Supplementary Materials: Ophiolitic Remnants from the Upper and Intermediate Structural Unit of the Attic-Cycladic Crystalline Belt (Aegean, Greece): Fingerprinting Geochemical Affinities of Magmatic Precursors

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1. X-ray Fluorescence (XRF) Analyses

Major elements: Major elements were determined on fusion discs. Prior to ignition the fine powders were dried overnight at 110 °C. Four to six grams of weighed, dry sample was ignited in platinum crucibles in a vented muffle furnace at 95 0°C for 90 min and allowed to cool in a desiccator before re-weighing to determine the percentage weight losses on ignition (LOI). One gram of ignited (volatile-free, fully oxidized) sample was fused with 5 g Englehard Standard XRF grade Flux—a 20:80 mix of lithium tetraborate and lithium metaborate (equivalent to Johnson Matthey Spectroflux JMIOOB). Each day a 5.00 g sample of flux was fused to determine LOI, and this weight of flux added to each 5.00 g used in fusion bead manufacture. The sample–flux mixture was ignited in a vertical tube furnace at 1100 °C for 20 min with intermittent swirling over a Bunsen burner to eliminate gas bubbles and ensure the homogeneity of the melt. The resultant melt was cast and pressed between polished aluminum die to form a glass disc. The disc was left for 5–15 min, before being transferred to sindanyo bricks to anneal for a minimum of four hours on a hotplate at 250 °C. After cooling, the beads were labeled and stored in sealed polythene bags to await analysis.

Trace elements: Trace element analyses were determined on pressed powder pellets. Approximately 15 g of powdered sample was weighed into a glass beaker and mixed with 12–18 drops of the binding agent, Mowiol solution (polyvinyl alcohol in a 1:5 mix of methanol and distilled deionised H_2O). The sample was pressed into 46 mm diameter pellets under 15 tons of pressure using a steel die and hydraulic ram. Pellets were left to dry overnight.

2. Wavelength-Dispersive (WD-XRF) Analysis

Samples were analysed for major elements and selected trace elements at the University of Leicester using wavelength-dispersive XRF techniques on a Philips PW 1400 (3 kW, 100 kV) single goniometer X-ray spectrometer. The major elements determined were Si, Ti, Al, Fe, Mn, Mg, Ca, Na, K, P (all as oxides, with Fe being reported as total Fe_20_3, and LOI (the total loss on ignition observed during preparation of fused discs for XRF analysis). Trace elements determined were Cr, Co, Sc, V, Ni, Cu, Zn, Rb, Sr, Y, Zr, Nb, Ga, Ba, La, Ce, Nd, Pb, Th, and U [1].

Corrections for variation in mass absorption for trace element analysis were made using tube scatter lines RhKa (Compton) or WLβ(Rayleigh), and corrections across the Fe absorption edge (for V, Cr, Ba, La, Ce, and Nd) were made using the method of Walker (1973).

A general quality control filter on major element analyses is ensured by only accepting analyses with totals between 97.5 and 102%. If analyses fell outside this range, repeat fusion discs were prepared and analyzed. In most cases, precision ranges from less than 1% to about 10%, except for MnO. This is attributed to the low concentration of MnO in the analyzed standards, which approaches the detection limit of the method. The low values for standard deviation, and comparison of analyses to in-house and literature-recommended values, indicate high degrees of machine precision and probably accuracy.

Two analysis programs were run on the rhodium (Rh) anode tube and one on the tungsten anode tube in order to analyze powder pellets for the following trace elements:

Rh traces: Nb, Zr, Y, Sr, Rb, Th, Ga, Zn, Ni

Rh ores: Zr, Sr, Zn, Mo, W, Pb, Cu

W Traces: TiOg, V, Cr, Ba, La, Ce, Nd

During each machine run, a set of international and internal standards (BOB-1, BEN, and W-1) was run to monitor machine accuracy and precision [2]. As the trace element concentration decreases, the degree of error associated with analysis increases. Internal and international reference materials were analyzed on sample runs to quantify the analytical accuracy and precision (Table l). For evaluation of the analytical results, the 2σ value is taken as the minimum detection limit (MDL) and results below this limit are reported as "bdl".

Table 1. Error estimation as 1σ (Mean Standard Deviation—MSD) based on analyses of the international standard rock BOB-1. Data refer to mean values for seven analyses of the standard rock.

Element	1σ ($n = 7$)
V	4.48
Cr	1.71
Ni	3.02
Zn	0.67
Ga	0.73
Rb	0.95
Sr	1.58
Th	1.21
Y	1.03
Zr	1.1
Nb	0.26
Ba	0.82
La	0.92
Ce	1.9
Nd	1.09

Supplementary Table 2. Sampling locations and rock types.

Sample No.	Location	Tectonic Unit	Rock Type
PA-2	Paros-Dryos	Upper Unit (Dryos)	Serpentinite
PA-4	Paros-Dryos	Upper Unit (Dryos)	Serpentinite
PA-7	Paros-Dryos	Upper Unit (Marmara nappe)	Serpentinite (Hartzburgite)
PA-9	Paros–SE Naoussa	Upper Unit	Meta-gabbro
PA-10	Paros–SE Naoussa	Upper Unit	Meta-gabbros
PA-12	Paros-Isternia	Upper unit (Marmara nappe)	Serpentinized Harzburgite
PA-13	Paros-Marmara	Upper unit (Marmara nappe)	Serpentinite
PA-15	Paros-Marmara	Upper unit (Marmara nappe)	Serpentinized Harzburgite
PA-16	Paros-Marmara	Upper unit (Marmara nappe)	Serpentinized Harzburgite (cat. 1)
NA-3	Naxos-Ag. Thaleleos	Upper Unit	Meta-basalt/andesite
NA4	Naxos–Ag. Thaleleos	Upper Unit	Meta-basalt/andesite
NA5	Naxos-Ag. Thaleleos	Upper Unit	Meta-basalt
NA6	Naxos-Kourounohori	Flanks of gneiss dome	Serpentinized Harzburgite
NA7	Naxos–Ag. Barbara	Flanks of gneiss dome	Amphibolite
NA9	Naxos–Agia	Flanks of gneiss dome	Amphibolite
NA14	Naxos-Egkares	Upper Unit	Serpentinized Harzburgite
NA15	Naxos-Galanados	Upper Unit	Meta-gabbro
NA16	Naxos-Galanados	Upper Unit	Serpentinized Harzburgite
SA2	Samos-Kallithea	Upper Unit (Kallithea nappe)	Meta-basalt
SA8	Samos-Kallithea	Upper Unit (Kallithea nappe)	Meta-basalt

SA9	Samos-Spatharei	Topmost CBU (Selcuk nappe)	Serpentinite
SA11	Samos-Myli	(Ambelos nappe)	Meta-basic
SA12	Samos-Vournias	Topmost CBU (Selcuk nappe)	Serpentinized Olivin. Orthopyroxenite
SA14	Samos-Myli	CBU (Ambelos nappe)	Serpentinized Olivin. Orthopyroxenite
SK1	Skyros–Fere-kambos	Upper Unit (Eohellenic nappe)	Meta-Gabbro (blocks in mélange)
SK4	Skyros–Fere-kambos	Upper Unit (Eohellenic nappe)	Serpentinite (Harzburgite)
SK9	Skyros–Ag. Efstratios	Upper Unit (Eohellenic nappe)	Serpentinite (Lherzolite)
SK10	Skyros–Ag. Efstratios	Upper Unit (Eohellenic nappe)	Serpentinite
SK13	Skyros – Ag. Efstratios	Upper Unit (Eohellenic nappe)	Serpentinite (Harzburgite)
SK21	Skyros - Atsitsa-Tryfadi	Upper Unit (Eohellenic nappe)	Serpentinite (Olivin.Websterite)
SK23	Skyros - Atsitsa-Tryfadi	Upper Unit (Eohellenic nappe)	Serpentinite
SK26	Skyros-Tryfadi	Upper Unit (Eohellenic nappe)	Serpentinite

References

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