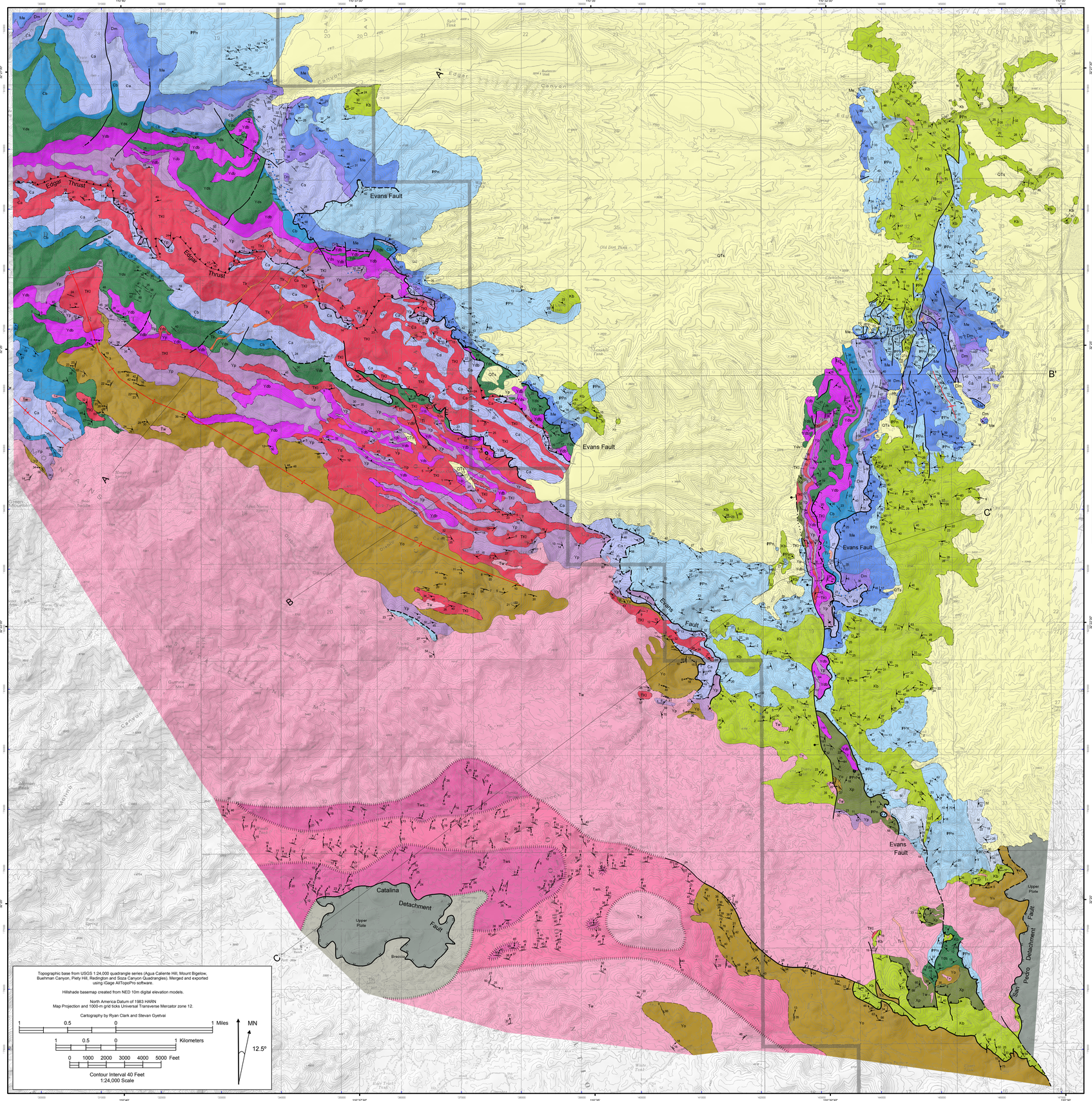

GEOLOGIC MAP OF THE SOUTHEASTERN SANTA CATALINA MOUNTAINS, PIMA COUNTY, ARIZONA

by Ann Bykerk-Kauffman
May 2008

Arizona Geological Survey Contributed Map 08-A (CM-08-A) Sheet 1 of 2

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Map Units

QTs — **Undifferentiated Clastic Material** - consist of the Quiburis Formation (flat-lying basin-fill alluvial fan, braid plain and lacustrine conglomerates, sandstones, mudstones and rare limestones) and Quaternary alluvium, undifferentiated.

Upper Plate - Lower Proterozoic granitoids, Paleozoic, Mesozoic and Cenozoic sedimentary rocks, undifferentiated.

Ti — **Minor Mafic Intrusions** - Small mafic plugs and dikes. Unfoliated.

Breccia — **Breccia** - Variably brecciated granite and mylonite immediately below the Catalina detachment fault.

si — **Silicified sedimentary rocks** - White fine-grained rocks made of pure quartz, commonly foliated and lineated, derived from Paleozoic and Mesozoic sedimentary strata.

Tw — **Granites of the Wilderness Suite** - Eocene leucocratic, commonly garnet-bearing two-mica granites, including equigranular medium-grained biotite-rich granites and muscovite-rich pegmatites. Radiometric age dates from samples collected just west of the study area yield ages between 47 and 55 Ma (Force, 1997).

Twn — **Mylonitic Wilderness Suite granites with north-vergent shear sense**

Tws — **Mylonitic Wilderness Suite granites with south-vergent shear sense**

TKl — **Porphyritic Leatherwood Granodiorite** - Bedding sub-parallel sills of dark gray aphanitic groundmass dotted with 3-4 mm-diameter plagioclase, biotite and quartz phenocrysts; commonly foliated. Radiometric age dates from samples collected just west of the study area range between 64 and 69 Ma (Force, 1997).

Tlr — **Rhyolite Dikes** - Extremely leucocratic aplitic dikes, locally foliated. Possibly synmagmatic with the Leatherwood Quartz Diorite Porphyry, located northwest of the map area.

Kb — **Bisbee Group** - Finely interbedded buff- to brown-weathering calcareous sandstones; red siltstones; conglomerates consisting of limestone, chert and quartzite cobbles in a coarse sand matrix; rare white quartz arenites; and rare light green silty limestones. Unmetamorphosed and brittlely strained in the northeastern part of the area, but ductile strain and metamorphic grade increases gradationally southwestward. Where ductlely strained and metamorphosed, the sandstones have become quartzites, commonly containing garnet and epidote; the siltstones have lost their red color and become light green calcareous phyllites and schists; and the limestone cobbles in the conglomerates have been profoundly flattened and stretched, forming a tectonite matrix to the relatively undeformed chert and quartzite cobbles. For more details, see Bykerk-Kauffman (1983).

PPn — **Naco Group** - The two lower formations of this group, the Pennsylvanian Horquilla Limestone and the Pennsylvanian-Permian Earp Formation are represented. The Horquilla Limestone consists of thin-bedded blue-gray limestones interbedded with red shale and shaley limestone (Cooper and Silver, 1964). The Earp Formation contains more shale and also contains sandstone, dolomite and rare conglomerate.

The Naco Group is foliated and unmetamorphosed in the northeastern part of the area and is variably metamorphosed, strongly foliated, lineated and locally folded in the southwestern part of the area. Where strongly tectonized and metamorphosed, the Naco group is difficult to distinguish from the Bisbee Group.

Gray lines decorated with blue circles denote the "jelly bean" conglomerate, a distinctive 1/2 - 1 m thick reddish conglomerate bed composed of red chert, jasper and limestone pebbles (Cooper and Silver, 1964).

Me — **Escabrosa Limestone** - Thick-bedded, coarse-grained, cliff-forming pure carbonate. The lower 30 m of the formation is a very dark gray coarse-grained dolomite while the rest is a pure light grey limestone with only subordinate dolomite beds (Creasy, 1967). Limestone beds are unfoliated in the northeastern part of the area but are well foliated and commonly lineated in the southwestern part of the area. Dolomites are commonly fractured but not foliated, even when interbedded with intensely foliated limestones.

Gray lines decorated with blue circles denote a bedding-parallel brecciated zone.

Dm — **Martin Formation** - Thin-bedded dolomite and sandstone (Creasy, 1967). Commonly absent.

Ca — **Abrigo Formation** - Made up of three members: a lower member of thinly interbedded sandstone and shale, a middle cross-bedded pure quartzite member and an upper thinly bedded sandy carbonate member (Creasy, 1967).

Gray lines decorated with blue circles denote the middle member.

Cb — **Bolsa Quartzite** - Thick-bedded, coarse-grained, gray to purplish gray cliff-forming quartzite (Cooper and Silver, 1964). It is over 90% quartz and unfoliated except for within rare several-mm-thick shear zones.

Ydb — **Diabase Sills** - Dated as 1,100-1,200 m.y. old by Silver and Damon (as reviewed by Shride, 1967). The diabase sills are locally foliated and lineated and typically contain discrete shear zones that average 1-2 cm in width, especially in the eastern parts of the study area.

Yds — **Dripping Springs Quartzite** - Arkosic quartzite, consisting of three members; a basal quartzite-pebble conglomerate (Barnes Conglomerate), a middle member of grey medium-grained well-sorted finely-laminated feldspathic quartzite, and an upper member of red and black thinly interbedded quartzite and argillite (Creasey, 1967). Fine-grained beds are commonly schistose. Coarse grained beds are commonly unfoliated.

Gray lines decorated with blue circles denote the Barnes Conglomerate.

Yp — **Pioneer Shale** - Reddish sequence of argillite and quartzite with quartzite pebble conglomerates, concentrated near its base (Creasy, 1967; Cooper and Silver, 1964). The argillites are metamorphosed to muscovite schist and display a strong foliation and lineation. Quartzite pebbles in the conglomerates are commonly flattened parallel to foliation and elongated parallel to lineation.

Yo — **Oracle Granite** - Porphyritic granite with potassium feldspar phenocrysts with biotite as the principle mafic mineral. Commonly mylonitic. Force (1997) correlated this granite with the Oracle Granite in the northern Santa Catalina Mountains, which has yield radiometric age dates between 1350 and 1430 Ma.

Xp — **Pinal Schist** - Dark grey to dark brown pelitic schist with quartzite interlayers and a distinctive 1 m thick breccia layer composed of angular white quartzite fragments in a dark grey matrix. Pelitic horizons of the Pinal Schist located near the Wilderness Granite contain abundant andalusite porphyroblasts.

Map Symbols

Bedding

- Bedding, inclined
- Bedding, overturned

Tectonic Foliation and Lineation

- Generic foliation, inclined
- Generic foliation, vertical
- Generic foliation, inclined, with lineation in the foliation plane; no shear sense determination
- Generic foliation, inclined, with lineation in the foliation plane; sense of shear is down the plunge of the lineation
- Generic foliation, inclined, with lineation in the foliation plane; sense of shear is along the lineation in the up-plunge direction
- Mylonitic foliation, inclined
- Mylonitic foliation, inclined, with lineation in the foliation plane; no shear sense determination
- Mylonitic foliation, inclined, with lineation in the foliation plane; sense of shear is down the plunge of the lineation
- Mylonitic foliation, inclined, with lineation in the foliation plane; sense of shear is along the lineation in the up-plunge direction

Contacts

- Gradational contact
- Approximately located contact
- Accurately located contact

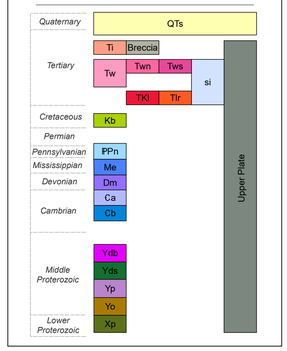
Folds

- Trace of axial plane of anticline
- Trace of axial plane of syncline
- Trace of axial plane of overturned syncline

Faults

- Accurately located high-angle fault
- Approximately located high-angle fault
- Concealed high-angle fault
- Accurately located high-angle normal fault; ball and bar on downthrown block
- Approximately located high-angle normal fault; ball and bar on downthrown block
- Concealed high-angle normal fault; ball and bar on downthrown block
- Accurately located thrust, teeth on hanging wall
- Approximately located thrust, teeth on hanging wall
- Concealed thrust, teeth on hanging wall
- Accurately located ductile low-angle normal fault; stipples on hanging wall
- Approximately located ductile low-angle normal fault; stipples on hanging wall
- Concealed ductile low-angle normal fault; stipples on hanging wall
- Acurately located brittle low-angle detachment fault; stipples on hanging wall
- Approximately located brittle low-angle detachment fault; stipples on hanging wall
- High-angle fault, left-lateral displacement
- Fault attitude
- Approximately located fault, queried

Correlation of Units



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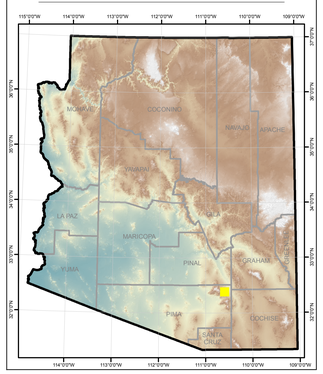
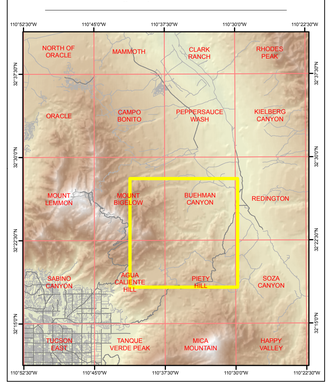
Location Map

Showing Map Location in Yellow



Adjoining 7.5' USGS Quadrangles

Showing Map Location in Yellow



Arizona Geological Survey
416 W. Congress Street, Suite 100
Tucson, AZ 85701
(520) 770-3500
www.azgs.az.gov