

Mineral Paragenesis of the El Alacrán Deposit Cu-Au Mineralization, San Matías Project, Córdoba Department, Colombia

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I. INTRODUCTION

Cooper-gold mineralization at the San Matias Project (SMP; Cordoba Minerals Corp., HPX Group) in NW Colombia comprises three distinctive styles: 1)Cu-Au-magnetite replacement mineralization (e.g. El Alacrán Deposit), 2)Cu-Au porphyry stocks (e.g. Montiel East Deposit), and 3)Meso to epithermal veins (e.g. Mina Ra) (Fig. 1).

The SMP lies in the northern sector of the Calima Terrane, composed of basalts, flysch-type chemical and siliciclastic sediments and pyroclastic rocks accreted to continental terranes (i.e. Tahami-Panzenu) in Late Cretaceous times though the Romeral Fault Zone (Restrepo et al., 2009; Ordóñez-Carmona, 2001; Vinasco et al., 2006). The Calima Terrane rocks were intruded by a Late Cretaceous east-facing magmatic arc producing a series of calc-alkaline tonalitic intrusions (e.g. Buga Batholith, ~90 Ma; Villagomez et al., 2011). The age of magmatism in the SMP is markedly younger (Montiel East porphyry, 70.0 ±2.0Ma; Leal-Mejía and Hart, 2017).

II. EL ALACRAN DEPOSIT

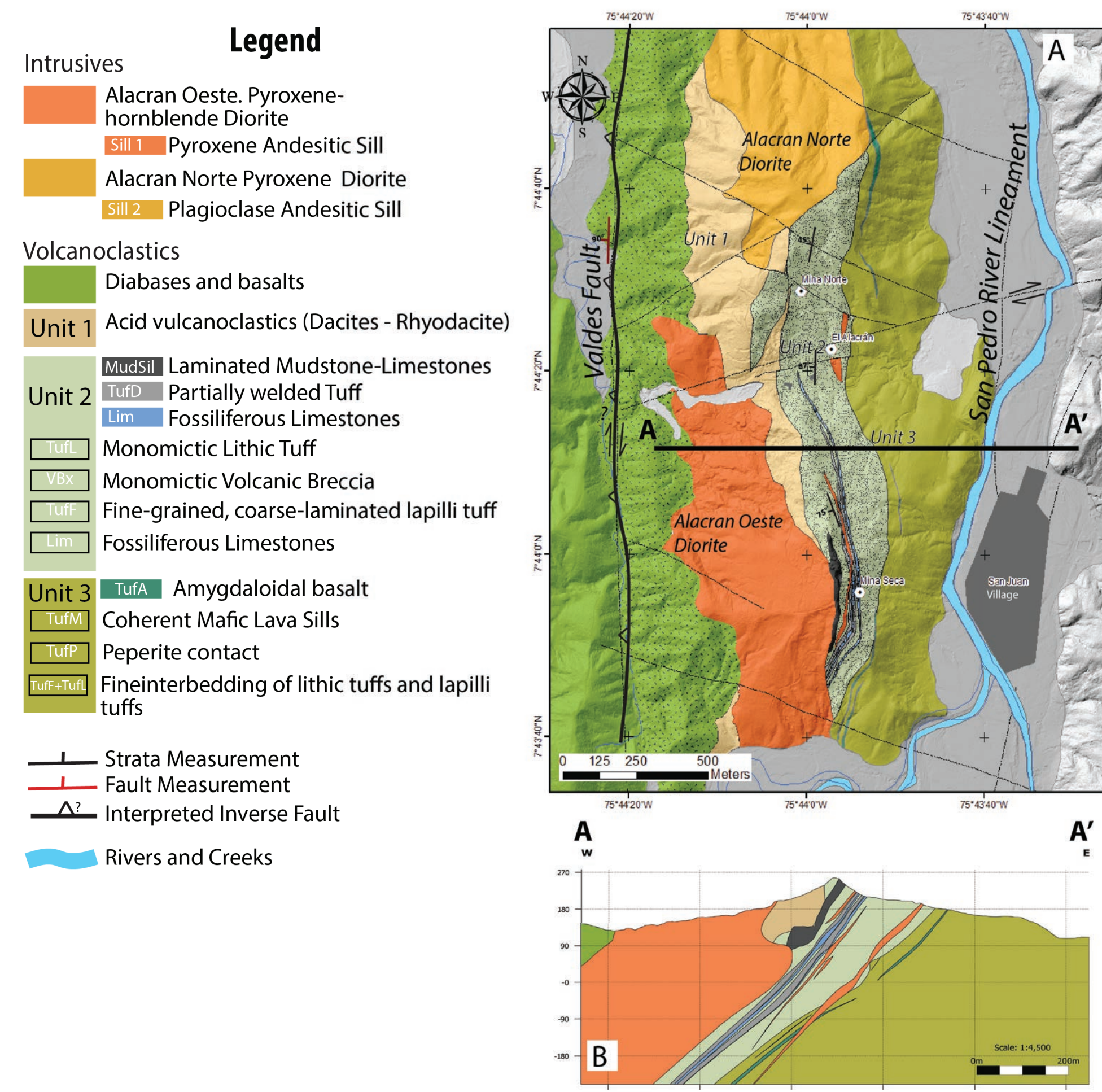


Figure 2. El Alacrán Deposit Geology. A. Surface map showing the major structures. B. East – West cross-section (A-A'). C. Stratigraphic column and marker lithofacies horizons. RBx: Rhyolite-andesite Breccia (1a-1b). MudSill: Laminated Limestone (2a-2b). Lim: Fossiliferous Limestone (3a-3b). TuF: Fiamme Tuff (5a-5b). TuFA: Coherent mafic lava with amygdaloids (5a-5b)

Mineralization at the El Alacrán Deposit (36.1M tonnes of Indicated Resources at 0.57% copper and 0.26 g/t gold (0.72% CuEq), and 31.8M tonnes of Inferred Resources at 0.52% copper and 0.24 g/t gold (0.65% CuEq) at a 0.28% CuEq cut-off) is hosted by a 550m-thick west-dipping succession comprising mafic volcanic rocks overlain by a volcanoclastic sequence and capped by post- and possibly syn-mineral dioritic intrusions (i.e. Alacrán Norte and Oeste). This succession can be broadly divided into three main stratigraphy units from top to bottom: Unit 1 (Acid volcanics), Unit 2 (Volcano-sedimentary rocks) and Unit 3 (Mafic Volcanoclastic rocks) (Fig. 2). Cu-Au mineralization is preferentially hosted in Unit 2.

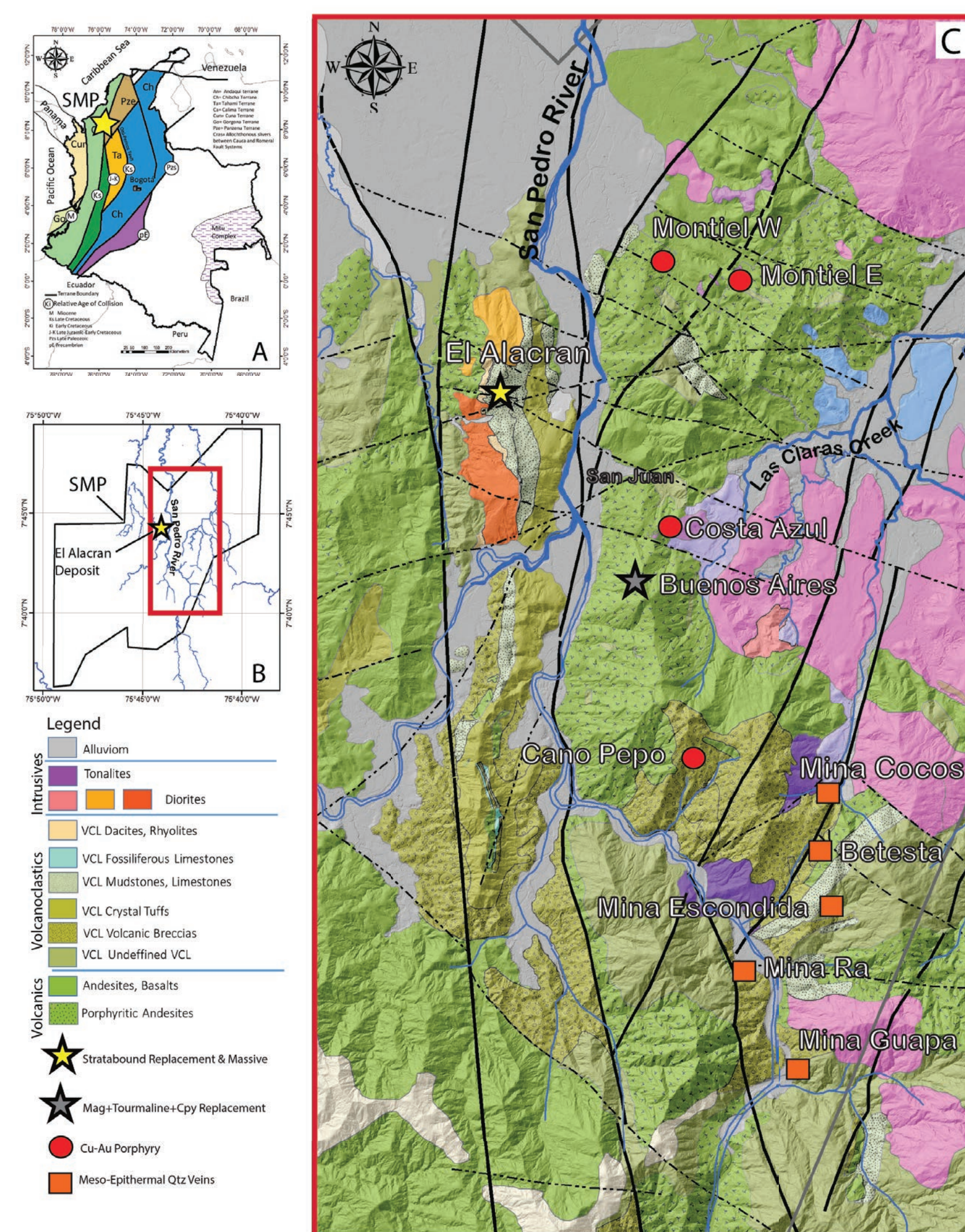
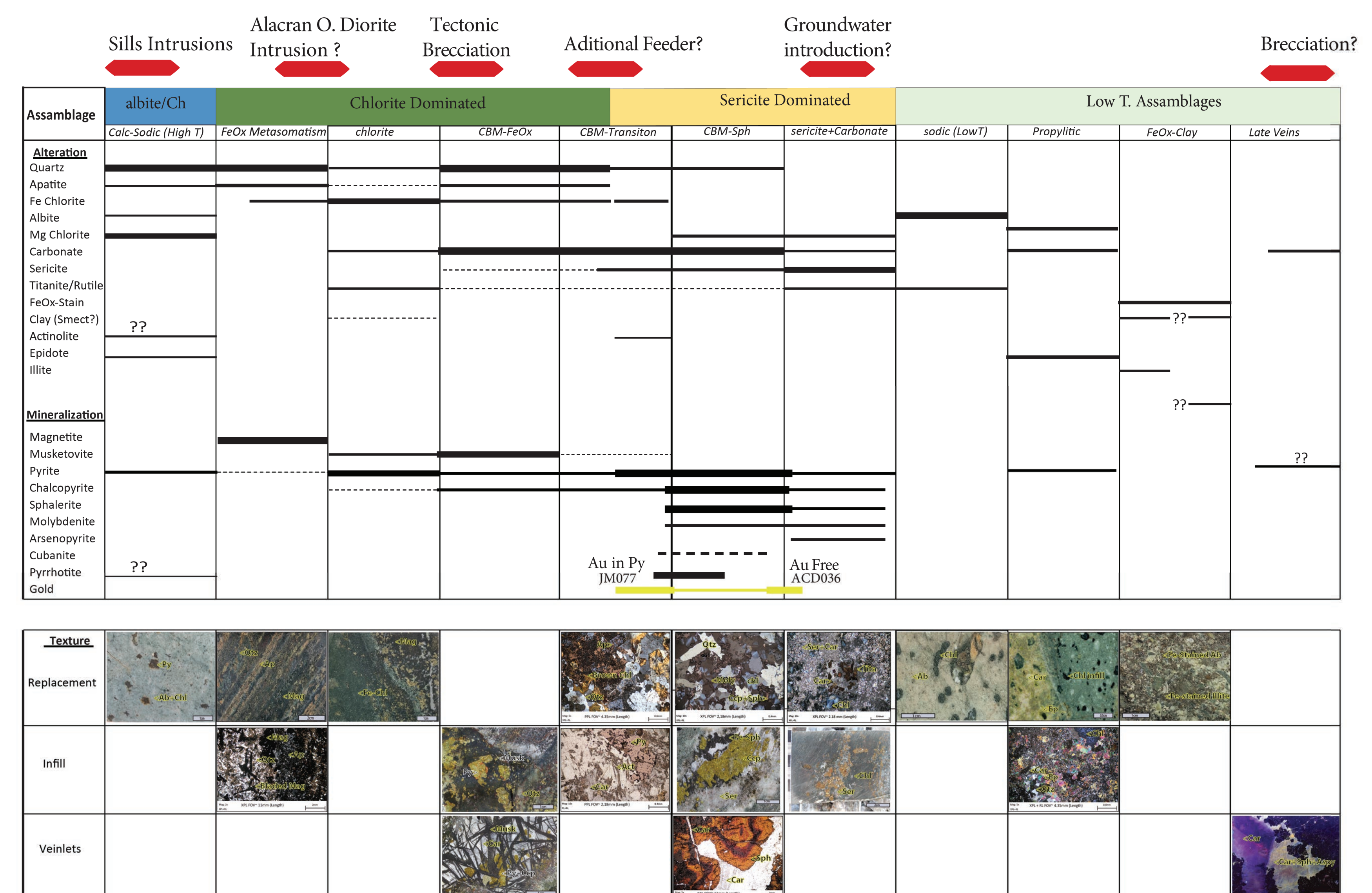


Figure 1. The San Matias Project. A. Location in the Colombia Tectonic Framework (Restrepo & Toussaint, 1988; Ordóñez-Carmona & Pimentel, 2002). B. San Matias Project area. C. Local geology and main prospects of the San Matias Project.

III. MINERAL PARAGENESIS

Characterization of hydrothermal alteration and mineralization assemblages of samples from the El Alacrán Deposit reveal a clear transition from chlorite-dominated assemblages in the South (i.e. FeOx, chlorite, CBM-FeOx) to sericite-dominated assemblages in the North (i.e. CBM-Sph, CBM transition, sericite+carbonate) (Fig3). A third alteration assemblage dominated by albite+chlorite is spatially associated with the sill intrusions in the northeast part of the deposit. Low temperature assemblages (Propylitic, Sodic and FeOx-Clay) occurs either as distal or later overprint events (Fig. 3).



IV. CONCLUSIONS

- The El Alacrán Deposit mineralogy can be grouped in at least 11 mineral assemblages. The early stages includes Calc-Sodic, FeOx-Metasomatism, Chlorite and CBM-FeOx alteration. An intermediate stage includes CBM-Sph, CBM transition and Sericite+Carbonate alteration.
- The Major Au and Cu events are related with the CBM-Sph stage. That represents the transition of the Chlorite-dominated zone to the Sericite-dominated zone.
- The textural and compositional variability of the volcanic lithofacies in the host rock, highly influenced the final mineralogy of the alteration assemblages.

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