Geometry and late Mesozoic-Cenozoic evolution of the Salar de Atacama Basin (22°30?-24°30?S) in the northern Central Andes: New constraints from geophysical, geochronological and field data

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The late Mesozoic-Cenozoic evolution of the Central Andes of northern Chile consists of a series of events related to changing conditions along the plate margin, leading to different episodes of compression and extension. A long-lasting basin which records these changes corresponds to the Salar de Atacama Basin. Its tectonic history has been blurred by several interpretations of seismic reflection lines and multiple chronostratigraphic correlations between subsurface-surface units. As such, many aspects of its tectonic evolution are still unclear. In this study, we performed an E-W gravimetric profile across the Barros Arana Syncline and the basin. We analyzed interval velocities obtained from seismic reflection studies and reviewed the profiles closest to the gravity survey. Four U-Pb samples for detrital zircon analysis were obtained from Late Cretaceous-Paleogene units. Geophysical data show a segmentation of physical properties within the basin, with denser units and faster interval velocities around the late Mesozoic-early Cenozoic units, and lighter, slower units in the actual salt pan. The main contrast in physical properties is observed in the evaporitic and fine-grained continental deposits of the San Pedro Formation. Geophysical and geological constraints show that its thickness varies between 800 and 1200 m, and that it was deformed during later events. The U-Pb data show that the rocks within the Barros Arana Syncline reach well into the Paleogene, and that they were mainly deformed during the late Eocene Incaic Event, where an east-verging thrust system also involving Permo-Triassic units was developed, establishing the

actual structural configuration. The late Oligocene-early Miocene units were then deposited in a post-orogenic setting, with minor compression. A stronger phase around the late Miocene reactivated previous structures and folded these deposits. This continuous, compressive history of the basin, which is mostly a result of the Incaic Event, is in agreement with the regional evolution of the Central Andes.