Revisions partially funded by
WATER & ENVIRONMENTAL RESEARCH INSTITUTE AT THE UNIVERSITY OF GUAM
through the
GUAM HYDROLOGIC SURVEY PROGRAM

144° 54′ 13° 37′ 30″ — 145° 00′ 13° 37′ 30″

13° 30′ 144° 54′ — 13° 30′ 145° 00′

DESCRIPTION OF MAP UNITS

Reefs—reef platforms of living coral, coralline algae, and reef sediment, raised terraced ramps and pools, and algal encrusted intertidal bedrock outcrops, including basaltic outcrops along the southwest coast and limestone outcrops on the platform margin from Ritidian Point south to Urano Point

Qrb — **Beach deposits (Quaternary)**—beach sand and gravel, beach rock in the intertidal zone, and small isolated patches of recently emerged detrital limestone. Sand generally is less than 15 feet above sea level, seldom as much as 30 feet above

Qrm — **Merizo limestone (Quaternary)**—emergent Holocene (2,500-4,800 years old) coralgal reef limestones, 2-12 feet thick, capping modern reef flats and platforms. Occurs as intertidal and low-supratidal outcrops. Extensive supratidal outcrops at Tarague (algal-rich), Ylig Point (coral-rich), and Aga Point (detrital-rich). Almost no meteoric diagenetic alteration evidenced in outcrops. Many outcrops, too small to map, occur along SW coast between Merizo and Agat

Qal — **Alluvium (Quaternary)**—alluvial clay deposits, mostly 30-100 feet thick, muck and clay in marshy estuarine deposits on the west coast, scattered sand and gravel bars within deposits near SE river mouths, and clay fill in large sinks in limestone areas

Qt — **Tarague limestone (Quaternary)**—125,000-135,000 year-old coralgal reef limestone cropping out exclusively in Tarague embayment at +15 to +25 feet elevation. Undergone only partial diagenetic alteration. Rich assemblage of reef corals. Maximum estimated thickness 25 feet

—UNCONFORMITY—

Mariana limestone (Pliocene and Pleistocene)

QTmr — **Reef facies (Pliocene and Pleistocene)**—massive, generally compact, porous, and cavernous white limestone of reef origin, especially along cliff faces, made up mostly of corals in position of growth in matrix of encrusting calcareous algae

QTmd — **Detrital facies (Pliocene and Pleistocene)**—friable to well-cemented coarse- to fine-grained generally porous and cavernous white detrital limestone, mostly of lagoonal origin

QTmm — **Molluscan facies (Pliocene and Pleistocene)**—fine-grained white to tan detrital limestone of lagoonal origin containing abundant casts and molds of molluscs, predominantly pelecypods

QTmf — **Fore-reef facies (Pliocene and Pleistocene)**—well-bedded friable to indurated white foraminiferal limestone deposited as fore-reef sand

QTmh — **Halimeda facies (Pliocene and Pleistocene)**—fine-grained, compact micritic limestone with densely packed coarse-sand size *Halimeda* grains and subordinate Foraminifera. Restricted to terraces above Tarague embayment

QTmp — **Phosphorite facies (Pliocene and Pleistocene)**—light tan, pisolitic structured grainstone. Individual 0.1–0.3mm diameter pisolites enclose recrystallized coral and mollusc fragments. Restricted to a single large and prominent re-entrant in the cliffline above the Tarague embayment. Estimated thickness 5-8 feet

—UNCONFORMITY—

Tal — **Alifan limestone (Miocene and Pliocene)**—Massive coarse-to fine-grained recrystallized limstone generally pale pink, buff, or white but locally red, yellow, or brown. Characterized by dominance of sticklike *Porites* and *Acropora* and by long calcite tubes formed by burrowing worms or gastrpods. Locally argillaceous above base. Maximum estimated thickness of the Alifan limestone is 150 feet

Tj — **Janum formation (Miocene and Pliocene)**—well-bedded white, pink, tan, and brown foraminiferal limestone containing abundant globigerinid Foraminifera. Overlies Bonya limestone in north Guam; generally unconformable with overlying Mariana limestone. Deposits are lenticular and tongue into Barrigada limestone; maximum thickness 70 feet

Tbl — **Barrigada limestone (Miocene and Pliocene)**—massive well-lithified to friable medium- to coarse-grained white foraminiferal limestone characterized by the Foraminifera *Operculina*, *Gypsina*, and *Cycloclypeus*. Corals and molluscs present at the top of the formation where it locally grades upward into the Mariana limestone. Unconformable with the Mariana limestone in parts of north Guam. Maximum thickness unknown but exceeds 540 feet

Tb — **Bonya limestone (Miocene)**—pure to argillaceous limestone. In south Guam, generally well bedded, coarse grained, and sandy; In north Guam, mainly massive, compact, white foraminiferal limestone. Scattered concentrations and grain coatings of manganese oxides. Maximum thickness about 120 feet

Ta — **Alutom formation (Eocene and Oligocene)**—bedded breccias, conglomerates, sandstones, turbidites, sandy limestones, and micritic to bioclastic limestones. Clasts in the breccias and conglomerates generally are two-pyroxene andesites, although rare olivine phyric basalts and hornblende andesite clasts also are present. Estimated thickness of the Alutom formation ranges from 1850 to 2000 feet

EXPLANATION OF MAP SYMBOLS

Contact—Dashed where approximately located, gradational, or inferred

Fault (showing dip)—Solid where definitely located; dashed where approximately located; dotted where concealed. Queries indicate uncertainty as to existence of fault. Arrows show relative movement. U, upthrown side; D, downthrown side

Brecciated zone—Crushed and brecciated zone in limestone. Zone may grade into joint and fault zones along its strike, and into massive, structureless rock perpendicular to its strike

Thrust fault—Dashed where inferred. T, indicates upper plate

Strike and dip of beds

32 — inclined

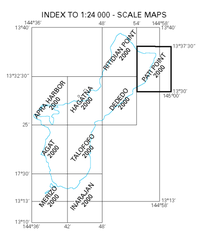
Strike and dip of joints

40 — inclined

Strike of vertical joints—A line of joint symbols indicates a prominent joint or structural lineament, along which unbrecciated limestone is cut by a dominant set of joints in which solution has produced deep fissures bounding elongate, pinnacled ridges or along which volcanic rocks are cut by recognizable structural lines that show as a series of knobs and ridges crossing topographic trends or as fine fissures. In places, drainage patterns and valley-wall alinements are determined by these lines. Minor movement at the zone may have occured, but significant stratigraphic displacement is not shown

Base from U.S. Geological Survey, 1:24,000 GIS quadrangle

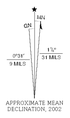
INDEX TO 1:24 000 - SCALE MAPS



SCALE 1:24 000

1 — 1/2 — 0 — 1 MILE
1000 — 0 — 1000 — 2000 — 3000 — 4000 — 5000 — 6000 — 7000 FEET
1 — .5 — 0 — 1 KILOMETER

CONTOUR INTERVAL 20 FEET



APPROXIMATE MEAN DECLINATION, 2002

GEOLOGIC MAP OF PATI POINT QUADRANGLE, GUAM

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