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The Controls on Vanadium, Iron and Zinc Stable Isotope Fractionation in Upper Crustal Plutons

STOW, MADELEINE,ANN

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Electronic Appendix 3 - Bogy Plain Zoned Pluton Petrographic Descriptions

Modal abundances are from Wyborn (1983). However, note that the modal abundances are not determined from the same thin sections used in this study. Minerals are grouped as primocrysts or interstitial phases based on their morphologies. Primocrysts are euhedral crystals, and interstitial phases are those with anhedral morphologies which appear to fill interstitial sites. GPS coordinates indicate the sample localities from fieldwork in 2013. These are close to the original sites in Wyborn (1983), and the same sample names are used.

Sample	Lithology	GPS Coordinates of Sample	Primocryst Phases	Interstitial Phases	Accessory Phases	Textural Observations
BP41	Diorite	644295, 6028177	Plagioclase: 50% Clinopyroxene: 23% Orthopyroxene: 13% Olivine: 6.5%	Biotite: 5.5% Hornblende: <0.1% K-feldspar: 1%	Apatite: 0.2% Fe-Ti Oxides: 1.2%	<ul style="list-style-type: none"> • Silicates: Framework of euhedral plagioclase, pyroxene and olivine with minor interstitial biotite. • Fe-Ti Oxides: Discrete ilmenite grains, and magnetite grains containing ilmenite blebs and sandwich lamellae. Found as inclusions within pyroxene and biotite.
BP34	Diorite	644350, 6028309	Plagioclase: 47% Clinopyroxene: 14% Orthopyroxene: 18%	Biotite: 7% Hornblende: 4% Quartz: 4.5% K-feldspar: 4.5%	Apatite: 0.4% Fe-Ti Oxides: 1.2%	<ul style="list-style-type: none"> • Silicates: Framework of euhedral plagioclase and pyroxene. • Fe-Ti Oxides: Discrete ilmenite grains. Magnetite grains containing trellis type lamellae, sandwich lamellae and/or irregular blebs of ilmenite. Mostly found as discrete inclusions within biotite in interstitial sites.
BP1	Diorite	642416, 6033277	Plagioclase: 46% Clinopyroxene: 17% Orthopyroxene: 8%	Biotite: 7% Hornblende: 15% Quartz: 4.5% K-feldspar: 0.5%	Apatite: 0.7% Fe-Ti Oxides: 1.9%	<ul style="list-style-type: none"> • Silicates: Framework of euhedral plagioclase (weakly foliated) and pyroxene. • Fe-Ti Oxides: Discrete grains of ilmenite and magnetite. Mostly associated with

						biotite in interstitial sites, and as fine rods in plagioclase.
BP39	Diorite	642336, 6032975	Plagioclase: 53% Clinopyroxene: 16% Orthopyroxene: 16%	Biotite: 6% Hornblende: 1.8% Quartz: 6% K-feldspar: <1%	Apatite: 0.5% Fe-Ti Oxides: 1.2%	<ul style="list-style-type: none"> • Silicates: Framework of euhedral plagioclase and pyroxene. Pyroxene crystals often found touching as clusters. • Fe-Ti Oxides: Discrete ilmenite grains. Magnetite grains containing trellis type lamellae, sandwich lamellae and/or irregular blebs of ilmenite. Found with biotite in interstitial sites, and as inclusions within pyroxenes.
BP40	Granodiorite	642441, 6033154	Plagioclase: 40% Orthopyroxene: 2.5% Clinopyroxene: 10% Biotite: 14% Hornblende: 14.5%	Quartz: 11% K-feldspar: 6.6%	Apatite: 0.5% Magnetite: 0.9%	<ul style="list-style-type: none"> • Silicates: Pyroxene crystals showing anhedral morphologies and ragged breakdown textures. Biotite and hornblende with more euhedral crystal habits. • Fe-Ti oxides: Mostly magnetite, with rare ilmenite. Found as discrete euhedral crystals in biotite and hornblende.
BP26	Granodiorite	643443, 6028264	Plagioclase: 38% Orthopyroxene: 0.1% Clinopyroxene: 5% Biotite: 10% Hornblende: 15%	Quartz: 18% K-feldspar: 13%	Apatite: 0.5% Magnetite: 0.8% Sphene: <0.1%	<ul style="list-style-type: none"> • Silicates: No pyroxene primocrysts. Some relict pyroxene cores with hornblende rims. • Fe-Ti Oxides: Mostly euhedral magnetite grains, containing ilmenite sandwich and trellis lamellae. Associated with biotite and hornblende.
BP23	Granodiorite	643467, 6029446	Plagioclase: 44% Clinopyroxene: 1.8%	Quartz: 18% K-feldspar: 10%	Apatite: 0.5% Magnetite: 1% Allanite: <0.1%	<ul style="list-style-type: none"> • Silicates: No pyroxene primocrysts. Some relict pyroxene cores within hornblende

			Biotite: 10% Hornblende: 15%			<p>rims. Biotite and hornblende show more prismatic morphologies.</p> <ul style="list-style-type: none"> • Fe-Ti Oxides: Small, discrete euhedral magnetite grains, almost exclusively associated with hornblende.
BP29	Granite	638108, 6026431	Plagioclase: 40% Clinopyroxene: 1.1% Biotite: 10% Hornblende: 11.5% Quartz: 18%	K-feldspar: 15%	Apatite: 0.4% Magnetite: 1.1% Sphene: 0.2% Allanite: <0.1% Zircon: <0.1%	<ul style="list-style-type: none"> • Silicates: Very minor relict pyroxene cores. Euhedral biotite and hornblende. Quartz grains are larger, and show more euhedral shapes. Poikilitic orthoclase. • Fe-Ti oxides: Small, discrete euhedral grains of magnetite, associated with biotite and hornblende.
BP22	Granite	643302, 6029464	Plagioclase: 36% Clinopyroxene: 1.4% Biotite: 10% Hornblende: 9% Quartz: 23%	K-feldspar: 20%	Apatite: 0.4% Magnetite: 0.7% Sphene: 0.2% Allanite: <0.1%	<ul style="list-style-type: none"> • Silicates: Euhedral biotite and hornblende as discrete grains or “clusters”. Poikilitic orthoclase. • Fe-Ti oxides: Discrete euhedral grains of magnetite, associated with biotite and hornblende. Largest grains show trellis exsolution lamellae of ilmenite. One grain with possible haematite lamellae.
BP28	Granite	638845, 6026362	Plagioclase: 37% Clinopyroxene: 0.4% Biotite: 11% Hornblende: 7% Quartz: 26%	K-feldspar: 18%	Apatite: 0.4% Magnetite: 0.5% Sphene: 0.4% Allanite: <0.1%	<ul style="list-style-type: none"> • Silicates: Euhedral biotite and hornblende, found as discrete grains, not clusters. Poikilitic orthoclase. • Fe-Ti Oxides: Discrete euhedral grains of magnetite associated with biotite and hornblende.
BP11	Granite	642951, 6030718	Plagioclase: 26% Biotite: 5%		Apatite: 0.1% Magnetite: 0.2% Sphene: 0.3%	<ul style="list-style-type: none"> • Silicates: Discrete euhedral grains of biotite and hornblende. Majority of the

			Hornblende: 2% Quartz: 30% K-feldspar: 36.5%		Allanite: <0.1% Rutile: <0.1%	sample composed of quartz, plagioclase and K-feldspar. <ul style="list-style-type: none"> • Fe-Ti Oxides: Discrete euhedral grains of magnetite associated with biotite and hornblende.
BP12	Aplite	642941, 6031048	Plagioclase: 30.5% Biotite: 3.5% Quartz: 32% K-feldspar: 32%		Apatite: 0.1% Magnetite: 0.5% Sphene: 0.4%	<ul style="list-style-type: none"> • Silicates: Very fine grained (<1mm grain size) equant quartz, plagioclase and biotite crystals. Poikilitic orthoclase. Biotite often chloritized. • Fe-Ti Oxides: Discrete magnetite grains. No obvious lamellae.
BP42	Aplite	642075, 6025759	Plagioclase: 26% Biotite: 3.5% Quartz: 32% K-feldspar: 38%		Apatite: <0.1% Magnetite: 0.5% Sphene: <0.1% Allanite: <0.1%	<ul style="list-style-type: none"> • Silicates: Very fine grained (<1mm grain size) equant quartz, plagioclase and biotite crystals. Poikilitic orthoclase. Biotite often chloritized. • Fe-Ti Oxides: Discrete magnetite grains. No obvious lamellae.