TECTONIC IMPLICATIONS OF PERMIAN TO JURASSIC PALEOMAGNETIC RESULTS FROM THE PERUVIAN CORDILLERA

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We report paleomagnetic data from 28 sites of Permian and Jurassic strata. A stable magnetic component from six sites of Mitu Formation red beds from northern Peru (Bagua region) passes fold and reversal tests and likely represents a primary magnetization (Figure 1). The overall mean pole agrees well with Permian to Triassic poles from cratonal South America, suggesting this part of northern Peru has experienced neither significant rotation nor latitudinal transport since the Permo-Triassic. Thermal demagnetization isolates stable magnetic components in 18 of 22 sites collected from a region spanning 2° in latitude and 5° in longitude from Lake Titicaca to Pisac/Cusco to Ayacucho. The 18 sites are rotated significantly (25° to 125°) counterclockwise and pass a fold test based solely on magnetic inclinations. Three Permo-Triassic sites, two from the La Paz, Bolivia area (Roperch and Carlier, 1992) and another from the Huancayo region (Creer, 1970) are also rotated significantly counterclockwise. Importantly, the amount of the paleomagnetic rotations is similar for both Permian and Jurassic rocks, which would indicate that the rotations occurred after the Jurassic (Figure 2). Because Cretaceous to Neogene rocks from the Cordillera are rotated much less, it would suggest that the age of rotation lies between the Upper Jurassic and the Upper Cretaceous, consistent with an important deformation event observed at that time. Counterclockwise rotation of the Permian to Jurassic rocks implies that the tectonic regime responsible for the rotations included an important component of sinistral shear. However, the paleolatitudes of these sites show no important difference with respect to cratonal South America arguing against the hypothesis that the sites were part of an accreted terrain. The northern limit of sinistral shear lies between about 12°S and 6°S, south of the 6 sites from Bagua (Figure 2).

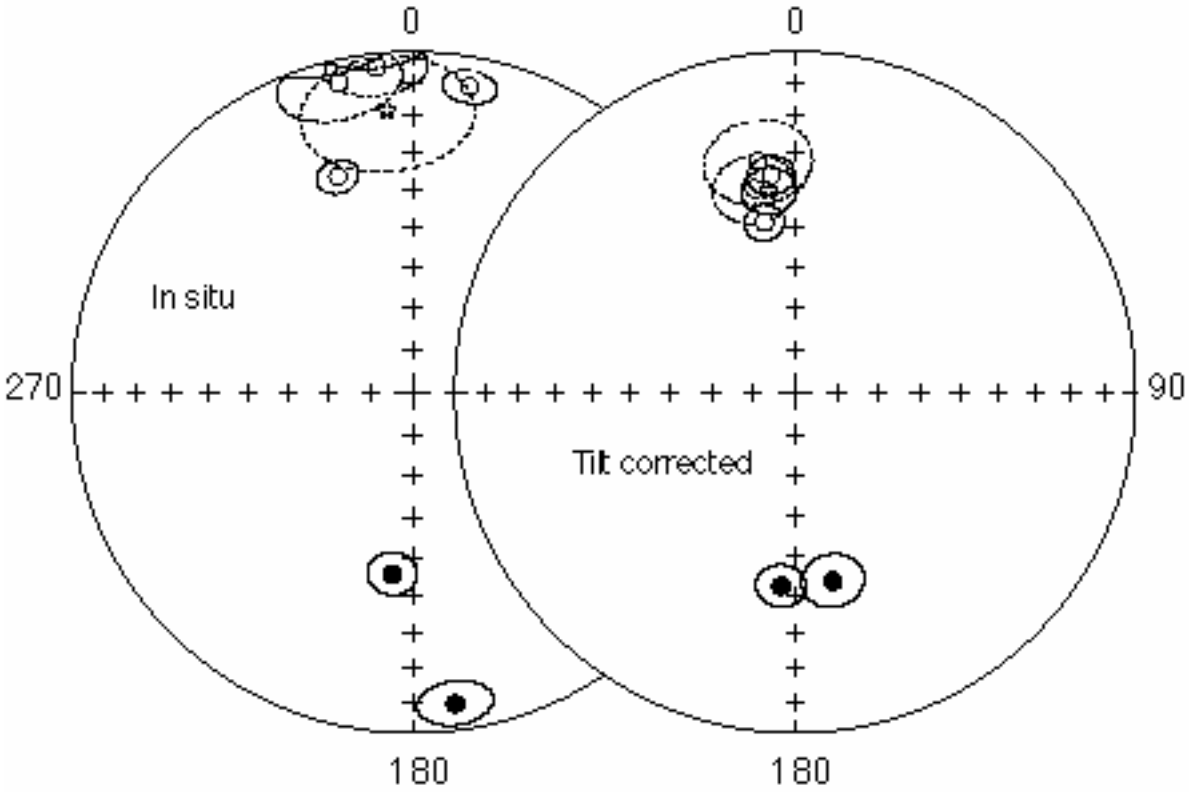

Figure 1. Site mean directions (circles) and 95% confidence envelopes of Mitu Group sites from Northern Peru (Bagua region sites PP938-943). Fold test is positive at the 95% significance level.

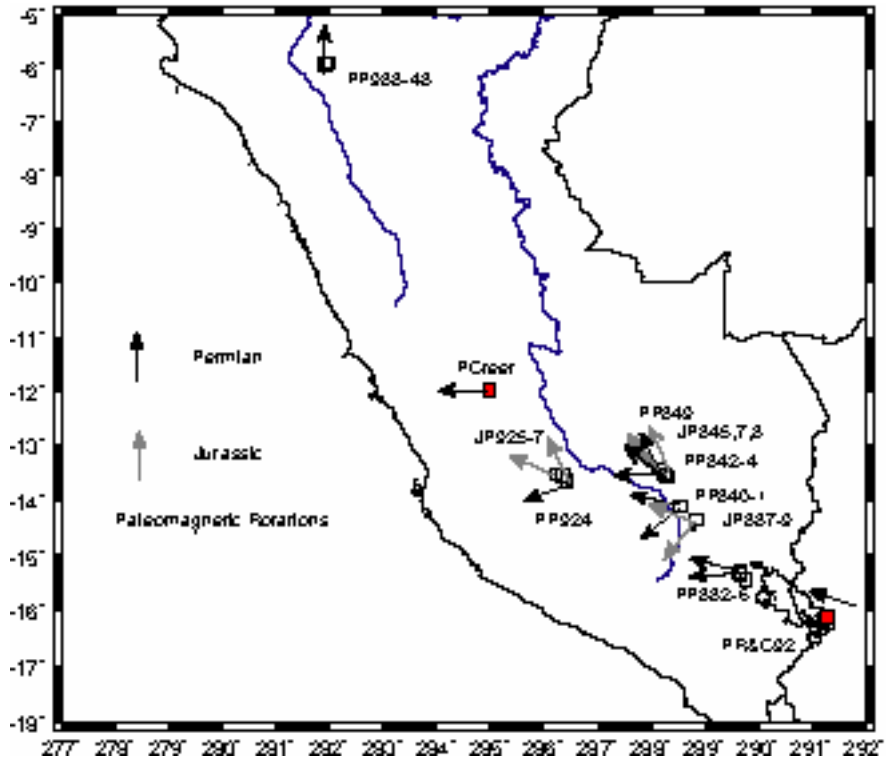

Figure 2. Paleomagnetic rotations in Peru. Sites beginning with a P are Permian; sites beginning with a J are Jurassic. Site PCreer from Creer (1970); site PR&C92 from Roperch and Carlier (1992).

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