

POST-EOCENE PLATE TECTONICS  
OF THE EASTERN PACIFIC

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## ABSTRACT

A Miocene reorientation of spreading patterns in the eastern Pacific is proposed based on post-Eocene tectonic reconstructions using principles of plate theory together with observed magnetic anomaly patterns. The reconstruction shows that the Pacific-Farallon ridge, prior to 26 m.y.B.P., was intact and eastwardly migrating relative to the Americas plate. This ridge, exceeding 11,000 km in overall length, had an equatorial spreading rate of  $\approx 13.5$  cm/yr. At  $\approx 26$  m.y.B.P., a section of the ridge collided with the Farallon-Americas trench off the west coast of North America, stopping all spreading and subduction activity at the point of collision and initiating a direct dynamic coupling between the Pacific and the Americas plates. The coupling, presumably unstable to earlier spreading kinematics, required a major reorientation of sea-floor spreading patterns in the eastern Pacific, and included the following correlative events: a clockwise rotation of the southern portion of the ridge; initial N-S spreading along the Galapagos rift zone; break-up of the Farallon plate into the Gorda, Cocos, and Nazca plates; and dual spreading from the Pacific-Antarctic ridge and the Chile ridge. Between  $\approx 26$  m.y.B.P. and  $\approx 4$  m.y.B.P., there were further concurrent adjustments to the spreading regime involving the continuing overriding of the ridge off the west coast

of North America. Included were numerous sectional jumps of the East Pacific rise, northward migration of the Chile triple junction, westward migration of the Galapagos triple junction, and development of the Gorda-Juan de Fuca-San Andreas-Gulf of California spreading system.

It is proposed that a reorientation of sea-floor spreading kinematics on the order of that described for 26 m.y.B.P. would have produced dramatic changes on circum-Pacific plate boundaries and that present circum-Pacific trench-continent and trench-island arc-marginal basin regimes were either created or significantly altered by this early Miocene reorientation of sea-floor spreading kinematics in the eastern Pacific.