





Artificial fill deposits (Quaternary, Holocene) **Keratophyre (Early Cretaceous)** Deposits associated with carbonate reefs and reef complexes (Quaternary and upper Spilitic basalt (Early Cretaceous) QTmc Marine conglomerate and sand, undifferentiated (Quaternary and upper Tertiary, Felsic volcanic rocks (Early Cretaceous, Barremian to Berriasian) Hypabyssal rocks, keratophyre porphyry (Early Cretaceous) QTcs Continental conglomerate and sand (Quaternary and upper Tertiary, Pliocene) Zurrapandilla Formation and Cajul Basalt (Early Cretaceous to Late Jurassic) SEDIMENTARY ROCKS Time Limestone, marl, and evaporite deposits, undifferentiated (Tertiary, Pliocene to Diabase and basalt flows and marine sedimentary rocks, undifferentiated (Jurassic, Tca Calcarenite, biocalcarenite, limestone, and marl, undifferentiated (Tertiary, Pliocene Tgb Gabbro and diorite, undifferentiated (Tertiary, Miocene to Eocene) Tcc Continental clastic rocks (Tertiary, Pliocene to Miocene) Quartz keratophyre (early Tertiary? or Late Cretaceous) Mixed clastic and carbonate rocks, undifferentiated (Tertiary, Miocene) Granite and granodiorite, undifferentiated (Tertiary, Eocene?) Carbonate rocks viorite and tonalite, undifferentiated (Tertiary, Eocene and Paleocene) Mixed clastic rocks Gabbronorite, norite, and diorite, undifferentiated (Tertiary, Eocene) s Clastic rocks (Tertiary, Miocene to Oligocene) Alkali syenite (Tertiary, Paleocene to Late Cretaceous, Maastrichtian) Limestone (Tertiary, middle Miocene to middle Eocene) Granite and aplite, undifferentiated (Tertiary, Paleocene to Late Cretaceous, Limestone and marl, undifferentiated (Tertiary, lower Miocene to upper Oligocene) Clastic rocks associated with carbonate-rock formations, undifferentiated (Tertiary, Granodiorite and quartz monzonite, undifferentiated (Tertiary, Paleocene to Late lower Miocene to upper Oligocene) Cretaceous, Maastrichtian) Mixed carbonate and clastic rocks, undifferentiated (Tertiary, Oligocene) More mafic granitic rocks, tonalite, monzonite, quartz diorite, and granodiorite (Tertiary, Eocene to Late Cretaceous, Maastrichtian) Carbonate rocks including clay-rich limestone Quartz diorite and diorite, undifferentiated (Tertiary, Paleocene to Late Cretaceous, Clastic rocks, including conglomerate Gabbroic rocks, including Fountain Gabbro (Tertiary, Paleocene or Late Cretaceous, Older clastic rocks (Tertiary, Oligocene to Eocene) Kd Dikes, granite to diorite (Cretaceous) Reef limestone and chert, undifferentiated (Tertiary, Oligocene to Eocene) Volcanic and sedimentary rocks, undifferentiated (Tertiary, Eocene) Gabbro (Cretaceous?) Limestone containing igneous-rock debris (Tertiary, Eocene) **Granitic rocks, undifferentiated (Cretaceous)** Limestone and igneous-rock debris, shallow water facies, undifferentiated Limestone and igneous-rock debris, deepwater facies, undifferentiated Granite (Late Cretaceous, Maastrichtian or Campanian) Mixed clastic and carbonate rocks, undifferentiated (Tertiary, Eocene) Granodiorite (Late Cretaceous, Maastrichtian and Campanian) Mixed clastic and volcanic rocks, undifferentiated Quartz monzonite (Late Cretaceous, Maastrichtian and Campanian) Guacio Member of the Rio Culebrinas Formation Quartz diorite and tonalite, undifferentiated (Late Cretaceous, Maastrichtian and Mixed carbonate and clastic rocks and tuff, undifferentiated Porphyritic diorite (Late Cretaceous, Maastrichtian and Campanian) Tesv Volcaniclastic and clastic rocks, undifferentiated (Tertiary, Eocene) Granodiorite and tonalite, undifferentiated (Cretaceous, Santonian to Albian) Tepc Clastic rocks, limestone, and breccia, undifferentiated (Tertiary, lower Eocene to Older granite (Cretaceous, Coniacian to Albian) Tpcv Clastic and volcanic clast-bearing rocks, undifferentiated (Tertiary, lower Eocene to Augite syenite (Cretaceous, Coniacian to Albian) Quartz diorite, tonalite, and trondhjemite, undifferentiated (Cretaceous, Santonian to Kfs Flysch (lower Tertiary to Upper Cretaceous) Mixed volcanic and clastic rocks, undifferentiated (lower Tertiary? to Cretaceous, Hornblende gabbro and diorite, undifferentiated (Late Cretaceous, Coniacian to Campanian or older?) Limestone, marl, and tuff, undifferentiated (Tertiary, Paleocene and Cretaceous, Kegb Doña Ruth gabbro and gabbro of the Careen Hill Intrusive Suite of Rankin (2002) Maastrichtian) Sedimentary rocks of Central Aguirre (Tertiary, Paleocene? or Upper Cretaceous) Jgr Rio Cana Granite (Middle Jurassic) Klsv Sedimentary and volcanic rocks, undifferentiated (Upper Cretaceous, Maastrichtian and Santonian) Pelitic schist, minor greenstone, and marble, undifferentiated (Cretaceous) Cor Limestone and chert, undifferentiated (Cretaceous) Gabbroic amphibolite and amphibolite, undifferentiated (Cretaceous?) Limestone and limestone conglomerate, undifferentiated (Upper Cretaceous, Maastrichtian and Campanian) Kmys Metavolcanic rocks, metasandstone, and blueschist, undifferentiated (Cretaceous, Limestone and minor calcarenite, undifferentiated (Cretaceous, Santonian to Albian) Turonian to Aptian) Marble and greenschist, undifferentiated (Cretaceous, Turonian or older) Carbonate rocks, including biomicritic limestone (Lower Cretaceous) Metavolcanic and meta-volcaniclastic rocks, undifferentiated (Early Cretaceous) Undifferentiated clastic rocks (Upper Cretaceous, Maastrichtian to Turonian) Mabujina complex and equivalent units (Early Cretaceous or Late Jurassic) Volcaniclastic sandstone and mudstone, undifferentiated Mabujina complex biotite-bearing amphibolite Siltstone and local olistostrome deposits, undifferentiated (Upper Cretaceous, Maastrichtian to Campanian) Mabujina complex amphibolite without biotite Kcgl Volcaniclastic conglomerate (Upper Cretaceous, Maastrichtian to Santonian) Mabujina complex metagranitic rocks Mixed clastic and carbonate rocks, undifferentiated (Upper Cretaceous, Mabujina complex and Puerca Gorda schist derived from mafic sources Maastrichtian to Campanian) Mixed clastic, carbonate, and volcanic rocks, undifferentiated (Upper Cretaceous, Mabujina complex amphibolite and Gaspar Hernández and Helechal peridotite Campanian to Coniacian) associated with serpentinite Older undifferentiated clastic rocks (Upper Cretaceous, Santonian to Cenomanian) Metasedimentary and metaigneous rocks, undifferentiated (Early Cretaceous to Late Jurassic, Tithonian) Tutu Formation (Cretaceous, Santonian to Albian) KJm Marble (Early Cretaceous to Late Jurassic) Older mixed clastic, carbonate, and volcanic rocks, undifferentiated (Cretaceous, Marble and quartzite, undifferentiated (Early Cretaceous to Late Jurassic) mm Martin Mesa Formation and similar formations, undivided (Cretaceous, Turonian to Metamorphosed mafic and ultramafic rocks, undifferentiated (Early Cretaceous to Late Jurassic) Mariquita Chert and Mate Prieto Unit (Upper Cretaceous, middle Turonian? to KJgm Garnetiferous amphibolite (Early Cretaceous, Barremian to Jurassic, Tithonian) Upper Jurassic, lower Tithonian to upper Kimmeridgian) Metamorphic complexes characterized by glaucophane schist (Jurassic?) Chert (Cretaceous, Cenomanian to Aptian or lower) Jqp Quartzite and phyllite, undifferentiated (Jurassic?) Volcaniclastic rocks, undifferentiated (Lower Cretaceous, Albian) Metasedimentary rocks including marble (Jurassic) Water Island Formation, volcanic-clast wacke (Lower Cretaceous) Schistose metasedimenatry rocks (Jurassic, Oxfordian to Early Jurassic) Kpf Polier Formation (Lower Cretaceous, Albian to Valanginian) **Pm** Oldest marble (Proterozoic) Chert-rich limestone (Lower Cretaceous to Upper Jurassic) ULTRAMAFIC ROCK AND OPHIOLITE ASSOCIATED UNITS Jagua Formation of Cuba (Upper Jurassic) Ultramafic and associated rocks, undifferentiated (Mesozoic or older) Punta Alegre Formation of Cuba (Upper Jurassic) Serpentinite (Cretaceous or Jurassic?) Francisco Formation (Upper Jurassic, upper to middle Oxfordian) Dike complex (Cretaceous or Jurassic) VOLCANIC ROCKS Gabbro and diorite, undifferentiated (Cretaceous or Jurassic) Qv Alkali basalt (Quaternary) Mixed sedimentary and volcanic component of ophiolite (Cretaceous to Jurassic) QTv Volcanic rocks of Dos Hermanos and Valle Nuevo (Quaternary, Pleistocene and Mafic cumulate rocks (Cretaceous to Jurassic) Thb Hypabyssal dikes and intrusions, undifferentiated (Tertiary) Volcanic rocks including Low Layton Lavas of Jamaica (Tertiary, early Pliocene to Young mélange (Late Tertiary, Pliocene?) Tve Basalt to andesite, undifferentiated (Tertiary, Eocene?) Iélange and olistostromes, undifferentiated (Tertiary, Eocene to Paleocene) Tab Andesite and basalt, undifferentiated (Tertiary, Eocene) Mélange (Cretaceous?) Tvc Pyroclastic rocks (Tertiary, Eocene) Necker Formation TKht Hydrothermally altered rocks (Tertiary, Eocene or Cretaceous) Dacite and keratophyre, undifferentiated (Tertiary, Eocene? to Late Cretaceous) Tfg Fault- or mega-breccia (Tertiary, Eocene) Mafic dikes and sills, undifferentiated (Tertiary, Eocene to Late Cretaceous) bu Bedrock of unknown type or age Felsic dikes and sills, undifferentiated (Tertiary, Eocene to Late Cretaceous) Porphyritic andesite-diorite (Tertiary, Eocene to Late Cretaceous) [Only major faults and international boundaries are shown on sheet 1, and all major on-land faults are shown on sheet 1 as solid lines, due to small map scale. See map sheets 2 through 5 for additional line Andesite and basalt flows and tuff, undifferentiated (Tertiary, Eocene to Late types defined below] Cretaceous, Campanian) **Unmapped islands** Tvep Tuff and breccia, undifferentiated (Tertiary, early Eocene and late Paleocene) ———— Contact—Solid where location is certain; long dashed where location is approximate; short

LIST OF MAP UNITS

[See Description of Map Units (in pamphlet) for complete unit descriptions]

UNCONSOLIDATED DEPOSITS

Qs Surficial deposits, undifferentiated (Quaternary)

Mafic volcanic rocks (Cretaceous, Cenomanian to Barremian)

rocks (Cretaceous, Turonian to Albian)

Intermediate to felsic biotite tuff (Tertiary, early Eocene to early Paleocene)

Rhyodacite and rhyolite, undifferentiated (Tertiary, Paleocene to Late Cretaceous)

Andesitic volcanic rocks and volcaniclastic sedimentary rocks, undifferentiated

Basalt, pillowed and nonpillowed flows, breccia and tuff, undifferentiated (Late

Cotorra and Jayuya Tuffs, undivided (Late Cretaceous, Santonian to Turonian)

Older basalt and andesite flows, breccia, and tuff, undifferentiated (Cretaceous,

Iberia Formation of Cuba, Hato Puerco Formation of Puerto Rico, and similar

Intermediate and mafic pyroclastic deposits (Cretaceous, Turonian to Aptian)

Intermediate and silicic pyroclastic rocks (Late Cretaceous, Santonian to Cenomanian)

Intermediate and felsic volcanic rocks (Late Cretaceous, Campanian to Coniacian)

Felsic pyroclastic rocks (Late Cretaceous, Maastrichtian to Campanian)

Extrusive rocks, flows, tuff, and breccia (Tertiary, Paleocene)

(Late Cretaceous, Maastrichtian to Santonian)

Cretaceous, Maastrichtian to Santonian)

Volcanic rocks, undifferentiated (Cretaceous)

Seafloor spreading center—Arrows indicate direction of spread. Shown only on sheet 1

Terrace—Erosional or wave-cut scarp. Hachures point downscarp. Shown only on sheets 2 and 4

Shear zone—Yellow where approximate, pale orange where concealed by water. Shown only

TECTONIC MAP UNITS

OTHER MAP UNITS

EXPLANATION OF MAP SYMBOLS

dashed where location is inferred; dotted where location is concealed

where location is inferred and queried; dotted where location is concealed

Fault—Solid where location is certain; long dashed where location is approximate; short dashed

- **Internal contact**—Shown only on sheets 3 and 5

Right-lateral offset—Shown only on sheets 2, 4, and 5

Left-lateral offset—Shown only on sheets 1, 4, and 5

——— International boundary—Shown only on sheets 1 and 4

———— Caldera or crater rim—Shown only on sheet 2

——— Generic fault—Includes normal faults and faults with unknown offsets

Thrust fault—Sawteeth on upper plate. Shown only on sheets 1, 4, and 5

Strike-slip fault—Arrows indicate direction of movement

Quadrangle boundary—Shown only on sheets 2, 4, and 5

High-angle thrust fault—Sawteeth on upper plate. Shown only on sheets 2 and 5

Pamphlet accompanies map

Tuff of the Fajardo Formation (Early Cretaceous, Albian)

Basalt and basaltic andesite, undifferentiated (Early Cretaceous)

PLUTONIC ROCKS

METAMORPHIC ROCKS

Intrusive breccia of the Daguao Formation

Intermediate-composition volcanic rocks (Early Cretaceous, Albian to Barremian?)

Any use of trade, product, or firm names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. Government This map or plate is offered as an online-only, digital publication. Users should be aware that, because of differences in rendering processes and pixel resolution, some slight distortion of scale may occur when viewing it on a computer screen or when printing it on an electronic plotter, even when it is viewed or printed at its intended publication scale Digital files available at https://doi.org/10.3133/sim3534, https://doi.org/10.5066/P13X7BHY, https://doi.org/10.5066/P1ZN39XQ, and https://doi.org/10.5066/P1QGKUBG Suggested citation: Wilson, F.H., and Labay, K.A., comps., 2025, Geologic map of the Greater Antilles and Virgin Islands: U.S. Geological Survey Scientific Investigations Map 3534, 5 sheets, scales 1:2,500,000, 1:1,000,000, 1:250,000, 1:500,000, 1:300,000, and 1:140,000, 102-p. pamphlet, https://doi.org/10.3133/sim3534. [Supersedes USGS Open-File Report 2019–1036.] Associated data for this publication: Wilson, F.H., and Labay, K.A., 2025, Data release for the geologic map of the Greater Antilles and Virgin Islands: U.S. Geological Survey data release, https://doi.org/10.5066/P13X7

Associated data for this publication: Wilson, F.H., O'Sullivan, P.B., Pongratz, A.L., and Zurcher, L., 2024, U-Pb isotopic data and zircon age determinations from the Island of Puerto Rico, United States: U.S. Geological Survey data release, https://doi.org/10.5066/P1ZN39XQ. Associated data for this publication: Wilson, F.H., and Pongratz, A.L., 2024, Age determinations from various geochronological methods of rock

samples in the Greater Antilles and Virgin Islands: U.S. Geological Survey data release, https://doi.org/10.5066/P1QGKUBG