

Provenance and Maximum Depositional Age of the Nueva Segovia Schist, Nicaragua: Tectonic Implications for Orogenic Gold in Central America

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The Nueva Segovia schist of NW Nicaragua constitutes a critical yet under-characterized unit in the tectonic evolution of the Corona de Oro district, as it is the primary host for high-grade, orogenic gold mineralization. Due to a paucity of geological studies, the relative age of the Nueva Segovia schist is unknown, limiting regional stratigraphic correlations and interpretation of the tectonic evolution leading up to gold mineralization in the Cretaceous. This study addresses this gap using U-Pb LA-ICP-MS analysis of detrital zircon grains from representative samples hosting the San Albino gold deposit to establish a revised chronostratigraphic and regional tectonic evolution model. From 291 concordant analyses, the five Nueva Segovia schist samples exhibit subsample variations between the prominent age peaks at approximately 1200–1000 Ma, 470 Ma, 250 Ma, and 180 Ma. These detrital age spectra are similar to Jurassic successions in southern Mexico and Honduras, with significant input inferred from Rodinian sources (i.e., Grenville Orogeny-related) exposed in Colombia, South America and/or the Gulf Coast, North America. The youngest concordant detrital zircon grains ($N = 17$) yield a maximum depositional age of 184.4 ± 0.9 Ma when calculated using a weighted mean ($MSWD = 3$) and a maximum likelihood age of 182.4 ± 1.1 Ma ($MSWD = 0.36$; probability of fit = 97%) when calculated from radial plot analysis. These results indicate that the Nueva Segovia schist is at least Early Jurassic and most likely correlates with the lesser deformed Agua Fria formation, which is well described in the Central Highlands of Honduras. Further, these results support a shared tectonic evolution between the Chortis terrane of Nicaragua with terranes comprising portions of northwestern South America (Colombia) and southern Mexico during Jurassic-Cretaceous tectonism that culminated in the formation of regionally extensive orogenic gold occurrences, defining the Corona de Oro district of Nicaragua.