertain age and Mesozoic plutonic rocks (Oakeshott, 1958).

## ACKNOWLEDGEMENTS

We have borrowed small portions of the road log from Carter (1982). D. Liggett and S. Jewett assisted with the road log.

## ROAD LOG

Interstate 210 (the Foothill Freeway) skirts the southern margin of the western San Gabriel Mountains and can be reached by I-5, I-605, State Routes 2, 57 or several other major highways. The trip starts at the Angeles Crest exit from I-210 in La Cañada. Head north on Angeles Crest Highway (SR 2) - mileage begins at the freeway overpass. Milage between points is indicated - cumulative milage is in parenthesis.

0.0 Head north on Angeles Crest Highway (SR 2) from I-210 - milage begins at the freeway overpass.

0.2 (0.2) On the right is the "Sierra Club parking area", a good stretch of curb for leaving accessory vehicles.

0.6 (0.8) The road proceeds up a steep alluvial fan. As the road makes the first big curve to the right it crosses a trace of the Sierra Madre fault zone, a frontal, reverse fault. Crystalline rocks in road cuts consist of migmatitic gneisses of uncertain age and Mesozoic granitoids, all of which are relatively little studied and poorly known.

0.6 (1.4) La Cañada-Flintridge Country Club on the right is located on an uplifted terrace of Arroyo Seco drainage.

0.5 (1.9) Another branch of the frontal fault is located just before the powerline. At several places nearby this reverse fault juxtaposes crystalline rocks over Quaternary gravels.

0.8 (2.7) Turnout on right for overlook of deeply incised Arroyo Seco that parallels the road. The road visible across the canyon is Brown Mountain Road.

0.5 (3.2) Angeles Crest Station.

1.8 (5.0) Bridge over Woodwardia Canyon. The ridge to the east with the firebreak is called CCC Ridge.

0.6 (5.6) The large parking area, created with fill, just before the ridge, covers a trace of the south branch of the San Gabriel fault. This represents the boundary between the Placerita terrane behind us and the San Gabriel terrane ahead of us. There has been an estimated 37 km (23 mi) of right-lateral displacement on this branch. The next road cut on the left exposes fault gouge and very sheared Mesozoic and Precambrian rocks that crumble during rains.

0.8 (6.4) Another trace of the south branch of the San Gabriel fault.

1.2 (7.6) This first occurrence of the Late Triassic Mount Lowe Intrusion on the left exposes the hornblende K-feldspar facies of the marginal zone pluton (MZP). The contact with older rocks is obscured by the intrusion of younger Mesozoic(?) granitoids. The occurrence here of a relatively fractionated facies of the MZP in contact with Precambrian(?) and Mesozoic(?) rocks is in sharp contrast to the relationship north of the north branch of the San Gabriel fault. There the less-fractionated border phase of the MZP is in contact with Precambrian rocks. Also note here Jurassic metabasaltic dikes and Jurassic(?) or Cretaceous quartz porphyry felsite dikes that have recrystallized in the greenschist facies. They are relatively underformed and crosscut MZP foliation.

0.7 (8.3) STOP ONE - Clear Creek Vista at Georges Gap. This ridge forms the divide between Arroyo Seco drainage to the south and Big Tujunga Creek (via Clear Creek) drainage to the north and west. One km to the northwest is located the Clear Creek School Camp run by the L.A. Unified School District. The buildings marking downtown Los Angeles can be seen to the south on a clear day. The historical marker notes that when it was created in 1892, the National Forest, then called San Gabriel Timberland Preserve, was the first in the state and second in the nation. The rocks underlying Georges Gap belong to the hornblende-K-feldspar facies of the Mount Lowe Intrusion. The vista overlooks a trace of the north branch of the San Gabriel fault in the Clear Creek valley and another trace on the slopes above Angeles Forest Highway to the north. The latter is evidenced by vegetation fed by springs that seep year round. This branch shows 23 km (14 mi) of right slip based on offset of the vertical west margin of the Mount Lowe Intrusion (Ehlig, 1973). The Clear Creek canyon is strictly an erosional fault-line feature and has not been caused by recent movement or offset. Erosion along the fault gouge has allowed Big Tujunga Creek and the San Gabriel River to actively capture other streams. An exposure in the stream bed shows a sliver of alluvial gravel overlain by crystalline basement rocks. The road visible across the canyon is Angeles Forest Highway. Josephine Peak is the prominant peak to the north. The white exposures on its southern flanks are composed of light-colored, late-stage, biotite and two-mica garnet granite of the Late Cretaceous Josephine Mountain Intrusion. This intrusive rock is not found at the peak itself, however; rather it is underlain by a dark slab inclusion of Precambrian Mendenhall gneiss. Strawberry Peak to the northeast is characterized by a lumpy profile and provides good hiking. It is underlain by early-stage hornblende-biotite tonalite of the Josephine Mountain Intrusion.

Just beyond the vista in exposures on the right are some Jurassic(?) metabasalt dikes that cut the Mount Lowe Intrusion.

0.1 (8.4) The fine-grained pink rocks are Jurassic or Cretaceous metamorphosed dikes of quartz-porphyry felsite.

0.9 (9.3) Intersection of Angeles Crest Highway and Angeles Forest Highway, and Clear Creek Ranger Station. Continue straigtht ahead (east) towards Mt. Wilson. The north branch of the San Gabriel fault extends from here through Red Box Ranger Station 4.2 mi to the east. The upper reaches of Arroyo Seco follow the fault in the valley to the right. For the next 2.5 mi the road is in the Josephine Mountain Intrusion. Note the gravels sitting on weathered basement rocks.

0.4 (9.7) Switzer Picnic Area. Switzer's Camp at the headwaters of Arroyo Seco used to be a fancy resort but only the basement foundation is left.

1.4 (11.1) The dark rocks across the valley to the right are metapyroxenite (now hornblendite) of unknown age.

0.6 (11.7) As we drive along these switchbacks to Red Box Gap (1.2 mi), we pass through exposures of an intimate mixture of Josephine Mountain Intrusion and Mendenhall gneiss. The latter is highly migmatized and shot through with Josephine dikes. This is a vivid reminder that intrusive contacts can be highly complex. These rocks have been further masticated by Tertiary hydrothermal alteration associated with the San Gabriel fault.

2.1 (13.8) Red Box Station, rest rooms and the road to Mt. Wilson. Stay left. This is the divide between Arroyo Seco and the West Fork of the San Gabriel River. The Mt. Wilson Observatory, completed in 1917, is not open at the time of this writing (Jan. '89), although efforts are currently afoot to reopen it to the public. The mountain top is still considered the finest site in the continental U.S. for observing the skies despite the light and occasional smog pollution and offers spectacular views of the Los Angeles basin.

Wilson Diorite, first named by Miller (1934), is found across the San Gabriel fault to the right. It is the offset southern portion of the Cretaceous(?) Waterman batholith. The Wilson body is characterized by a glomeroporphyritic texture of "snowball" plagioclase grains that stuck together during crystallization. The Wilson/Waterman batholith, although much larger than the Josephine Mountain Intrusion, is assumed to be about the same age (80-90 Ma) based on roughly similar mineralogy and geochemistry. The Wilson/ Waterman is dominated by granitic rocks, whereas the Josephine is dominated by tonalite.

0.4 (14.2) Contact of the Josephine Mountain Intrusion with Mendenhall gneiss.

0.3 (15.4) The peak to the right with the TV transmission towers is Mt. Wilson. Farther to the right is San Gabriel Peak, the highest peak in the front ranges at 1,878 m (6,161 ft). Behind it, but not visible from here, is Mt. Lowe, type area for the Mount Lowe Intrusion.

0.9 (15.4) Numerous exposures of Mendenhall gneiss on the left and Mt. Wilson Observatory and TV towers to the right. The Mendenhall gneiss is distinct from others in the San Gabriel Mountains in that it contains relict granulite-facies minerals of uncertain origin. A discordant age of 1.4 Ga has been obtained from a pegmatitic phase of this gneiss (Silver and others, 1963).

2.6 (18.0) Road to Barley Flats.

2.6 (18.0) Upper Big Tujunga Canyon Road. Turn left (northeast)

0.1 (18.2) STOP TWO - Pullout on left for overlook of Vetter Mountain Stock. This is an elongate body (1 x 4 km), grossly zoned from a mafic border to a felsic core, which was introduced along the contact between the Mount Lowe Intrusion and the Mendenhall gneiss. Vetter Mountain to the north is actually underlain by rocks of the Mount Lowe Intrusion. These rocks underlie the sparsely vegetated ground to the northwest. In the far distance can be seen the Mt. Gleason fire road and the San Gabriel Anorthosite. Behind us across the road are folds in the Mendenhall gneiss. We'll spend some time here talking about terranes. Over the next 0.6 mi we'll see Vetter dikes cutting the Mendenhall gneiss.

0.7 (18.9) Contact between the Mendenhall gneiss and Vetter Mountain Stock. Note in the Vetter small, nondescript, subrounded, mafic inclusions, inclusions clearly derived from Mendenhall gneiss, and farther down the road slab inclusions from the Mount Lowe Intrusion. All of these inclusions have helped produce highly disturbed isotopic systematics, precluding determining a meaningful age of intrusion. A Cretaceous(?) age is inferred from similar mineralogy and chemical composition to the Josephine Mountain Intrusion.

0.2 (19.1) At the bridge is a slab inclusion of Mount Lowe Intrusion.

0.1 (19.2) Shortcut Fire Station. The Vetter here is deeply weathered because of proximity to an old erosional surface, overlain by gravels exposed just ahead.

0.1 (19.3) Spectacular gravels from an old stream channel overlie the Vetter.

0.9 (20.2) Another stream channel.

0.3 (20.5) Contact between the Vetter and the border facies of the Mount Lowe Intrusion. Note the presence of mafic dikes, which were absent in the Vetter - thus they must be younger than Late Triassic and older than Late Cretaceous(?). They therefore occupy a similar time relationship to the Mesozoic intrusive rocks here as the Independence Dikes do to the Mesozoic intrusions in the Sierra Nevada/Inyo Mountains and Mojave Desert.

0.1 (20.6) Another stream channel.

0.7 (22.6) Excellent foliation and compositional banding in the border facies of the Mount Lowe near its contact with Mendenhall gneiss.

0.2 (22.8) The contact is exposed on the left.

0.1 (22.9) STOP THREE - Pullout on the left just before the bridge over Alder Creek. We will walk back up the road to look at the contact relationships. The Mendenhall gneiss here is quite mylonitic with attenuated porphyroblasts. Lowe pegmatite dikes cut foliated Lowe as well as foliated Mendenhall gneiss, so that the event that caused foliation development in this area was contemporaneous with intrusion.

0.4 (23.4) The road is following Big Tujunga Canyon on the left.

0.8 (24.2) The contact between the Mendenhall Gneiss and the San Gabriel anorthosite-syenite body is obscured by the drainage.

0.3 (24.5) Note pink intrusions of Josephine granite into the anorthosite complex.

0.9 (25.4) This is the contact between the anorthosite complex and the Josephine Peak Intrusion. We will cross this contact two more times.

0.1 (25.5) A landslide on the north slopes of Strawberry Peak to the left has exposed tonalite intruded by biotite granite dikes, the two main phases of the Josephine Mountain Intrusion. To the southwest is Josephine Peak. The top of Josephine Peak is dark owing to the presence of an inclusion of Mendenhall gneiss, and is bare owing to clearing of brush to eliminate snakes and rodents for fire station personnel.

0.3 (25.8) The contact between the anorthosite and Josephine Mountain Intrusion is covered by drainage here.

1.3 (27.1) Intersection with Angeles Forest Highway (CR 3). Turn left (southwest) towards Tujunga/La Cañada.

0.2 (27.3) STOP FOUR - Monte Cristo Ranger Station. Park at the far end of the pulloff on the right. We're at the Josephine-anorthosite contact again. Note several large xenoliths of anorthosite and leucogabbro in the younger intrusion. Foliation in the Josephine quartz diorite is defined by aligned hornblende and biotite crystals that parallel the contact and also by stretched, elliposidal xenoliths. Note the felsite dike that intrudes the anorthosite but is truncated by the Josephine quartz diorite.

0.4 (27.7) More large anorthosite xenoliths. Mapping these xenoliths within the Cretaceous plutons helps to define the original southern extent of the anorthosite body.

0.5 (28.2) A small resort used to be located across from Hidden Springs Cafe along Mill Creek below the highway. Following heavy rains in February 1978, the community was struck by an estimated 4.3 m (14 ft) wave of water that washed away several homes and killed 10 people.

0.3 (28.5) STOP FIVE - Hidden Springs picnic area. Here we're in the garnet biotite granite of the Josephine Peak Intrusion. In the creek we will see float of quartz diorite, pegmatitic muscovite, xenolithic anorthosite, alluvial magnetite/apatite from the anorthosite body and float of Mount Gleason hornblende gabbro.

0.1 (28.6) Tunnel. We're in a large slab inclusion of Mendenhall gneiss. Beyond the far southern end of the tunnel is the contact with Josephine quartz diorite.

0.3 (28.9) Note abundant mafic inclusions on both sides of the bridge over the Narrows area of Big Tujunga Creek.

0.5 (29.4) Note the two Josephine facies.

2.0 (31.4) There are several exposures of thick colluvium deposits on the left which are now mostly stabilized and undergoing dissection. Note the complex intrusive relationships on the road cut across the valley to the right.

0.2 (31.6) Intersection with Big Tujunga Canyon Road. Option 1 returns to Clear Creek Station and then retraces the beginning of our route to I-210 in La Cañada. Option 2 travels down Big Tujunga Canyon to Sunland and thence to I-210.

**OPTION 1**

(31.6) Stay left on Angeles Forest Highway. Note again the landslide deposits on the left.

1.4 (33.0) Deeply entrenched meanders of Big Tujunga Canyon (difficult to see without pulling off) occur to the right. Entrenched meanders are characteristic of many streams in the San Gabriel Mountains and were produced during major uplift during the late Pleistocene.

1.5 (34.5) Clear Creek School Camp.

1.0 (35.5) Intersection with SR 2, Angeles Crest Highway. Turn right.

9.3 (44.8) Intersection with I-210.

**OPTION 2**

(31.6) Turn right onto Big Tujunga Canyon Road towards Sunland/Tujunga.

0.2 (31.8) Note intrusive relationships on the left between Josephine rocks and Mendenhall gneiss.

1.2 (33.0) Big Tujunga Dam Overlook. The dam was built in 1931 for flood control. The reservoir emphasizes the entrenched meanders of Big Tujunga Creek.

1.0 (34.0) Note Quaternary terrace deposits.

0.3 (34.3) Inclusion of Mendenhall gneiss in Josephine rocks.

0.3 (34.6) Bridge over Big Tujunga Creek.

0.4 (35.0) Here and twice more in the next 0.6 mi we cross the north branch of the San Gabriel fault. The south branch is in the creek bed to the left and rocks between the two branches have been highly sheared.

1.4 (36.4) There are several Quaternary terrace deposits exposed over the next 0.5 mi.

0.6 (37.0) Vogel Flats Road to Big Tujunga Station. The two branches of the San Gabriel fault join about here. The road and Big Tujunga Canyon follow the fault for the next 2.4 mi.

1.2 (38.2) Wildwood Picnic Area.

0.8 (39.0) Delta Flats.

0.4 (39.4) The fault continues northwest off the right, while the road and Big Tujunga Canyon turn to the southwest. We have left the San Gabriel Terrane and are now in the Placerita Terrane.

0.1 (39.5) Pullout on the left overlooks Big Tujunga Canyon.

2.1 (41.6) This new section of the road was built after the 1979 floods.

0.8 (42.4) Intersection with Mt. Gleason Road to the left. Proceed straight ahead.

0.4 (42.8) Oro Vista Road to the right to the development across Big Tujunga Wash is obviously an impermanent route.

0.6 (43.4) This curve to the left puts us on Oro Vista Avenue.

0.5 (43.9) At the light, turn right onto Foothill Blvd (SR 118).

0.7 (44.6) At the light, Foothill Blvd. turns to the right. Proceed straight ahead on Sunland Blvd. and follow signs to I-210.

0.4 (45.0) Intersection with I-210.

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