

# MAP AND TABLE SHOWING METAMORPHIC ROCKS OF ALASKA

By  
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### INTRODUCTION

The metamorphic scheme (Zwart and others, 1967) used on this map is based on pressure and temperature-sensitive metamorphic minerals. Metamorphosed rocks are divided into four facies groups on the basis of increasing temperature: (1) laumontite and prehnite-pumpellyite facies (LPP), (2) greenschist facies (GNS), (3) epidote-amphibole and amphibolite facies (AMP), and (4) low-pressure granulite facies (LPG). Where possible, the greenschist-facies and the epidote-amphibole- and amphibolite-facies groups are divided into three facies series on the basis of pressure: H, I, or L in place of the final letter in the symbol for the facies group indicates a high-, intermediate-, or low-pressure series, respectively.

### USE OF METAMORPHIC COLOR PATTERNS AND SYMBOLS

**GNS (KSI)** Metamorphic-facies designation—Age or bracketing ages of metamorphism shown in parentheses; p, pre. (For example, GNS (K) indicates greenschist-facies metamorphism bracketed between Cretaceous and Paleozoic time). More specific metamorphic ages (giving early, middle, or late epochs), where known, are given on Sheet 2. Numerical subscripts are used to differentiate between units that have the same metamorphic grade and age as generalized in the unit designation but are thought to have different metamorphic histories.

**AMP-GNS** Undifferentiated facies groups or series—Dominant facies given first

**GNS/H** Undifferentiated intermediate- and high-pressure greenschist facies

**LPP/GNS** Transitional between two facies groups or series—Lower grade or pressure facies shown first

**AML/I** Transitional between laumontite and prehnite-pumpellyite facies and greenschist facies

**GNS+L** Evolving from one facies series to another during a single continuing episode—Arrow shows direction of change

**AMP (K) + GNS (K)** High-pressure greenschist (shaded) facies rocking to low-pressure greenschist facies

**AMP (K) + GNS (K)** Two phases—Older shown first

**Vertical stripes—Older phase (AMP (K))**

**Horizontal stripes—Younger phase (GNS (K))**

**Area of magnetite**

**Strongly metamorphosed pluton (orthogneiss)—Metamorphic-facies designation of pluton considered to be that of surrounding metamorphic unit. Plutonic protolith age given in text**

**Weakly metamorphosed pluton—Known, or inferred, to have been metamorphosed under low-grade metamorphic conditions (laumontite and prehnite-pumpellyite- or lowest greenschist-facies grade) along with its wallrocks. Plutonic protolith age given in text**

**Pressure-sensitive metamorphic mineral locality—** amphibole: c, cordierite; ex, crossite; gl, glaucophane; jg, jadeite or jadeitic pyroxene; k, kyanite; l, lawsonite or pseudomorphs after lawsonite

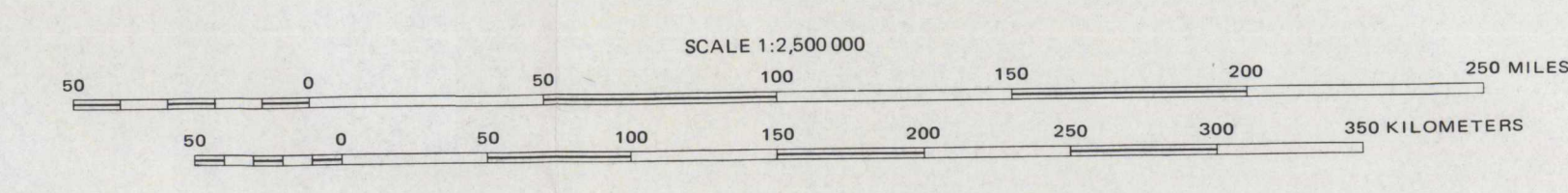
### OTHER ROCK SYMBOLS

- Gs** Quaternary surficial deposits
- N** Area of unmetamorphosed volcanic or sedimentary rocks
- Tg** Postmetamorphic granulite—Also includes some postmetamorphic intrusive rocks of intermediate or mafic composition and some related volcanic and hypabyssal rocks
- Tkg** Tertiary postmetamorphic granulite
- Kg** Tertiary or Cretaceous postmetamorphic granulite
- Kjg** Cretaceous postmetamorphic granulite
- Jg** Early Cretaceous and (or) Jurassic postmetamorphic granulite
- Dg** Jurassic postmetamorphic granulite
- +Tg+** Devonian postmetamorphic granulite
- +TKg+** Symmetamorphic and, in some cases (indicated below), also synkinematic granulite—Unit also includes some intrusive rocks of intermediate or mafic composition
- +Kg+** Tertiary synmetamorphic and synkinematic granulite
- +Jg+** Early Tertiary and latest Cretaceous synmetamorphic and synkinematic granulite
- +JTg+** Cretaceous synmetamorphic and synkinematic granulite
- Jmu** Earliest Jurassic and latest Triassic synmetamorphic granulite
- Ku** Undivided mafic and ultramafic rocks
- Ju** Jurassic Border Ranges ultramafic and mafic complex of Burns (1985)
- Mku** Ultramafic rocks—Unit also may include minor associated gabbro and pillow basalt
- Pku** Cretaceous ultramafic rocks
- Mku** Jurassic ultramafic rocks
- Pku** Mesozoic and (or) Paleozoic ultramafic rocks
- Pku** Paleozoic ultramafic rocks
- \*** Eclogite locality—Metamorphic-facies scheme considers this a rock type and not a separate facies. Description of metamorphic history of eclogite given under metamorphic unit in which locality occurs

### LINE SYMBOLS

- Contact or boundary between metamorphic facies units—Dashed where approximately located; dotted where boundary between mapped and unmapped areas near eastern margin of southeastern Alaska. Cuts across premetamorphic faults in one area of Yukon-Tanana upland of east-central Alaska
- - - -** High-angle fault—Dashed where approximately located; dotted where concealed; queried where uncertain. Arrows show relative horizontal movement
- - - -** Thrust fault—Dashed where approximately located; dotted where concealed; queried where uncertain. Sawtooth on upper plate
- - - -** Low-angle fault on which most recent movement is known to be or may have been extensional—Dashed where approximately located; dotted where concealed; queried where uncertain. Sawtooth on upper plate
- - - -** Low-angle fault of unknown dip and sense of movement
- - - -** Coast Range megaclineament—Major structural feature of southeastern Alaska
- - - -** Sillimanite isograd—Ticks on high-grade side
- - - -** Kyanite isograd—Ticks on high-grade side
- - - -** Glacier—Shown with color of unit inferred to underlie glacier

\* Standard abbreviations for metamorphic ages are: T, Tertiary; K, Cretaceous; J, Jurassic; P, Paleozoic; M, Mesozoic; M, Mesozoic; D, Devonian; S, Silurian; O, Ordovician; C, Cambrian; B, Paleozoic; E, Proterozoic; Z, Late Proterozoic; Y, Middle Proterozoic; X, Early Proterozoic.  
\* B.R.F., Border Range fault system



BATHYMETRIC CONTOURS IN METERS  
Base prepared by Geological Society of America from U.S. Geological Survey National Atlas, 1:500,000, 1970. Bathymetry north of 60° plotted by U.S. Geological Survey National Mapping Division from DEEC digital data. Bathymetry south of 60° (DYNAPOS) plotted by National Oceanographic and Atmospheric Administration.

This map is preliminary and has not been released for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.