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SULFUR AND LEAD ISOTOPE STUDY OF THE EL MOCHITO Zn-Pb-Ag DEPOSIT

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Abstract

The El Mochito mine, located in west-central Honduras, exploits a Zn-Pb-Ag skarn deposit. Sulfide minerals including sphalerite, galena, pyrrhotite, and pyrite postdate a gangue consisting mainly of pyroxene in the hedenbergite-diopside series and garnet in the andradite-grossular series. A strong structural control is apparent, with most mineralization located along or near fault zones. No igneous body, which could have contributed to the formation of the skarn, appears spatially associated with the El Mochito deposit, and a source of fluid and metals has not been identified previously.

$\delta^{34}S$ values of sphalerite, galena, and pyrrhotite cluster between –1 and +2 per mil, suggesting that the sulfur at El Mochito was primarily igneous in origin. Lead isotope ratios for galena have mean values of 18.766, 15.616, and 38.572 for $^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$, and $^{208}Pb/^{204}Pb$, respectively, and are similar to Pb isotope ratios for the Miocene-Pliocene Padre Miguel ignimbrite. A progressive decrease in the $\delta^{34}S$ values of sphalerite and a corresponding increase in the whole-rock Pb isotope ratios of the host limestone correlate with decreasing alteration from northeast to southwest along the trend of the Salva Vida and Nacional orebodies. These observations are interpreted to indicate that the fluid and lead source was located to the northeast of the deposit, and that magma genetically related to the Padre Miguel ignimbrite produced the hydrothermal system, which formed the deposit.

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