



Base map from U.S. Geological Survey State base maps  
SCALE 1:500,000  
10 20 30 40 50 MILES  
10 20 30 40 50 KILOMETERS  
EXPLANATION

**INTRODUCTION**  
This map showing the distribution of ultramafic and intrusive mafic rocks from the Hudson River to eastern Alabama was compiled during 1964-65 in order to show areal distribution of the rocks at a scale that would be usable with most State geologic maps. All occurrences of ultramafic rocks, regardless of size, that the compiler could locate from available published and unpublished maps and reports were plotted on topographic maps at a scale of 1:250,000. Large masses were drawn to scale; small bodies, many of which are only a few feet in diameter, were shown as dots. These maps were reduced photographically, and the final map reflects geographic adjustments between the reduced maps and the several State base maps at a scale of 1:500,000. The overall pattern, however, is believed to portray accurately the present knowledge of distribution of the ultramafic rocks.

In the course of the compilation it became apparent that mafic rocks, and possibly some ultramafic rocks (peridotites) of different associations and possible ages were being included; in some places mafic rocks are closely associated with ultramafic rocks, but elsewhere no such association was noted. Where the identities and origins of some mafic rocks have been disputed, the compiler had to make some arbitrary decisions. In South Carolina and elsewhere, amphibolites considered to have been volcanic flows and tuffs are not shown.

Anorthositic of more than one variety have been included under gabbro on the map. The large mass of potassic anorthositic in Nelson and Amherst Counties, Va., with which economic deposits of rutile and ilmenite are associated, differs in many ways from the anorthositic layers that constitute only a small proportion of the gabbro in and near Baltimore and that are related genetically to chromite-bearing peridotites.

Unlike the other ultramafic rocks in the Southeast States, the important soapstone deposits of Virginia appear as belts. Some maps indicate a possible genetic relationship between greenstone and gabbro, metapyroxenite, peridotite, and soapstone; these associations have, therefore, been shown in this area. Elsewhere, such association, if present, is less conspicuous, and greenstone has not been indicated.

Mica peridotites of the area generally are recognized as belonging to the late Mesozoic alkalic magma suite of the eastern United States and have not been shown.

Dunite is concentrated in western North Carolina and northern Georgia; serpentinite in Maryland and Pennsylvania; and the largest harzburgitic masses are in Ashe County, N. C. Much of the serpentinite in Maryland and Pennsylvania appears to be the same dunite originally; the freshness of most of the dunite in western North Carolina, therefore, is of special interest.

The grouping of spots in parts of Georgia, North Carolina, and South Carolina is believed to be more apparent than real and in many places probably is attributable to gaps in geologic mapping. Sizeable masses of ultramafic rocks occur far east of the major concentrations; those near Augusta, Ga., Raleigh, N. C., and Spartanburg, S. C., are noteworthy. Some deposits shown as various types of ultramafic rocks in South Carolina are of questionable origin. It is hoped that this map will interest others in the detailed mapping of individual ultramafic bodies and of areas between those known to contain such masses.

Mineral commodities known to the ultramafic rocks include asbestos, chromite, corundum (including some gem varieties and emery), nickel, olivine, soapstone, talc, and vermiculite.

**TERMINOLOGY FOLLOWED IN THIS COMPILATION**  
As used in this compilation the term *ultramafic* refers to platiniferous intrusive rocks composed essentially of pyroxene and olivine

or minerals derived from them; such rocks contain little or no feldspar or quartz.

The mafic rocks shown on the map are of basaltic or gabbroic composition and most are believed to be intrusive; they average 50 percent or more ferromagnesian minerals, and with increase in dark minerals they grade into the ultramafic rocks.

*Peridotite* is an intrusive rock containing olivine as an essential mineral and commonly also pyroxene or other ferromagnesian minerals, but little or no feldspar.

*Dunite* is a green, granular rock composed essentially of olivine, and commonly containing small amounts of chromite.

*Harzburgite* is a peridotite composed of olivine and the pyroxene enstatite.

*Serpentinite* is a green rock composed chiefly of serpentine, in most places derived from olivine and pyroxene by metamorphic processes.

*Pyroxenite* is a rock composed essentially of pyroxene.

*Soapstone* is a soft, soapy rock composed chiefly of talc and chlorite; included as soapstone on the map are soapstonelike rocks containing amphiboles and other metamorphic minerals.

*Chlorite schist* is a dark-green to black foliated metamorphic rock that consists essentially of chlorite.

*Amphibolite* is a metamorphic rock composed of amphibole and plagioclase; those amphibolites mapped are believed to have been derived mostly from gabbroic rocks. By increase in the proportion of amphibole the rocks grade into amphibole schist.

*Gabbro* is a dark platiniferous rock composed chiefly of labradorite or bytownite and/or anorthite and pyroxene or hornblende, or both. Olivine and magnetite may be accessory minerals.

*Metagabbro* is a metamorphosed gabbro.

*Troctolite* contains as the essential constituents olivine and calcic plagioclase feldspar; it might be regarded as pyroxene-free olivine gabbro.

*Anorthositic* is a gabbroic or noritic rock practically free from dark minerals; also, a rock composed entirely of plagioclase feldspar.

*Greenstone* is a green, altered mafic igneous rock—commonly a volcanic rock—in which the primary dark minerals have been replaced by chlorite, epidote, or amphibole.

*Norite* is a gabbroic plutonic rock in which the amount of orthopyroxene, usually hypersthene, equals or exceeds orthopyroxene.

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