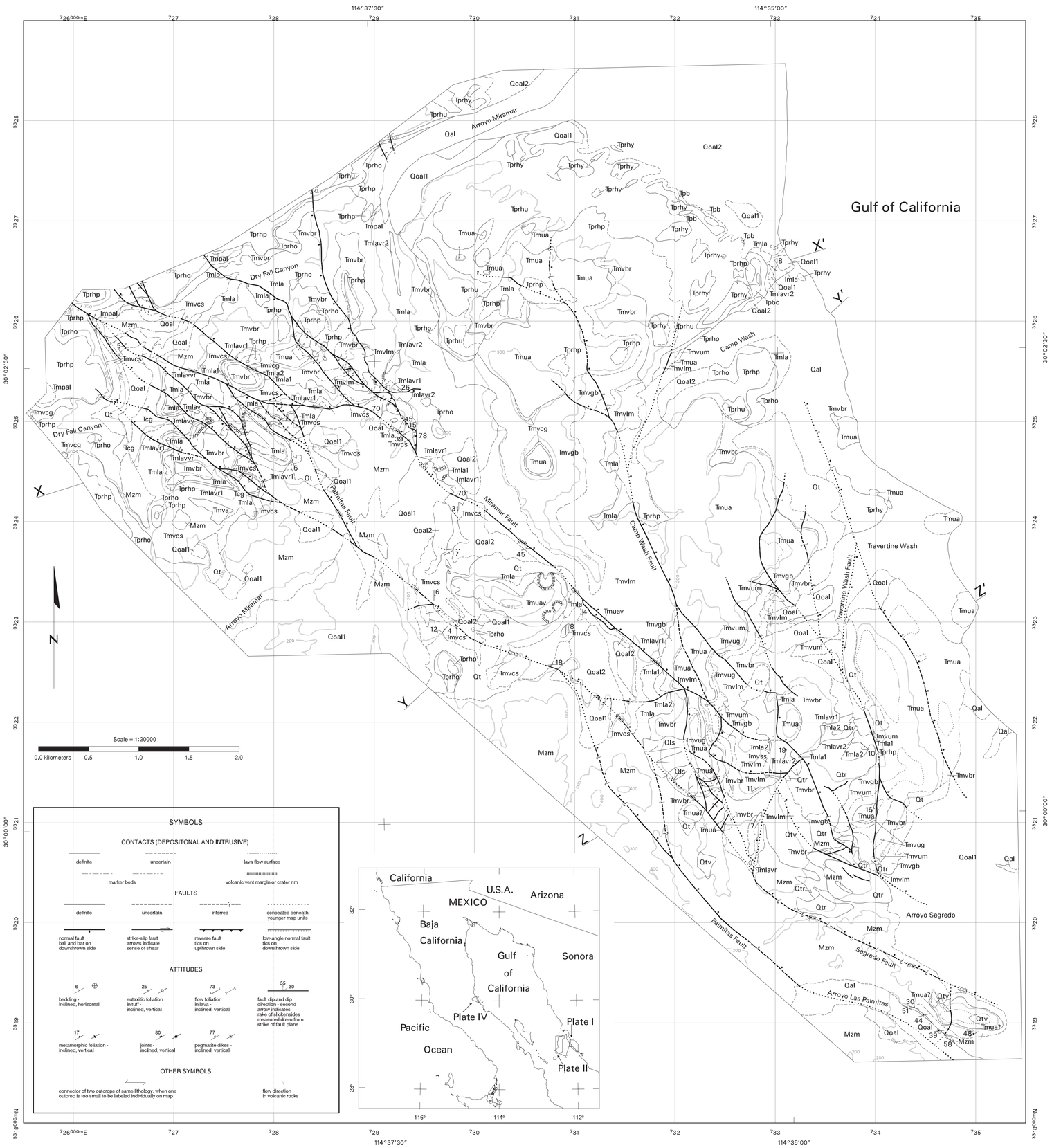
Plate IV

Geologic map of Cinco Islas, Baja California

By Michael E. Oskin, 2001



GEOLOGIC MAP OF CINCO ISLAS, SOUTHERN PUERTECITOS VOLCANIC PROVINCE, BAJA CALIFORNIA, MEXICO

Michael Oskin, 2001

QUATERNARY

- **Qal** — **Young alluvium**. Active arroyo sedimentation. Local aeolian and lacustrine deposits.
- **Qls** — **Landslide**. Brecciated semi-intact mass of locally derived deposits. Depression and adjacent headwall scarp developed.
- **Qt, Qtr** — **Talus**. Qtr mapped where andesite clasts are present without an adjacent source.
- **Qoal2, Qoal1, Qoal** — **Old Alluvium**. Qoal1: 5-20 m thick alluvial terrace. Follows courses of major streams (Arroyo Miramar and Sagredo / Palmitas). Coeval with travertine deposits. Qoal2: Old alluvium, younger and less extensive deposits than Qoal1. Qoal mapped where undifferentiated.
- **Qtr** — **Travertine**. Flowstone and travertine-cemented conglomerate. Mantles topography

PLIOCENE — GROUP 6

- **Tpb** — **Basalt lava flow**. Thin, weathered blocky basalt lava flow.
- **Tprhy, Tprhu** — **Tuffs of Los Heme, upper sequence.** Tprhu: Moderately to densely welded, crystal-poor, partially devitrified dark purple ash-flow tuff. Reversed paleomagnetic polarity. Tprhy: Densely welded dark purple crystal-rich ash-flow tuff. Forms a thin veneer deposit near coastal area. Paleomagnetic polarity not determined.
- **Tpbc** — **Basalt cinders and bombs**. Basaltic scoria and blocks. Probably part of a cinder cone.
- **Tprhp, Tprho** — **Tuffs of Los Heme, lower sequence.** Tprho: Moderately welded to non welded crystal-poor, pumice-rich tuff. Pink to bright orange color. Tprhp: Moderately welded to non-welded crystal-poor pink to purple ash-flow tuff. Distinctive densely-welded zone 1/3 up form base of low. Also forms veneer of welded tuff on higher ridges. Both tuffs are normal paleomagnetic polarity.

MIOCENE OR PLIOCENE — GROUP 5 OR 6

- **Tmpal** — **Basin-fill alluvium**. Miocene and/or Pliocene basin-fill deposits. Moderately lithified conglomerate and sandstone. Similar to Tmvcg except for stratigraphic position. Coeval deposition with the Tufs of Los Heme above.

MIOCENE — GROUP 3

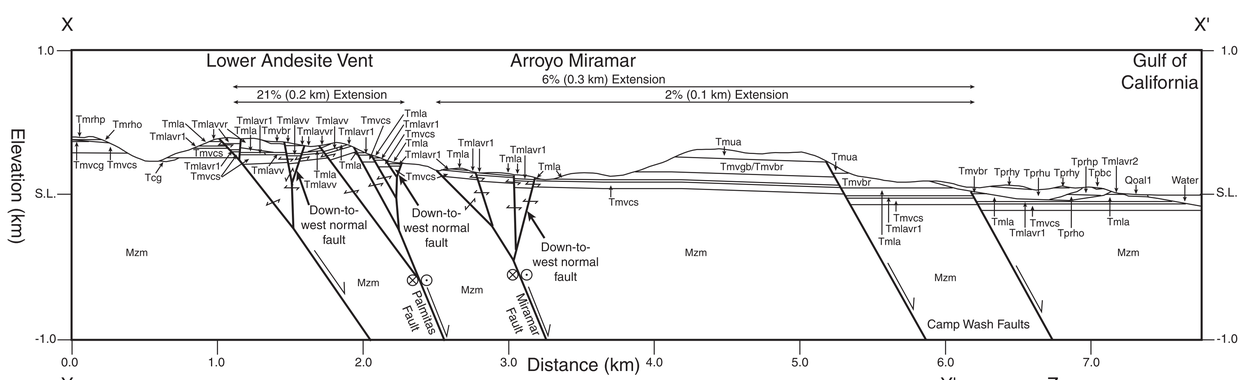
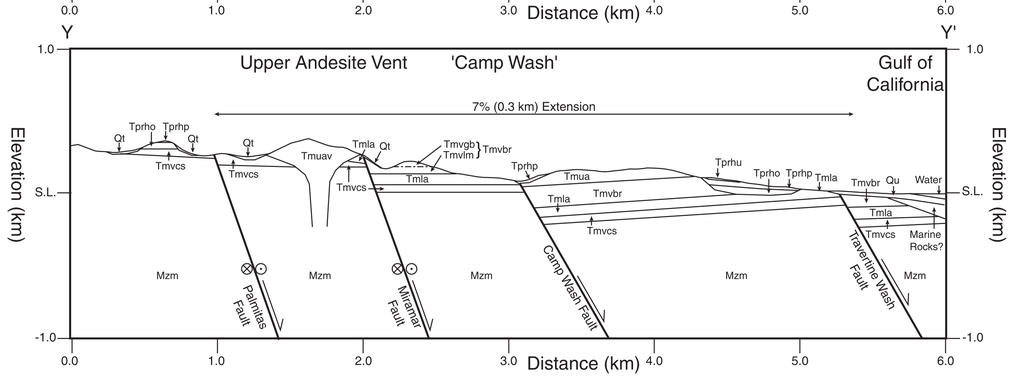
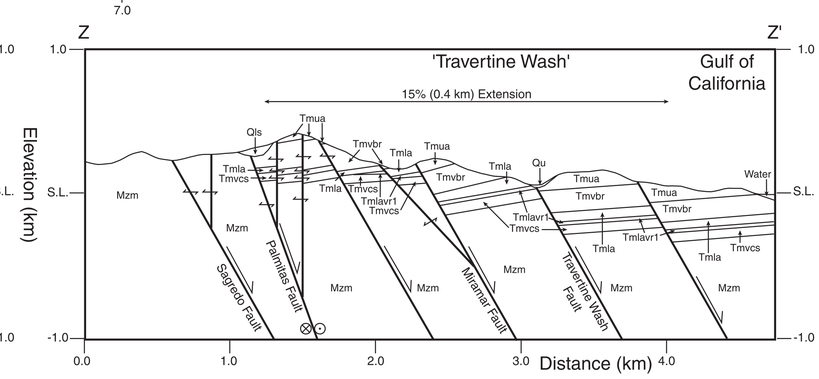
- **Tmua, Tmuav** — **Upper andesite lava flow and vent.** Plagioclase and hornblende-phyric andesite lava flows. Marker beds indicate breccia beds between flows. Dotted lines indicate preserved flow surfaces. Tmuav is a denuded vent plug of upper andesite. Hatched lines indicate inferred vent craters.
- **Tmvug, Tmvum, Tmvgb, Tmvlm, Tmvss, Tmvb** — **Volcaniclastic deposits**. Tmvss: Volcaniclastic sandstone, ash and pumice lapilli. Tmvlm: Lower massive beds. Ash-rich volcaniclastic debris flows, lahar deposits, and tuff. Tmvgb: Lower graded beds, 1 to 2 m thick beds of poorly sorted clast-supported volcaniclastic breccia. Tmvum: Upper massive beds, ash-rich volcaniclastic debris flows abd tuffs. Tmvug: Upper graded beds. 1 to 5 m thick beds of poorly sorted clast-supported volcaniclastic breccia. Tmvbr: Volcaniclastic breccia, undifferentiated. Other marker beds terminate within this unit where these cannot be mapped further.
- **Tmlavvr, Tmlav** — **Lower andesite terminal pyroclastic deposits.** Post-dates Tmla lava flows. Red scoria deposits plastered onto central depression in cinder cone and on adjacent lava flow surface. Tmlav is a small andesite stock in the center of the cinder cone.
- **Tmla2, Tmla1, Tmla** — **Lower andesite lava flows.** Plagioclase-phyric andesite lava flows. Tmla1 mapped between Tmlavr1 and Tmlavr2. Tmla2 mapped above Tmlavr2. Boundary also mapped as marker bed. Mapped as Tmla where undifferentiated.
- **Tmlavr2, Tmlavr1, Tmlavr** — **Lower andesite vent-related red scoria deposits.** Distal equivelant to Tmlavv. Tmlavr1 and Tmlavr2 precede Tmla1 and Tmla2 lava flows, respectively. Mapped as Tmlavr where undifferentiated
- **Tmlavv** — **Lower andesite vent-building scoria and bombs**. Comprises cinder cone of lower andesite vent. Contains cow-pie bombs of andesite. Arrows indicate downslope elongations directions.
- **Tmvcg** — **Volcaniclastic conglomerate.** Poorly sorted to moderately well-sorted fluvial conglomerate. Composed primarily of volcanic detritus. Basement clasts rare. Overlies Tmvcs through Tmvbr.
- **Tmva** — **Andesite lava flow**. Andesite lava flow intercalated with unit Tmvcs.
- **Tmvcs** — **Volcanic conglomeratic sandstone.** Buff-colored. Volcanic lithic fragments and pumice increase in abundance up-section.

EOCENE TO MIOCENE — GROUP 2

- **Tcg** — **Conglomerate.** Basal conglomerate and sandstone. Contains predominantly basement clasts with volcanic clasts increasing up-section.

CRETACEOUS — GROUP 1

- **Mzm** — **Metasedimentary Rock**. La Olvidada Formation of Phillips (1993). Middle-Cretaceous (Albian-Aptian) metachert, phyllite, and minor siliceous marble.

Mapping completed from 1995-2000. Author affiliation: California Institute of Technology. Assisted by Scott Dobner, Naomi Marks, and Lesley Perg.

Topogaphic maps from CETENAL and used as base maps. Mapping compiled on the El Huerfanito and Bahía San Luis Gonzaga 1:50,000 scale quadrangles. Universal transverse mercator projection, zone 11, central meridian 117 W.