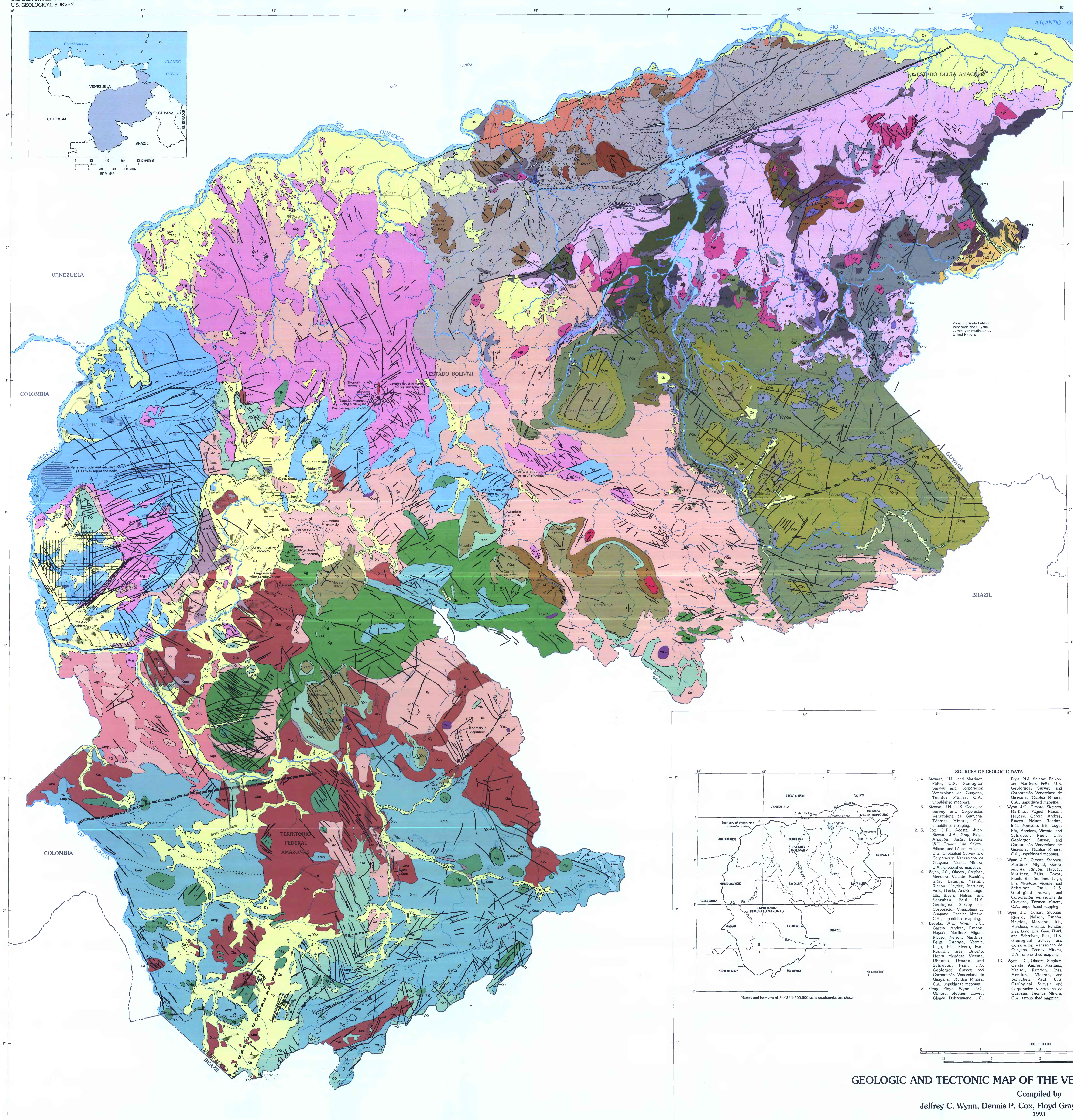
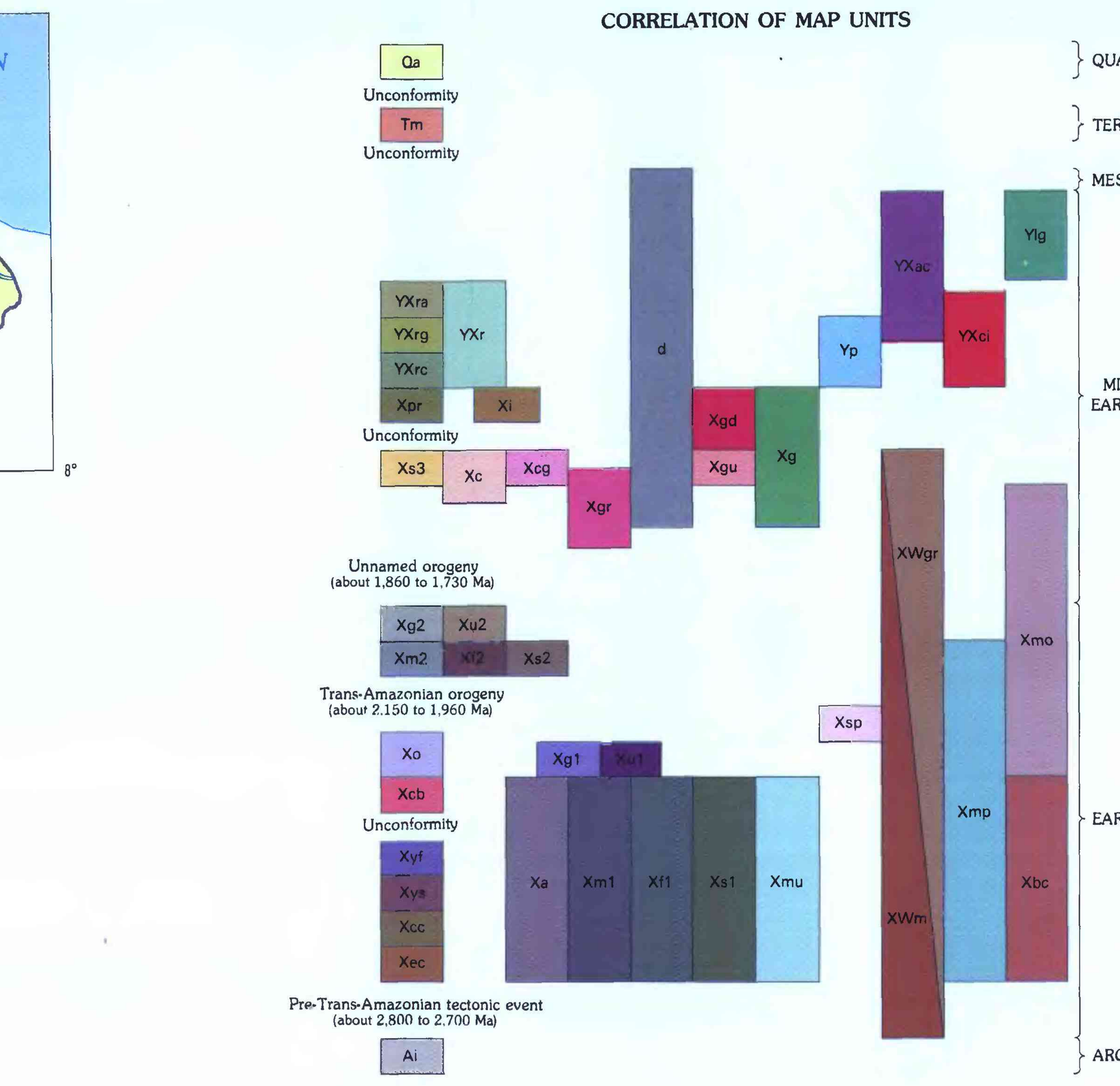


CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

SEDIMENTARY, METASEDIMENTARY, AND VOLCANIC ROCKS

Qa — **Alluvial deposits (Quaternary)**—Sand, gravel, and silt

Tm — **Mesa Formation (Pleistocene and Pliocene)**—Siltstone, sandy siltstone, and claystone. Unconsolidated gravel and sand in upper part

Roraima Group (Middle and Early Proterozoic)

YXr — **Roraima Group, undivided**

YXra — **Auyantepuy Formation of Yánez (1985)**—Mainly quartzarenite and minor arkose. Forms steep cliffs and flat-topped mesas. Equivalent to Mataui Formation of Reid and Bisque (1975)

YXrg — **Guaiquinima Formation of Yánez (1985)**—Fine-grained quartzarenite and arkose that are cross stratified, laminated, and massive; siltstone and graywacke; red, green, and greenish-gray jasper composed of devitrified and (or) silicified ash and small crystals of quartz and feldspar. Weathers to form flat or gently sloping topography. Upper part is mostly covered with debris from overlying Auyantepuy Formation. Several hundreds of meters thick. Equivalent to all but the lowermost part of the Uaimapué Formation of Reid and Bisque (1975)

YXrc — **Canaima Formation of Yánez (1985)**—Quartzarenite and arkose, conglomeratic arenite, conglomerate, siltstone, and shale. Abundant cross-strata in arenite and arkose units. Weathers to forms cliffs on resistant arenite, arkose, and conglomerate units and slopes on relatively nonresistant siltstone, shale, and silty arenite units. About 1,100–2,000 m thick (Yánez, 1985). Equivalent to Uairén and Coquenán Formations and lowermost part of Uaimapué Formation of Reid and Bisque (1975)

Xi — **Ichún Formation of Briceño and others (1989) (Early Proterozoic)**—Well-stratified ignimbrite, sandstone, and andesite flows

Xpr — **Pre-Roraima Group sedimentary rocks (Early Proterozoic)**—Fine-grained to very fine grained, clay-rich sandstone, locally containing granule-size quartz grains, interbedded with red shale and sandy shale (Briceño, 1982). Includes Urico Formation. Probably is unconformabe below Roraima Group

Xs3 — **Los Caribes Formation (Early Proterozoic)**—Weakly metamorphosed to unmetamorphosed sequences of reddish arkose and polymictic conglomerate and minor felsic tuff

Xc — **Caicara Formation of the Cuchivero Group (Early Proterozoic)**—Rhyodacitic to rhyolitic tuff, some of which is crystal and lithic rich; rhyodacite porphyry; andesite and dacite lava flows that commonly are hydrothermally altered; andesite to basalt dike; rhyodacite granophyre; local mylonite. Only slightly metamorphosed

Xo — **Metasedimentary rocks of Río Oris (Early Proterozoic)**—Hematitic quartzarenite; reddish phyllitic siltstone; feldspathic arenite; conglomeratic arenite; quartz-sericite phyllite; red, laminated, fine-grained meta-arenite showing graded bedding and erosional channels

Xmo — **Moriche Formation and correlative rocks (Early Proterozoic)**—Mainly metaconglomerate, quartzite, and mica schist. Includes Cinaruco and Esmeralda Formations

DEEP-SEATED METAMORPHIC AND PLUTONIC ROCKS AND BASEMENT ROCKS IN TERRITORIO FEDERAL AMAZONAS (EARLY PROTEROZOIC)

Xmu — **Greenstone-belt rocks**

Xmp — **Metamorphic-plutonic terrane of San Carlos**—Granite, granite gneiss, and augen gneiss and relatively abundant pegmatite

Xbc — **Basement complex**—Well-foliated granite to granodiorite gneiss

EUGEOSYNCLINAL METAMORPHIC ROCKS OF NORTHEASTERN ESTADO BOLIVAR (EARLY PROTEROZOIC)

Xg2 — **Metagabbro**

Xu2 — **Ultramafic rocks**—Mainly metaperidotite, metapyroxenite, serpentinite, and talc schist. Cumulus texture is locally preserved

Xs2 — **Mica schist and phyllite**—Quartz + muscovite ± chlorite ± chloritoid ± ankerite schist and phyllite and subordinate quartzite or metachert derived from sedimentary and felsic volcanic rocks. Ankeritic rocks weather to ferruginous schist and phyllite

Xf2 — **Felsic metatuff and flows**—Quartz + muscovite ± chloritoid schist containing relict phenocrysts of partially resorbed quartz and broken plagioclase replaced by albite. Groundmass is mainly devitrified glass. Traces of relict lapilli are locally abundant

Xm2 — **Mafic to intermediate metalava and metatuff**—Chlorite + epidote ± actinolite schist and phyllite and greenstone, commonly containing relict pyroxene phenocrysts. Relict textures suggest amygdaloidal flows and lithic- and crystal-rich tuff

GREENSTONE-BELT ROCKS OF EL CALLAO AREA (EARLY PROTEROZOIC)

Xcb — **Caballape Formation**—Mainly felsic metatuff and phyllite derived from laminated volcaniclastic siltstone and graywacke. Metatuff contains plagioclase phenocrysts, resorbed phenocrysts of quartz, wisps of pumice, and minor lithic clasts

Pastora Supergroup

Yuruari Formation

Xyf — **Felsic metatuff**—Quartz ± muscovite ± calcite schist containing relict quartz and feldspar phenocrysts and traces of lapilli and breccia clasts. Minor greenstone

Xys — **Schist and phyllite**—Finely laminated quartz + muscovite ± chloritoid ± biotite ± andalusite ± sillimanite schist locally containing volcaniclastic metasandstone and felsic metatuff and breccia

Carichapo Group

Xcc — **Cicapra Formation**—Mafic to intermediate metatuff. Mainly albite ± epidote ± biotite amphibolite. Relict textures suggest interlayering of tuff and volcaniclastic sandstone

Xec — **El Callao Formation**—Greenstone, greenschist, and minor talc-schist and amphibolite. Relict pillow structures are common. Flow rocks are commonly intercalated with flow breccia. Fine-grained quartz-hematite rocks are present in uppermost part. Minor chert

ROCKS OF OTHER GREENSTONE BELTS (EARLY PROTEROZOIC)

Xg1 — **Metagabbro**—Saussuritized and locally amphibolitized. Cumulus texture is locally present

Ultramafic rocks—Mainly metaperidotite, metapyroxenite, serpentinite, and talc schist. Relict cumulus texture is locally present

Xs1 — **Mica schist and phyllite**—Quartz + muscovite ± chlorite ± ankerite schist and phyllite and subordinate quartzite or metachert derived from sedimentary and felsic volcanic rocks. Ankeritic rocks weather to ferruginous schist and phyllite

Xf1 — **Felsic metatuff and flows**—Quartz + muscovite ± chlorite schist containing relict phenocrysts of partially resorbed quartz and broken feldspar

Xm1 — **Mafic to intermediate metalava and metatuff**—Chlorite + albite + epidote ± actinolite schist, phyllite, and greenstone that are locally amygdaloidal. Subordinate albite-epidote amphibolite and minor amphibolite. Minor chert

Xa — **Amphibolite**—Mainly highly deformed hornblende schist containing plagioclase. Locally shows outlines of original phenocrysts replaced by hornblende

ROCKS OF IMATACA TERRANE

Ai — **Imataca Complex (Archean)**—Amphibolite- to granulite-facies quartz-feldspar orthogneiss and paragneiss, commonly garnet bearing, and felsic granulite. Subordinate pyroxene granulite and charnockite. Dashes indicate metamorphosed iron formation and ferruginous quartzite. Protolith may be as old as 3,700–3,400 Ma (Montgomery, 1979) and age of metamorphism is 2,150–2,000 Ma (Onstott and others, 1989)

XWm — **Migmatite and gneiss (Early Proterozoic and (or) Archean)**—Granitic migmatite and lineated gneiss

INTRUSIVE ROCKS

d — **Diabase (Mesozoic to Early Proterozoic)**—Dark-gray to greenish-gray, fine- to coarse-grained diabase of tholeiitic composition. Present as dikes, sills, and laccoliths

Ylg — **Late granite (Middle Proterozoic)**—Typically penetrating through, and doming, Roraima sediments

YXac — **Alkaline complexes (Middle to Early Proterozoic)**—Riebeckite- and aegerine-bearing granite, gabbro

YXci — **Carbonatite intrusion of Cerro Impacto (probably Middle to Early Proterozoic)**

Yp — **Parguaza Granite (Middle Proterozoic)**—Rapakivi-textured granite

Xgd — **Silicic to intermediate intrusive rocks (Early Proterozoic)**—Forms small domes intruding and folding Ichún Formation rocks

Xgu — **Intrusive rocks, undivided (Early Proterozoic)**—Underlies water-flooded plains and jungle in southeastern Territorio Federal Amazonas

Xg — **Calc-alkaline granite (Early Proterozoic)**—Massive, coarse-grained, gray, equigranular biotite granite that has rapakivi texture similar to rocks of the Parguaza Granite

Xcg — **Granitic rocks of the Cuchivero Group (Early Proterozoic)**—Includes Santa Rosalía granite

Xgr — **Granitic rocks of post-Supamo age (Early Proterozoic)**—Mostly monzogranite and granite. Porphyritic, medium to coarse grained. Includes some granodiorite and tourmaline-rich rocks

Xsp — **Supamo Complex (Early Proterozoic)**—Sodic granodiorite and trondhjemite, paragneiss, and migmatite commonly in dome-shaped intrusions. Rare pegmatite. About 2,230–2,050 Ma (Sidder and Mendoza, in press)

XWgr — **Granitic rocks of Imataca Complex (Early Proterozoic and (or) Archean)**—Granite and granodiorite

Geologic contact—Approximately located. Dashed where concealed

Area underlain by intrusive magnetic rocks

Area of iron formation

Major deep-penetrating shear zone inferred from geologic mapping and radar imagery

Graben-bounding fault—Dashed where inferred; ticks point toward graben

Fracture or fault determined from geologic mapping, magnetic data, or airborne radar imagery—Direction of movement, where shown, is based on ground mapping. Dashed where inferred; dotted where implied

Anticline

Syncline

Structural trend

Magnetic source—Number, where shown, indicates depth (in kilometers) to top of source; s, shallow; d, deep

Positively polarized

Negatively polarized

Deep dense mass

Circular feature of unknown origin identified using geophysical or side-looking radar imagery data—In some cases may represent caldera

Axis of strong magnetic gradient—May represent major hidden fault or suture between different geologic terranes

DISCUSSION

The geologic map of the Venezuelan Guayana Shield was produced digitally from 12 1:500,000-scale geologic maps that were compiled by geologists of the U.S. Geological Survey and Corporacíon Venezolana de Guayana, Técnica Minera, C.A., between 1990 and 1992 using geologic (Sidder and Martinez, 1990; Sidder and Mendoza, 1991, in press) and geophysical (Graterol, 1988; Herrero and Navarro, 1989; this report, pls. 3, 4) data and interpretations and numerous published and unpublished larger scale maps. The information on the 1:500,000-scale maps was digitized and reprojected to 1:1,000,000 scale using GSMAP (Selner and Taylor, 1991). The projection used is Proyeccíon Cónico Secante Compensada, an equidistant conic projection using lat 4° and 9° N. as standard parallels and long 66° W. as the central meridian. The 1:1,000,000-scale map was then transformed into ARC-INFO files for further refinement and compilation and for preparation of the materials from which this map was created.

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CONTRIBUTORS

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Names and locations of 2° × 3° 1:500,000-scale quadrangles are shown

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SCALE 1:1 000 000

GEOLOGIC AND TECTONIC MAP OF THE VENEZUELAN GUAYANA SHIELD

Compiled by
Jeffrey C. Wynn, Dennis P. Cox, Floyd Gray, and Paul G. Schruben

1993