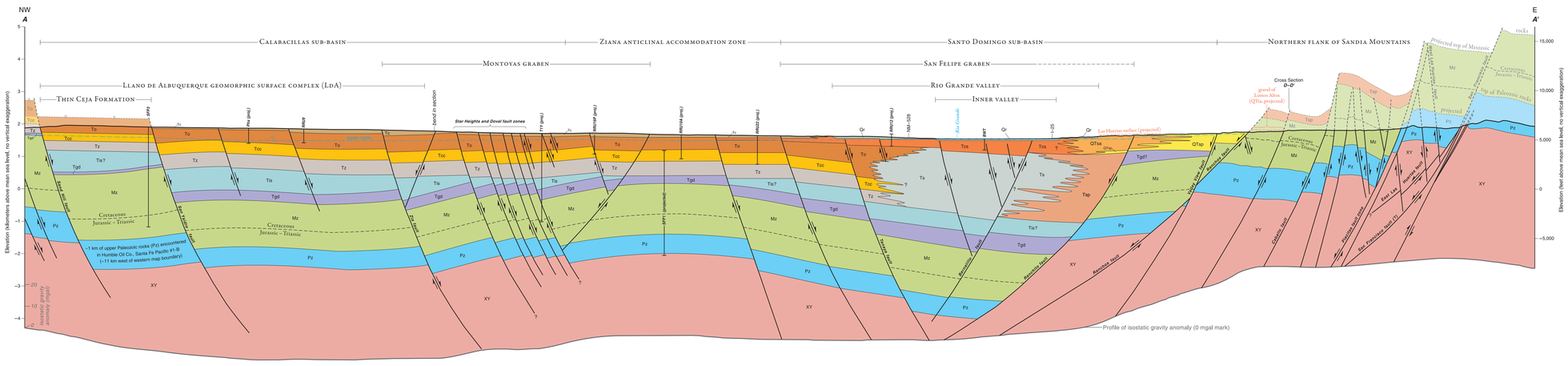
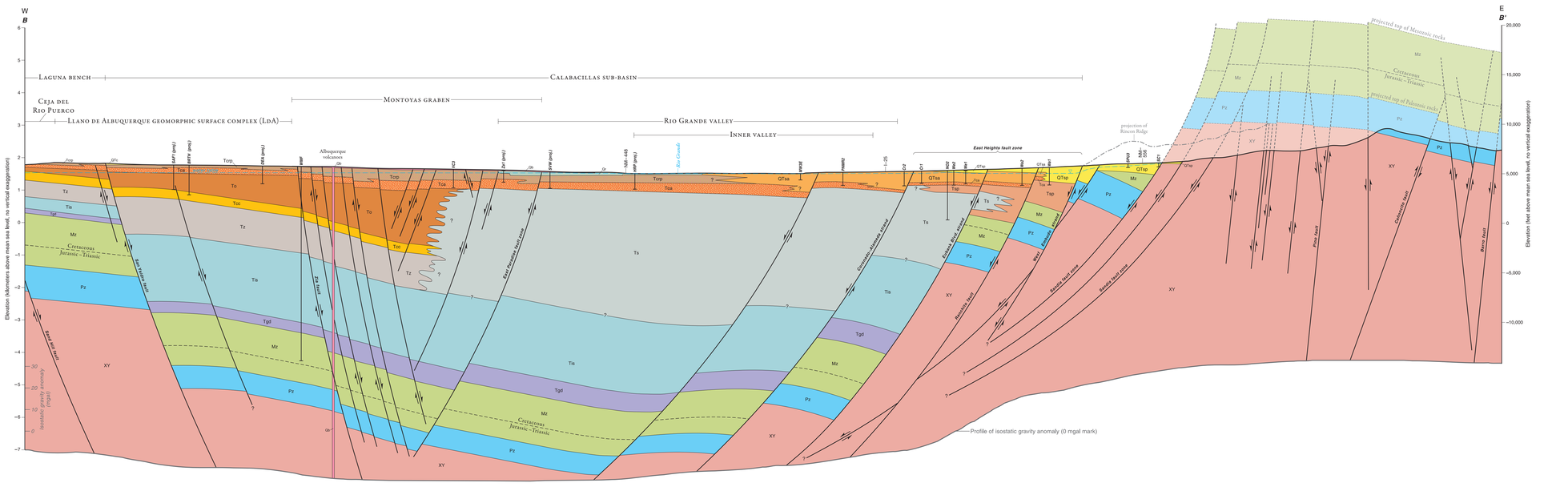




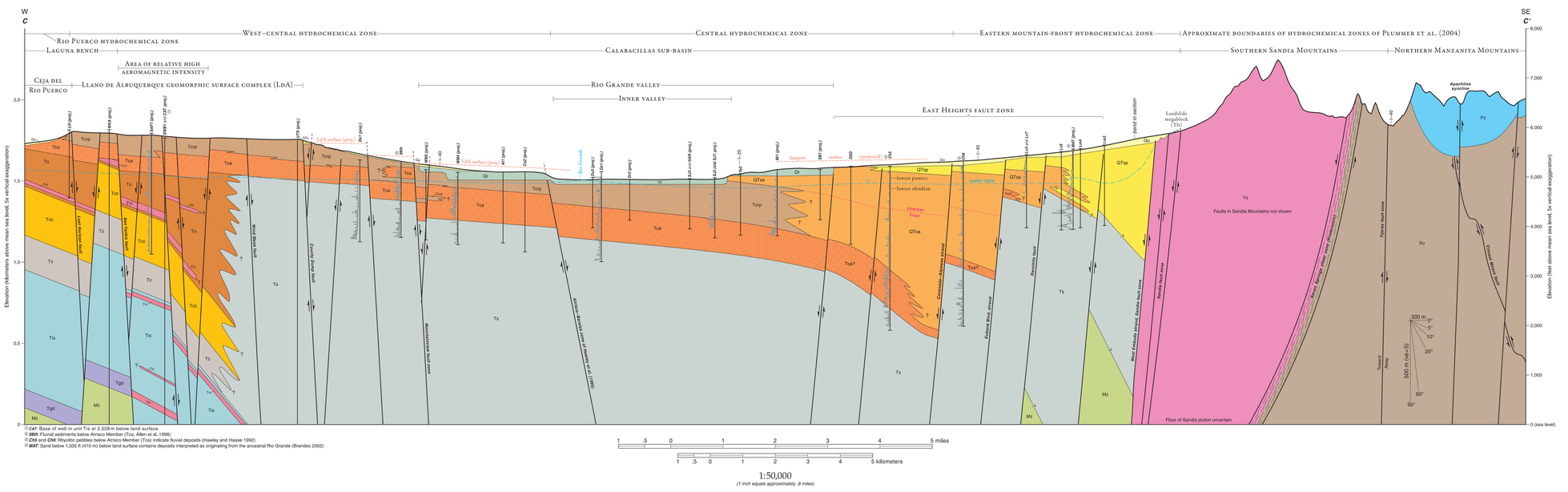


TABLE 1—Summary of geochronological data for Cenozoic units. Sample locations on geologic map (Sheet 1) and Map 2A (Sheet 2). Unit column denotes mapped units on Sheet 1. Brackets denote units Map 2A (Sheet 2). Colors in Sample number column refer to unit colors on geologic map (Sheet 1). Colors in Unit column refer to unit colors (Sheet 2). Laboratory numbers not available (n.a.).

Sample number	Unit	Lab number	Age (Ma; *yr)	Method	Comments	Source
SC–1	Qa (Qu)	104958[1]	1790 ± 90*	radiocarbon (standard)	Detrital charcoal; 3.3 m below top of Qay	Karlstrom et al. (1994)
SC–2	Qa (Qu)	109129[1]	4550 ± 140*	radiocarbon (extended)	Detrital charcoal; 3.6 m below top of Qay	Connell et al. (1998b)
SB–1	QTsg (QTs)	1452[4]	1.6–1.0	biostratigraphy	Tijeras Arroyo local fauna; Irvingtonian NALMA	Morgan and Lucas (2003)
SB–2	Tcrp (QTs)	1458[4]	~3.6–2.2	biostratigraphy	Mountainview local fauna; Blancan NALMA	Morgan and Lucas (2003)
SB–3	Tcc (QTs)	AMNH[6]	14–12	biostratigraphy	Rincon quarry; late Barstovian NALMA fauna	Tedford and Barghoorn (1999)
SB–4	Tcc (QTs)	AMNH[6]	14–12	biostratigraphy	Zia prospect; late Barstovian NALMA fauna	Tedford and Barghoorn (1999)
SB–5	Tcp (QTs)	AMNH[6]	19–22	biostratigraphy	AMNH: Standing Rock quarry, late Arikareean fauna	Tedford and Barghoorn (1999)
SA–1	QTsg (QTs)	13[5]	~1.21	geochemistry (glass)	Probable upper Bandelier fallout ash	Connell et al. (1995)
SA–2	QTsa (QTs)	5725[6]	1.27 ± 0.02	$^{40}Ar/^{39}Ar$, sd (sanidine)	Upper Bandelier fallout ash (NMGRL–IR123)	Unpublished data
SA–3	QTsa (QTs)	9745[6] 29–31[5]	1.58 ± 0.06	$^{40}Ar/^{39}Ar$, sd (sanidine)	Casino ash (Cerro Toledo rhyolite), fallout ash	Cather and Connell (1998)
SA–4	QTsa (QTs)	n.a.	~1.61	geochemistry (glass)	La Farge ash; 40-cm thick fallout lapilli, correlates to Bandelier Tuff (NMGRL–IR165)	Unpublished data
SA–5	QTsa (QTs)	2340[6]	1.65 ± 0.01	$^{40}Ar/^{39}Ar$, sd (sanidine)	Fluvially recycled pumice of lower Bandelier Tuff	Connell et al. (1995)
SA–6	QTsa (QTs)	5139[6]	1.94 ± 0.02	$^{40}Ar/^{39}Ar$, sd (sanidine)	Fluvially recycled(?) black-and-white zsh; white component dated at 2.16 ± 0.46 Ma (NMGRL–IR165)	Unpublished data
SA–7	Tb	8922[6]	1.78 ± 0.21	$^{40}Ar/^{39}Ar$ step-heat (groundmass)	Basaltic lava flow, southeast margin San Felipe volcanic field	Cather and Connell (1998)
SA–8	Tb	5196[7a]	2.60 ± 0.11	$^{40}Ar/^{39}Ar$ step-heat (groundmass)	Easternmost exposure of basaltic lava flow of San Felipe volcanic field, interbedded with QTsa (NMGRL–IR157)	Brandes (2002)
SA–9	Tvc (Tb)	9131[1]	2.54 ± 0.43	$^{40}Ar/^{39}Ar$ step-heat (groundmass)	Canyon Hill basaltic feeder dike	Connell et al. (1995)
SA–10	Tcrp (QTs)	n.a.	–	geochemistry (glass)	Fluvially recycled pumice	Unpublished data
SA–11	Tcrp (QTs)	n.a.	–	geochemistry (glass)	Shooting Gallery ash; fallout ash; not correlated	Unpublished data
SA–12	Tcrp (QTs)	n.a.	–	geochemistry (glass)	Fluvially recycled pumice pebble; geochemically indistinct from SA–13	Cather et al. (1997)
SA–13	Tc (QTs)	n.a.	–	geochemistry (glass)	Fluvially recycled pumice; geochemically indistinct from SA–12	Unpublished data
SA–14	Tc (QTs)	25[1]	~3.28	geochemistry (glass)	La Ceja ash; Nomlaki Tuff, fallout ash (could also be 3.58–4.15 Ma)	Connell et al. (1999)
SA–15	Tca (QTs)	8077[7a] 55[1]	3.81 ± 0.29	$^{40}Ar/^{39}Ar$, sd (hornblende)	Spillway ash; fallout lapilli ~42 m below basaltic lavas of Santa Ana Mesa (Tb)	Unpublished data
SA–16	Tca (QTs)	5144[8]	4.15 ± 0.15	$^{40}Ar/^{39}Ar$ step-heat (groundmass)	Youngest age of three fluvially recycled basaltic cobbles (NMGRL–IR123)	Unpublished data
SA–17	Tcrp (QTs)	5430[7a]	8.47 ± 0.22	$^{40}Ar/^{39}Ar$ step-heat (plagioclase)	Youngest age for three fluvially recycled basaltic cobbles (NMGRL–IR364)	Unpublished data
SA–18	Tca (QTs)	5048[3a]	4.82 ± 0.19	$^{40}Ar/^{39}Ar$ step-heat (hornblende)	Fluvially recycled rhyodacitic cobble (NMGRL–IR67)	Unpublished data
SA–19	Top (QTs)	5048[5a]	6.56 ± 0.20	$^{40}Ar/^{39}Ar$ step-heat (groundmass)	Youngest age for three fluvially recycled basaltic cobbles; 6.10 ± 0.52 Ma if affected by recoil (NMGRL–IR67)	Koning and Personius (2002)
SA–20	Tob (QTs)	9473[1]	6.85 ± 0.14	$^{40}Ar/^{39}Ar$, sd (sanidine)	Peralta Tuff, fallout ash, ~100 m below top of Tob	Connell et al. (1999)
SA–21	Tob (QTs)	8925[1] 54[1]	6.86 ± 0.04	$^{40}Ar/^{39}Ar$, sd (sanidine)	Peralta Tuff fallout lapilli, <3 m below eroded top of Tob	Connell et al. (1995)
SA–22	Tob (QTs)	5056[6]	7.07 ± 0.06	$^{40}Ar/^{39}Ar$, sd (sanidine)	Peralta Tuff, fallout lapilli and ash (NMGRL–IR67)	Koning and Personius (2002)
SA–23	Tob (QTs)	n.a.	7.14 ± 0.04	$^{40}Ar/^{39}Ar$, sd (sanidine)	Peralta Tuff, pumice	Personius (2002)
SA–24	Tpc (QTs)	n.a.	7.05 ± 0.06	$^{40}Ar/^{39}Ar$, sd (sanidine)	Peralta Tuff, pumice	Personius (2002)
SA–25	Tca (QTs)	n.a.	~10.8	geochemistry (glass)	Trapper Creek fallout ash; 6–9 m below base of unit Ton	Personius et al. (2000)
SA–26	Tcc (QTs)	n.a.	~11.2	geochemistry (glass)	Trapper Creek fallout ash	Koning and Personius (2002)
SA–27	Tcc (QTs)	n.a.	~11.3	geochemistry (glass)	Marillo ash; Trapper Creek fallout ash	Koning and Personius (2002)
SA–28	Tcc (QTs)	n.a.	~11.3	geochemistry (glass)	Trapper Creek fallout ash	Koning and Personius (2002)
SA–29	—	3183[1]	31.1 ± 0.5	$^{40}Ar/^{39}Ar$ step-heat (groundmass)	Mafic dike, unconformably overlain by unit Tsp	Connell et al. (1995)

[1]Radiocarbon dating using single crystal (sd) and whole-rock furnace (step-heat) $^{40}Ar/^{39}Ar$ technique on groundmass at the New Mexico Geochronological Research Laboratory (NMGRL; W. C. McIntosh and M. Heizler, directors), New Mexico Institute of Mining and Technology, Socorro, New Mexico. Ages recalculated using Fish Canyon Tuff standard of 28.02 Ma (Renne et al. 1998).
[2]Geochemical correlations of volcanic glass through the New Mexico Bureau of Geology and Mineral Resources database of New Mexico ashes (NMASH; N. Dunbar unpubl. data).
[3]Radiocarbon ages (Beta Analytical Laboratories) using standard and extended counting methods.
[4]Biostratigraphic site and age (North American Land Mammal "Age" [NALMA]) data from the New Mexico Museum of Natural History and Science (Morgan and Lucas 2003) and the American Museum of Natural History (AMNH; Tedford and Barghoorn 1999; Tedford et al. 2004).
*Age reported in radiocarbon years.

TABLE 2—Explanation of map and geologic cross section units. Geologic cross section drawn based on data from geologic map (Sheet 1), available well data, gravity data (Kucks et al. 2001), data and interpretation from Lozinsky (1994), Hawley (1996), Hawley et al. (1995), Connell (2004), Connell et al. (1998a, 1999), and seismic reflection profiles (Russell and Snelson 1994). Lighter shading and bracketed unit symbols denote eroded units that are projected above the topographic profile. Curved fault geometry after Russell and Snelson (1994). Surficial geology incompletely shown.

Map and Cross Section Symbols

- **Contact**—Gray dashed where projected above topographic profile on cross sections ❋❋❋
- **Normal fault**—Bar and ball on downthrown side; solid line denotes pre-Pleistocene or unknown age; dashed line denotes age of latest ground rupture; inferred age of latest slip based on crosscutting relationships and data from Machette et al. (1998) ❋
  - Latest Pleistocene (<15 ka)
  - Late Pleistocene (<128 ka)
  - Middle and early Pleistocene (<1.6 Ma)
  - Late Pliocene (<2.6 Ma)
- **Normal fault**—Bar and ball on downthrown side ❋❋
- **Reverse fault**—Box on upthrown side; inferred Paleogene age ❋❋❋
- **Thrust fault**—Ductile; barb on upthrown side; inferred Proterozoic age ❋❋❋
- **Strike-slip fault**—Showing relative horizontal separation ❋❋❋
- **Cross section fault**—Showing relative separation; gray dashed where projected above topographic profile; crosscutting relationships shown diagrammatically ❋
- **Anticline**—Showing direction of plunge ❋❋❋
- **Syncline**—Showing direction of plunge ❋❋❋
- **Overturned anticline** ❋❋❋
- **Overturned syncline** ❋❋❋
- **Monocline** ❋❋❋
- **Projection of geomorphic surface** ❋
- **Approximate lateral (mostly buried) limit of axial-fluvial deposits of the Sierra Ladrones Formation (QTsa)** ❋❋
- **Active Rio Grande channel** ❋❋❋
- **Topographic profile** ❋
- Cretaceous / Jurassic–Triassic **Age boundary form line**—Gray dashed where projected above topographic profile ❋
- **Projection of Rincon Ridge** ❋
- **Landslide megablock** ❋
- coarser / finer **Form line**—Texture in Sierra Ladrones Formation ❋
- **Static water level** ❋
- **Aluminosilicate mineral assemblage** ❋
- **Seven Springs shear zone**—Down to northwest ❋
- **Topographic front of Sandia Mountains** ❋
- 4900 **Static water level contour of elevation**—Modified from Kernodle (1998) and Johnson (2000); contours (100 ft intervals, 50 ft intervals dashed) in feet above mean sea level ❋
- 6000 / 5800 **Structure contour of elevation of upper–middle Santa Fe Group (QTs–Tb) boundary**—Based on surface exposures and wells; contours (200 ft intervals) in feet above mean sea level; dashed where projected over 1 ❋
- –20 **Contour of isostatic gravity anomaly**—Gridded using point data from Kucks et al. (2001); 5-mgal interval ❋❋
- 10 / 0 **Profile of isostatic residual gravity anomaly at base of cross sections A–A' and B–B'**—0-mgal reference mark and scale; vertical position of profile is arbitrary and does not denote compensation depth; data from Kucks et al. (2001) ❋
- A / A' **Geologic cross section** ❋❋❋
- 25 **Interstate highway** ❋❋❋
- 550 **Federal highway** ❋❋❋
- 10 **State highway** ❋❋❋
- Cn6 **Well**—"Projected" denotes well projected more than 1 km into cross section line; gray line denotes electrical conductivity log ❋
- WKA (2000 ft) **Oil well**—Including thickness of Santa Fe Group sediments (QTs, in feet) ❋
- WKA (600) **Oil well**—Including thickness of upper Santa Fe Group (QTsfu, in feet) ❋
- Le2 (800) **Water supply well**—Includes thickness of upper Santa Fe Group (QTsfu, in feet) on Map 2B ❋❋
- MAT (1980) **Monitoring well**—Includes thickness of upper Santa Fe Group (QTsfu, in feet) on Map 2B ❋❋
- SA–2✕ **Geochronologic sample site** (Table 1) ❋
- ✳ **Volcanic vent in Albuquerque volcanoes (Qb) and San Felipe volcanic field (Tb)** ❋

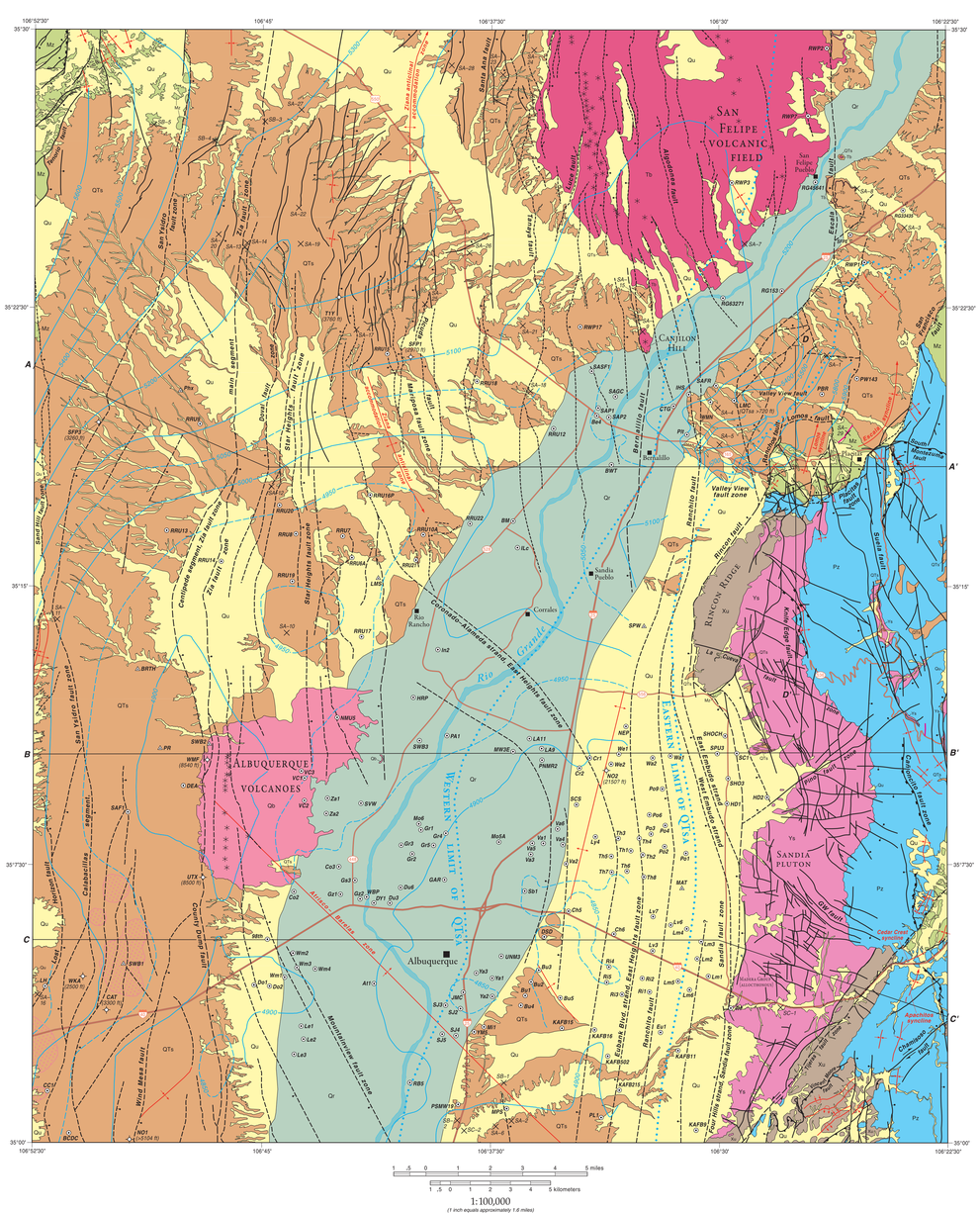
Description of Map and Cross Section Units

- QTc **Footwall colluvium and eolian deposits** (Pleistocene–upper Pliocene?) ❋
- Qu **Alluvium, undivided** (Holocene and Pleistocene) ❋❋
- Qr **Rio Grande fluvial deposits, undivided** (modern–middle Pleistocene)—Includes undifferentiated alluvium (Qa) ❋❋
- QTsfu **Santa Fe Group, undivided upper subgroup** (lower Pleistocene–Pliocene)—Includes Ceja (Tc) and Sierra Ladrones (QTsp, QTsa) Formations ❋
- QTs **Santa Fe Group, undivided** (lower Pleistocene–upper Oligocene)—Includes Zia (Tz), Arroyo Ojito (To), Ceja (Tc), and Sierra Ladrones (QTsp, QTsa) Formations ❋
- Ts **Santa Fe Group, undivided middle and lower subgroups** (upper Miocene–upper Oligocene)—Includes Zia (Tz), Cerro Conejo (Tcc), and Arroyo Ojito (To) Formations; probable lateral equivalent to Popotosa Formation (south, Machette 1978) and Tanos and Blackshare Formations (northeast, Connell et al. 2002) ❋❋
- QTsp **Sierra Ladrones Formation, piedmont member** (lower Pleistocene–Pliocene) ❋
- QTsa **Sierra Ladrones Formation, axial-fluvial member** (lower Pleistocene–Pliocene or Miocene?) ❋
- Tc **Ceja Formation, undivided** (lower Pleistocene?–Pliocene)—Includes Rio Puerco (Torp), Atrisco (Tca), and Santa Ana Mesa (Tcs) Members ❋
- Torp **Ceja Formation, Rio Puerco Member** (lower Pleistocene?–Pliocene) ❋
- Tcs **Ceja Formation, Santa Ana Mesa Member** (Pliocene) ❋
- Tca **Ceja Formation, Atrisco Member** (Pliocene) ❋
- To **Arroyo Ojito Formation, undivided** (upper-middle Miocene)—Includes Navajo Draw (Ton), Loma Barbon (Tob), and Picuda Peak (Top) Members ❋
- Tc **Cerro Conejo Formation** (upper–middle Miocene) ❋
- Tz **Zia Formation, undivided** (lower Miocene–upper Oligocene)—Includes Piedra Parada (Tzp), Chamisa Mesa (Tzm), and Cañada Flores (Tzr) Members ❋
- Tis **Older eastern basin-margin piedmont deposits, undivided** (Miocene–upper Oligocene?) ❋
- Tsi **Unit of Isleta well #2** (Oligocene–upper Eocene)—Sandstone, mudstone, and interbedded volcanic rocks described by Lozinsky (1994) in subsurface; probable lateral equivalent to Spears Group (south) and Espinaso Formation (north). 0–2,185 m thick ❋
- Tgd **Diamond Tail and Galisteo Formations, undivided** (Eocene–Paleocene)—Includes units Td and Tg; 22–350 m thick ❋
- Mz **Mesozoic sedimentary rocks, undivided** (Cretaceous–Triassic)—Includes units Km, Kep, Km, Kmb, Kmv, Ju, and Ru; 1,600–2,400 m thick ❋❋
- Pz **Upper Paleozoic sedimentary rocks, undivided** (Permian–Mississippian)—Includes units Pig, Pip, IPm, and IPt; 632–1,000 m thick ❋❋
- Qb **Basaltic lavas of Albuquerque volcanoes, undivided** (middle Pleistocene)—Includes units Qb1–5 ❋❋
- Tb **Basaltic lavas of Santa Ana Mesa** (upper Pliocene) ❋
- Tvi **Buried igneous rocks** (Pliocene–Oligocene)—Igneous rocks, locally encountered in boreholes ❋
- **Buried igneous rocks inferred from aeromagnetic anomalies** (Pliocene or Miocene) ❋❋
- **Mafic dike** (Oligocene) ❋
- Xp **Paleoproterozoic and Mesoproterozoic crystalline rocks, undivided**—Includes units Ys, Yss, Ygr, Ys, Ygr, and Yx ❋❋
- Ys **Sandia granite** (Mesoproterozoic) ❋❋
- Xu **Proterozoic crystalline rocks, undivided** ❋❋
- **Watersaturated upper Santa Fe Group deposits** (QTsfu)—Constructed using static ground water level data of Kernodle (1998) and Johnson (2000) and structure contour map of upper–middle Santa Fe Group boundary on Map 2B ❋
- 40 / −36 **Value of isostatic gravity anomaly** (in mgal)—Gridded using point data from Kucks et al. (2001) ❋

Note: Cross section units shown above the topographic profile are depicted in a lighter shade of the unit color.

❋ CAT: Base of well in unit Tis at 2,028 m below land surface
❋ RRb: Fluvial sediments below Atrisco Member (Tca; Allen et al. 1998)
❋ Cn6 and Cn8: Rhyolitic pebbles below Atrisco Member (Tca) indicate fluvial deposits (Hawley and Haase 1992)
❋ MAT: Sand below 1,335 ft (410 m) below land surface contains deposits interpreted as originating from the ancestral Rio Grande (Brandes 2002)

1 .5 0 1 2 3 4 5 miles
1 .5 0 1 2 3 4 5 kilometers
1:50,000
(1 inch equals approximately .8 miles)


San Felipe volcanic field
Canyon Hill
Albuquerque volcanoes
Sandia pluton
Rio Grande
Albuquerque
Bernalillo
Corrales
Rio Rancho
Sandia Pueblo
Valley View fault zone
Rincon Ridge
Cedar Crest syncline
Chapelle fault
Sandia fault
Tijeras fault zone
Hubbell Springs fault
Calabacillas fault
Rincon fault
Rincon Ridge fault
Rincon Ridge fault zone
Rio Grande fault
Rio Grande fault zone
Rio Grande valley
Eastern limit of QTsa
Western limit of QTsa
Eastern limit of QTsa
West Sandia Pluton
Sandia fault zone
Sandia Pluton
Cedar Crest syncline
Chapelle fault
Tijeras fault zone
Hubbell Springs fault
Calabacillas fault
Rincon fault