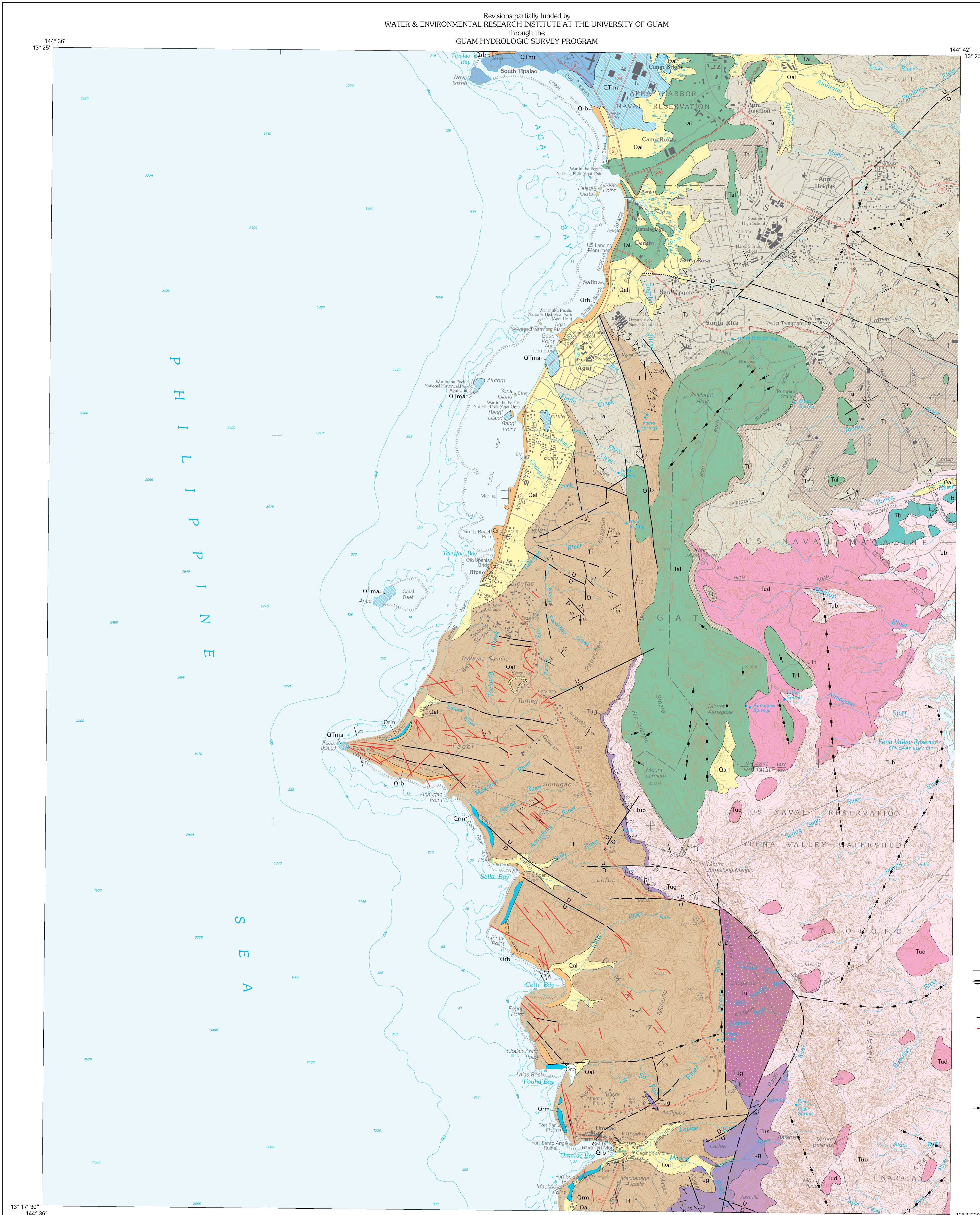


DESCRIPTION OF MAP UNITS

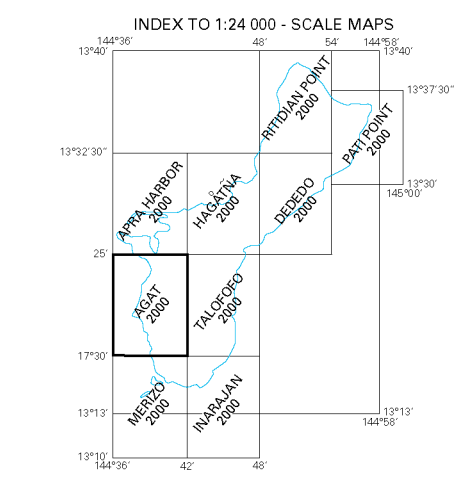
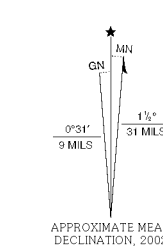
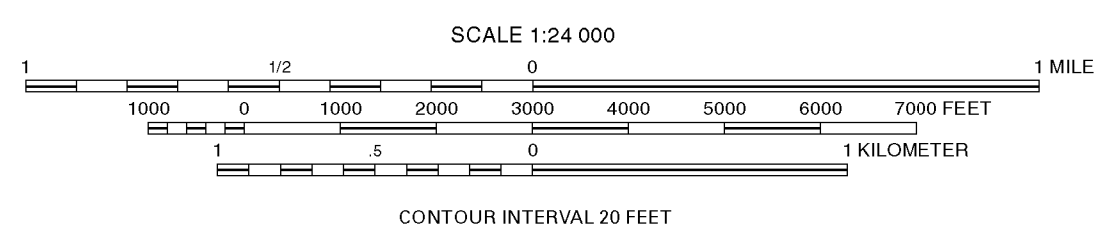
- Reefs**—reef platforms of living coral, coralline algae, and reef sediment, raised terraced ramps and pools, and algal encrusted intertidal bedrock outcrops, including basaltic outcrops along the southwest coast and limestone outcrops on the platform margin from Ritidian Point south to Uro Point
  - Orb** **Beach deposits (Quaternary)**—beach sand and gravel, beach rock in the intertidal zone, and small isolated patches of recently emerged dental 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) coralline 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), Yig Point (coral-rich), and Aga Point (dental-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, mud 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 sink in limestone areas
- UNCONFORMITY—
- Mariana limestone (Pliocene and Pleistocene)**  
The maximum aggregate thickness of the Mariana limestone formation is estimated to be between 550 and 600 feet (Ritidian Point Quadrangle)
  - 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
  - QTma** **Hagaita argillaceous member (Pliocene and Pleistocene)**—coarse-to fine-grained pale-yellow, tan, or brown fossiliferous dental limestone containing 2 to 5 percent disseminated clay and as much as 20 percent clay in pockets and cavities; includes undifferentiated lenses of other Mariana Limestone facies. Formation typically unconformable upon underlying rocks.
- UNCONFORMITY—
- Tal** **Allian limestone (Miocene and Pliocene)**—Massive coarse-to fine-grained recrystallized limestone generally pale pink, buff, or white but locally red, yellow, or brown. Characterized by dominance of stielike *Porites* and *Acropora* and by long calcite tubes formed by burrowing worms or gastropods. Locally argillaceous above base. Maximum estimated thickness of the Allian limestone is 150 feet
  - Tb** **Bona 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
- UNCONFORMITY—
- Umatate formation (Oligocene-Miocene)**  
Aggregate thickness of formation about 2200 feet
  - Tu** **Umatate formation undifferentiated (Miocene)**—unresolved stratigraphic sequences in Umatate formation that encompass sections of Tub, Tug, and/or Tus. Approximate thickness ranges from 200 to 500 feet
  - Tud** **Dandan flow member (Miocene)**—compact medium- to coarse-grained porphyritic andesite flows separated from the underlying Bolanos pyroclastic member by a flow breccia approximately 10 feet thick, maximum thickness of member 50 feet
  - Tub** **Bolano pyroclastic member (Miocene)**—breccias, conglomerates, and sandstones consisting largely of fragmented andesite. These andesites typically have prominent euhedral augite phenocrysts up to 1 centimeter in length and millimeter-scale plagioclase phenocrysts. Limestone clasts are conspicuous in some breccias and conglomerates. Estimated thickness of the Bolano pyroclastic member ranges from 750 to 1000 feet
  - Tus** **Schroeder flow member (Miocene)**—basaltic andesite pillow lava with plagioclase, augite and olivine phenocrysts. Volcanic sandstones consisting of clasts derived from the pillow lavas. Interbedded with the uppermost portion of the Schroeder flow member. Estimated thickness of the Schroeder flow member ranges from 100 to 400 feet
  - Tug** **Geus River member (Oligocene)**—interbedded limestones, sandy and tuffaceous limestones, sandstones and conglomerates. Clasts in sandy units are largely fragmented and altered andesitic volcanics, but also include intraformational limestones including reef limestones not seen in southwestern Guam. Conglomerates with clasts of basalts, andesites and dacites are considered to be near the base of Tug. Estimated thickness of the Geus River member ranges from 250 to 300 feet
  - Tt** **Talsay member (Oligocene)**—yellow, green, and red clay and lenticular clayey conglomerate and lignite gray to green marl containing stielike *Porites* and *Acropora*, and interbedded limestone lenses, 2 to 30 feet thick. Generally unconformable with the volcanics locally overlies the Bona limestone
  - Ta** **Autom 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 phytic basalts and hornblende andesite clasts also are present. Estimated thickness of the Autom formation ranges from 1850 to 2000 feet
  - Tf** **Facpi formation (Eocene)**—basal portion consists of high-Ca boninite pillow lavas interbedded with pillow breccias, hyaloclastites, and sandstones of the same lithology. Least differentiated lavas have olivine, augite, and chromite phenocrysts; more differentiated varieties lack chromite and have plagioclase and orthopyroxene phenocrysts. The upper portion consists of pillow lavas, breccias, bedded breccias and conglomerates of an tholeiitic basalt with olivine, augite, and plagioclase phenocrysts. Boninitic and basaltic dikes cut this formation and are particularly abundant in the region of the Facpi peninsula. All portions of this formation have undergone zeolite facies metamorphism, and many areas also have undergone lateritic weathering. Estimated thickness of the Facpi formation ranges from 500 to 800 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. Quizzes indicate uncertainty as to existence of fault. Arrows show relative movement, U, upthrown side; D, downthrown side
- Thrust fault**—Dashed where inferred
- Basaltic and boninitic dike**
- Anticline**—Showing crestline and bearing and plunge of axis
- Strike and dip of beds**  
 inclined  
 vertical
- Strike and dip of joints**  
 inclined
- Strike of vertical joints**—A line of joint symbols indicates a prominent joint or structural lineament, along 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 five fissures. In places, drainage patterns and valley-wall alignments are determined by these lines. Minor movement at the zone may have occurred, but significant stratigraphic displacement is not shown



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



**GEOLOGIC MAP OF AGAT QUADRANGLE, GUAM**

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Field interpretations assisted by  
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Digital cartography by Linda Masonic