

Basin inversion and the role of inherited extensional structures in the forearc of northern Chile: The Late Cretaceous tectonic inversion of the Domeyko Basin in the Sierra de Varas segment, Andean Precordillera of northern Chile

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The Andean margin of South America is a long-lived subduction margin since the Permian and, as a consequence, has developed a varied and complex sequence of superimposed deformation and magmatic events recorded in the overriding plate. In this context, compressional inversion of extensional sedimentary basins is a common phenomenon observed in the forearc of northern Chile. In general, the inversion geometry and the recognition of inherited and reactivated structures have not understood and recognized very well. Specifically, in the Precordillera at ca. 24°S, the stratigraphy of Triassic-Jurassic Domeyko Basin in an extensional regime is well-known, however, its geometry and its subsequently late Cretaceous basin inversion remains unveiled. Our aim is to understand the original geometry of the Late Triassic Domeyko Basin and its inversion in the exposed segment of the Precordillera at 24°S. We performed a structural analysis considering geological and structural mapping, stereography of folding and kinematic fault analysis. Our results show three deformational events affected the rocks: a Late Triassic synsedimentary extension; a compressive event responsible of basin inversion and the Precordillera fold-and-thrust Belt; and a set of sinistral strike-slip faults linked to the Sierra de Varas Fault and the Domeyko Fault System. The results evidence the Cretaceous compression caused the inversion of this basin by the propagation of fault-related folds and thrusts, as a result, normal faults were inverted and the Precordillera fold-and-thrust belt was formed. The structural inheritance was a first order factor and played an important role on the geometry of Late Triassic rifting and its Cretaceous inversion and, consequently, a triangle zone was built.