

Geochemistry and mineralogy of the Mesozoic volcanic rocks in Central Peru and their plate tectonic position

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Along the Peru-Chile trench the oceanic crust of the Nazca plate is subducted beneath the continental South American plate. Volcanic arcs or island arcs characterize the outward appearance of convergent plates. They were observed in Chile, Ecuador and Colombia. In Central Peru, however, the complex geologic situation has lead to discussions about the plate tectonic evolution.

Four different intensive volcanic phases can be distinguished during the pre-orogenic stage of the Andean orogeny in Central Peru, whose mineralogy and geochemistry can help to clarify their origin:

1. In Doggerian time the Rio Grande volcanic rocks
2. In Berriassian time the Puente Piedra volcanic rocks
3. In Aptian to Albian time the Copara volcanic rocks
4. In Middle Albian time the Casma volcanic rocks

The four volcanic series are very similar in their mineralogy and their chemical composition. They are predominantly basalts to basaltic andesites. No geochemical differentiation could be observed between the four volcanic series. Analyses of main and trace elements indicate that the volcanic rocks have all the same source, and that there is no magmatic evolution from Doggerian to Albian time in Central Peru. The interpretation of the geochemical analyses and the mineralogical observations point to mantle material as main source. The four Mesozoic volcanic phases in Central Peru can be correlated with tectonic events there.