Dataset for

Reconstructing the crustal section of the intra-oceanic Caribbean island arc: contraints from the cumulate layered gabbronorites and pyroxenites of the Rio Boba plutonic sequence, northern Dominican Republic

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Abstract

This dataset present petrological, mineralogical and geochemical (major and trace elements) data for a suite of mafic and ultramafic rocks from the lower crust of an intra-oceanic island arc (the Caribbean island arc), exposed in the Rio Boba mafic-ultramafic plutonic sequence in the northern Dominican Republic.

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Data Availability Statement

The data for this paper are contained in the text, figures and supporting information and can also be found in the ESSOAr (Earth and Space Science Open Archive; Escuder-Viruete et al., 2022).

References

Escuder-Viruete, J., Castillo-Carrión, M., Pérez Valera, F., Valverde-Vaquero, P., Rubio Ordónez, Á., Fernández, F.J. (2022). Cumulate layered gabbronorites and pyroxenites of the Rio Boba plutonic sequence, northern Dominican Republic. [Preprint] https://essoar.org (2022) https://doi.org/10.1002/essoar.10507766.1

Supporting Information A. Geology of the structural units/nappes of the Río San Juan complex

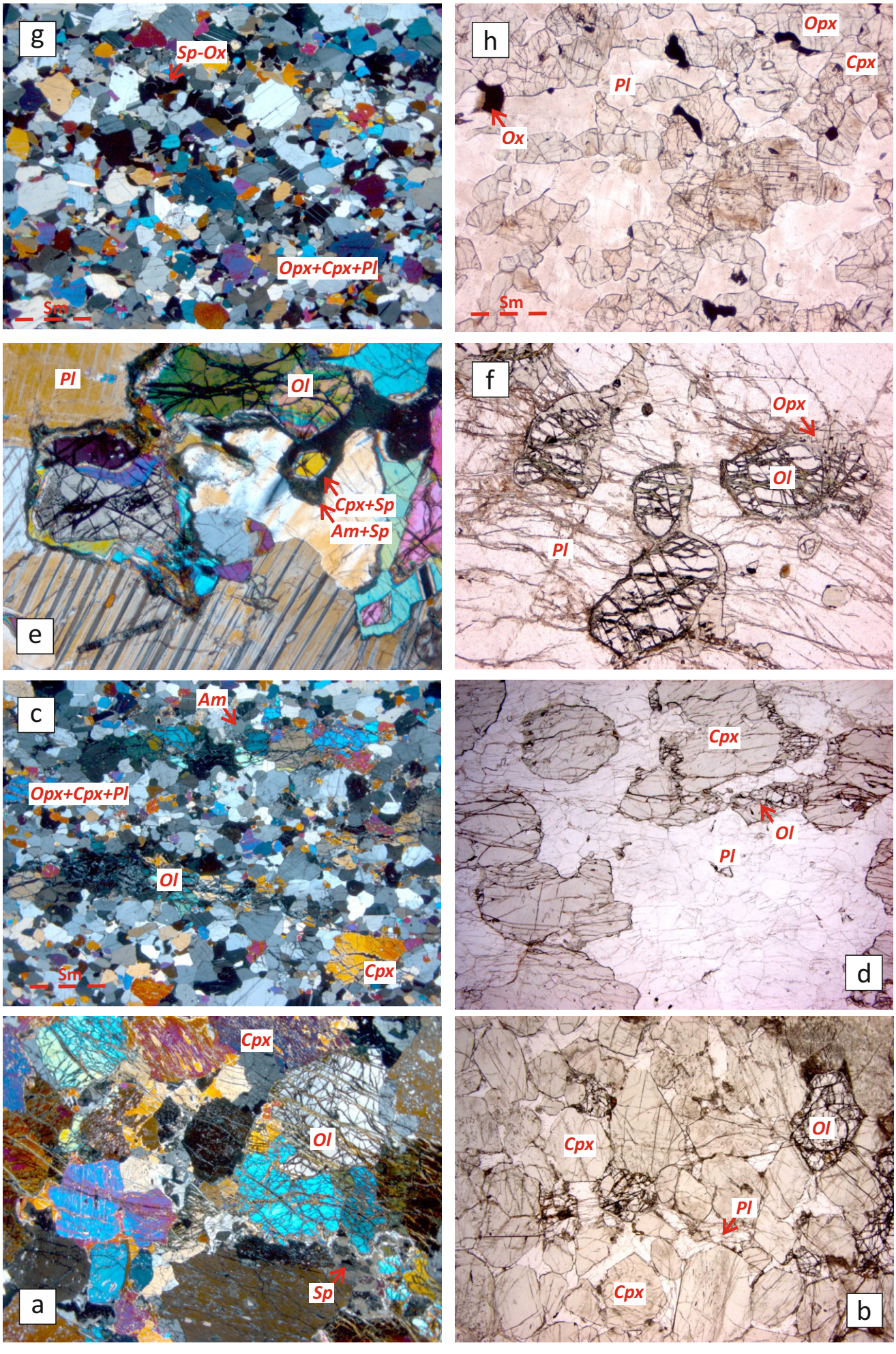
Unit	*Regional tectonic unit*	*Metamorphism (a)*	*General lithology*	*Comments*
Río Boba metagabbro suite	Quita Espuela, Matel y La Manaclá. Subduction-related magmatism. Uppermost structural levels	Emplacement: low-P, two-pyroxene granulite facies; cooling: upper amphibolite facies	Gabbronorites, gabbros, diorites and metamorphic derivatives (Quita Espuela and Matel assemblages). Subordinated ultramafic cumulates (wehrlites and websterites). Late Cretaceous intrusion of Hbl-bearing tonalites and diorites (90.1±0.2 Ma; Manaclá suite) (f)	Refractory, low-Ti IAT and boninite-types of parental melts. Sub-solidus deformation at high-T. Intrusive contact developed hornfels in the Puerca Gorda Schists
Morrito subcomplex	El Guineal Schists. Upper structural levels. Subducted/accreted volcanic arc crust	Blueschist and upper greenschist facies	Porphyritic meta-rhyolites, felsic meta-volcanics and quartz-feldespatic schists and phyllites. Rare intercalations of mafic schists	Coherent internal ductile structure. Protholiths are subduction-related felsic volcanic rocks with boninitic signature
	Puerca Gorda Schists. Lower structural levels. Subducted/ accreted volcanic arc crust.	Blueschist and upper greenschist facies	>3000 m thick sequence of mafic schists and porphyritic meta-basalts, with minor intercalated quartz-feldespatic schists	Coherent internal ductile structure. Protholiths are mafic volcanic rocks with boninitic, low-Ti IAT and IAT geochemical signatures. Basal contact on Morrito fault zone
Cuaba unit subcomplex	Jobito subunit. Upper structural levels. Subducted/ accreted arc and forearc crust	Low-P amphibolite facies, outer shear zone	Fine-grained amphibolites and metadiorites. Intercalated tectonic lenses at the base of serpentinized peridotites (harzburgites) with supra-subduction zone signature	Coherent internal ductile structure. Mafic protholiths of low-Ti and low-LREE IAT and IAT affinity. Syn-metamorphic S-L fabrics. Strong non-coaxial deformation.
	Guaconejo subunit. Lower structural levels. Subducted/ accreted arc and forearc crust	High-P garnet-epidote amphibolite to eclogite facies, antiformal core	Garnet-bearing mafic gneisses, metagabbros, metadiorites, retrograded eclogites and mylonitic rocks. Ultra-high-P metamorphism (?), P~42 kbar and T~750-800 ºC; retrograde amphibolite P~12 kbar and T~750 ºC; late cooling and decompression (b). Mafic eclogites at P=25-35 kbar/T=650-750 ºC (e)	Coherent internal ductile structure. Mafic protholiths of low-Ti and N-MORB affinity. Syn-metamorphic S-L fabrics. Strong coaxial and coaxial vertical thinning
	Subducted/accreted arc or oceanic mantle and/or lower crust (b, e)	Ultra-high-P eclogite and eclogite facies	Garnet-bearing ultramafic rocks. Subsolidus reequilibration, 27-30 kbar and 807-838 ºC (42 kbar/867 ºC, one garnet peridotite) (b). Cumulate crystallization of mafic melt at P=5-7 kbar and T>850-900 ºC; prograde met. to (at least) 7-11 kbar and T>700 ºC (e)	Ultramafic hard blocks tectonically enclosed in the lower structural levels of the Guaconejo subunit
Helechal subcomplex	Serpentinized peridotites (spinel-harzburgites and lherzolites)	Upper to lower greenschist facies	Massive and foliated chrysotile-lizardite-magnetite serpentinites (±Tlc±Trm±Chl). Relic textures of abyssal peridotites	Resembles Gaspar Hernández serpentinized peridotites
Hicotea Schists	Subducted/accreted volcanic arc crust	(Lw/Gln+Ep) Blueschist and greenschist facies	Mylonitic mafic schists (metavolcanics) with minor intercalations of white marbles and chert	Tectonic mega-blocks. Protoliths are basic-intermediate volcanic rocks with a low-Ti IAT signature
Jagua Clara serpentinite-matrix mélange	Accretionary prism. Ophiolitic material. Chaotic ductile to brittle disruption; mélange-like internal structure. Exotic high-P blocks. Arc-continent suture zone	Upper blueschists and eclogite facies followed by retrograde blueschist and greenschist facies	Serpentinite/antigorite schistosity surfaces warp around mélange hard blocks (<1m to 2.5km). Blocks are massive serpentinized peridotite, and eclogites, blueschists, greenstones, metasediments and orthogneisses. Serpentinite gouge and breccia	Eclogite: igneous protolith, 139.1±1.9 and 137.8 Ma (U-Pb); metamorphic peak (23 kbar/750 ºC) 103.6±2.7 Ma (Lu-Hf); exhumation 74.7±0.5 Ma (Rb-Sr) and 73.42±0.74 Ma (Ar-Ar) (c). High-P metabasites originated from N-MORB and IAT type protoliths (f).
Gaspar Hernández serpentinized peridotite	Accretionary prism. Ophiolitic material. Fragments of the proto-Caribbean oceanic lithosphere	Low-P amphibolite and upper greenschist facies sea-floor metamorphism	Massive and serpentinized harzburgite and dunite. Chrysotile-lizardite-magnetite serpentinites. Relic textures of abyssal peridotites (d).	Bodies, sills and dykes of tholeiitic gabbros, microgabbros and dolerites with N-MORB geochemical signatures. Lower Cretaceous magmatic (136.4±0.32 Ma; U-Pb) (f)

(a) Refered to peak P-T conditions of Cretaceous metamorphism;

(b) include garnet-bearing ultramafic rocks metamorphosed to ultra-high-P eclogite facies (Abbott et al., 2006, 2007, 2009)

(c) Data from Krebs et al. (2008, 2011); (d) Data from Samur et al. (2010); (e) Data from Hattori et al. (2010);

(f) Data from Escuder-Viruete et al. (2009, 2011c, 2013b); (g) Weaver et al. (1976)



Supporting Information B. Photomicrographs of Fig. 3 in complementary parallel/cross-polarized light (PPL/CPL).