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Title: CORRELATION OF PALEOZOIC AND PROTEROZOIC TERRANES OF SOUTHERN MEXICO WITH THE NORTHERN ANDES BASED ON U-PB GEOCHRONOLOGY OF DETRITAL ZIRCONS

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Abstract: Much has been written about the relationship of the Proterozoic Oaxaca complex and Paleozoic Acatlan Complex of southern Mexico with the northern Andes. Here we show new U-Pb geochronology of detrital zircons of all the units of the Acatlan Complex and some of the Paleozoic cover of the Oaxacan Complex that show that the provenance and the depositional history of the Acatlan Complex and the age of source rocks and their orogenic affinities is from either Gondwana, Laurentia or Oaxaquia, even though the sedimentary packages are presently juxtaposed. These new data clearly show that our understanding of the history of the Acatlan Complex is poor, at best.

The U-Pb zircon ages from the Xayacatlan Formation range from 447 to 3115 Ma. Only five zircons show U/Th ratios >10 indicating that most zircons are magmatic. The cumulative age pattern shows the most important zircon clusters at 447-550 (peak at 477 Ma) and 590-795 (peaks at 603 and 708 Ma). Smaller but distinctive populations occur at 800-1400 (peaks at 946 and 1128 Ma) and 1651-1964 (peak at 1821 Ma) with a few grains in the range 2550-3115 Ma. Zircons from the Cosoltepec Formation yield U-Pb ages ranging from 341 to 3451 Ma. The age-probability curve shows important populations at 500-750 Ma (peaks at 543 and 568 Ma). Minor populations occur in the range 341-450 Ma (peaks at 345, 394 and ~410 Ma), 800-1000 Ma (peaks at 936 and 975 Ma) and 1780-2197 Ma (peaks at 1960, 2087 and 2197 Ma). Detrital zircons from two Chazumba samples (which likely correlates with the Silgara Fm of Colombia) yield ages ranging from 249 to 1772 Ma. The large majority of zircons from Chazumba show low U/Th ratios typical of magmatic zircons. The cumulative age patterns show dominant zircon clusters in the range 249-440 Ma (peaks at 275 and 304 Ma) and 720-1400 Ma (peaks at 744, 922-943 and 1123-1171 Ma)

Our data show that the main units of the complex have different depositional histories and were deposited in contrasting paleogeographic locations at different times. The Xayacatlan Formation represents a Laurentian fragment, whereas that the Cosoltepec Formation is a South American (Gondwanan) suite. The Chazumba and the underlying Magdalena Formation contains zircons compatibles with both Laurentia and Gondwana sources. Our data further indicate that the Xayacatlan and Cosoltepec Formations evolved

independently at least until the Silurian. The Chazumba and Magdalena Formations were deposited during Early Permian time and accordingly, their amalgamation with Cosoltepec and Xayacatlan Formations could not have occurred until the final assembly of Pangea.