

Figure 2.2. Shaded digital elevation model of the western United States showing the major seismic belts, and earthquakes greater than magnitude 3.0 in blue circles. Yellow triangles are GPS sites of the BARGEN network; sites labeled in bold text are part of the initial BARGEN network, and have been operational since 1997; sites labeled in italicized text are part of the expanded BARGEN network, and have been operational since 1999. Site density near Yucca Mountain and the Nevada Test Site ($\sim 116^{\circ}\text{W}$ at the bottom edge of the figure) precluded site labels. Location of Figure 2.3 is shown with a dashed box.

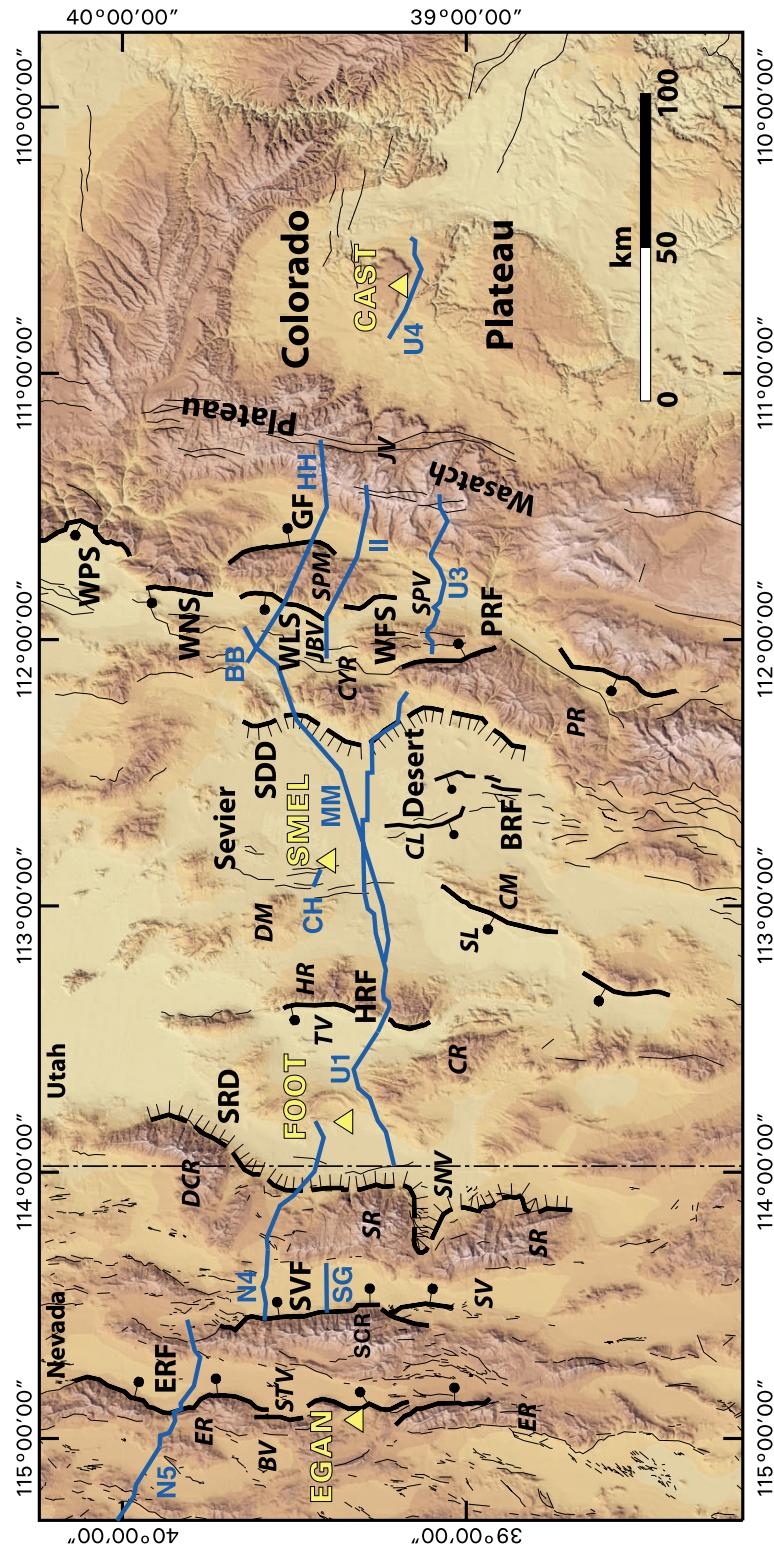
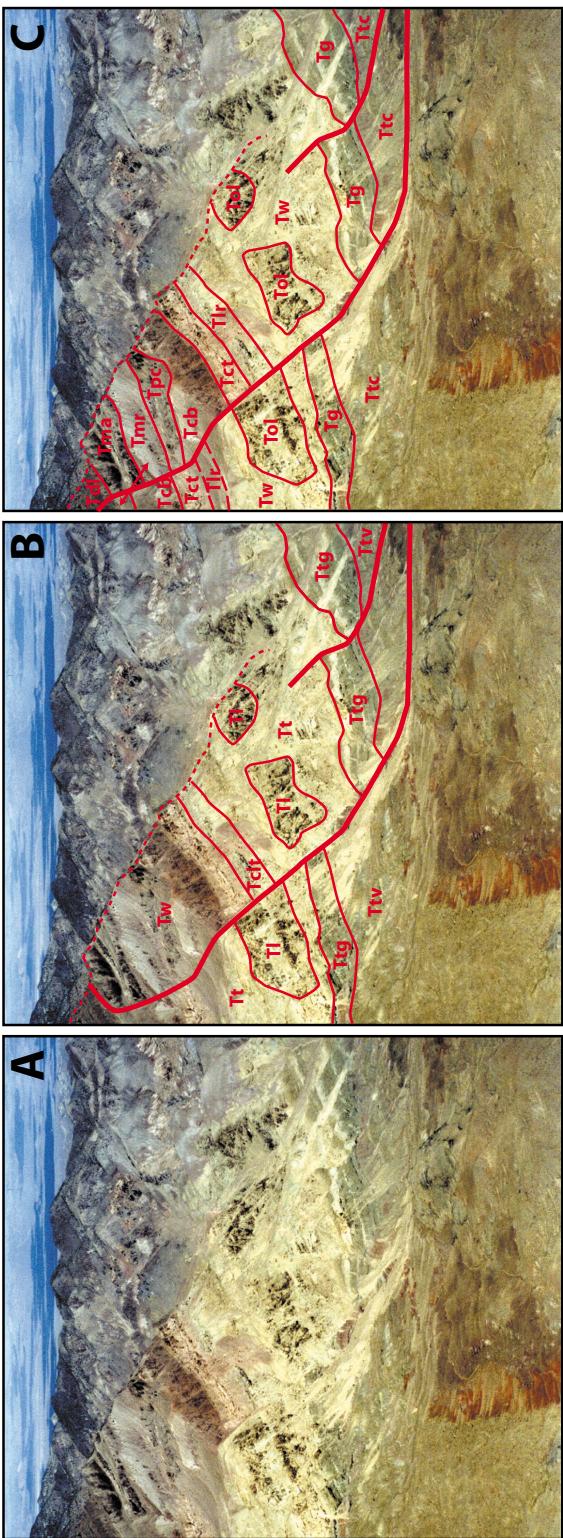


Figure 2.3. Shaded relief map of the area of study showing GPS sites (yellow triangles), seismic reflection profiles (green lines), and surface traces of high-angle (bold line with ball-and-bar symbol on hanging wall) and low-angle (hachures on hanging wall) normal faults. Abbreviations: Faults: BRF, Black Rock fault zone; ERF, Egan Range fault; HRF, House Range fault; PRF, Pavant Range fault; SRF, Sevier Desert detachment; SRD, Sevier Desert fault; SVF, Spring Valley fault; WFS, Wasatch fault, Provo segment, Fayetteville segment; WLS, Wasatch fault, Levan segment; WNS, Wasatch fault, Nephi segment; WPS, Wasatch Canyon Range; DCR, Deer Creek Range; DM, Drum Mountains; SR, Snake Range. Valleys: BV, Butte Valley; HR, House Range; PR, Pavant Range; SCR, Schell Creek Range; SPM, San Pitch Mountains; SR, Snake Range. Lakes: CL, Clear Lake; SL, Sevier Lake. Mountain Ranges: CM, Cricket Mountains; CYR, Canyon Range; DCR, Deer Creek Range; DM, Drum Mountains; ER, Egan Range; JBV, Juab Valley; JV, Joes Valley; SNV, Snake Valley; SPV, San Pete Valley; TV, Spring Valley; Tule Valley. Reflection profiles: CH, Drum Mountains scarps (Crone and Harding 1984); N4 and N5, COCORP Nevada lines 4 and 5 (Hauser et al., 1987); SG, Spring Valley (Gans et al., 1985); MM, BB, HH, II, seismic lines MM', BB', HH', and II' of Smith and Bruhn (1984); U1, U3, and U4, COCORP Utah lines 1, 3, and 4 (Allmendinger et al., 1987).



Reynolds (1969) Map Units		Reynolds (1969) Written Descriptions		Snow and Lux (1999)		This Report	
TdI	Latite of Donovan Mountain	Tma	Ammonia Tanks Tuff	Timber Mountain Group	Crater Flat Group	Wahguyhe Formation	
Tmr	Rainier Mesa Tuff	Tmr	Rainier Mesa Tuff	Timber Mountain Group	Tiva Canyon Tuff Paintbrush Group	Tiva Canyon Tuff Paintbrush Group	
Tpc	Tiya Canyon Tuff Paintbrush Group	Tcb	Bullfrog Tuff	Bullfrog Tuff	Bullfrog Tuff		
Tct	Crater Flat Group	Tct	Tram Tuff	Crater Flat Group	Tram Tuff		
?	Unit C	?	?	Ash Flow Tuff		Lithic Ridge Tuff	
?	Unit B	?	?	Welded Tuff		Rhyolite of Picture Rock	
Tw	Unit A	?	?		Leadfield Formation	Tw	Panuga Formation
Tct	Crystal Lithic Tuff	?	?	Crystal Lithic Tuff	Unnamed Tuff Sequence	Tlr	Panuga Formation
Tt	Latite Flow	?	?	Latite Flow	Latite Flow	Tir	Titus Canyon Formation
?	?	?	?	?	?	?	Titus Canyon Formation
10.33 Ma	Not to Scale	11.45 Ma	11.6 Ma	12.7 Ma	13.25 Ma	~13.4 Ma	14.0 Ma
11.45 Ma	+	<	>	<	>	<	>
11.6 Ma	<	<	<	<	<	<	<
12.7 Ma	<	<	<	<	<	<	<
13.25 Ma	<	<	<	<	<	<	<
~13.4 Ma	<	<	<	<	<	<	<
14.0 Ma	<	<	<	<	<	<	<
~14-15 Ma	+	+	+	+	+	+	+
~16-15 Ma	0	0	0	0	0	0	0
~34-20? Ma	0	0	0	0	0	0	0

Figure 5.5. Photographs and chart showing changes in Tertiary stratigraphy of the Grapevine Mountains suggested by this report. A) Photograph looking north into Titus Canyon, which shows a fairly complete Oligocene through middle Miocene stratigraphic sequence. B) Overlain on the photograph is the Tertiary stratigraphy mapped by Reynolds (1969). C) Overlain on the photograph is the Tertiary stratigraphy recognized in this report. The chart underneath the photographs shows evolution of changes to Oligocene and Miocene stratigraphy in the Grapevine Mountains.

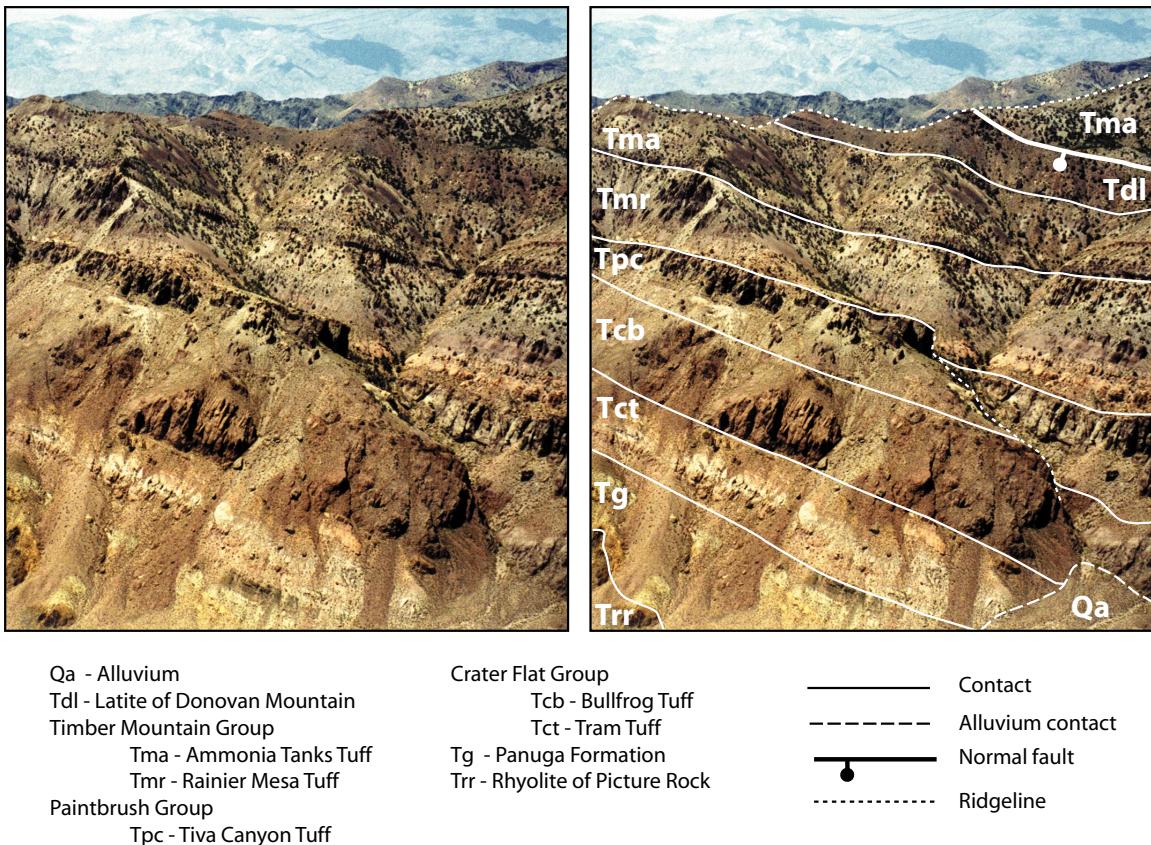


Figure 5.6. A) Photograph of ash flow tuffs of the southwest Nevada volcanic field exposed on the western wall of Titus Canyon. B) Contacts between ash flow tuff units recognized in this study, overlain on the same photograph. Short dashed lines are ridge lines. Strata beyond upper ridge line are Paleozoic miogeoline.



Figure 5.8. Photograph looking north along the western range front of the Grapevine Mountains, ~1 mile north of Fall Canyon. Yellow and orange colored beds on the left side of the photo are deposits of the Red Wall Basin sequence. Person in left center of photo for scale.

the upper sequence (for zircon (U-Th)/He). Results of (U-Th)/He zircon analyses yield ages of 3.09 ± 0.19 Ma (Table 5.1), while geochronologic results from the basalts are still in progress. Field evidence suggests a tentative correlation of the tuff within the upper sequence with the ~3.2 Ma Tuff of Mesquite Spring (Snow, 1990; Snow and Lux, 1999), a correlation strengthened by the (U-Th)/He geochronology. If this correlation is correct, then the Red Wall Basin deposits are early- to mid-Pliocene in age, and would be correlative with the Nova Formation found on the western side of Death Valley (Snow and Lux, 1999).

5.4.4 Quaternary

Quaternary Gravels

Outcrops of poorly to moderately consolidated conglomerates located within the Grapevine Mountains are mapped as Quaternary gravels. These gravels weather grayish-brown to reddish-brown, and contain clasts of locally derived Paleozoic car-