PLATE 1: GEOLOGIC MAP AND CROSS-SECTIONS OF THE EASTERN ESPAÑOLA BASIN

GSA DR Item 2013139 accompanies the following chapter (https://doi.org/10.1130/2013.2494(08)) in GSA Special Paper 494:

Structure and tectonic evolution of the eastern Española Basin, Rio Grande rift, north-central New Mexico

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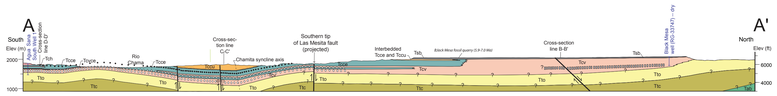
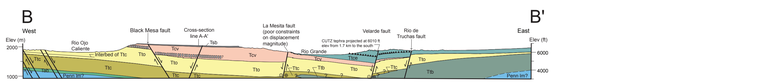
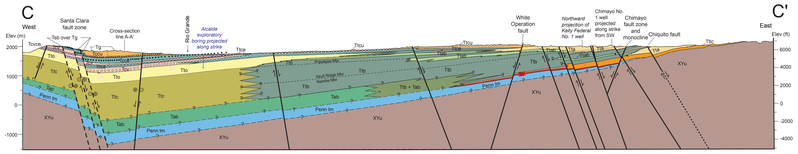
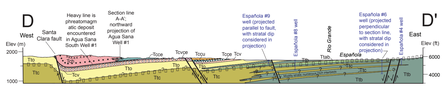
ACKNOWLEDGMENTS

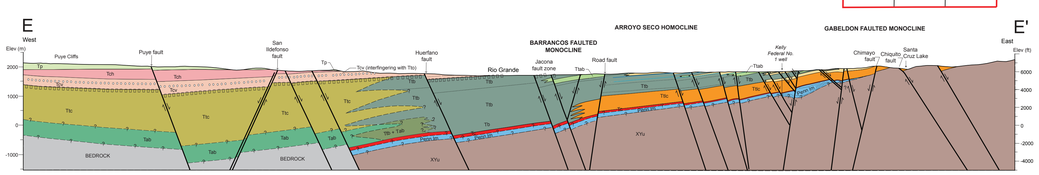
Subsurface interpretations of Proterozoic and Paleozoic strata in the eastern third of cross-section I-I' are by Adam Read (New Mexico Bureau of Geology and Mineral Resources). Eastern third of cross-section G-G' slightly modified from Borchert et al. (1998). Pre-Santa Fe Group structure in cross-sections G-G' and H-H' drawn using Biehler et al. (1991), Cather (1992), and Grauch et al. (2009). Pre-Santa Fe Group structure in cross-section C-C' used unpublished gravity data and interpretations by Sean Biehler (Univ. of California, Riverside). Depths of basalt under Caja del Rio Plateau based in part from magnetotelluric soundings (Brian Rodriguez, written communication, 2009). Surface faults on the Caja del Rio Plateau drawn using Minor et al. (2013).

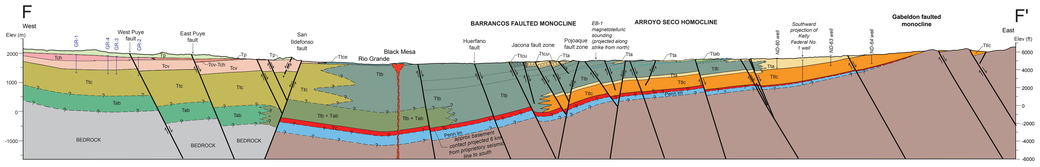


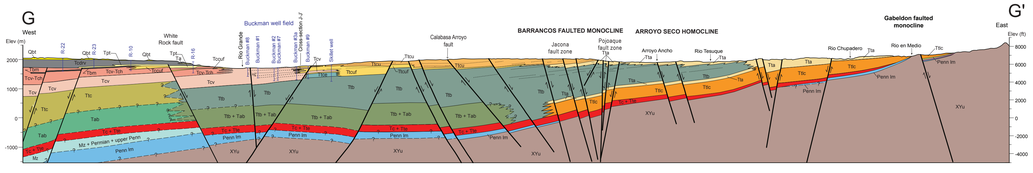


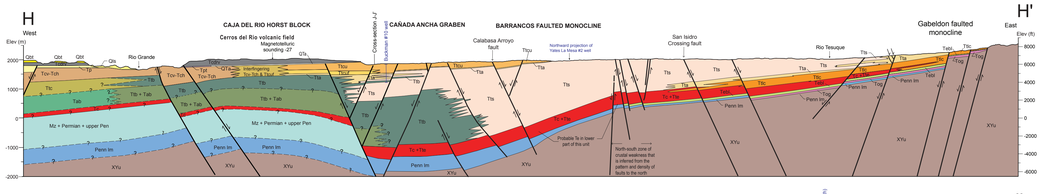


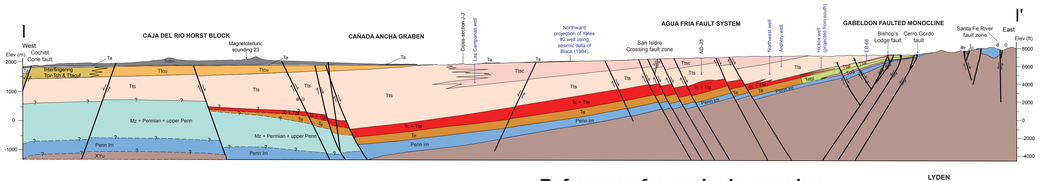


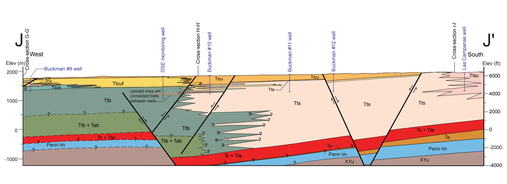












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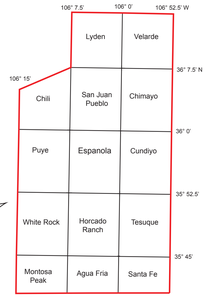
INDEX TO SOURCES OF GEOLOGIC MAPPING (RIGHT)

Outline of mapped area shown in red; names given are for U.S. Geological Survey 7½-minute topographic quadrangles that correspond to geologic maps listed at the base of the plate.



EXPLANATION

LITHOLOGIC UNITS

QUATERNARY VALLEY-FILL, LANDSLIDES, AND IGNIMBRITES

- Qal — Valley-fill alluvium
- Qls — Landslide complex
- Qbt — Bandelier Tuff

Note: Low- and mid-level Quaternary terrace deposits not shown

PLIOCENE-AGE, COARSE BASIN-FILL AND BASALT-ANDESITE VOLCANIC FLOWS

- Pliocene (minor lower Pleistocene):
  - Ta — Ancha Fm
  - Tp — Puyé Formation
  - Tpf — Totavi Lentil, Puyé Formation (shown in cross-sections only)
  - Tbs, Tcb — Servilleta basalt (Tbs) and Cerros del Rio basalt and andesite (Tcdrv)
  - Tgt — High-level terrace gravel, locally subdivided as Tgt1, Tgt2, and Tgt3 (oldest to youngest)

UPPER COARSE DEPOSITS OF SANTA FE GROUP (13.2 TO ~6 Ma)

- Late middle Miocene and late Miocene:
  - Tch — Hernandez Mbr, Chamita Fm
  - Tcc, Tcv — Mixed and intercalated Vallito and Hernandez Mbrs, Chamita Fm
  - Tcvce — Mixed and intercalated Vallito and Cejita Mbrs, Chamita Fm
  - Tcv — Vallito Mbr, Chamita Fm
  - Tcc, Tcce — Cejita Mbr, Chamita and Tesuque Fms
  - Tcc, Tccu — Cuarteles Mbr, Chamita and Tesuque Fms
  - Tccf, Tccu — Cuarteles Mbr, fine-grained distal facies, Chamita and Tesuque Fms
  - Tts — Ojo Caliente Sandstone,Tesuque Fm

UPPER MIOCENE VOLCANIC ROCKS

- Tbt, Tbl — Lobato Basalt (Tlt) and undifferentiated Upper Miocene basalt (Tbm)
- Tlp — Lobato Basalt - phreatomagmatic deposits

LOWER TO MIDDLE DEPOSITS OF SANTA FE GROUP

- Late Oligocene through early middle Miocene:
  - Tth — Chama-El Rito Mbr,Tesuque Fm
  - Ttb — Lithosome B (basin-floor lithofacies),Tesuque Fm
  - Tta — Lithosome A (eastern alluvial slope lithofacies), Tesuque Fm
  - Ttab — Intercalated and mixed lithosomes A & B, Tesuque Fm
  - Tts — Lithosome S (ancestral Santa Fe River), Tesuque Fm
    - On cross-sections, lithosome S is differentiated as:
    - Ttsc — Coarse-grained lithosome S
    - Ttsu — Undivided lithosome S
  - Ttsh, Tab — Interbedded and/or mixed lithosome B (Tesuque Fm) and Abiquiu Fm
  - Tab — Abiquiu Formation
  - Ttc — Lower coarse unit, Nambé Mbr, Tesuque Fm
  - Tc + Tbc — Cieneguilla Basanite (Tc - locally minor Espinaso Fm near base); basanite locally interbedded with lithosome E of Tesuque Fm (Tbc)
  - Cieneguilla Basanite flow(s) (25-26 Ma)

OLIGOCENE-AGE VOLCANIC AND SEDIMENTARY ROCKS

- Tobl — Bishop's Lodge Member of Espinaso Formation (formerly of Tesuque Formation)
- Te — Espinaso Formation
- Tog — Limestone- and granite-bearing conglomerate and sandstone

PRE-RIFT BEDROCK UNITS

- Uppermost Pennsylvanian, Permian and Mesozoic strata
- Pz — Paleozoic strata (Mississippian and Pennsylvanian)
- Penn lm — Limestone-dominated, Pennsylvanian strata (locally minor Mississippian strata at base)
- XYu — Proterozoic crystalline rocks
- BEDROCK — Undifferentiated bedrock (includes Oligocene volcanic rocks and older rocks; shown in cross sections only)

GEOLOGIC MAP SYMBOLS

- Subhorizontal bedding
- Well location
- Magnetotelluric sounding
- H-45 — Tephra sample locality
- 10 — Strike and dip of bedding
- 10 — Strike and dip of bedding used in Figure 12 of Koning et al. (this vol)
- 10 — Overturned bedding
- PV — Paleovalley NW of Cerro Roman back-filled by interbedded Lobato Basalts and Chamita Formation
- City or town
- Normal fault - solid where exposed, dashed where inferred, dotted where concealed, queried where uncertain; ball and bar on down-thrown side
- Anticline -- approx location of hinge line
- Syncline -- approx location of hinge line
- Monocline -- dashed line drawn near approximate center of limb
- Contact separating stratigraphic units - half-arrows denote lateral gradation; queried where uncertain
- River or stream
- PS — Stratigraphic section (those north of Santa Cruz River are not shown here but are depicted in Figure 8). WASF and WASH = West Arroyo Seco fault footwall and hanging-wall sections, respectively; PS = Pojoaque section; RDO_U, RDOI, RDO_L, $RDOhw$, and $RDOfw$ = Rio del Oso upper, lower, basal, hanging wall, and footwall sections, respectively
- H — Cross-section end point

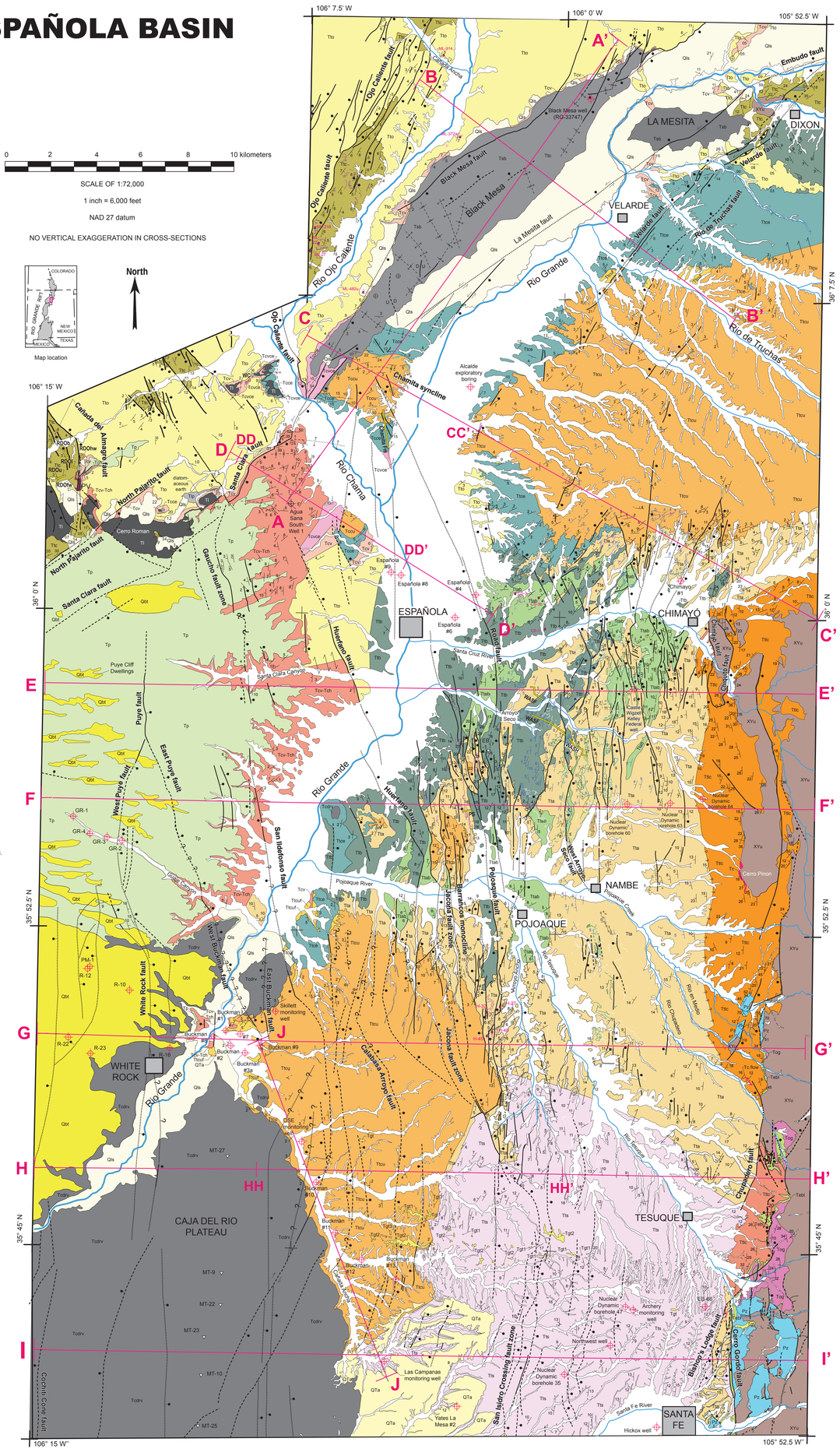
TEPHRAS

- Upper Chamita tuffaceous zone
- Lower Chamita tuffaceous zone
- Vallito tuffaceous zone
- Alcalde tuffaceous zone (tics mark successive beds)
- Black coarse ash
- Trapper Creek ashes
- upper green coarse white ash bed
- Coarse white ash or lapilli
- Pojoaque white ash zone
- Road Ash (Skull Ridge ash zone)
- No. 4 white ash bed (Skull Ridge ash zone)
- No. 3 white ash bed (Skull Ridge ash zone)
- No. 2 white ash bed (Skull Ridge ash zone)
- Undifferentiated ash (Skull Ridge ash zone)
- Nambe ash zone (tics mark successive beds)
- Undifferentiated ash (below Nambe ash zone)

CROSS-SECTION SYMBOLS

TEPHRA ZONES (NORTHERN CROSS-SECTIONS ONLY)

- Chamita upper tuffaceous zone (Peralta Tuff; 6.8-6.9 Ma)
- Chamita lower tuffaceous zone (8.1-8.7 Ma)
- Vallito ash zone (8.5-10 Ma)
- Alcalde tuffaceous zone (9.0-10.0 Ma)
- main Espanola tephra zone (10.2-12.0 Ma)
- upper coarse white ash zone (8.0-11.2 Ma)
- lower coarse white ash zone (12.0-13.0 Ma)
- Pojoaque white ash zone (13.2-14.0 Ma)
- Inferred dips of bedding
- EB-66 — Water well or borehole
- ND-36 — Uranium prospect or oil wildcat borehole
- Fault -- Arrows show sense of vertical movement; cross and dot in circle show sense of lateral movement, if any (cross = into page, dot = away from page)



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