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**Permian-Jurassic rift-related alkaline magmatism of the Eastern Mountains,
Central Andes Bolivia**

Matos, R.

Instituto de Investigaciones Geológicas y del Medio Ambiente, Universidad Mayor de San Andrés, La Paz, Bolivia
rmatoss@yahoo.com

This paper presents an overview of alkaline rocks and carbonatite from the Eastern Cordillera of the Central Andes of Bolivia. Field observations, petrography, geochemistry and geochronology from extensive literature revision is synthesized. Upper Paleozoic to Mesozoic alkaline magmatism and carbonatites are associated with an aborted rift [1].

In the Eastern Cordillera this magmatic activity extends from the Bolivia-Peru boundary to the North to Argentina-Bolivia boundary in the South. The magmatism started in the Permian [1] and protracted until the Cretaceous. The alkaline magmatism is dispersed forming hundreds of igneous bodies including stocks of different sizes, and hypabyssal rocks in dike and sill swarms. They outcrop at Ayopaya, Morochata, Toro Toro, San Lucas and Vichacla to cite the most important localities. At Ayopaya, alkaline rocks consist of medium to coarse-grained nepheline syenites and syenites, which are often associated with ultramafic breccias, ijolite, melilitite, basanite, sodalite dykes [2] and carbonatites. The Ayopaya carbonatites are the unique exposure of this lithology in the Bolivian Andes [3]. In turn, at Morochata there is a predominance of alkaline breccias, in some places intruded by dikes. In Toro Toro, there are fine-grained mafic, ultramafic rocks as basanite, melilitite, sienodiorite and fonolite [4] [5]. Finally, in San Lucas, there are recognized stocks of intermediate composition and subparallel mafic dykes swarms.

Rb-Sr and Sm-Nd isotopes from Ayopaya alkaline rocks show an early depleted mantle signature followed by metasomatic enrichment events. Evidence of metasomatic enrichment preceding the melting include trace-element compositions and abundant formation of sodalite, ankerite and barite crystallized from the carbonatite melt. The metasomatism involved the crystallization of hydrous alkali silicates, flogopite and amphiboles. The melt were rich in alkalis with a strong prevalence of Na over K. The highest differentiated magmas were found at Ayopaya, Toro Toro, and San Lucas. At Ayopaya the carbonatites are associated with alkaline silicate rocks and may indicate a close spatial and time relationship between silicate and carbonate rocks.

References

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