

**FOREARC BASIN EVOLUTION AND PLATE KINEMATICS:
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Active forearc basins provide the best opportunity to study the interaction between plate movements and forearc tectonics. An insight into the plate tectonic controls on arcs may be gained by the comparison of well-constrained basin histories, seismotectonic analysis of the subduction system and well-constrained plate kinematic models.

The continental forearc basin stratigraphies in Ecuador and northern Chile preserve a history of contractional, extensional and strike-slip tectonics. The Tertiary evolution of the forearc shows a very close correlation with the changing convergence rate of the Farallon, and later Nazca, oceanic plate with continental South America. The Incaic orogeny (≈ 40 Ma) occurs at a time of a major change in Pacific plate motion. The angle of convergence as well as the rate also appears to have a controlling effect on forearc tectonics and the subduction of buoyant aseismic ocean ridges correlate with minor tectonic events such as the Quechuan orogeny (≈ 5 Ma).

A fast convergence rate will result in the subduction of thermally young, relatively buoyant oceanic lithosphere. This produces increased interplate coupling, a compressional forearc and basin inversion. Slow convergence results in the subduction of thermally older lithosphere, trench rollback, decreased coupling between the plates, extension in the forearc and basin formation.