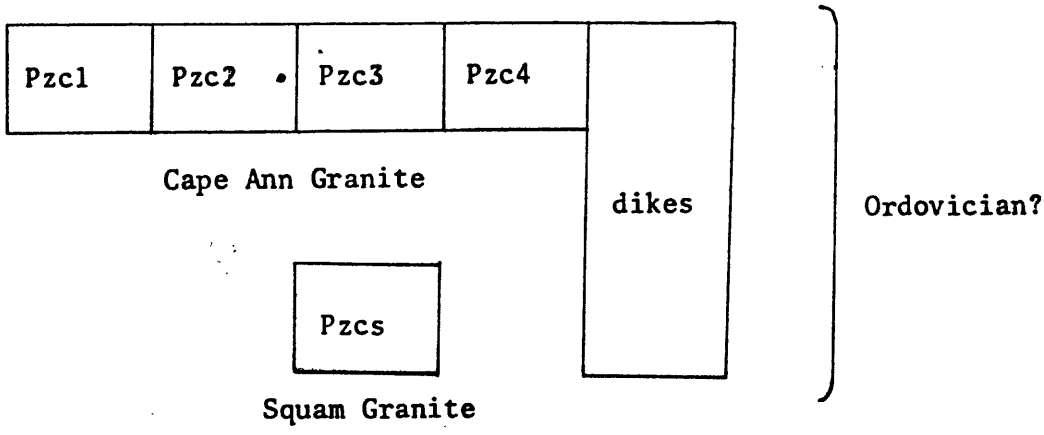
William Dennen 1975

PRELIMINARY BEDROCK GEOLOGIC MAP OF THE ROCKPORT QUADRANGLE, MASSACHUSETTS

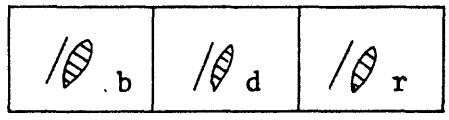
Correlation of Map Units



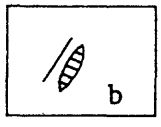
U. S. Geological Survey
OPEN FILE REPORT 75-545

PRELIMINARY BEDROCK GEOLOGIC MAP OF THE ROCKPORT QUADRANGLE MASSACHUSETTS

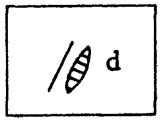
Description of Map Units



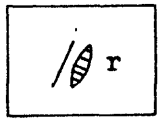
Dike Rocks: b = basalt or gabbro; d = diabase; r = rhyolite. Where appropriate, rock-type symbols are combined with p (=porphyritic) and/or s (=dike is separated into isolated angular blocks surrounded by unfoliated country rock)



Fine to medium-grained mafic rocks with granular and porphyritic textures. Texturally and mineralogically variable. Plagioclase altered, commonly labradorite. Hornblende is the dominant mafic mineral; there is also pinkish pigeonite, pale green augite, and biotite, and rare olivine. Accessory minerals are apatite, sphene, magnetite, and pyrite. Often separated and cut by unfoliated granite. Chilled margins typical but fractured ends of separated blocks not chilled.



Medium-grained mafic rock with diabasic texture; otherwise the same as b.



Porphyritic rhyolite. Medium gray, aphanitic, with sparse potash feldspar phenocrysts.

Pzc

Cape Ann Granite: Predominantly unfoliated fine-, medium- to coarse-grained (0.3 to 1.5 cm) leucocratic alkali granite to alkali syenite. Ranges and medians of the principal minerals are: potash feldspar, 58-85 (63) percent; plagioclase (An_{6-12}), 0-22.5 (2.8) percent; quartz, 0-41 (24) percent; ferrohornblende, 0.1-17 (4.5) percent; biotite, 0-3.2 (0.8) percent; and opaques 0.2-7.5 (1.0) percent. Augite occasionally present. Accessory minerals include sphene, zircon, apatite, fluorite, allanite, magnetite, and ilmenite. Feldspars in unaltered rock are pale green-gray, have a greasy luster, and weather to a faintly pinkish tan or white. Potash feldspar is the dominant mineral--usually microcline microperthite but sometimes homogeneous microcline; albite or oligoclase is present in minor quantities. Quartz is glassy, shows weak strain shadows, and contains dust-size inclusions. Feldspar and quartz as large single grains and grain clusters partly to completely surrounded by finer grained interstitial quartz and feldspar. Ferromagnesian minerals, variable in amount and appearance, occur as ragged clots, wisps, single subhedral crystals and zonally arranged reaction aggregates. Augite is colorless to pale green as a core partly or completely surrounded by pale-green amphibole, darker-green soda-iron amphibole, and reddish-brown biotite with magnetite granules scattered throughout the reaction aggregate. Isolated crystals and clots of soda-iron amphibole, biotite, or both. Rock fabric is principally uneven granitoid, but varies to subporphyritic and is locally an accumulate.

Pzc1 — Beverly Syenite Facies, Cape Ann Granite: Predominantly unfoliated medium- to coarse-grained, texturally variable alkali syenite. Textural extremes include very coarse-grained (2-5 cm) massive and coarse-grained trachytic phases whose mineral composition, except for lack of quartz and common presence of nepheline and sodalite, is identical with Cape Ann Granite. Modal quartz content measured on outcrop less than 5 percent.

Pzc2 — Cape Ann Granite: Modal quartz content measured on outcrop 5-15 percent.

Pzc3 — Cape Ann Granite: Modal quartz content measured on outcrop 15-25 percent.

Pzc4 — Cape Ann Granite: Modal Quartz content measured on outcrop greater than 25 percent.

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Pzcs

Squam Granite Facies, Cape Ann Granite: Fine- to fine medium-grained, medium-gray granite which weathers brown with a highly siliceous appearance. Texturally and mineralogically variable rock; texture ranges from hypidiomorphic or allotripmorphic granular to subophitic and subporphyritic. Plagioclase as anhedral to subhedral zoned and unzoned equant or bladed grains variable in amount and composition, ranging from <5 to >40% of the rock and from about An_{30} to An_{55}. In subporphyritic varieties, phenocrysts are more sodic than groundmass plagioclase (An_{30} vs. An_{40}). The potash feldspar may be orthoclase, microcline, or microcline microperthite either alone or in combination and range from a minor to the dominant constitutent. Anorthoclase is often present as an accessory mineral. Grains range from anhedral to subhedral, equant to bladed, and fresh to highly sericitized. Zoning is fairly common. Quartz is in slightly strain-shadowed equant or interstitial glassy grains and makes up 15 to 30% of the rock. Ferromagnesian minerals comprise from <5 to >50% of the rock. Pyroxene (pigeonite) is rare and typically occurs as unreacted cores. Amphibole, both green poikilitic hornblende and ferrohastingsite, together with red brown biotite are the principal dark constituents and are present in roughly equal quantities. Accessories include apatite, zircon, opaque minerals, sphene, allanite, and monazite.

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SYMBOLS

Probable fault. Arrows show direction of relative movement.

Possible fault (concealed). Arrows show direction of relative movement.

Lineament, probable fault. Arrows show direction of relative movement.

Lineament, possible fault. Arrows show direction of relative movement.

Lithologic boundary

Lithotypic boundary

Granite and Syenite

- station for modal analysis
- subporphyritic or cumulose
- aplite or pegmatite present
- non-cognate inclusion
- cognate inclusion
- P — pink phase

Dikes

- more than 10 feet wide
- less than 10 feet wide

Strike and dip of primary foliation

- 50 — Inclined
- Vertical

Strike and dip of shearing

Strike and dip of jointing

- 70 — Inclined
- Vertical

Glacial striae

Brecciation

Macroporphyry inclusion

Massachusetts (Rockport quad.). Geol. 1:24,000. 1875
sheet 2
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