

Orchard Beach Ultramafic Erratics – Where Are They From?

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OB1-N

Twin Island

OB2-C

OB3-S





Red Till

NNW to SSE



0B1-N

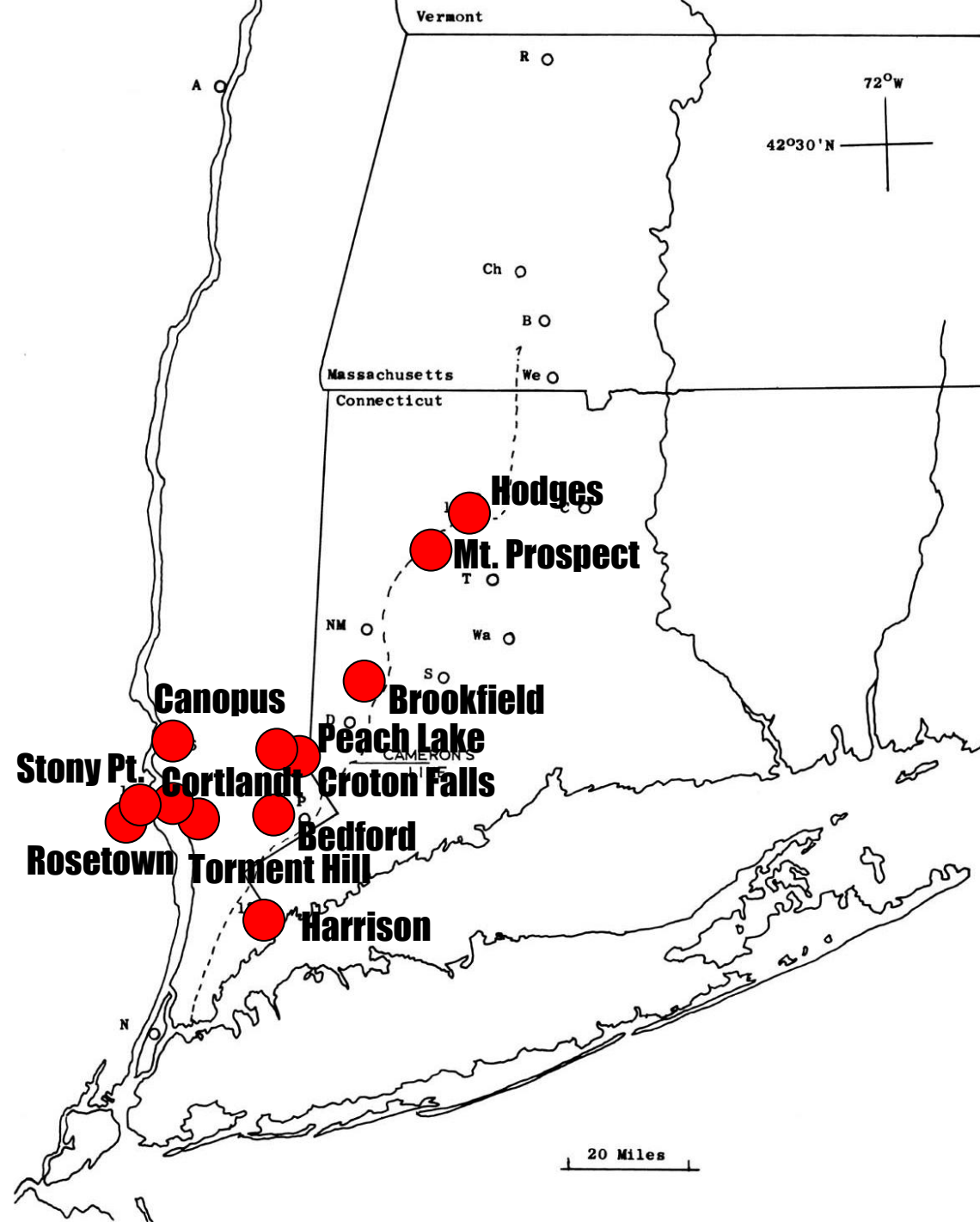


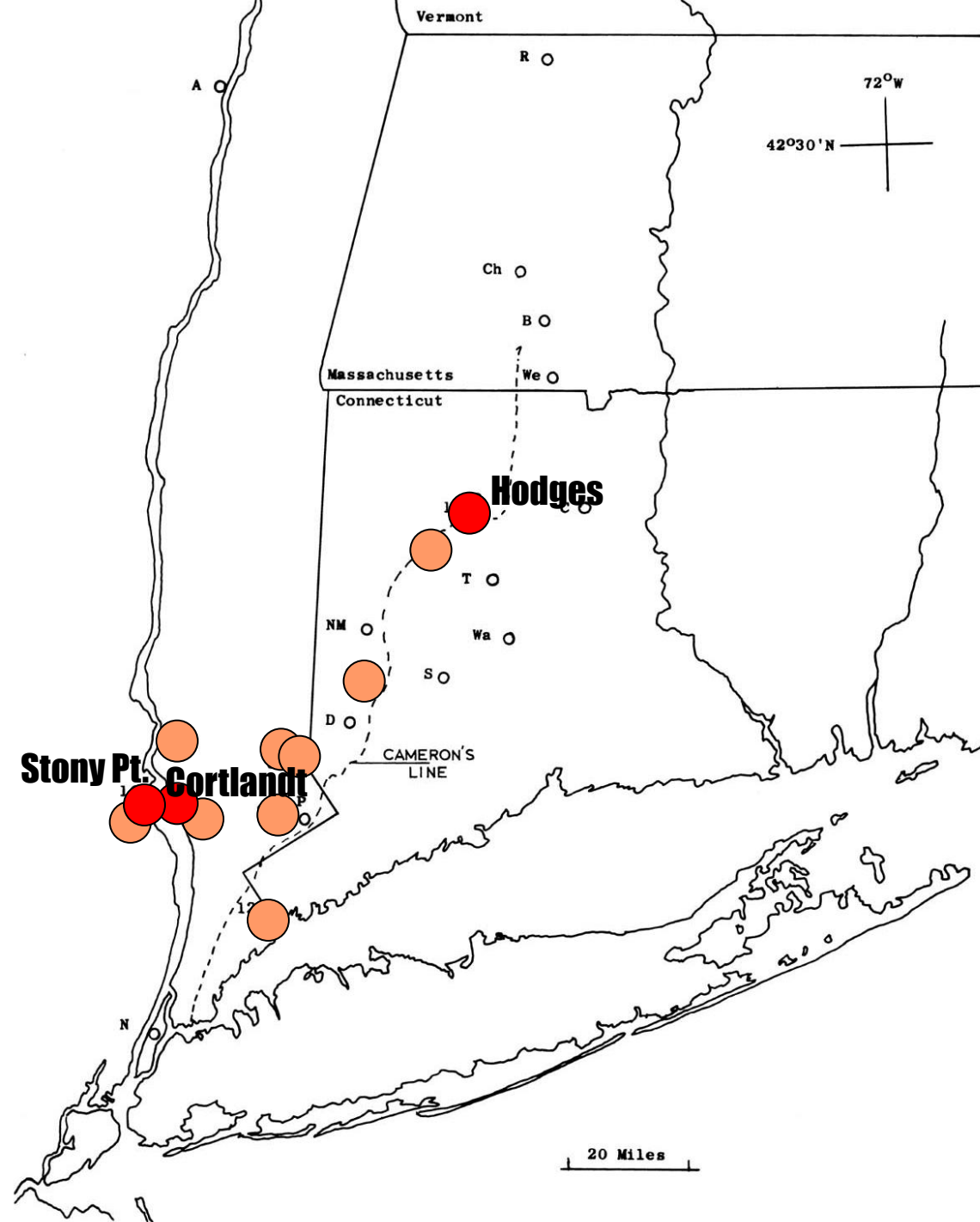
OB2-C



OB3-S

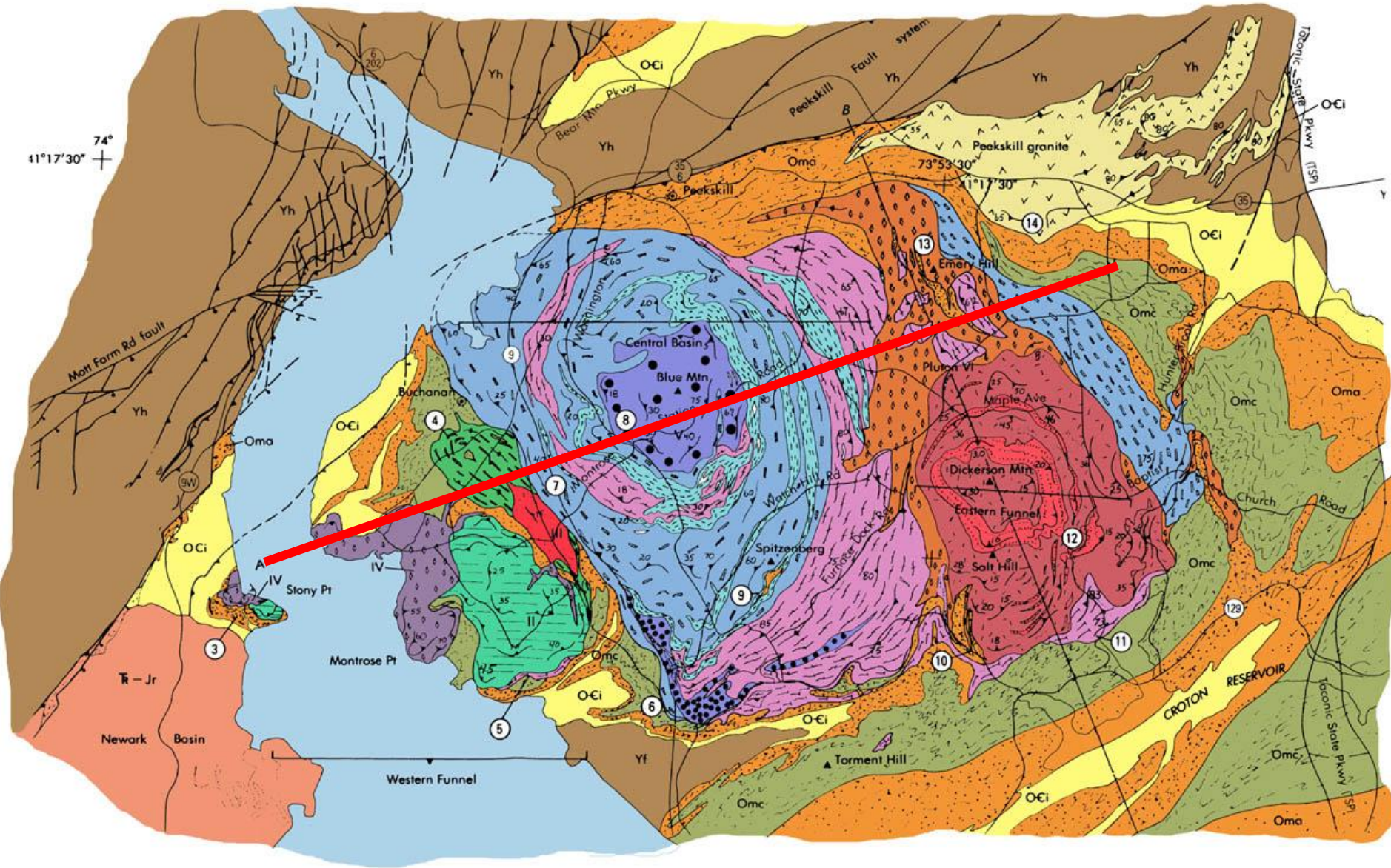
Mafic-Ultramafic Igneous Complexes





Mafic-Ultramafic Igneous Complexes

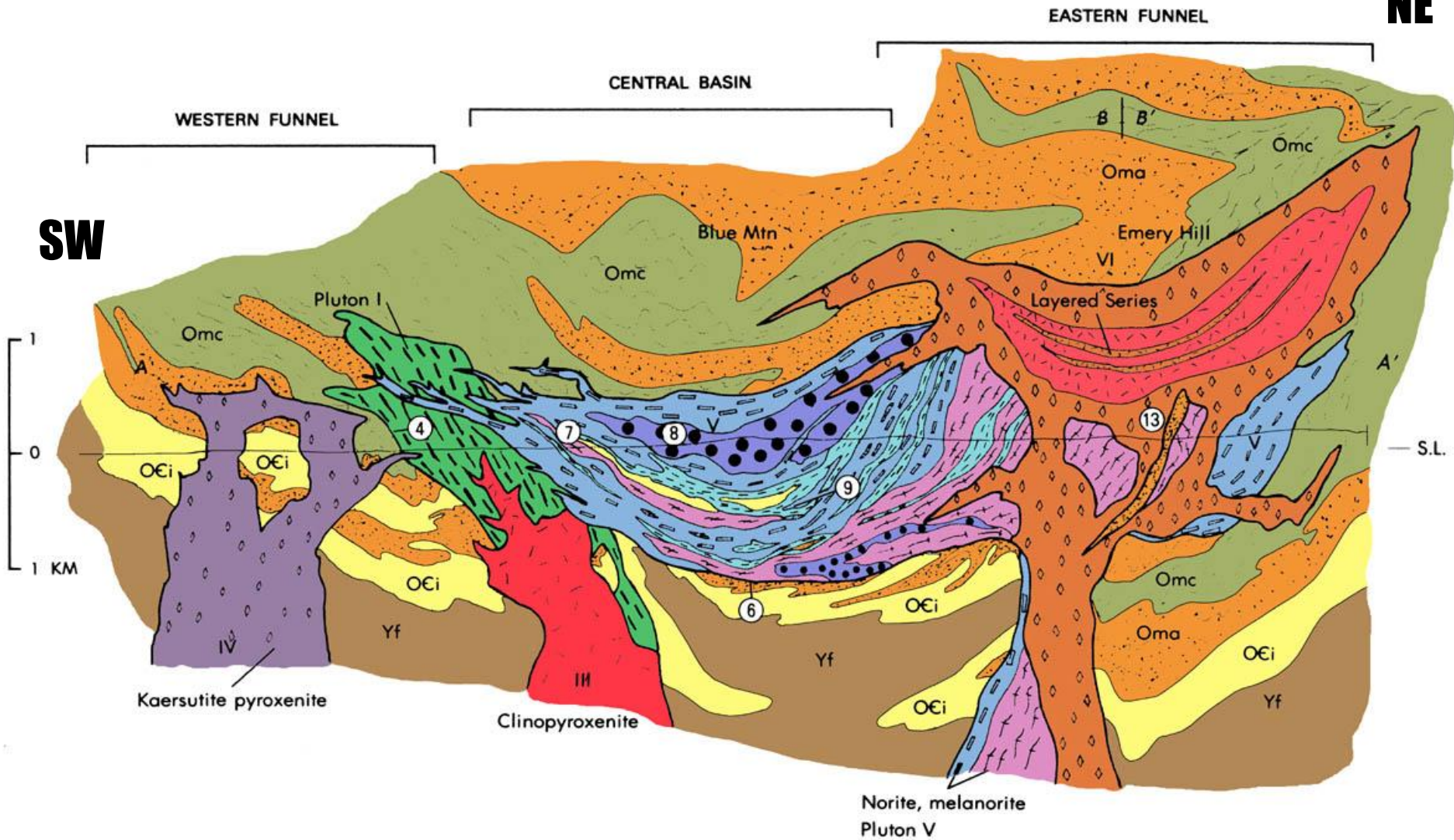
Cortlandt Complex



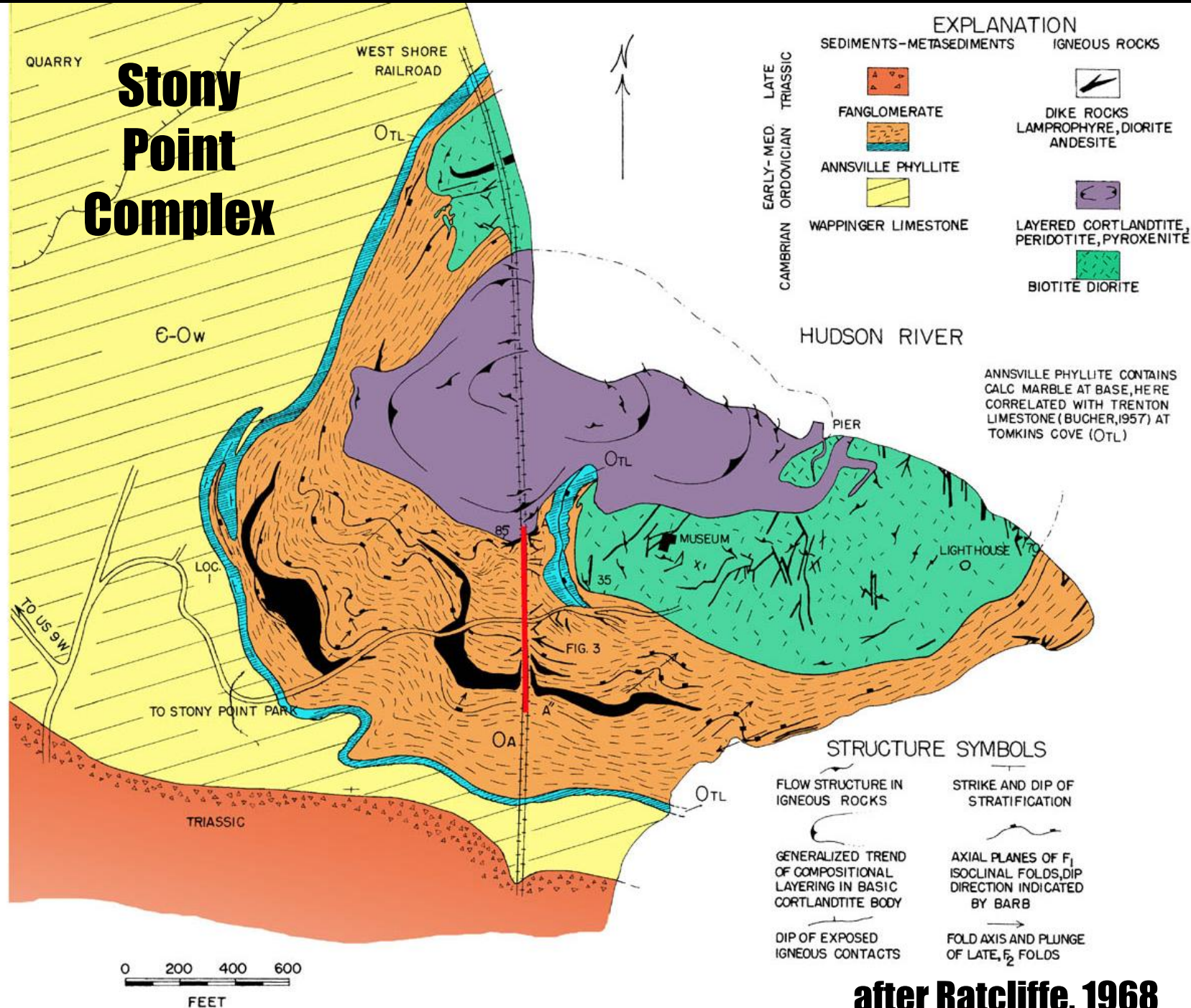
Cortlandt Complex

NE

SW

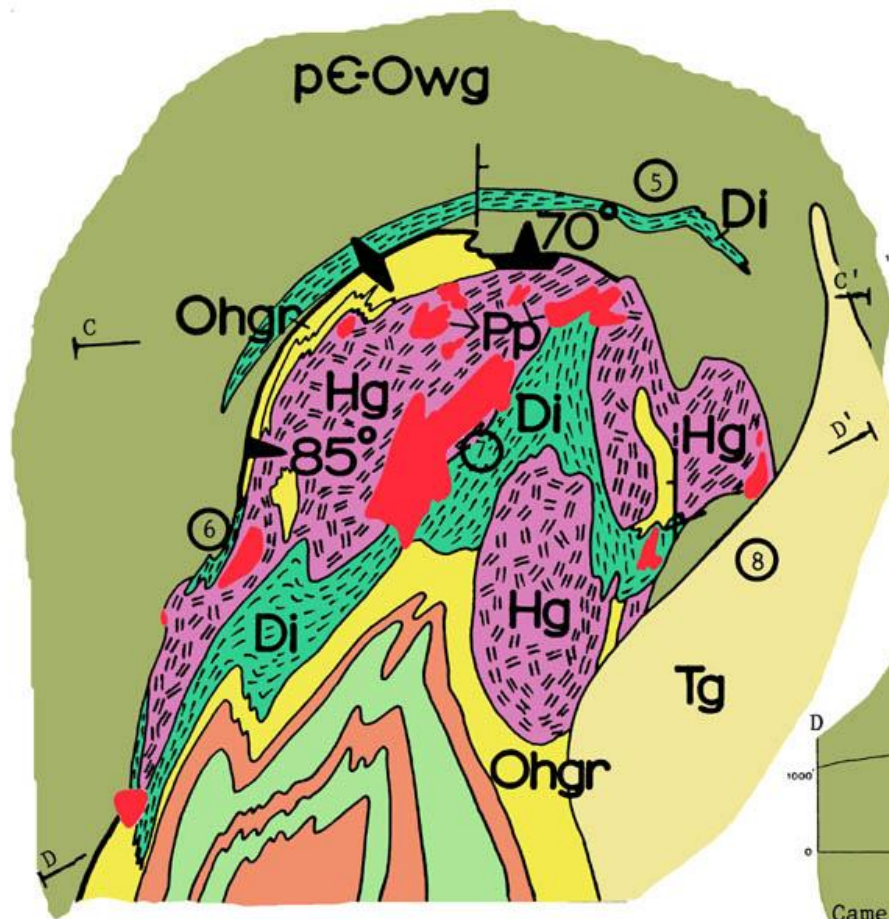


Stony Point Complex

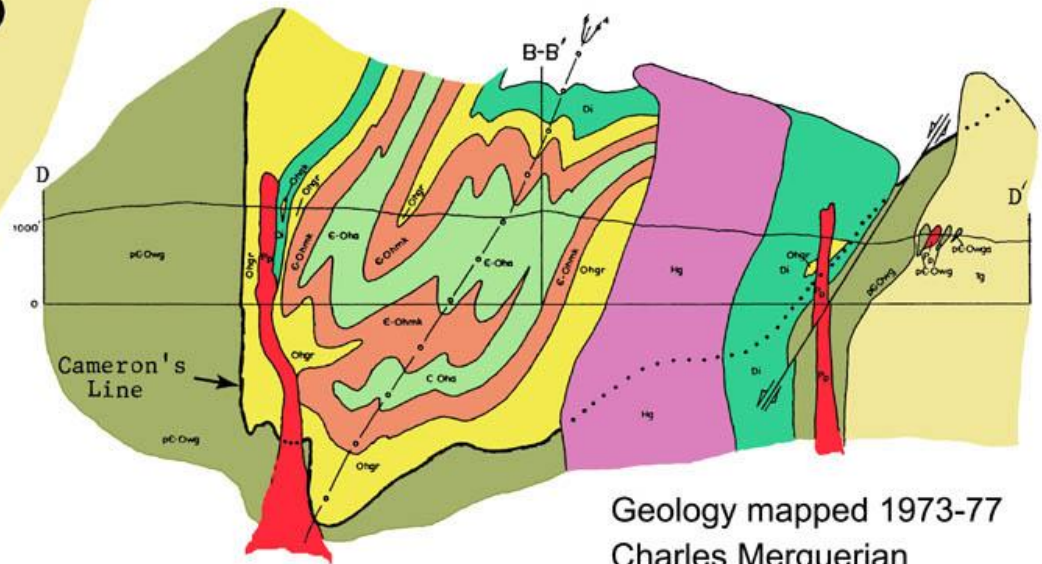
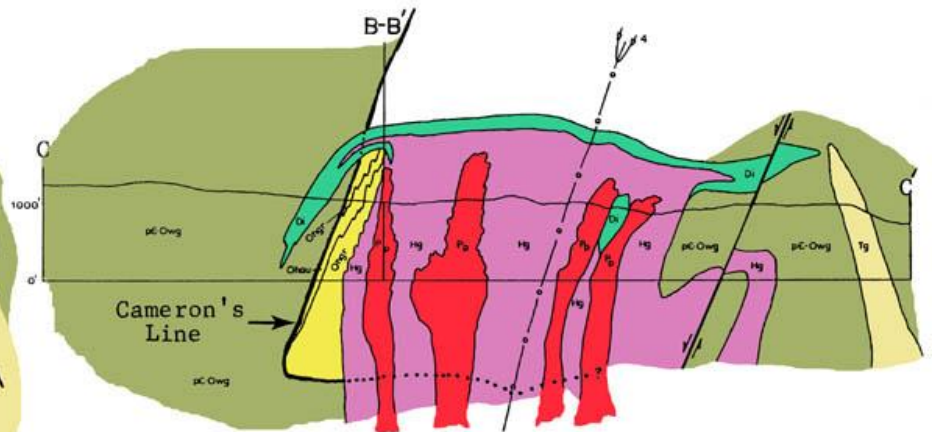


after Ratcliffe, 1968

Hodges Complex and cross sections

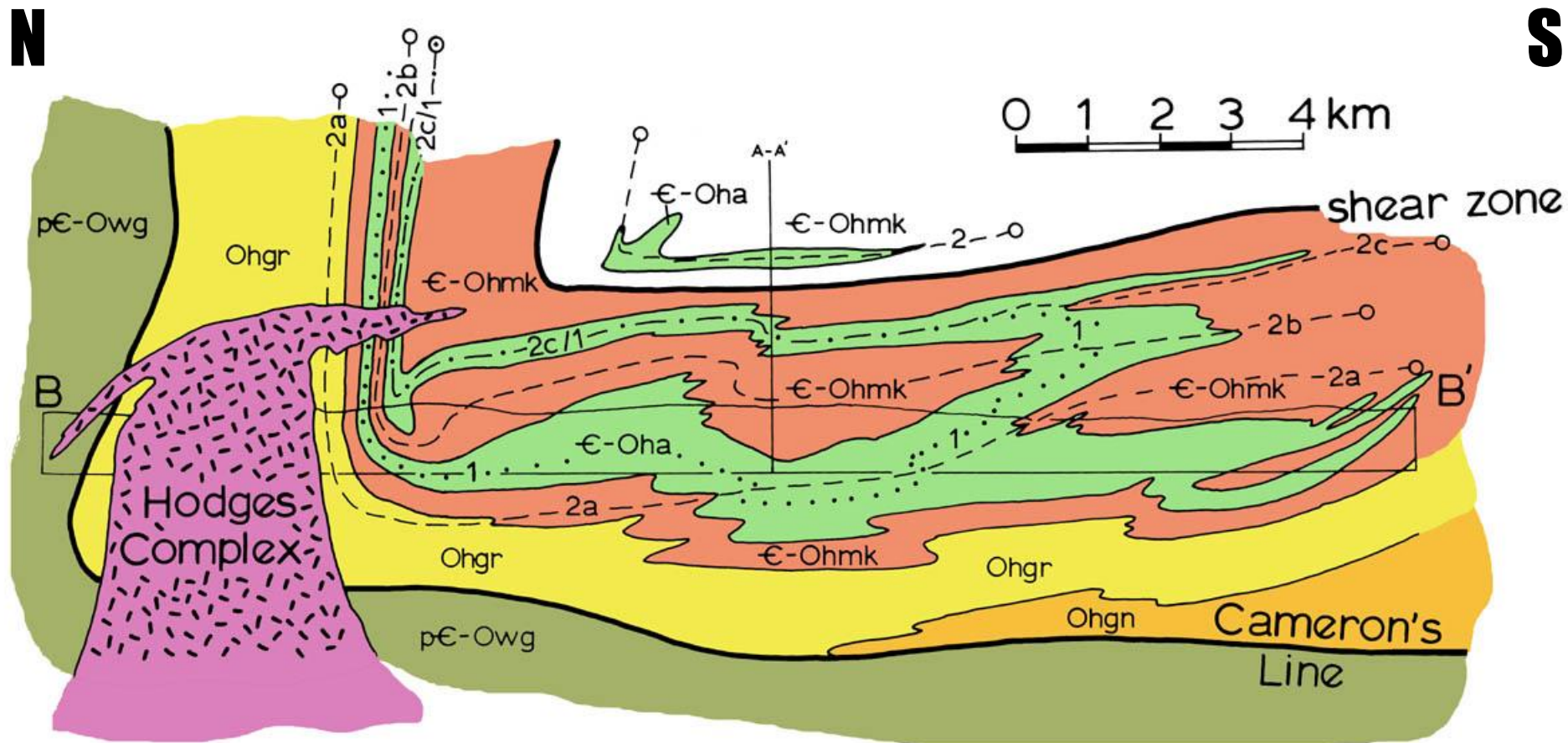


- Pp Meta-pyroxenite, -hornblendite
- Di Metadiorite
- Hg Metagabbro



Geology mapped 1973-77
Charles Merguerian

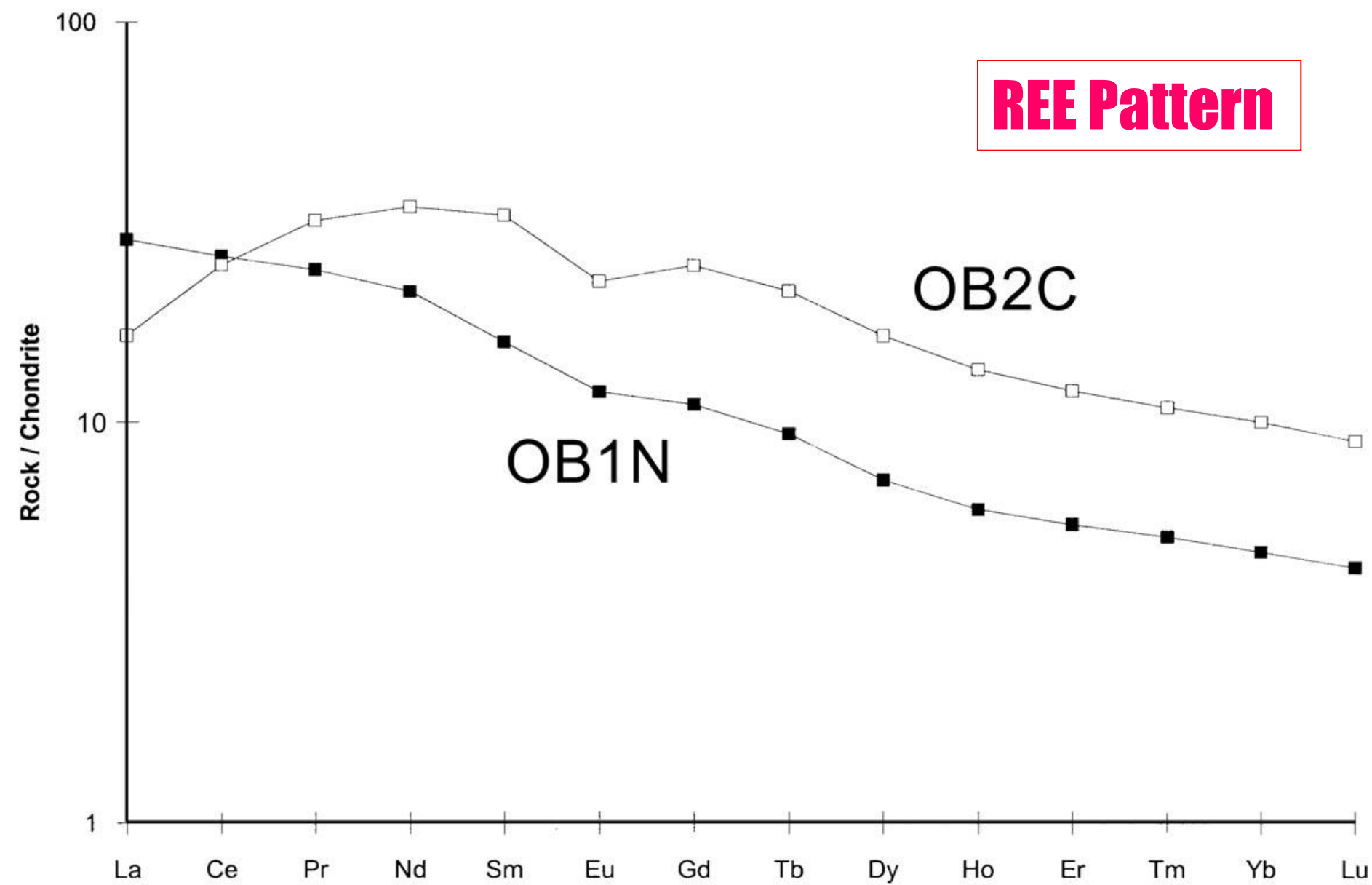
Hodges Complex N-S Cross Section



Major Element Chemistry

				Cortlandt		Hodges
Element	Units	OB1 N	OB2 C	Pluton IV	OB3 S	H-232
SiO ₂	%	45.36	46.31	45.50	45.42	46.69
Al ₂ O ₃	%	4.64	5.53	3.86	9.7	8.02
Fe ₂ O ₃ (T)	%	11.06	13.93	11.50	11.4	12.43
MnO	%	0.161	0.218	0.16	0.156	0.179
MgO	%	24.27	16.79	20.80	17.02	17.73
CaO	%	10.11	13.84	13.00	10.13	8.5
Na ₂ O	%	0.74	0.52	0.41	1.39	1.15
K ₂ O	%	0.38	0.02	0.14	1.08	0.79
TiO ₂	%	0.605	1.12	0.67	1.616	1.116
P ₂ O ₅	%	0.08	0.02	0.02	0.1	0.07
LOI	%	1.09	0.21	3.22	0.88	2.43
Total	%	99.30	99.22	99.28	98.88	99.1

REE Pattern



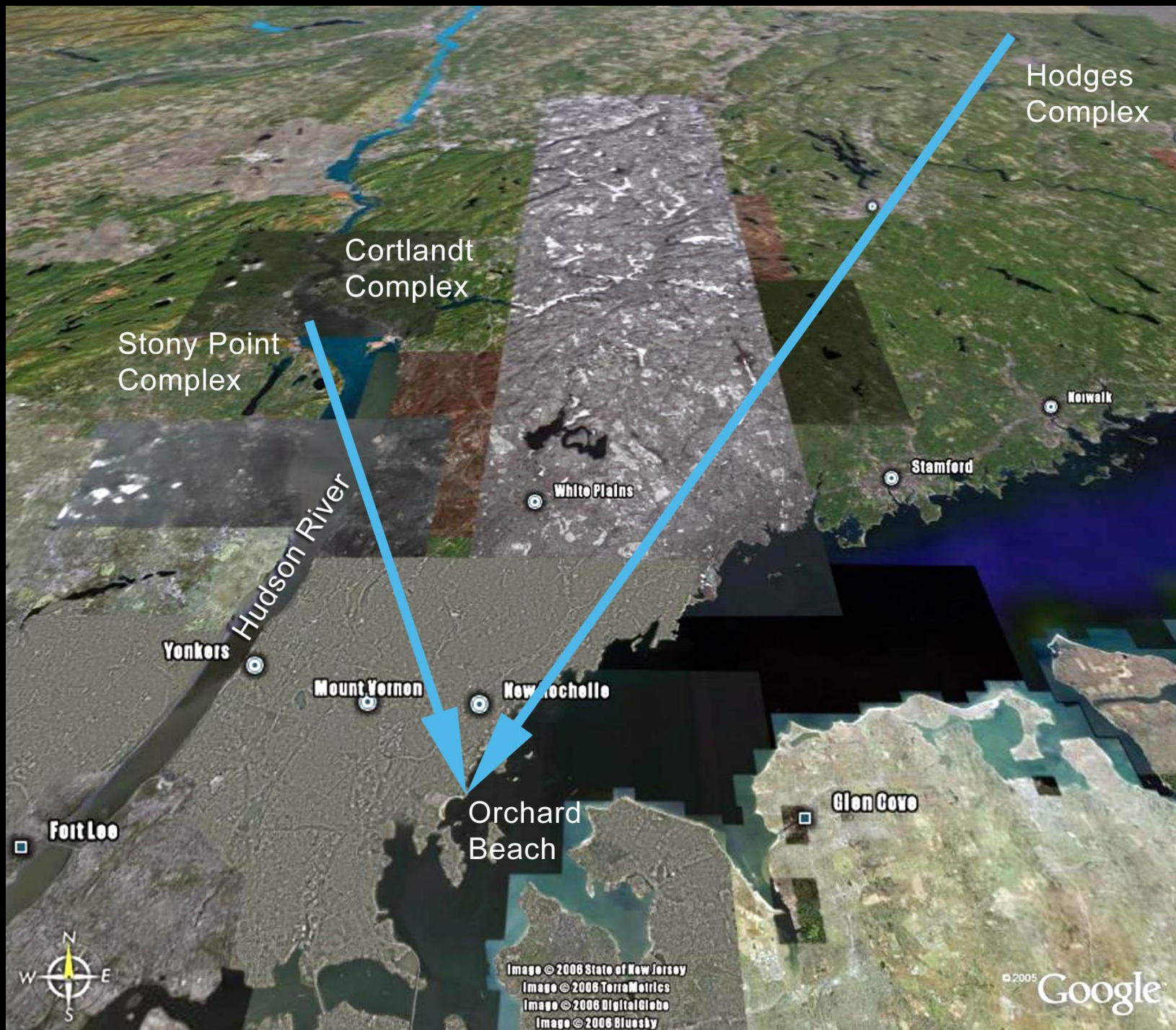


Mineralogy

Orchard Beach Erratics							
			Cortlandt			Hodges	Cortlandt
	OB 1-N	OB 2-C	Pluton IV		OB 3-S	H-232	Pluton III, VI
Olivine	X	X	X		?		X
Orthopyroxene	X	?	?		X		X
Clinopyroxene	X	X	X		X		X
Amphibole	X	?	X		X	X	X
Biotite	X	?	X		X	X	X
Plagioclase	X	?	X		X	?	X
Accessories							
Chromite	X	X	X		X	X	X
Ilmenite	X	?	?		?	X	?
Sulfide	X	?	?		?	X	?
Phosphate	X	?	?		?	X	?
Sphene	X	?	?		?	?	?
Carbonate (Int)	X	X	?		?	?	?

Electron Microprobe data

Orchard Beach Erratics							
Electron Microprobe Data							
			Cortlandt			Hodges	Cortlandt
Minerals/Samples	OB 1-N	OB 2-C	Pluton IV*		OB 3-S	H-232	Pluton III, VI*
Olivine	Fo 78-79	Fo 79	Fo 77		?		Fo 74-78
Orthopyroxene	En 81	?	En 77-80		En 77		69-79
Clinopyroxene							
Ca	45.7	47.2	45-49	Ca	46.5		42-48
Mg	48.7	44.3	43-47	Mg	44.5		42-47
Fe	5.7	8.5	8-10	Fe	9.0		7-10
Amphibole Fe/(Fe+Mg) Ratio	~24	~24	19-22		x	22-23	19-30
Biotite							
K ₂ O	~ 8%	?	7-9%		8-10%	7-8%	9.5
Plagioclase	An 14-16	?	An 55-61		An 37-40	?	x
Accessories							
Chromite	x	x	x		x	x	x
Ilmenite	x	?	?		?	x with Van	?
Sulfide	x	?	?		?	x	?
Phosphate	x	?	?		?	x	?
Sphene	x	?	?		?	?	?
* Data from Bender (1980)							



Hodges
Complex

Cortlandt
Complex

Stony Point
Complex

Hudson River

White Plains

Stamford

Newark

Yonkers

Mount Vernon

New Rochelle

Fort Lee

Orchard
Beach

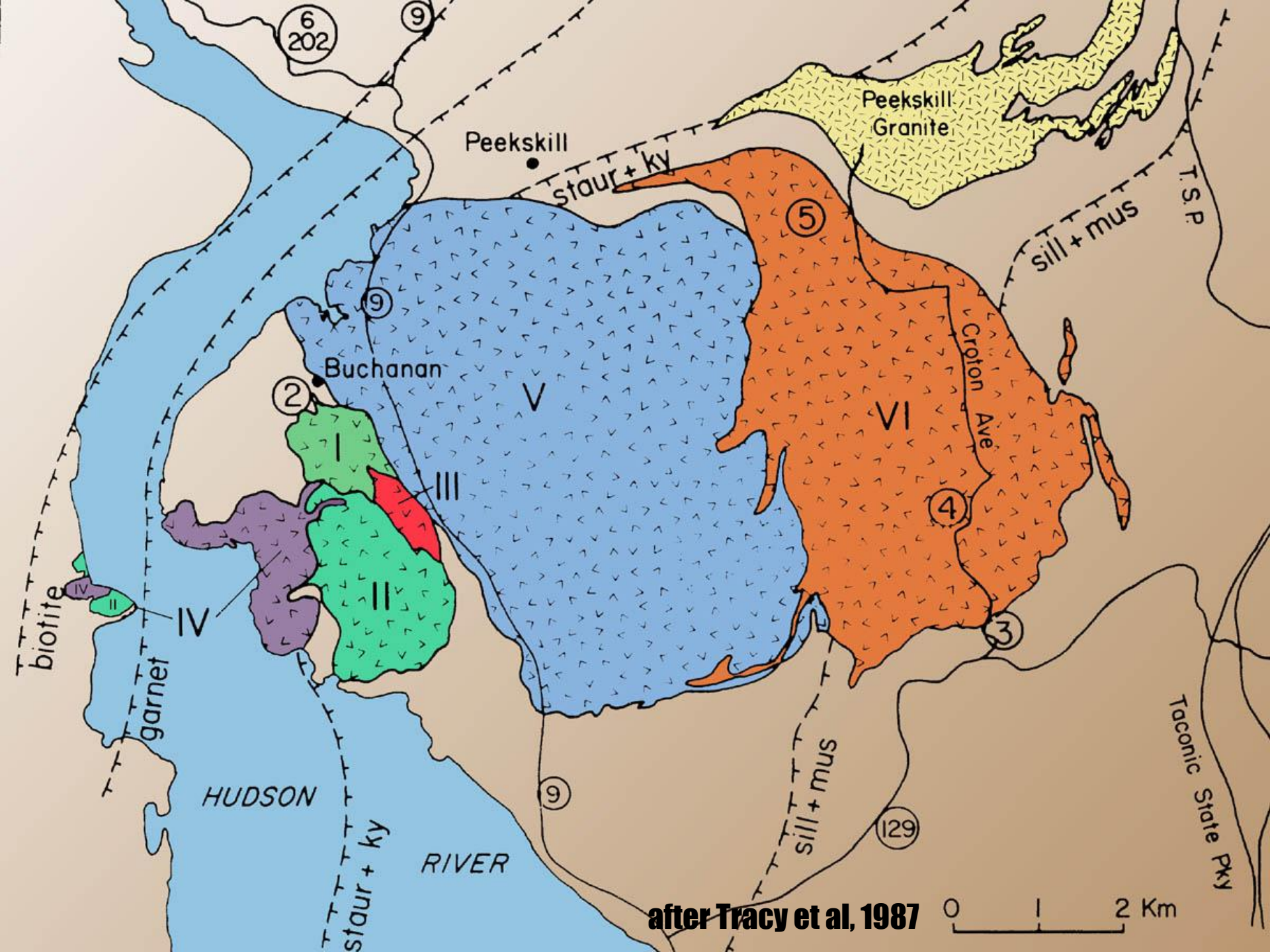
Glen Cove



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Extra Slides



Electron Microprobe Data

Electron Microprobe Data								
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Minerals/Samples		OB 1-N	OB 2-C	Pluton IV*		OB 3-S	H-232	Pluton III, VI*
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Amphibole Fe/(Fe+Mg) Ratio		~24	~24	19-24		x	22-23	19-30
Biotite	K2O	~ 8%	?	7-9%		8-10%	7-8%	9.5%
Plagioclase		An 15	?	An 55-61		An 37-40	?	x
Accessories								
Chromite		x	x	x		x	x	x
Ilmenite		x	?	?		?	x with Van	?
Sulfide		x	?	?		?	x	?
Phosphate		x	?	?		?	x	?
Sphene		x	?	?		?	?	?
* Data from Bender (1980)								

Mineralogy

	OB 1-N	OB 2-C	Pluton IV		OB 3-S	H-232	Pluton III, VI
Olivine	X	X	X		?		X
Orthopyroxene	X	?	?		X		X
Clinopyroxene	X	X	X		X		X
Amphibole	X	?	X		X	X	X
Biotite	X	?	X		X	X	X
Plagioclase	X	?	X		X	?	X
Accessories							
Chromite	X	X	X		X	X	X
Ilmenite	X	?	?		?	X	?
Sulfide	X	?	?		?	X	?
Phosphate	X	?	?		?	X	?
Sphene	X	?	?		?	?	?
Carbonate (Int)	X	X	?		?	?	?