







Geology and hydrothermal alteration of the Santa Bárbara polymetallic deposit (Cu, Zn, Pb, Ag, Au): Insights into Ediacaran-Cambrian rift system evolution, Camaquã Basin, southern Brazil

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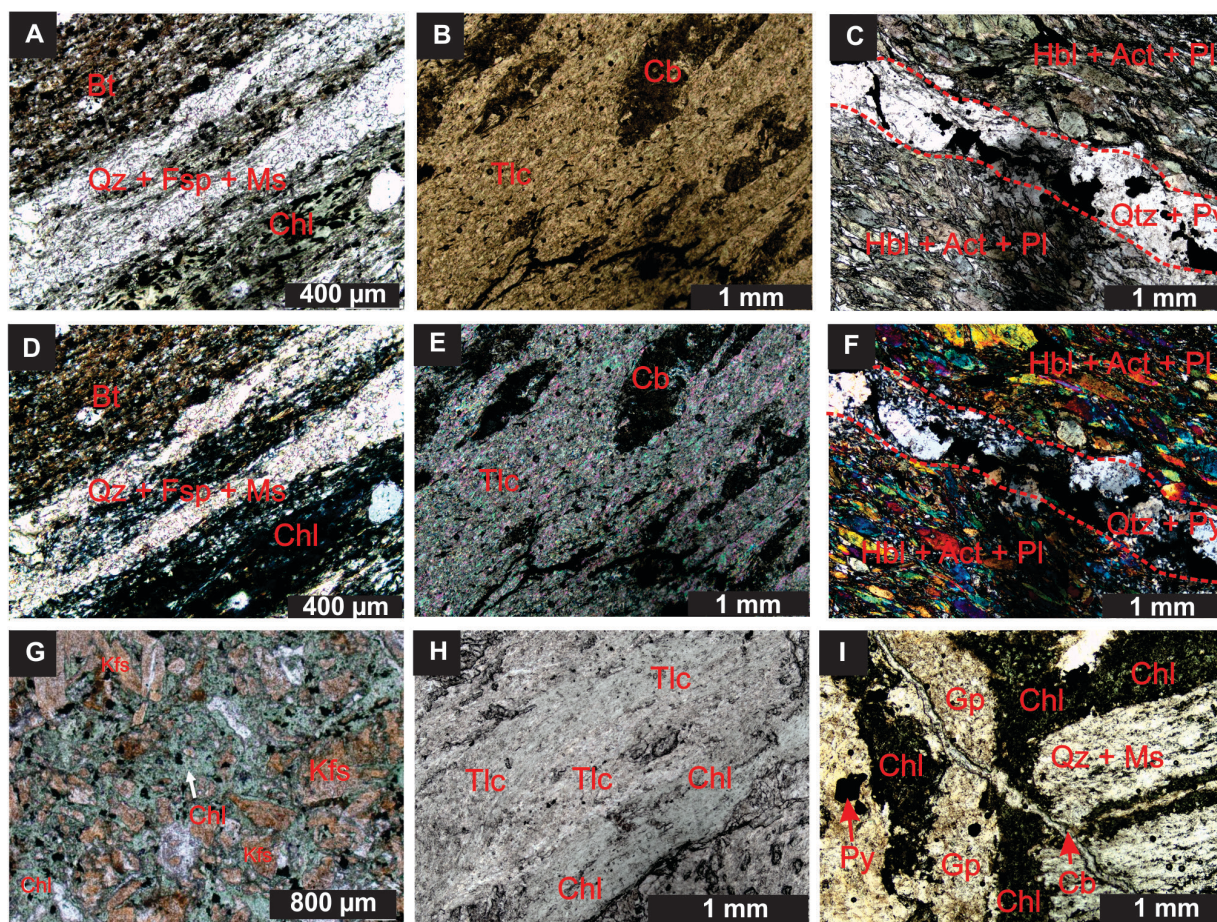
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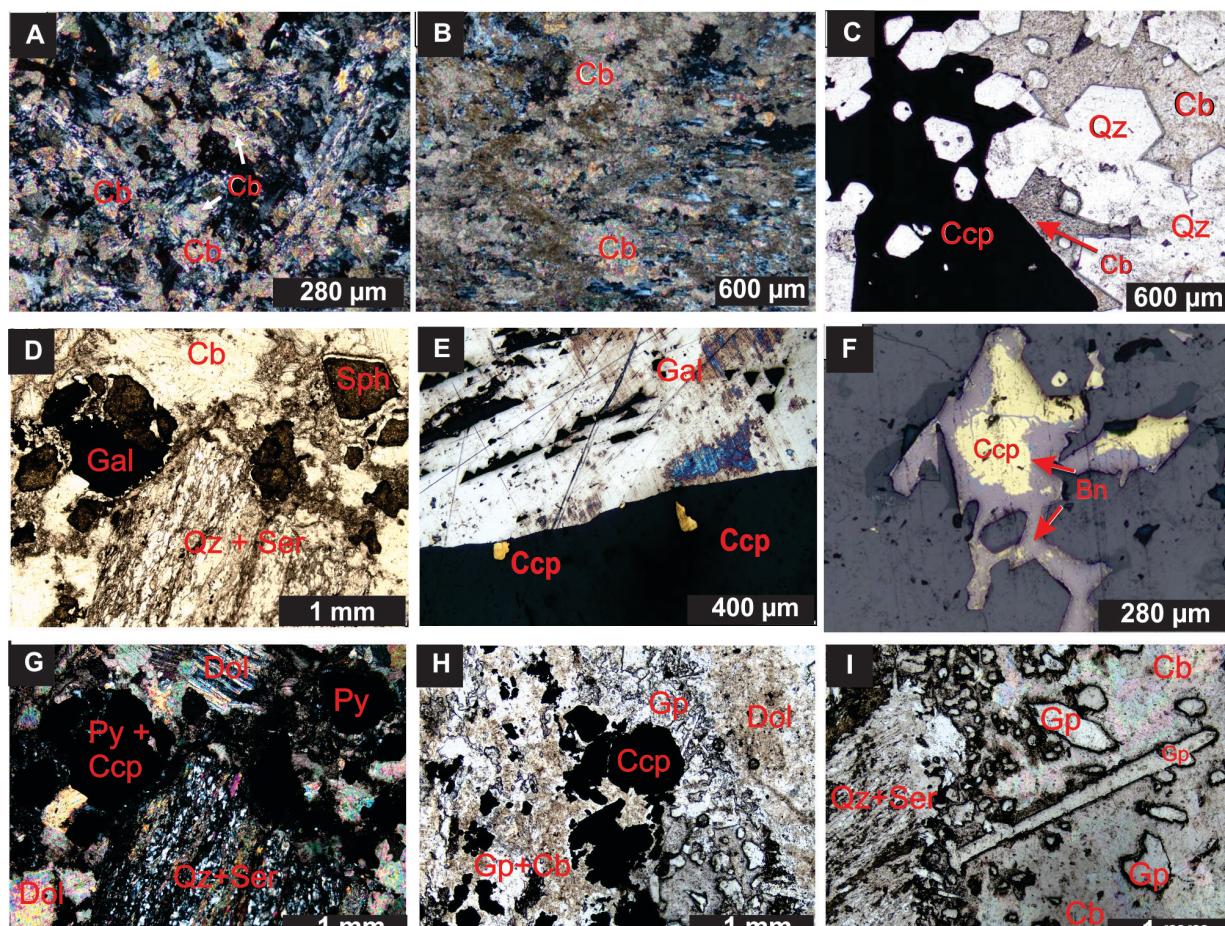
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APPENDIX

Appendix 1



Appendix 1 - continued



Photomicrographs of main lithotypes found in drill hole SB-02, and argillization and chloritization at the Santa Bárbara Deposit.

(A) mylonitic muscovite-biotite-chlorite schist quartz-feldspathic (580m, LTP);

(B) mylonitic talc-carbonate schist (502m, LTP);

(C) mylonitic actinolite amphibolite (689m, LTP);

(D) Photomicrograph of (A) in LTC;

(E) Photomicrograph of (B) in LTC;

(F) Photomicrograph of (C) in LTC.

(G) Hydrothermal breccia (cataclasite) with pervasive chloritization (SB-08-119m-LTP); (H) Talc-chlorite schist (SB-02-219m-LTP);

(I) Fissural hydrothermal chlorite associated with a vein of sulfate, carbonate, and sulfide (SB-02-779m-LTP);

(J) Andesitic basalt with saussuritized plagioclase and interstitial hydrothermal chlorite (SB-08-119m-LTP);

(K) Fissural hydrothermal chlorite associated with a carbonate vein (SB-08-120m-LTP); (L) Fissural hydrothermal chlorite associated with quartz and sericite veinlets (SB-08-122m-LTP).

(M) Hydrothermal breccia with fragments of potassic quartz-feldspathic rock and argillization fissure zones (SB-09-56m, LTP);

(N) Detail of a carbonate vein wall with ultracataclasite and clay matrix (SB-09-60m, LTP);

(O) Sericitized proto-cataclastic quartz-feldspathic breccia with argillization fissure zones (SB-09-56m, LTP);

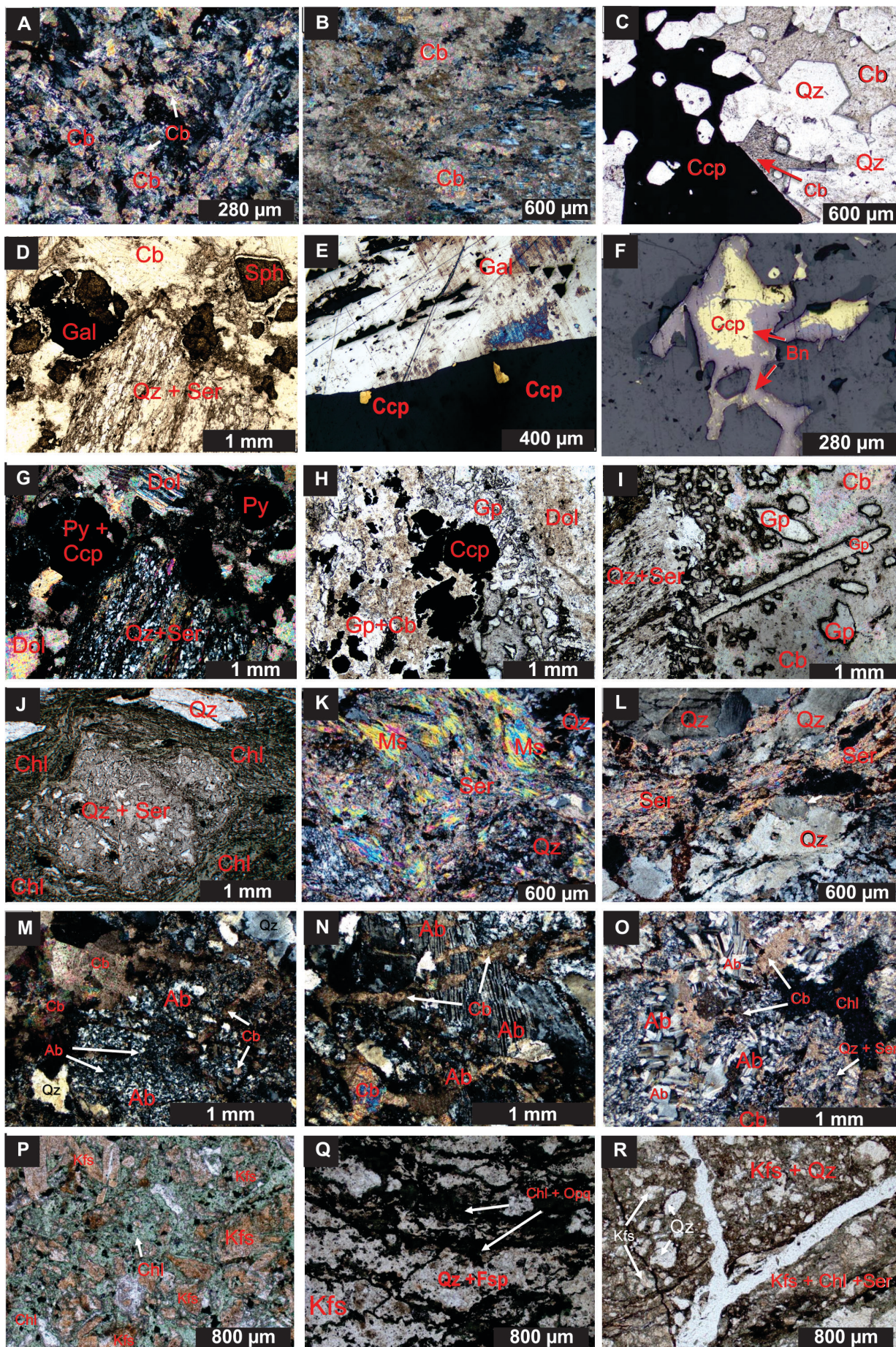
(P) Image of (M) in LTC;

(Q) Image of (N) in LTC;

(R) Image of (O) in LTC.

Abbreviations: Ill: Illite; Ser: Sericite; Cb: Carbonates; Qz: Quartz; Fk: Potassic Feldspar; LTP: Transmitted light, parallel polarizers; LTC: Transmitted light, crossed polarizers; LRP: Reflected light, parallel polarizers.

Appendix 2



Photomicrographs of carbonatization associated with sulfation, sericitization and sodium and potassic alteration at the Santa Bárbara Deposit.

- (A) Pervasive carbonatization in andesite with igneous phaneritic texture and preserved plagioclase pseudomorphs (SB-08-116m, LTC);
- (B) Intense pervasive carbonatization near a sulfide-bearing carbonate vein, featuring anhedral calcite aggregates (SB-08-116m, LTC);
- (C) Sulfide-bearing carbonate vein with euhedral quartz and chalcopyrite crystals (SB-08-122m, LTC);
- (D) Sulfide-bearing carbonate vein with euhedral sphalerite and galena crystals (SB-02-502m, LTC);
- (E) Detail of (D), showing galena crystal with small chalcopyrite crystals on the edge (SB-02-502m, LRP);
- (F) Chalcopyrite replacing edges and fractures with bornite (SB-08-119m, LRP);
- (G) Sulfide-bearing carbonate vein with poikiloblastic crystals of pyrite and zinc sulfide (SB-02-779m, LTC);
- (H) Detail of a zinc-mineralized vein with banding of sulfides, sulfates, and Fe-carbonates (SB-02-779m, LTP);
- (I) Detail of gypsum crystals at the edge of a zinc-mineralized vein (SB-02-779m, LTP); (J) mylonitic Quartz-chlorite schist with a porphyroclast of sericitized quartz-feldspathic breccia (SB-02-651m, LTP);
- (K) Sericitized hydrothermal breccia with muscovite porphyroclast (SB-08-138m, LTC); (L) Silicified and sericitized tectonic breccia (SB-08-122m, LTC);
- (M) Tectonic breccia with albitized fragments and small anhedral albite crystals, overlaid by pervasive carbonatization (SB-09-56m, LTC);
- (N) Tectonic breccia with albitized fragments featuring polysynthetic twin albite crystals, overlaid by fissural carbonatization (SB-09-48m, LTC);
- (O) Hydrothermal albite with chessboard-type twinning (SB-09-69m, LTC).
- (P) Chloritized hydrothermal breccia with fragments of potassic rock (SB-08-119m, LTP);
- (Q) Potassically altered tectonic breccia overlaid by fissural argilization (SB-09-69m, LTC);
- (R) Quartz-feldspathic fault cataclasite, potassically altered and intersected by a quartz vein (SB-07-103m, LTC).

Abbreviations: Chl: chlorite; Ms: muscovite; Ser: sericite; Cb: carbonates; Qz: quartz; Fk: potassic feldspar; Ab: albite; Gal: Galena; Sph: Sphalerite; CCp: Chalcopyrite; Bn: Bornite; Gp: Gypsum; Py: Pyrite; LTP: transmitted light, parallel polarizers; LTC: transmitted light, crossed polarizers; LRP: reflected light, parallel polarizers. Py: Pyrite; LTP: transmitted light, parallel polarizers; LTC: transmitted light, crossed polarizers; LRP: reflected light, parallel polarizers.