NEW INSIGHTS INTO THE DEVELOPMENT OF THE SOUTHERN SIERRA MADRE OCCIDENTAL AND THE FORMATION OF MULTIPLE MINERALIZATION EVENTS IN THE PLOMOSAS - SAN MARCIAL DISTRICT, SINALOA, MEXICO

AME ROUNDUP.

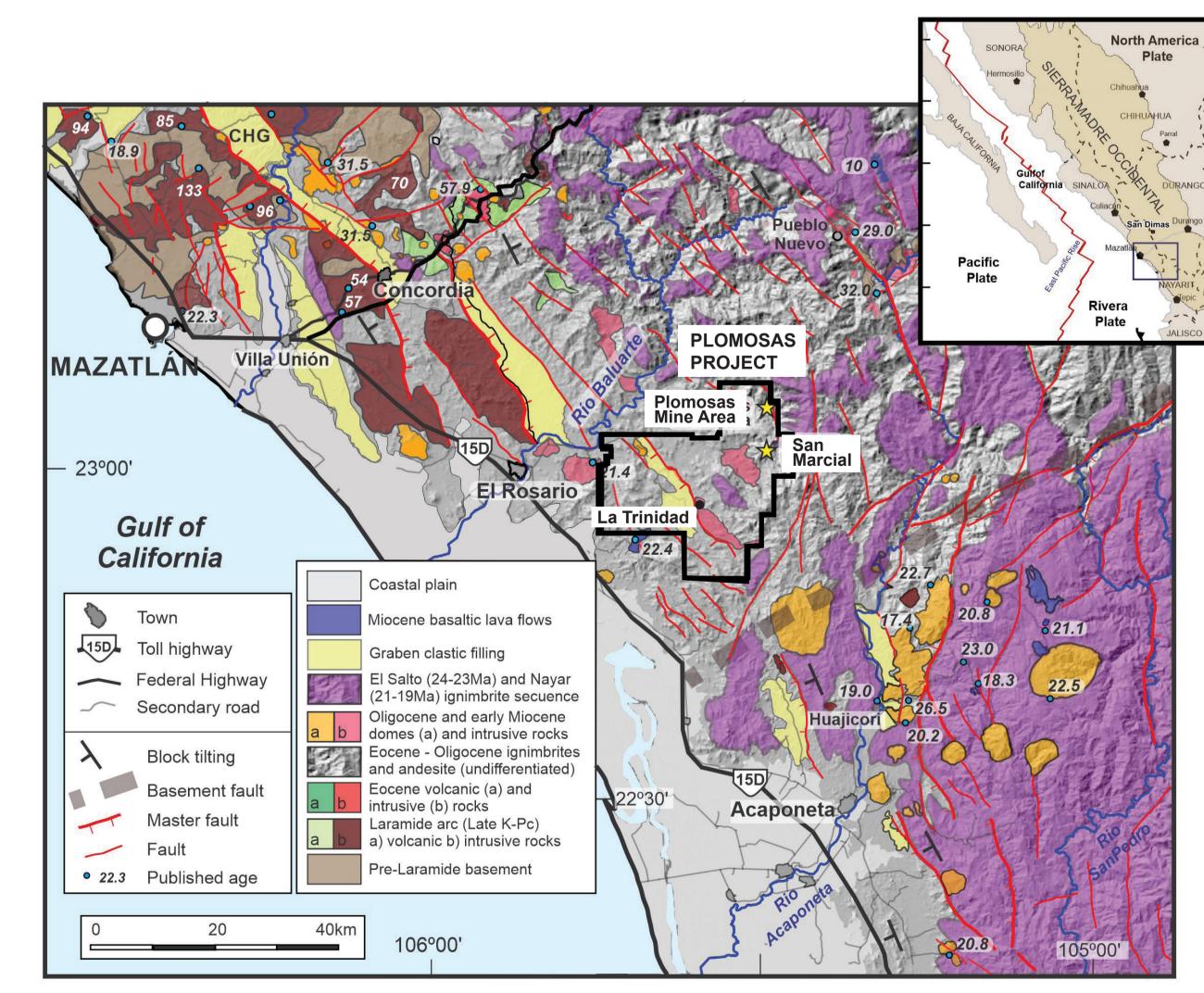
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THE PLOMOSAS-SAN MARCIAL DISTRICT PROJECT

The Plomosas-San Marcial district (PSMD) is a Pb-Zn-Ag-Au epithermal low sulfidation district located at the southern end of the Sierra Madre Occidental (SMO) in Sinaloa, Mexico. Field observations, detailed petrography and U/Pb age dating of the entire stratigraphic sequence were used to characterize the evolution of mineralization styles and obtain new insights into the evolution of the southern extension of the SMO. This study is a collaboration with Vancouver-based GR Silver Mining Ltd. focused on the company's two silver resource areas at the historical Plomosas (underground) Mine Area and the nearby San Marcial Area. Part 1 focused on the Plomosas Mine Area is complete and Part 2 on the San Marcial Area is currently in progress.



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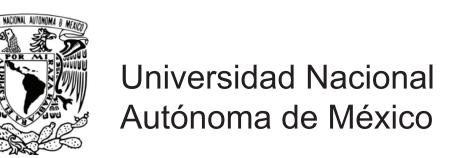








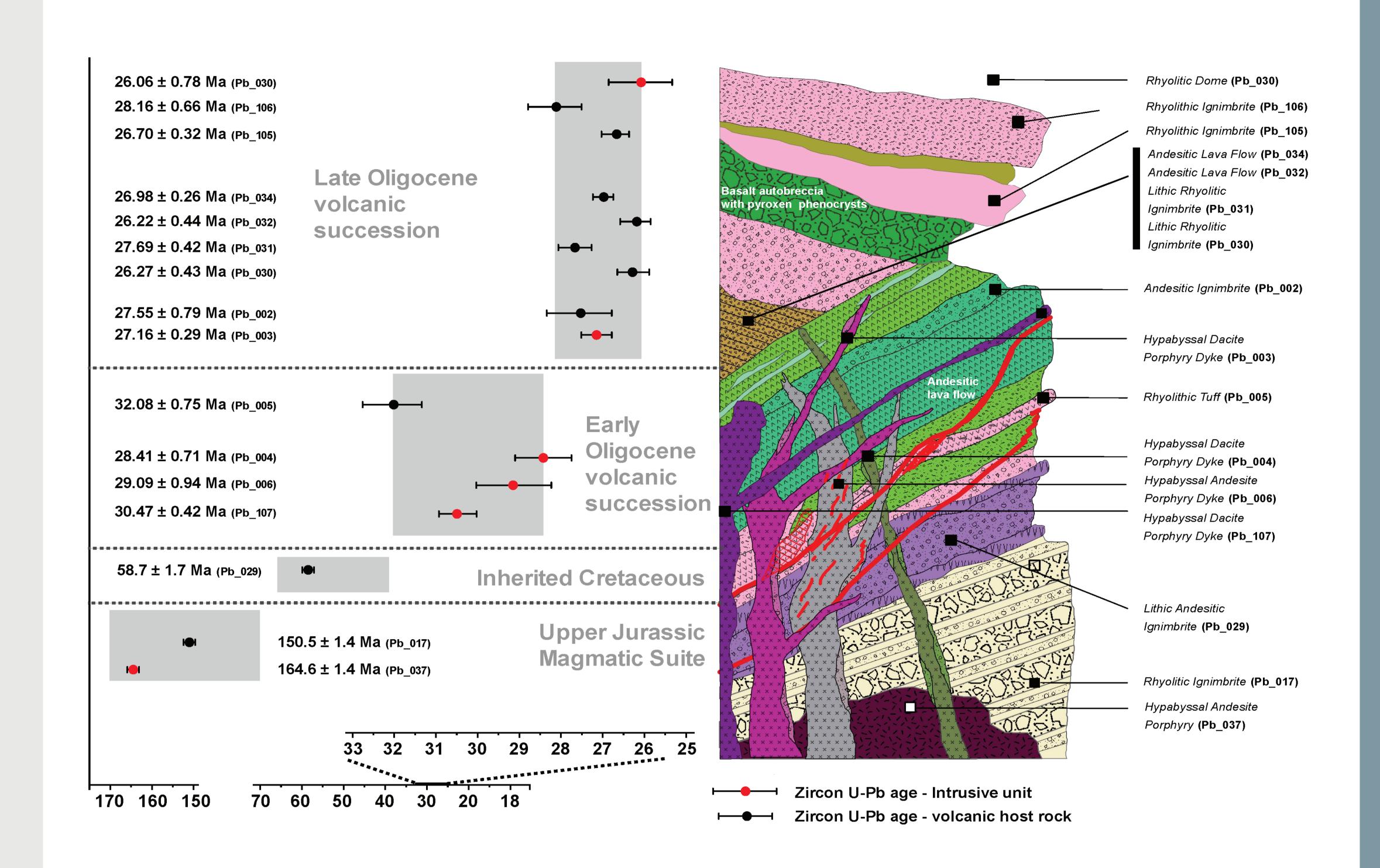








The PSMD does not have a typical SMO stratigraphic column. Basinal-sedimentary units of the Jurassic, the Cretaceous Laramide volcanic arc, as well as the Cretaceous and Paleocene batholiths, are absent in the district. The local basement is composed of non-deformed Late Jurassic volcaniclastic units and coeval felsic intrusions dated at 164-151 Ma. Early to late Oligocene silicic ignimbrites, intermediate lava flows and occasional basaltic flows directly overlay the Jurassic basement, separated by an angular discordance. Several Oligocene coarse intermediate porphyry bodies and a few Miocene rhyolitic domes intrude the PSMD stratigraphy. Within the Oligocene volcanic sequence, an angular discordance separates an early and a late period, dated at 32–28 Ma and 28–26 Ma, respectively.



MAGMA FERTILITY EVENTS

Magma fertility and mineralizing events in the central SMO are typically recognized associated with the final stages of formation of the late Cretaceous Mazatlan batholith and the Eocene Piaxla batholith (Ag-event; San Dimas deposit, Montoya et al., 2019), and at the end of the early Oligocene volcanic sequence (Au-event; San Dimas district, Montoya et al., 2019).

In the PSMD study area, the Cretaceous to Eocene rock units are absent and mineralizing events of that age are not observed. However, the inherited zircons and zircons from lithic rock fragments in Oligocene volcanic units record the existence of a hydrated and oxidized late Cretaceous magmatic event at 100 Ma which is 10 Ma younger than similar lithologies encountered in the San Dimas district (Montoya-Lopera et al., 2019). The Paleocene and Eocene lithologies evidenced by the inherited and lithic zircons encountered in the PSMD remain oxidized and hydrated, as is the case in San Dimas.

At the transition from Eocene to Oligocene, at about 31 Ma, the zircon chemistry turns from being reduced and hydrated, to oxidized and mixed, hydrated and

dry in the PSMD study area. This magma transition corresponds with the appearance of basaltic flows intercalated with the rhyolitic series, and perfectly illustrates the generation of bimodal magmatism. The Oligocene event in the study area shows a comparable hydration level but much higher oxidation than San Dimas. Peak fertility is at 27 Ma, which corresponds with the recognized Au mineralization in the felsic dome intrusions, bracketed by the U-Pb ages of the intrusive events.

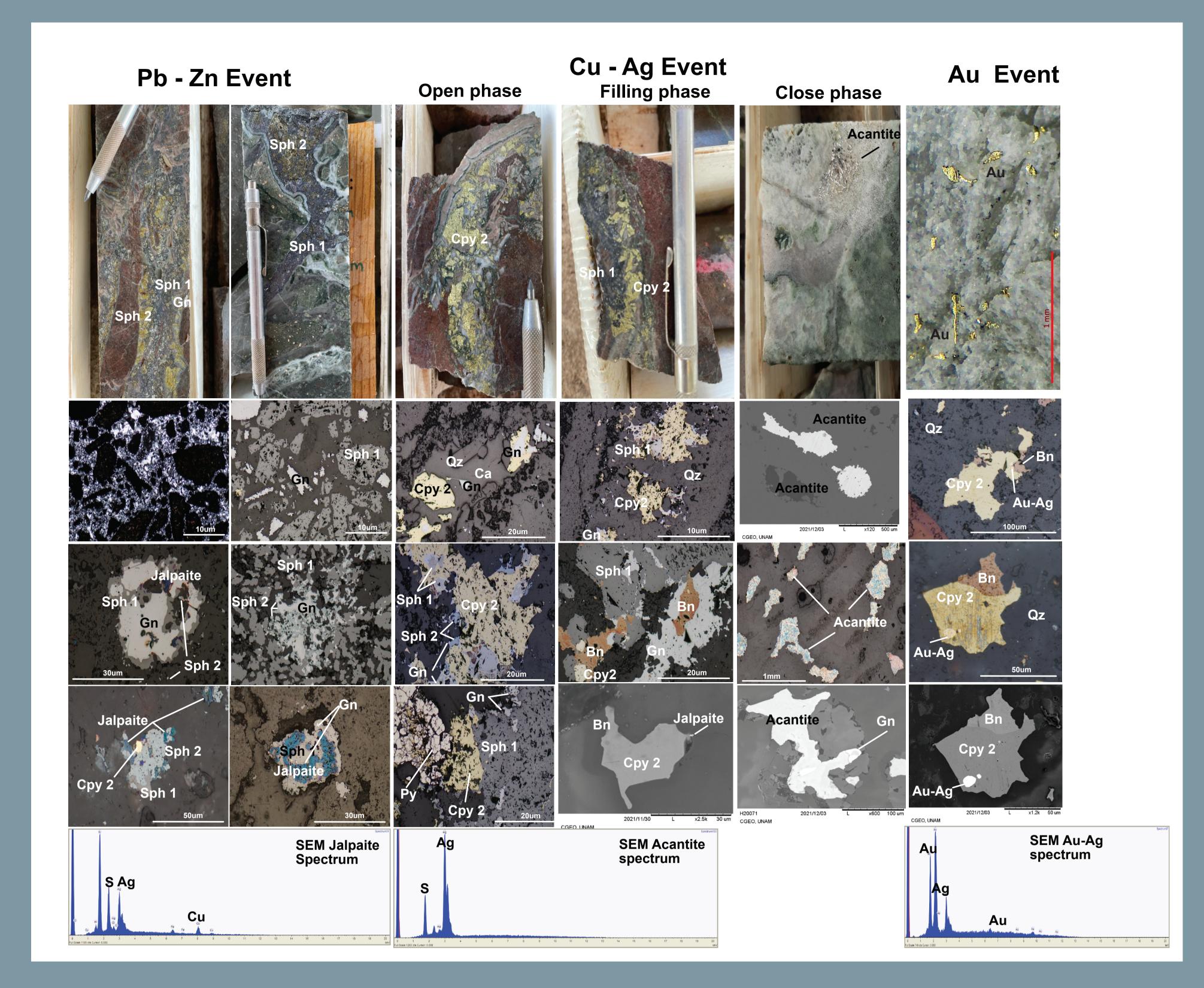
On a regional perspective, the mineralization events in the study area represent the southern limit of the fertile late Cretaceous to Eocene magmas, and the Ag-Au epithermal style mineralization displays younging from north to south along the SMO. This observation is in general agreement with the magmatism migration direction during the Cretaceous, the Eocene and the Oligocene periods (Ferrari et al., 2013).

The comparison between the southern SMO and the central SMO is not as direct as expected. The structural controls and the magmatism occurrence, and intensity, is significantly different. These unexpected differences observed in the study area include the previously unrecognised presence of Late Jurassic magmatism with arc root implications, the lack of evidence of Laramide and Piaxtla batholiths and the Paleocene extension intensity (Montoya-Lopera et al., 2019), which have an important impact on the implications for mineral exploration in the PSMD.

RELATIVE AGES OF MINIERALIZING EVENTS

The mineralization in the PSMD consists of a sequence of overlapping mineralizing events. The earliest event observed is rich in Pb-Zn while the later event is rich in Ag and Au. The Pb-Zn mineralized structures are hosted in ~30 Ma Oligocene volcanic host rock units. Age dating, petrographic observation and cross-cutting relationships indicate that there is a genetic link between Pb-Zn mineralization and coarse-grained intermediate Oligocene intrusive bodies. The Ag-Au veins are related to the late Oligocene volcanic sequence. The Ag- and Au-rich veining crosscu the whole stratigraphic column in the study area. In the absence of direct mineralization ages, Ag-Au mineralization is bracketed by ages of several dacitic porphyry intrusions at 30 to 27 Ma within a period of less than 3 Ma.

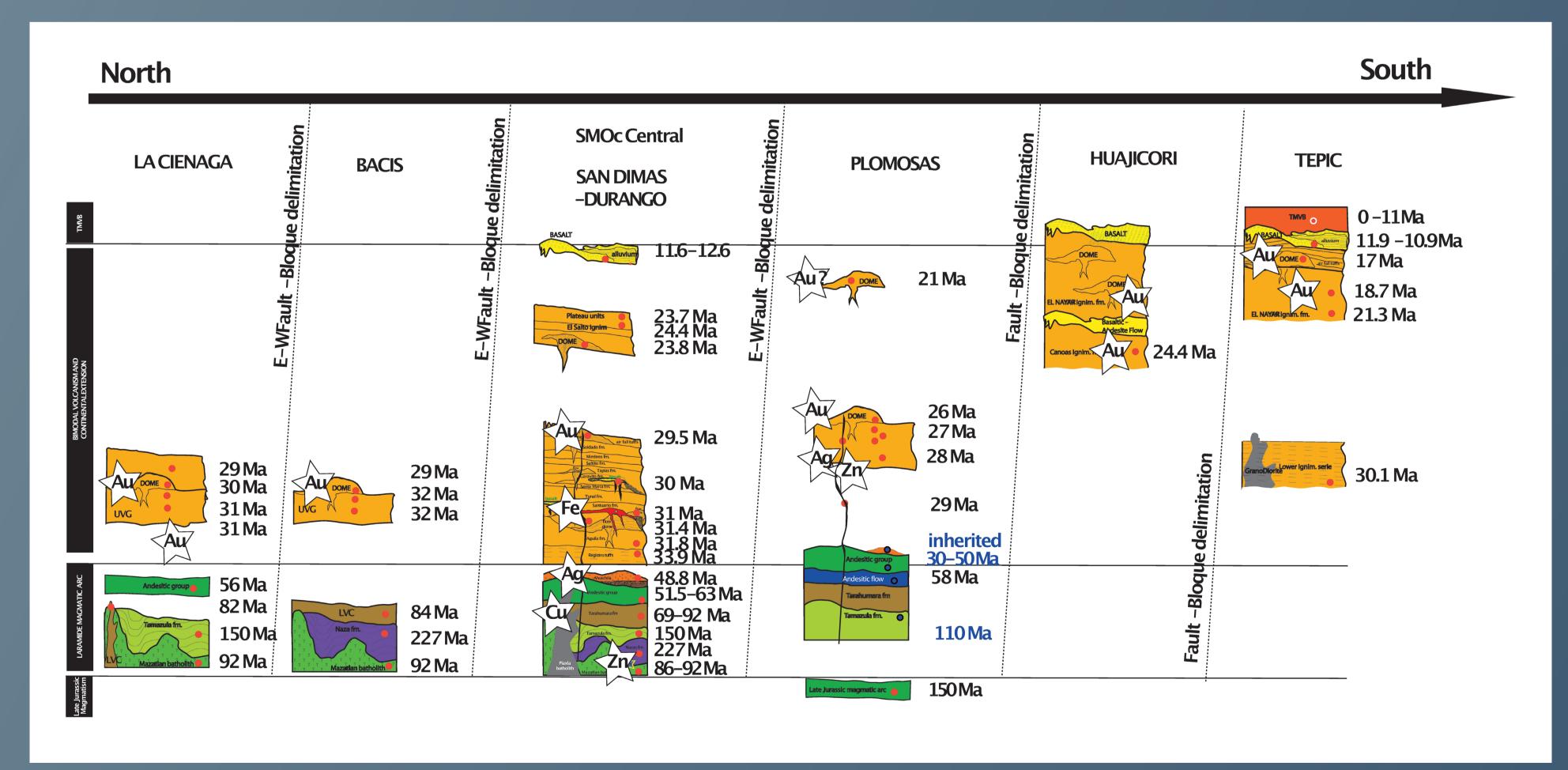
The paragenesis of the three mineralization events in the Plomosas Mine Area can be summarized as follows: **(1) Pb–Zn Event**, represented by chalcopyrite (Cpy 1)-brown Fe-rich sphalerite (Sph



1)-galena (Gn), quartz (Qz)-chlorite-carbonates, and Fe-poor sphalerite (Sph 2), associated with hydrothermal breccias in a predominantly N-S oriented, shallow angle (30°-40°) fault dipping to the west ("Plomosas Fault"); (2) Cu-Ag Event, represented by chalcopyrite (Cpy 2)-bornite (Bn)-covellite-pyrite-jalpaite with quartz-chlorite-epidote-amphibole, associated with a NE-SW trending and steeply dipping vein-breccia system. This event is developed in three main episodes: i) opening phase characterized by crustiform quartz; ii) filling phase where more of the Cu mineralization is deposited; and iii) closing phase, which is also the boiling phase where free acanthite crystallized. (3) Au Event, this final event is represented by electrum (Au>>Ag) associated with sinuous crustiform quartz veinlets and calcite-filled fractures, strong pervasive silicification, sericitization and disseminated pyrite mineralization, emplaced in a NW-SE to N-S trending system with high-angle mineralized structures.

CONCLUSIONS AND IMPLICATIONS FOR EXPLORATION

-The PSMD stratigraphic column displays important differences compared to that described for the central portion of the SMO. The Jurassic metasedimentary formation, as well as the Cretaceous and Paleocene Laramide volcanic arc intrusives, are absent in the district. In the PSMD, the basement is composed of Late Jurassic volcanoclastic units and coeval felsic intrusions. The early to late Oligocene bimodal volcanism, consisting of ignimbrites, lava flows and occasional basalts, unconformably overly the Jurassic basement. Within the Oligocene



volcanic sequence an angular discordance separates an early and a late period. Different from the central SMO, several Oligocene coarse intermediate porphyry bodies and a few Miocene rhyolitic domes intrude the PSMD stratigraphy, illustrating the proximity of Miocene magmatism to the south.

- The Plomosas-San Marcial mineralization is the result of overprinting of at least two mineralizing events (a Pb-Zn event and a Ag-Au event) developed at 30 Ma and 27-26 Ma, which coincides with the beginning of explosive felsic volcanic events in Sinaloa.
- Late Oligocene domes dated at 26 Ma are the source of the Au veins, considered the last mineralizing event.