NEO-TECTONICS WITHIN THE CONTINENTAL FORE-ARC OF NORTHERN CHILE

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The continental fore-arc of northern Chile exhibits juxtaposition of tectonic styles over a relatively narrow stretch of the continental lithosphere.

Detailed fieldwork reveals that the style of deformation varies across the fore-arc from a broadly extensional Coastal Cordillera with fault-alluvial fan interactions and well developed beach terraces indicating an emergent coastline (confirmed by tide gauge records), to active fore and back-thrusting in the Sierra de Moreno which lies 135km west of the Pacific and 15km from the active volcanic arc. Between these areas of active tectonism is a zone of quiescence some 80-100km wide containing wholly undeformed Tertiary and Quaternary successions. This is the Central Depression and may well represent an area of non-emergence of a linked fault system whose activity or otherwise is determined by the rate, angle and obliquity of subduction of the Nazca plate, and whose emergence at the surface is controlled by the pre-existing structural framework.

This presentation attempts to show, via analysis of neo-tectonic structural expression (aided by detailed aerial photography and Landsat imagery), and using earthquake focal mechanisms derived using the Pearce Relative Amplitude Moment-Tensor Program, how the fore-arc is deforming in the area of interest.

The controls being exerted on the accumulation of clastic sediments in an extremely arid environment by the emergent coastline and active extensional regime at the coast are clearly recognisable with fault scarps cutting the Quaternary to Recent alluvium on the eastern side of the coastal range. Multiple beach terraces are developed and fault controlled alluvial fans accumulate on the Pacific coast.