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Origin and characteristics of the Mesozoic basalts of San Luis, Midwest Argentina

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Outcrops and additional exposures of alkali basalts have recently been identified in the province of San Luis, Midwest Argentina. Based on the regional setting, these outcrops were ascribed to the upper Cretaceous–Jurassic, coetaneous with the fragmentation of Western Gondwana, and the subsequent breakup of South America and Africa. Nonetheless, many uncertainties remain about the origin and characteristics of the alkaline province in San Luis. In this regard, an investigation is being undertaken to better determine the morphology, petrology and chemical composition of the basalts. Results from the study indicate that the volcanism has mostly manifested as monogenetic volcanoes, lava domes and dyke swarms. A classification based on major elements and discrimination diagrams (R1-R2; Nb/Y vs. Zr/TiO2) suggests that the rocks would correspond to basanites, and to alkali basalt–trachytes. In particular, the basanite suite exhibits a porphyritic texture with phenocrysts of olivine and augite embedded in a glassy groundmass containing plagioclases, sanidine and accessories such as apatite, ilmenite and magnetite. In contrast, the alkali basalt–trachyte series is characterized by a trachytic texture of olivine in a plagioclase-enriched groundmass. The presence of zeolites could be explained as partial alteration of the trachytic glass. A low La/Yb ratio is indicative of silica-undersaturated magmas whilst, similar contents in titanium, rare earth elements and europium suggest that both rock types have a common source, evolving from an ocean island basalt mantle. The observed geological relationships and the distinctive chemical data support the view that basalts in San Luis could be associated to lava events at the fringes of the Paraná-Etendeka Province, once a single magmatic province in the Southern Hemisphere.

Biography

Adrian H Gallardo is affiliated to the Department of Geology, San Luis National University, Argentina, undertaking research in a variety of fields within Midwest Argentina and overseas. He specializes in hydrogeology, solute transport modeling, geological storage, and environmental sciences. He has also substantial experience in the exploration of gold, copper, and iron ore. His education and career extend to several countries such as Argentina, Australia, Canada, China, India, Italy, Japan, Malaysia, Mongolia, Namibia, Paraguay, Spain, and USA. His work has been summarized in more than 20 publications and conference presentations across the world.

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