

The Emerging Story of Jurassic Magmatism and Basin Development, Southern US Cordillera and Mexico

Tim Lawton¹

¹Universidad Autonoma de Mexico, Queretaro, Mexico, and this year's.

Abstract

Jurassic magmatism and basin formation dominated the paleogeography of the southwestern United States and Mexico north of the Trans-Mexican volcanic belt. Numerous models exist for the distribution of Early to Late Jurassic magmatic belts and sedimentary basins, with two end-member models: (1) A Middle Jurassic arc, termed the Nazas arc in Mexico, and recorded by intercalated ignimbrites and siliciclastic strata, including eolianites in NW Mexico, extended across the northern part of the country and into Chiapas prior to the southward displacement of that block; in this model the Gulf of Mexico has been considered a backarc basin; (2) the Middle J arc is recorded by scattered plutons on the Baja Peninsula and coastal Jalisco and Guerrero, and the intercalated ignimbrites and strata of northern Mexico represent an assemblage of backarc basins lying between the arc and the Gulf of Mexico, which opened independently of active margin tectonics of western Mexico.

Improved geochronology indicates that extension and basin formation in northern Mexico took place nearly continuously throughout the Jurassic, with waning influence of magmatism on stratigraphic successions by about 165 Ma, the beginning of the Late Jurassic. The new data provide support for the concept that the Nazas arc is in fact the Nazas backarc basin complex, which ranged in age from about 200-165 Ma, and accompanied the rift phase of the Gulf of Mexico. From 165-145 Ma, a succession of extensional basins, known as the Border rift system, formed across northern and central Mexico. These basins contain ash-fall tuffs and uncommon basalts derived from asthenospheric melting, but subduction-related tectonics appears to have been a less-important factor in their development. The extensional basins formed during the sea-floor spreading phase of the Gulf of Mexico in the context of the northward drift of North America during Atlantic opening.