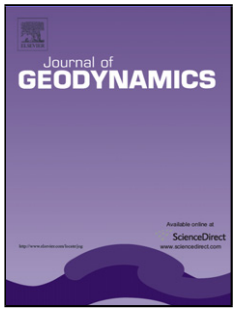

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Tectonic inversion and magmatism in the Lautaro Basin, northern Chile, Central Andes: A comparative approach from field data and analogue models

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Abstract

We present the results of a series of analogue models addressing the relationships between tectonic inversion and magmatism, taking the Lautaro Basin in northern Chile (27º–28ºS), Central Andes as a natural case. The experiments consisted of extension and orthogonal shortening of sand–silicone models to reproduce the tectonic inversion of a previous extensional system synchronous with the emplacement of analogue magma. We analyzed how the variation in the rate of magma intrusion, shortening, and syn-compressive sedimentation may affect the final configuration of an inverted system, and the results were compared with field observations. Our results showed that (i) folding of syn-rift deposits and increased steepness of the master faults accommodate the shortening of the extensional system, (ii) magmatic intrusions condition the final geometries (top view and cross-section) of inverted normal faults in the models and in the Lautaro Basin, (iii) magma tends to migrate preferentially along the inverted faults, and accumulates beneath the faults and in the core of the inversion anticlines, (iv) the syn-inversion magmatism may indicate the migration pathways, which favor major lubrication and slip on the structures during their reactivation.

Key words: Tectonic inversion, magmatism, Lautaro Basin, inverted faults, inversion anticlines.