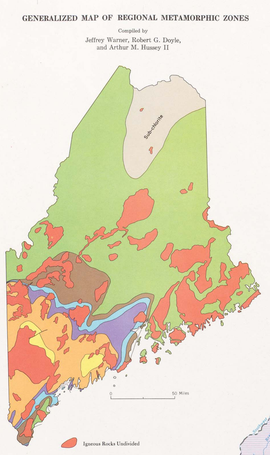
GENERALIZED MAP OF REGIONAL METAMORPHIC ZONES

Compiled by
Jeffrey Warner, Robert G. Doyle,
and Arthur M. Hussey II



Igneous Rocks Undivided

Zones of Regional Metamorphism

- Sillimanite plus orthoclase
- Sillimanite
- Staurolite (plus andalusite locally)
- Garnet
- Biotite
- Chlorite

(Contact metamorphic zones are not shown)

PLUTONIC ROCKS

PERMIAN TO CRETACEOUS(?)	Kfga	Gabbro, norite and anorthositic gabbro with minor granodiorite and quartz diorite.
PERMIAN TO JURASSIC(?)	JPbg	Biotite and biotite-hornblende granite.
	JPag	Alkalic granite.
	JPqs	Alkalic quartz syenite.
	JPas	Alkalic syenite.
	JPu	Undifferentiated alkalic rocks (*includes some nepheline* in southern Oxford County).
DEVONIAN TO TRIASSIC(?)	D	Diabase dikes in so. Aroostook, Penobscot, and Piscataquis Counties.
DEVONIAN	Dg	Biotite and biotite-muscovite granite and quartz monzonite (*includes some granodiorite and felsic subvasive rocks in Aroostook County*).
	Dhg	Hornblende granite.
	Dgr	Granodiorite.
	Dgp	Granophyre.
	Dga	Gabbro and diorite.
	Dgn	Granitic gneiss.
DEVONIAN (?)	Dfs	Feldspathoidal syenites at Litchfield, Kennebec County.
	Dm	Metasyenite of the Lincoln Sill, Lincoln and Waldo Counties.
SILURIAN OR DEVONIAN OR ORDOVICIAN	SOsp	Spruce-top Greenstone of Aroostook County.
SILURIAN OR ORDOVICIAN	SOgd	Granitic and dioritic rocks in Penobscot and Aroostook Counties.
ORDOVICIAN	Od	Diabase of Cambrician age in Penobscot and Aroostook Counties.
	Og	Granite, quartz monzonite, and granodiorite.
	Oga	Gabbro and diorite.
AGE UNCERTAIN	S	Serpentinite.

Stippling indicates areas of contact metamorphism.

Plutonic Rocks: White Mountain Plutonic - Volcanic Series; New Hampshire Plutonic Series; Oakman Plutonic Series; Highlandcroft Plutonic Series

STRATIFIED ROCKS

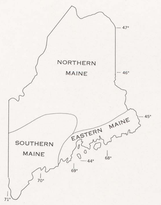
SYSTEM	SERIES	STAGE	Zone	Formation	Description
MISSI	UPPER CARBONIFEROUS			MD	Red and light gray conglomerate, sandstone, and quartzite; and reddish brown quartzite and siltstone (*unsorted units in Washington, Hancock, and Penobscot Counties*).
DEVONIAN	MIDDLE DEVONIAN	ERIAN		Dm	Red conglomerate, sandstone, and shale, with minor green sandstone (*Reptiliera Sandstone in Aroostook County*).
				Dlv	Light gray to black shale, siltstone, sandstone, felsite cobble conglomerate, with minor siliceous sandstone and ironstone (*Traual Valley Formation in Piscataquis County*).
		Upper (Lower?)		Dlu	Metamorphosed dark sandstone, tuffaceous sandstone, shale, and quartzite (*Umbagog Formation in Somerset and Piscataquis Counties*).
		Catskill		Dr	Felsic volcanic rocks (*include Kineo Rhyolite Member of Pukaskwa Gremlin, Traveler Rhyolite in Piscataquis and Penobscot Counties, and unnamed units in Piscataquis County*).
		L. Eifelian (Lower Devonian)		Dv	Volcanic rocks and tuffs (*include the Hedgehog Formation and Edmunds Member of the Seboomook Formation, Fisher Bay Formation of Somerset County, and unnamed units in Piscataquis County*).
	LOWER DEVONIAN	Helderbergian		Dsl	Mafic volcanics (*Grants Hill Member of the Seboomook Formation*).
		L. Gedinnian		Dsq	Felsic and mafic extrusives and intrusives rocks in northern Oxford and Somerset Counties.
SILURIAN	UPPER SILURIAN	CAYUGAN	U. Ludlow	Sm	Metamorphosed shale, siltstone, and sandstone (*unsorted units in Piscataquis County*).
				Dm	Thrasher Peak Conglomerate in northern Oxford County.
				Du	Unnamed tuff in Oxford County.
	MIDDLE SILURIAN	NIAGARAN	Wenlock	Sm	Metamorphosed red and gray shale and conglomerate (*Ten Mile Stream Formation in Piscataquis County of Early Ludlow age; quartzite (White Cap Mtn. Member) in Piscataquis County of Late Ludlow age*).
				Sh	Calcareous metasiltstone (*upper member of the Fitzhugh Formation in Aroostook County*).
				Sc	Metamorphosed calcareous siltstone, shale, and limestone containing wollastonite, garnet, and sparse diopside (*Smith Mountain Formation in Aroostook and Penobscot Counties*).
				Sbl	Metamorphosed calcareous siltstone, shale, and limestone containing wollastonite, garnet, and diopside (*Bull Mountain Formation in Aroostook County*).
				Sch	Calcareous metasiltstone (*Chesuncook Limestone in Piscataquis and Somerset Counties*).
				Sbr	Metamorphosed gray and black shale, siltstone, sandstone, conglomerate, and sedimentary iron-formation (*Brassua Formation, Jerome Mills Island Falls, and Kilburn Formations of Somerset County, Ripogenus Formation of northern Penobscot County, Kellyland Formation of Washington County, and unnamed metamorphosed limestone, sandstone, and shale in Piscataquis, Aroostook, and Washington Counties*).
				Sbs	Metamorphosed gray limestone, calcareous siltstone, and shale within the Island Falls Formation in northern Aroostook County.
				Sbd	Siliceous calcareous metasiltstone and shale in Hancock County.
				SOd	Metasedimentary rocks and minor felsic volcanics (*Dunbar Brook Formation in Aroostook County*).
				SOgm	Slate and metagraywacke (*Madawaska Formation in Aroostook County*).
				SOv	Felsic and mafic metavolcanics in Piscataquis and Somerset Counties.
	LOWER SILURIAN	MEDINAN	M.–L. Llandovery	Sbr	Slate (*Rural Brook Formation in Aroostook County*).
				SOgs	Metamorphosed shale, conglomerate, and volcanic rocks (*Seboomook Formation in Somerset County*).
				SOs	Slate, slaty and metagraywacke, and metasiltstone in Aroostook County.
				Ou	Slate and calcareous rocks (*Oquidoc Ridge Formation in Aroostook County*).
ORDOVICIAN	UPPER ORDOVICIAN	CINCINN.	Ashgill	Ou	Metamorphosed shale, siltstone, sandstone, and limestone (*unsorted units in Piscataquis and Penobscot Counties*).
				Ous	Metamorphosed shale, siltstone, and graywacke (*unsorted units in Franklin County*).
	MIDDLE ORDOVICIAN	MOHAWKIAN	Ashgill–Caradoc	Ou	Metamorphosed dark gray and black shale, chert, sandstone, and minor volcanic rocks, silicified in places (*Moosehorn Formation in Oxford County, Hurrell Formation in Franklin and Somerset Counties, and unnamed units in Piscataquis, Penobscot, and Aroostook Counties*).
				Ous	Conglomerate, sandstone metagraywacke in Franklin, Somerset, Piscataquis, and Oxford Counties.
				Ou	Metamorphosed felsic to mafic volcanic rocks with interbedded metasedimentary rocks (*includes Bowtownus Volcanics in western Oxford County, unnamed formation in Franklin County, and unnamed units at several places in northern Piscataquis County*).
				Ou	Slate and metagraywacke at base, separately mapped in northern Piscataquis County.
				Ou	Metamorphosed felsic to intermediate tuff and tuffaceous sandstone (*includes Bald Mountain Formation in Oxford County, Attean Rhyolite, Attean Granites, and Kennebec Formation in undifferentiated Somerset County*).
				Ou	Interbedded quartzite, metasiltstone, and slate, including red and green varieties (*Frenchtown Quartz Conglomerate adjacent to Quebec boundary in eastern Aroostook County; Cross Point in Grande adjacent to Quebec boundary in Aroostook County, and unnamed formation with thin limestone beds in northern Piscataquis County*).
	LOWER ORDOVICIAN	CANADIAN	Arenig	Ou	Slate, metasiltstone, and quartzite, including green and black slate, and some interbedded volcanic rocks (*Spencer Stream Formation in Somerset County, and unnamed units in Piscataquis County, and in northern Washington County*).
			Trenadoc	Ou	Metamorphosed felsic to intermediate volcanic rocks and subordinate amounts of laminated sediments (*include Allen Formation in Oxford County and unnamed units in Franklin and Somerset Counties*).
				Ou	Red and green metasiltstone (*includes Attean Formation and unnamed units in Oxford and Franklin Counties*).
				Ou	Red and green metasiltstone (*includes Ketenka Formation and unnamed units in Oxford and Franklin Counties*).
				OCs	Sulfidic slate in OCp in Oxford and Franklin Counties.

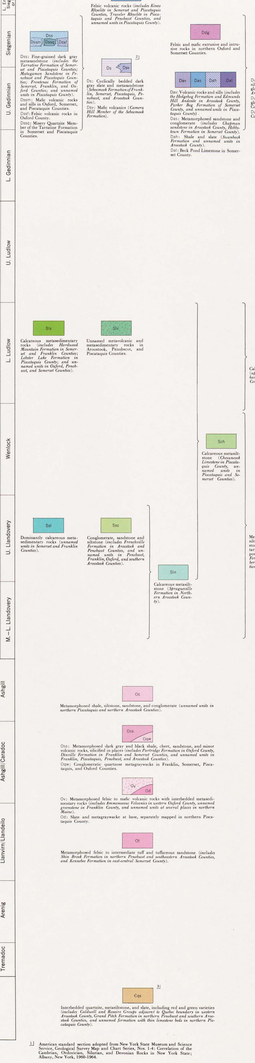
[1] American standard section adapted from New York State Museum and Science Service, Geological Survey Map and Chart Series, Nos. 1-4: Correlation of the Devonian Rocks of New York and Devonian Rocks in New York State; Albany, New York, 1960-1964.

[2] Plants and spores from some rocks in Aroostook County assigned to Dv and Ou suggest a Middle Devonian age (C. McGregor and J. Schopf: Biochronological data and correlation of the Early Devonian of Maine. In Boucot, *For purposes of this map, all these rocks are assigned an Early Devonian age*.

[3] Modified after Boland, J. (1956 & 1957) from geology of the Eastern Townships, Quebec.

NORTHERN MAINE

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