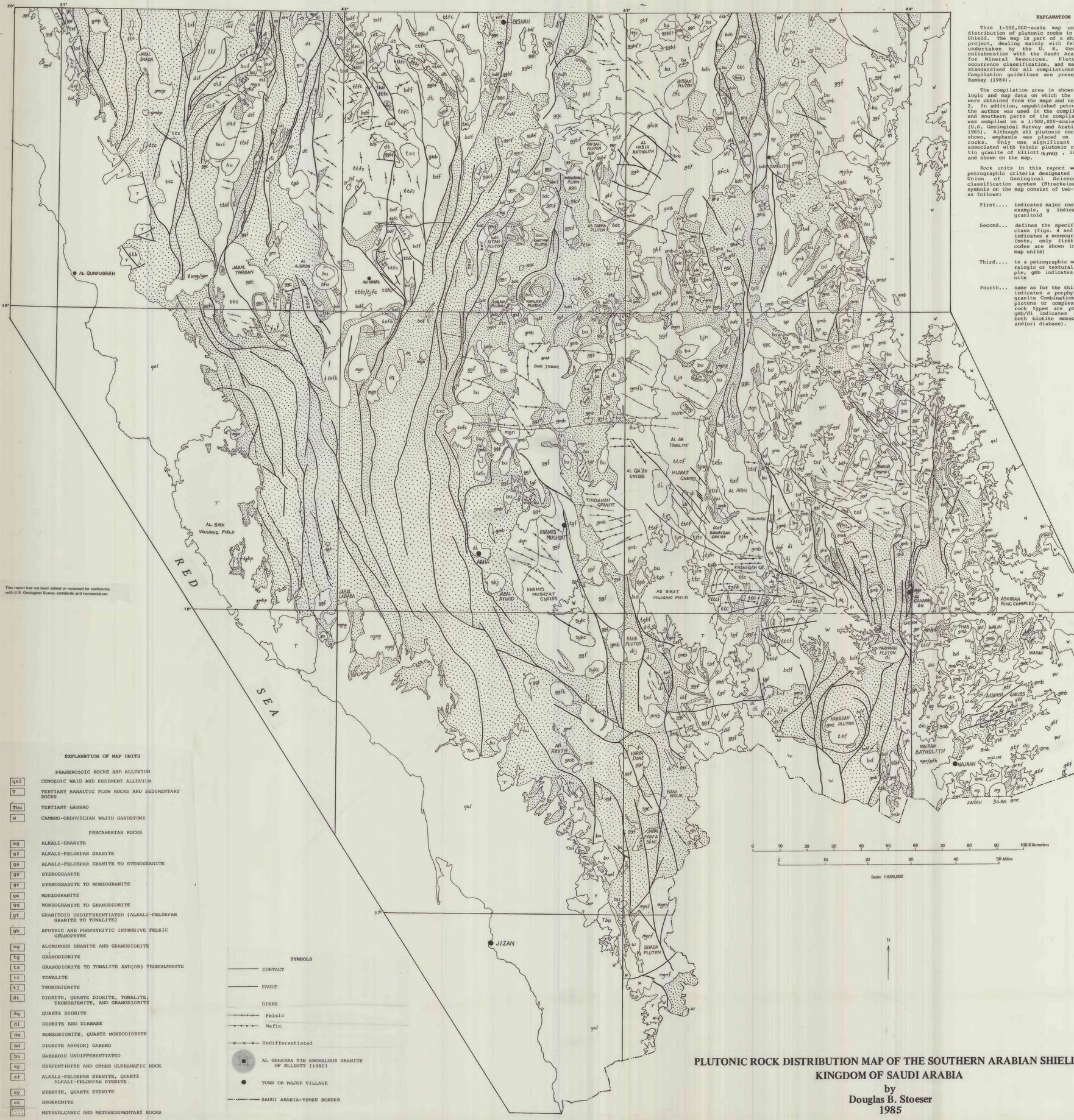
U.S. DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY, PREPARED FOR
MINISTRY OF PETROLEUM AND MINERAL RESOURCES
DEPUTY MINISTRY FOR MINERAL RESOURCES

OPEN-FILE REPORT USGS-OF-85-264
PLATE 1



This report has not been edited or reviewed for conformity with U.S. Geological Survey standards and nomenclature.

EXPLANATION OF MAP UNITS

PHANEROZOIC ROCKS AND ALLUVIUM

- qal — CENOZOIC WAID AND PEDIMENT ALLUVIUM
- T — TERTIARY BASALTIC FLOW ROCKS AND SEDIMENTARY ROCKS
- Tbu — TERTIARY GABBRO
- W — CAMBRO-ORDOVICIAN WAJID SANDSTONE

PRECAMBRIAN ROCKS

- ag — ALKALI-GRANITE
- gf — ALKALI-FELDSPAR GRANITE
- ga — ALKALI-FELDSPAR GRANITE TO SYENOGRANITE
- gs — SYENOGRANITE
- gr — SYENOGRANITE TO MONZOGRANITE
- gm — MONZOGRANITE
- gg — MONZOGRANITE TO GRANODIORITE
- gt — GRANITOID UNDIFFERENTIATED (ALKALI-FELDSPAR GRANITE TO TONALITE)
- gh — APHYRIC AND PORPHYRITIC INTRUSIVE FELSIC GRANOPHYRE
- mg — ALUMINOUS GRANITE AND GRANODIORITE
- tg — GRANODIORITE
- tx — GRANODIORITE TO TONALITE AND(OR) TRONDHJEMITE
- tt — TONALITE
- tj — TRONDHJEMITE
- dt — DIORITE, QUARTZ DIORITE, TONALITE, TRONDHJEMITE, AND GRANODIORITE
- dq — QUARTZ DIORITE
- di — DIORITE AND DIABASE
- dm — MONZODIORITE, QUARTZ MONZODIORITE
- bd — DIORITE AND(OR) GABBRO
- bu — GABBROID UNDIFFERENTIATED
- sp — SERPENTINITE AND OTHER ULTRAMAFIC ROCK
- sf — ALKALI-FELDSPAR SYENITE, QUARTZ ALKALI-FELDSPAR SYENITE
- sy — SYENITE, QUARTZ SYENITE
- sk — SKONKENITE
- m — METAVOLCANIC AND METASEDIMENTARY ROCKS

SYMBOLS

- CONTACT
- FAULT
- DIKES
  - Felsic
  - Mafic
  - Undifferentiated
- AL GAHARRA TIN ANOMALOUS GRANITE OF ELLIOTT (1980)
- TOWN OR MAJOR VILLAGE
- SAUDI ARABIA-YEMEN BORDER

EXPLANATION

This 1:500,000-scale map compilation shows the distribution of plutonic rocks in the southern Arabian Shield. The map is part of a shield-wide compilation project, dealing mainly with felsic pultonic rocks, undertaken by the U. S. Geological Survey in collaboration with the Saudi Arabian Deputy Ministry for Mineral Resources. Plutonic rock, mineral occurrence classification, and map symbolization were standardized for all compilations within the project. Compilation guidelines are presented in Stoeser and Ramsay (1984).

The compilation area is shown in figure 1. Lithologic and map data on which the compilation is based were obtained from the maps and reports shown in figure 2. In addition, unpublished petrographic data held by the author was used in the compilation of the eastern and southern parts of the compilation region. The map was compiled on a 1:500,000-scale Landsat mosaic base (U.S. Geological Survey and Arabian American Oil Co., 1985). Although all plutonic rocks of the region are shown, emphasis was placed on the felsic plutonic rocks. Only one significant mineral occurrence associated with felsic plutonic rocks, the al Gaharra tin granite of Elliott (in press), is known for the area and shown on the map.

Rock units in this report were classified using petrographic criteria designated by the International Union of Geological Sciences plutonic rock classification system (Streckeisen, 1976). Lithology symbols on the map consist of two- to four-letter codes as follows:

- First.... indicates major rock class (fig. 3); for example, g indicates an alkali-rich granitoid
- Second... defines the specific rock type or subclass (figs. 4 and 5); for example, gm indicates a monzogranite (note, only first and second letter codes are shown in the explanation of map units)
- Third.... is a petrographic modifier, either mineralogic or textural (table 1); for example, gmb indicates a biotite monzogranite
- Fourth... same as for the third; for example, gmbp indicates a porphyritic biotite monzogranite Combination codes are used for plutons or complexes in which several rock types are present (for example, gmb/di indicates a pluton containing both biotite monzogranite and diorite and(or) diabase).

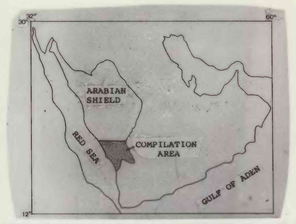


Figure 1.--Index map showing the location of the compilation area (patterned).

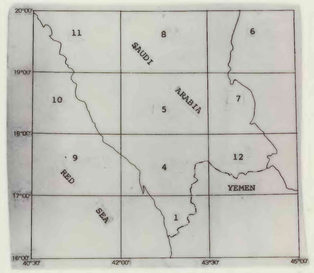


Figure 2.--Index map to compilation sources. Numbers keyed to References Cited list.

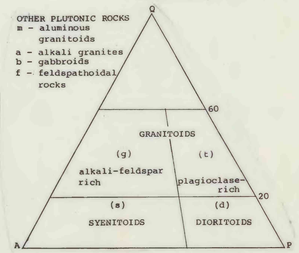


Figure 3.--Ternary quartz-alkali feldspar-plagioclase modal diagram showing first-order classification of plutonic rocks. Q, A, and P are modal quartz, alkali feldspar, and plagioclase, respectively (normalized to 100 percent).

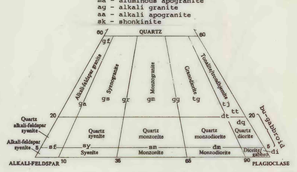


Figure 4.--Ternary quartz-alkali feldspar-plagioclase modal diagram showing second-order classification of plutonic rocks.

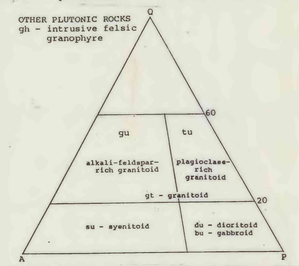


Figure 5.--Ternary quartz-alkali feldspar-plagioclase modal diagram showing classification of undifferentiated plutonic rocks.

Table 1.--Petrographic rock name modifiers for (third- and fourth-order) classification of plutonic rocks

- a = alkali-feldspar phenocrystal
- b = biotite
- c = biotite + hornblende
- d = plagioclase phenocrystal
- f = foliated
- g = garnet
- h = hornblende
- i = intrusive complex
- j = hornblende + CaMgFe-pyroxene
- k = CaMgFe-pyroxene
- m = muscovite
- n = muscovite + biotite
- p = porphyritic
- q = quartz
- r = granophyric (totally or in part)
- t = magnetite
- u = Na-amphibole (katophorite or arfvedsonite)
- v = Na-amphibole + NaFe-pyroxene
- w = NaFe-pyroxene (aegirine or aegirine-augite)
- x - pethitic
- z = quartz phenocrystal

DATA STORAGE

No data files or Mineral Occurrence Documentation System (MODS) entries resulted from this project.

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PLUTONIC ROCK DISTRIBUTION MAP OF THE SOUTHERN ARABIAN SHIELD, KINGDOM OF SAUDI ARABIA

by
Douglas B. Stoeser
1985